BOOK OF ABSTRACTS

UNIVERSITY OF VOCATIONAL TECHNOLOGY, SRI LANKA

INTERNATIONAL RESEARCH SYMPOSIUM 2023

"Emerging Technologies and Skills for Resilient Industries"

INTERNATIONAL RESEARCH SYMPOSIUM -2023 (IRS2023-UoVT)

Emerging Technologies and Skills for Resilient Industries

UNIVERSITY OF VOCATIONAL TECHNOLOGY
SRI LANKA

ABSTRACTS

INTERNATIONAL RESEARCH SYMPOSIUM -2023 (IRS2023-UoVT)

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MESSAGE OF THE HON MINISTER OF EDUCATION

Greetings to the esteemed participants, scholars, and innovators gathered for the University of Vocational Technology's International Research Symposium 2023 and Collaborative Initiatives in Sri Lanka's Technical and Vocational Education and Training (TVET) Landscape.
In our pursuit of educational excellence, the University of Vocational Technology (UoVT) has been an unparalleled beacon of transformative change. Envisioned through the parliamentary Act No. 31 of 2008, UoVT has been steadfast in its commitment to nurturing excellence in Technical and Vocational Education. Its pioneering initiatives and unwavering dedication have set the stage for a paradigm shift in Sri Lanka's educational landscape.
The IRS 2023 stands as a testament to UoVT's unwavering commitment to innovation, collaboration, and sustainable development. The symposium, themed "Emerging Technologies and Skills for Resilient Industries," serves as a converging point for visionaries, educators, practitioners, and students to deliberate on key themes crucial for our evolving industries and educational platforms.
The outlined themes of IRS23 encompass a diverse array of areas imperative for resilience and innovation across industries, technological advancements, and educational platforms. From fostering sustainable practices in various industries to harnessing innovative pedagogies for transformative educational platforms, each theme addresses contemporary challenges and sets the course for transformative growth.
Moreover, the parallel events meticulously curated alongside IRS23 further amplify the symposium's impact. From the Committee of

Vice-Chancellors and Directors meeting to the Leadership and Management of TVET Institute program, these events not only complement the grandeur of IRS23 but also signify our collective dedication to fortifying TVET excellence and fostering industry-academia collaborations.

The collaborative workshops and seminars planned during this symposium are invaluable incubators for innovation and sustainable practices within the TVET landscape. The initiatives, such as the Waste Management and Sustainability Development workshop in collaboration with the TESS EU project, highlight our commitment to nurturing environmentally-conscious practices and fostering industry partnerships.

I commend the University of Vocational Technology for its relentless pursuit of excellence, innovation, and sustainable development in the TVET sector. Together, let us continue to chart new pathways, foster collaborations, and propel Sri Lanka towards a future defined by resilience, innovation, and educational excellence.

Hon (Dr.) Susil Premajayantha
Minister of Education, Sri Lanka

MESSAGE OF THE SECRETARY TO THE MINISTRY OF EDUCATION

Greetings to all gathered for the University of Vocational Technology's International Research Symposium 2023 and Collaborative Initiatives in Sri Lanka's Technical and Vocational Education and Training (TVET) sector.

I commend the University of Vocational Technology (UoVT) for spearheading transformative initiatives within Sri Lanka's education sector. The IRS 2023, themed "Emerging Technologies and Skills for Resilient Industries," unites minds to deliberate on pivotal aspects shaping our industries and educational framework.

These discussions encompass resilient industries, sustainable practices, technological innovations, and transformative educational pedagogies, crucial for our nation's progress. The aligned parallel events, including the CVCD meeting, Leadership and Management of TVET Institute program, and the Industry Seminar, serve as catalysts for refining strategies and forging collaborations.
I am particularly enthused by UoVT's collaborative initiatives, notably the Waste Management and Sustainability Development workshop with the TESS EU project. This reflects our dedication to cultivating environmentally-conscious practices and facilitating knowledge exchange among industry leaders, researchers, policymakers, and students.
I commend UoVT's dedication and strides in advancing the TVET landscape in Sri Lanka. Let us continue nurturing an environment

where innovation, collaboration, and educational excellence thrive, propelling our nation towards resilience and sustainable growth.

Mr. M. N. Ranasinghe
Secretary to the Ministry of Education, Sri Lanka

MESSAGE OF THE VICE CHANCELLOR

Technical and Vocational Education and Training (TVET) serves as a cornerstone in a nation's knowledge creation through education and research. The TVET sector, being instrumental in generating crucial knowledge and innovative solutions, guides policy agendas and aids in achieving national development goals. Recognizing the importance of empowering its youth to address challenges, Sri Lanka, as a developing country, places a high priority on enhancing the novelty, relevance, and quality of research and innovation within its TVET sector.

In pursuit of this objective, the University of Vocational Technology has actively participated in numerous national and international projects spanning diverse disciplines. Upcoming projects slated for implementation in the coming year focus on critical areas such as education, agriculture, health, food, renewable energy, engineering, information and communication technology, and waste management. The overarching goal is to cultivate a high-quality workforce by enhancing skills and capacities within the TVET sector, among youth, and among entrepreneurs.

As a premier institution in the TVET sector, the Vocational University of Technology plays a pivotal role, in offering students the opportunity to pursue degrees in technology. The university's purview encompasses student training, trainer development, curriculum design, quality assurance, and accreditation. This empowerment positions us to address the human resource needs of emerging industries through the creation of innovative training materials and courses.

The 7th International Research Symposium (IRS 2023) signifies a crucial juncture as we elevate the TVET sector and position the University as a model for the next wave of paradigm shifts in teaching and learning practices, aligning with both local and international expectations. The conference will delve into future trends and practices within Industrial Technology and the TVET sector.

In my role as the Vice-Chancellor of Vocational Technology University, I extend my appreciation to the IRS 2023 organizing team for their dedication and tireless efforts in orchestrating such a high-profile event. The success of the 2023 International Research Symposium hinges on the quality of the research presented. I extend heartfelt congratulations and best wishes to all the authors and researchers who have contributed to this endeavor.

Professor C. Mahesh Edirisinghe
Vice Chancellor
University of Vocational Technology

MESSAGE OF THE SYMPOSIUM CHAIR

I extend a warm welcome and heartfelt greeting to all of you as the Chair of the symposium. This event holds great significance for the University of Vocational Technology (UoVT) Sri Lanka, signifying a monumental step toward fostering a robust research culture within the University and the TVET sector.

I am thrilled to share that the response to our call for submissions has exceeded expectations. The dedication and enthusiasm displayed by all authors in their submissions are truly commendable. In our commitment to nurturing a dynamic research culture, we have given special emphasis to advancements in engineering, industries, education, ICT, vocational training, and waste management sectors. Recognizing the pivotal role of emerging scholars, we have also focused on contributions from students who represent the future generation of researchers.

After careful deliberation and rigorous evaluation, a selection of outstanding submissions has been chosen to be part of the symposium proceedings. These contributions epitomize the forefront of research in engineering technology, industrial technology, education technology, ICT, TVET, and waste management and sustainability. We are excited to provide a platform for these ideas to be shared and discussed.

Beyond being an event, this symposium serves as a catalyst for positive change. It marks the beginning of a journey toward creating a lasting impact on sustainable technology practices, not only in Sri Lanka but globally. We envision this event as a steppingstone to

fostering collaboration, innovation, and a deeper understanding of challenges and opportunities in the realm of sustainability.

To all our authors, I extend heartfelt congratulations on your achievements in the field of research. Your dedication and hard work have brought us to this moment, and we eagerly anticipate the discussions and insights that will emerge during the symposium.

As we approach the UoVT International Research Symposium 2023, we eagerly anticipate the vibrant exchange of ideas, the forging of new partnerships, and the collective pursuit of knowledge. Together, we can make a difference in the world of sustainable technology development.

We wish each and every one of you the best of luck as you present your research and engage in the stimulating conversations that lie ahead. May this symposium be the beginning of an exciting journey into a future filled with groundbreaking research and positive change?

Helawikum Athauda Seneviratne
Symposium Chair
UoVT International Symposium 2023

MESSAGE OF THE KEYNOTE SPEAKER

Digital transformation of society, news media and families

Digital transformation affects society and culture in complex and interrelated ways as digital technologies dramatically change the ways in which individuals, companies and governments interact among and with one another. New media technology and artificial intelligence are changing working life and business models. Theories of 'surveillance capitalism', 'attention economy' and 'social acceleration' describe how media technology changes society. Global media platforms such as Meta/Facebook and Tik Tok's collect data from users 'likes', 'dislikes', views etc, while artificial intelligence replaces journalists and teachers, media content is more easily disseminated globally, and everything seems to go faster and faster in our modern society. Children, families and societies are affected worldwide.

Eiri Elvestad is professor of media sociology at USN. She has extensive experience with research into the role of media in society, with a particular interest in news media use, the spread of misinformation and democracy. Lately, she has done research on digital parenting and children's rights in a digital world. In this lecture, she will discuss how global media platforms and social media change the spread of information in society and intervene in family life.

The lecture is based on recent research on the opportunities and dangers of children's digital lives, and how digital media change the parental role. Elvestad argues that raising and protecting children today requires knowledge of how parents and children use social

media as well as global media platforms' algorithms and datafication. Parents across the world worry a lot about their children's media use. 'Sharenting' is an example of a phenomenon that shows how children's digital lives and security also depend on their parents' use of social media. Elvestad also argues for the need for more research, and more comparative studies that include non-Western countries. Despite global platforms, she further points out that the way social media is used and regulated varies across countries.

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Professor Eiri Elvestad
Vice Dean for Research & Development
University of South-Eastern Norway Delegation

MESSAGE OF THE PROGRAM COMMITTEE CHAIR

The 2023 International Research Symposium of the University of Vocational Technology is the seventh iteration of the flagship platform to disseminate the groundbreaking research done in the areas of industrial technology, education technology, engineering technology, and information technology at the university as well as by partner institutions both locally and overseas.

The annual research symposium is part of a series of activities that include training workshops and research outcome dissemination events conducted by the university leveraging its unique position as the highest education institute in Sri Lanka for the tertiary and vocational education sector bringing together educators, industry practitioners, and technology researchers.
The International Research Symposium originated from the Annual Research Symposium of the university and gained broader participation of local experts as well as international contributors gradually elevating its stature. The International Research Symposium was held for the first time in 2017 under the Conference Program Committee Chairmanship of Dr Dimuthusiri Suraweera and continued under the able guidance of Prof Kanchana Perera (2018), Prof KKDS Ranaweera (2019), Prof Chandana Jayalath (2021), and Dr Sunil Kularatne (2022).

This year, the conference received a total of 123 research papers with 77 accepted as full papers for oral presentation and a further 32 papers accepted for poster presentations. Every submitted paper was reviewed by at least two subject area specialists in a double-blind

review process to improve the quality of the research dissemination as well as to provide useful feedback to the researchers for further improving and extending their research work.
The 2023 International Research Symposium has eight tracks covering areas of importance to the Sri Lankan economy, technology, and environment with a particular emphasis on sustainability, resilience and innovation. These themes are of great importance to Sri Lanka as it emerges from the pandemic and sovereign debt induced economic crisis as well as climate change driven challenges to food security and disaster preparedness.

As the primary higher education centre leading research, technology development, and training of experts for the TVET sector, the University of Vocational Technology places great emphasis on this flagship symposium to highlight the achievements of researchers and provide a broad platform to disseminate research outcomes for practical implementations and adaptation to existing technologies.

On behalf of the Program Committee, I wish to acknowledge the extraordinary effort volunteered by the members of the research paper review committee from local universities, industries, public sector organizations, and overseas universities. The value added by the review committee members to the continued development and upliftment of the International Research Symposium is immeasurable. The program committee gratefully acknowledges the leadership and guidance provided to it by the Vice Chancellor, Prof Mahesh Edirisinghe, the General Chair of the Symposium, Mr Athauda Seneviratne, and the Symposium Secretary, Ms Malkanthi Thenabadu.

I wish to thank all contributing researchers, reviewers, presenters and participants of the 2023 International Research Symposium of the University of Vocational Technology for the continuing support to ensure the success of the event.

Prof Chandana Gamage
Chairman, Program Committee
University of Vocational Technology

INTERNATIONAL RESEARCH SYMPOSIUM -2023
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ABSTRACTS OF THE PROCEEDINGS

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Sustainable Solid Waste Management Practices in Sri Lanka: A Case of Moratuwa Municipality

T.R. Vidanapathirane [a,*], Chamara Kuruppu [b], U Sivachelvy[a]., B.M.T.D. Jayasekara[a]., R. Shanmugapriya[c] and K.G.N.P. Rajapaksha[a]

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Abstract

Sustainable practices in solid waste management play a crucial role in establishing a viable waste management system. The volume of solid waste has emerged as a serious environmental concern in Sri Lanka and the prevailing system struggles to dispose municipal solid waste as per the Sustainable Development Goals. Our study explores how Moratuwa Municipality has established sustainable solid waste management practices. The findings of the study elucidate that cooperating among a range of actors has enabled it to overcome the socio-cultural aspect of waste management and to generate additional revenue to the municipal budget. Similarly, this study demonstrates that officers like public health officers could play a leading role in fostering sustainable waste management practices at Municipalities.

Keywords: Municipal council, Municipal solid waste, Waste segregation, Sustainable waste management practice

Circular Entrepreneurship for Shared Value Creation: Case Study from Southern Sri Lanka

F.Mafasiya Fairoz[a]*, T.S.L.W Gunawardana[b], G.T.W Sriyani[a], M.W. Indrani[c] and K.G.P.V. Gunarathne[c]

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Abstract

Economies are facing numerous social, and environmental challenges due to the absence of proper waste management. Circular entrepreneurship plays an important role in identifying and exploiting new business opportunities to create innovations from waste which is paramount in enhancing resource efficiency and reducing negative environmental impact. Therefore, circular entrepreneurship is imperative in achieving sustainable development goals. In this milieu, this study explores how circular entrepreneurs create innovation from waste which leads to shared value creation through business start-ups in southern Sri Lanka, and recognizes the challenges they face during the start-up stage. Multiple case study method was applied and data were collected from three circular entrepreneurs by conducting in-depth interviews. The findings of the study reveal that circular entrepreneurs introduce innovations by using waste with the motivation of reusing it to reduce resource wastage and negative environmental impact. Their knowledge and experience, creativity, cross-sector collaboration, networking, and learning induce them to make business start-ups in this sector. Further, they are facing several challenges during the start-up stage such as lack of access to finance, high electricity costs, finding partners, technical faults in the machinery, having licenses from multiple authorities which delays the process, and inadequate support from the government. This study provides insights into the practitioners and policy-makers in Sri Lanka to facilitate circular entrepreneurs to successfully exploit circular business opportunities that ultimately impact the triple bottom line and achieve sustainable development goals.

Keywords: Circular entrepreneurship, Waste management, Shared value creation, Sri Lanka

Study on the Effect of Turmeric in Water Treatment as a Case Study for Nagoda and Thawalama Rural Water Supply Schemes in Galle District

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Abstract

Water is an important natural resource. It is required for the survival of all living things. Animals and plants require water to perform their daily metabolic functions. Global population increase, climate change, and lifestyle changes are affecting water quality and state of water resources, resulting in severe water stress in many nations. Water is crucial to life since it has a significant impact on public health and living standards.

Rural water delivery schemes were formed with the goal of increasing access to clean drinking water for underserved poor people in rural places. Yet, as a result of human activity, these resources suffer from any changes in pollution, whether direct or indirect, in water content, and the sources become hazardous for daily use of human. Many chemicals and processes were used on this process. Long time usage of certain chemicals in water purification process caused for many health issues to the humans. As a developing country, Sri Lanka is facing difficulties on the cost of water purification process and chemicals. Turmeric (Curcuma domestica) is a healing tropical medicine, not like chemicals if over dosing that not affect for human's health. Objectives of the experiments were to identify the quality of raw water which feeds selected rural water supply schemes of Nagoda and Thawalama in Galle District and check for the effectiveness of applying Turmeric and study the optimum Turmeric dosage. At the end of the study, it could be found whether turmeric is applicable or not for water purification works for the Nagoda and Thawalama water supply schemes through the obtained results from the experiments.

Keywords: Rural water supply schemes, Turmeric, Turbidity

Sustainable Waste Management Practices: A Failed Attempt of Local Governments in Southern Province of Sri Lanka

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Abstract

Local Government Authorities in developing countries confront a significant challenge regarding sustainable waste management. This study examines the implementation of sustainable waste management practices by the Local Government Authorities in the southern province of Sri Lanka and evaluates their conformity to sustainability principles. A mixed-methods approach included questionnaires, semi-structured interviews, focus groups, informal discussions, observations, and document analysis. The findings indicate that despite budget allocations for waste management, financial constraints frequently force Local Government Authorities to redirect resources to other programmes, prompting concerns about prioritising waste management. Due to personnel and vehicle constraints, the waste collection process faces significant obstacles, resulting in significant quantities of uncollected waste. Encouragingly, awareness campaigns have stimulated active citizen participation in waste source separation. The disparities between Local Government Authorities in collecting non-degradable waste highlight underlying issues such as resource disparities, inadequate regulations, irregular collection schedules, and a lack of technical expertise. Despite their potential to resolve environmental concerns, initiatives promoting sustainable waste management, such as home gardening and organic fertiliser production, confront obstacles due to limited support from political and administrative figures. In addition, the study reveals a significant disparity in recycling efforts among Local Government Authorities, representing the unrealised

potential for waste reduction and revenue generation through recycled materials. In addition, this research highlights the need for comprehensive measures, such as improved infrastructure, enhanced regulatory frameworks, and increased citizen involvement, to reconcile these gaps and transition to a more sustainable waste management paradigm.

Keywords: Sustainable waste management, Local government authorities, Citizen involvement, Recycling, Sri Lanka

Household Waste Management Practices in Sri Lanka

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Abstract

Proper disposal of domestic waste is a concern in every society. The purpose of this study was to identify how households dispose of different categories of waste to find out any deviation from standard practices. The study analysed responses from 143 technology stream undergraduates to determine how different varieties of garbage are disposed of from their houses. Even though the majority disposes of waste after separating into different types, and environmentally friendly practices are used for disposing of biodegradable waste, burning of plastics, rubber and other allied waste materials was identified as the most significant concern. Additionally, very low responses were received for the questions related to the disposal of electronics or e-waste. Hence, the study findings show a great need for identifying or making aware of proper waste disposal methods**.**

Keywords: Biodegradable waste, Electronic waste, Household waste disposal, Non-bio degradable waste

Upcycling to Preserve Intergenerational Equity: The Project of Green Life Generation

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Abstract

Unsustainable waste management practices undermine well-being of both present and future generations. Our study demonstrates how upcycling efforts by a woman contribute to preserving intergenerational equity. The forms of cultural, economic and social capital help to sustain her business. She keeps transforming one form of capital to another form of capital during crisis. Similarly, a new form of currency, namely "BinCoin" is introduced to foster a grassroots circular economy. Her upcycling initiatives are in line with some of the sustainable development goals.

Keywords: Upcycling, waste, Intergenerational equity, Forms of capital

Reviewing the Biogas Generation Technologies and Identifying the Potential Applications in Local Concept

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Abstract

The issue of Waste Management has garnered considerable attention from various authorities, coupled with the significant challenge of non-renewable energy depletion. Consequently, there is a pressing need to adopt an eco-friendly alternative energy source to mitigate these problems. In this regard, 'Biogas Technology' emerges as an effective solution, offering a more stable and efficient renewable energy source with the potential to maintain a pollution-free environment. Biogas proves to be competitive, economically viable, and generally sustainable, benefiting from the abundant supply of inexpensive feedstocks. Its versatility is evident in a wide range of applications, including heating, power generation, fuel production, and serving as raw materials for further processing and the sustainable production of chemicals such as H_2O, CO_2, and biofuel. This review paper provides a comprehensive overview of biogas generation, design, and operation, exploring operational parameters, the biogas production potential of organic matter, as well as highlighting the benefits, applications, and upgrading technologies associated with biogas.

Keywords: Biogas technology, Non-renewable energy source, Sustainable, eco-friendly, Alternative source

Recycling of Blended Fiber Fabrics for Sustainable Textile Industry: Short Review of Methods and Processes

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Abstract

The growing forecast of the environmental footprint of the textile industry due to the continued manufacture of synthetic fiber textiles has led the research community to find new methodologies to move forward as a sustainable industry contributing to circularity. Unlike 100% synthetic fiber fabrics, blended fiber fabrics challenge the circularity process. This short review highlights the methods and processes recorded in the literature during the last five years on the recycling of blended fiber fabrics towards fabric-to-fabric recycling, which stands for closed loop recycling. Blended fiber fabrics, such as Polyester/Cotton, Cotton/Wool/Polyester, Polyester/Viscose and Polyester/Wool recycling methods discovered in recent studies, have become the focus and are categorized under mechanical, chemical, and biological methodologies.

Keywords: Blended fiber, Multi fiber, Textiles circularity, Textile recycling

Integration of Skill Development and Waste Management for Waste to Wealth

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Abstract

Under Education Sustainable Development Govt. ITI Berhampur trainees designed and fabricated some beautiful Sculptures from the scraps in the design thinking lab. Scraps from the workshop of the technical institute generated during training practice are being up-cycled and given a sculptured shape with aesthetic look and finishing. This enhances the hands on skills such as fitting, welding, painting, filling and turning of the students. The designed sculptures are in high demand among interior decorators and have high market value. By this the trainees are earning money during their training practice at the same time they became warriors of the planet to lead sustainability, transformed the campus into an educational wonderland. This develops interest among the students to have career in the TVET sector.

Keywords: Skill development, Waste management, Waste to wealth, Sustainable employment, Economic development use

Value Chain Development for Municipal Solid Waste Management in Sri Lanka: An Integrated Approach for Sustainable Urban Development

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Abstract

The steadily increasing urbanization rate and population growth in Sri Lanka cause a significant rise in the generation of Municipal Solid Waste. Inefficient Municipal Solid Waste Management in Sri Lanka creates many environmental, health, and socioeconomic challenges. Thus, there is a pressing need for an integrated approach that goes beyond traditional waste management practices for addressing these challenges. This study focuses on identifying the key stakeholders in the Municipal Solid Waste Management process in Sri Lanka and the possibility of value chain development as a long lasting solution for this tragedy. Based on the qualitative research and purposive sampling method, six municipal areas in Southern Province of Sri Lanka were selected. Focus group discussions, observations, and documentary survey methods were applied in data collection. Thematic analysis and SWOT analysis were applied in revealing the facts on the key themes of this study. The plus factors include: more enthusiastic young officers and having sound Solid Waste Management plans and novel ideas among the majority of municipals; apply circular economy practices like producing compost, recycling, bailing and reselling paper and plastics; having networks with several solid waste management projects in the province; and having more enthusiastic

entrepreneurs who produce solid waste based value added products. The key negative factors include: absence of long-sighted vision and capital for the government; dependence on traditional technology; lack of integration of the actors in Municipal Solid Waste Management process; poor attitudes of the citizens; lack of market linkages, inability to expand the operations and hence create employment opportunities; and absence of updated databases of waste collectors and solid-waste based entrepreneurs. By integrating all the key actors of the municipal solid waste management process as a value chain, there is a possibility to inculcate a culture of applying circular economy practices with the attitude of 'waste' to 'wealth'.

Keywords: Circular economy practices, Municipal solid waste management, Stakeholders, Sustainable development, Value chain development

Determinants of Households' Pro-Environmental Behavior on Solid Waste Management: Towards Circular Economy in Sri Lanka

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Abstract

The main objective of this research is to find out what are the determinants of households' pro environmental behavior (PEB) to enhancing towards solid waste management towards circular economy in Sri Lanka and what are the methods to manage waste. This study is focused on households' pro-environmental behavior determinants, or the factors that affect personal or external factors Above mentioned particulars are the specific objectives of this research. In Sri Lankan context it is very rare to find literature on determinants of employers' pro environmental behavior enhancing towards small and medium scale industries waste management and shows the contextual research gap. This study is conducted using qualitative and quantitative research methods (Mix method). To identify the determinants influencing employers' PEB relating to households, a literature review and a questionnaire survey is employed. Based on the literature review, eight potential factors are identified. A structured questionnaire is developed for data collection. It was ensured to include respondents representing the Matara, Galle, and Hambantota districts as well. Initially, 1070 questionnaires were posted to randomly chosen households in Southern province, Sri Lanka. However, only 546 respondents returned completed questionnaires. The response rate was sufficient (51%). The study used PLS-SEM to analyze the data. Scholarly findings available on the website used in the preparation of this article and the lack of evidence in relation to solid waste management and pro-environmental behavior were identified as the main limitation. It reveals that pro-environmental behavior of

households has a positive impact on solid waste management. This is in line with the findings of previous research findings. According to researchers, personal and external factors have been identified as an important factor in the pro environmental behavior that could affect solid waste management. Previous research has demonstrated positive relations between personal factors and solid waste management. Even though most of the scholars conducted research based on pro environmental behavior in different contexts they have not identified the PEB of households and the findings of the solid waste management in circular economy is vague in literature.

Keywords: Pro-environmental behavior, Circular economy, Theory of planned behaviors, Solid-waste management, Personal factors, External factors

The Role of Central Environmental Authority in Managing Solid Waste in Sri Lanka

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Abstract

Large-scale solid waste generation, together with improper waste management systems, has been a critical issue in the world today. Therefore, a properly managed effective waste management system is essential to ensuring the good health and environmental quality of the nation. This study thus explores the contribution of the Central Environmental Authority (CEA), empowered through the National Environmental Act (NEA), in managing solid waste in Sri Lanka. This study is based on data and information gathered from the CEA website, NEA and allied regulations, CEA Annual Reports, and Corporate Plans, other than the discussions and interviews made with CEA officials for more details and clarifications. The data were qualitatively analyzed using thematic analysis and content analysis. The study reveals that CEA, coordinating with provincial and district offices, contributes substantially to managing waste/ solid waste/ hazardous waste. Through legislation, CEA influences industrialists and takes actions to minimize the volume of waste and its polluting density from the initial stage before commencing high-medium-polluting industrial activities and large-scale projects. Similarly, by delegating power to local authorities (LAs), CEA assists in managing waste/solid waste of low-polluting industries and households. CEA is also involved in initiating and amending regulations, and implementing them to streamline waste management practices. Thus, CEA's role convinces us of the importance of taking protective measures in advance to minimize the extent of waste and its polluting density. Nevertheless, CEA has initiated

large-scale waste management projects as well. The findings will help relevant authorities take policy decisions, strategies, and actions to reform waste management systems. In turn, these findings will provide valuable insights for waste generators, collectors, and recyclers to be more attentive to their responsibilities, legal compliance, and potentials for maintaining suitable waste management systems. All of CEA's efforts greatly contribute to mitigating pollution while managing waste/ solid waste/ hazardous waste and thus improving the health and environmental quality of the nation. This study, however, did not explore the role of other divisions of CEA, apart from the three divisions considered, and the difficulties and challenges faced by related parties i.e., CEA, LAs, waste generators, collectors, and recyclers, in implementing waste management strategies and actions; all such areas are exposed to future researchers.

Keywords: Central environmental authority, National environmental act, Environmental legislations, Environmental pollution, Solid waste management

Enhancing the sustainability of sri lankan waste-to-energy plants: a circular economy approach

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Abstract

This paper explores the crucial role of segregated waste collection in facilitating the transformation from waste to energy, thereby underpinning a circular economy model. It argues that proper segregation of waste is a prerequisite for efficient Sri Lankan waste-to-energy (WtE) waste-to-energy (WtE) conversion, which helps to optimize the value of waste resources while minimizing environmental impacts. The study draws on primary data sources to demonstrate that waste segregation during collection is an essential step for sustainable waste management. Results indicate that well-implemented segregation systems significantly enhance the quality of recoverable materials, improve energy conversion efficiency, and reduce environmental pollutants. Furthermore, the paper shows how these systems, when integrated within a circular economy model, catalyzes sustainable development by minimizing waste and reducing resource consumption. The findings underscore waste segregation as a critical step toward effective WtE processes and a sustainable circular economy. The paper concludes by suggesting future research directions to overcome potential barriers in implementing such systems.

Keywords: Waste to energy, Segregation, Circular economy

Stakeholder Analysis in Pursuit of Developing Curriculum for a Master's Degree in Waste Management and Circular Economy

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Abstract

This paper aims to analyze stakeholder views to develop an appropriate curriculum for a master's degree in waste management and circular economy by the university of Sri Jayewardenepura for the purpose of building capacity in the field of higher education in Sri Lanka under a project funded by the European union Erasmus+ programme.

The research site was selected to represent different perspectives of stakeholders namely university academics & students, schoolteachers & principals, officials engaged in waste management at the ministry of environment, local government authorities, provincial councils, representatives from central environmental authority, coastal conversation & coastal resource management department, and non-governmental organizations, industry experts and entrepreneurs engaged in waste management business. Data is collected through peer discussions, focused group interviews, and individual interviews.

All stakeholders highlighted the importance of higher education in waste management, and a master's degree is viewed as an excellent opportunity for people to improve their capacity in managing waste at different levels. The need for an updated curriculum to cater for the space of knowledge, skills and attitudes was also emphasized while highlighting the importance of finding solutions to real-life problems. Technology is regarded as a main enabler of waste management. The importance of global cooperation and solidarity through collective approaches are identified as sustainable solutions. The need for educational reforms to see the outcome of economic

activities as a resource rather than a problem would create mor entrepreneurial opportunities, and rooms for innovations to create value in a circular economy. Education and capacity building on waste management should not be limited to higher education rather it needs to reach a wider array of people from end consumers to manufacturers. All in all, the outcome of this research provides an insight into the scope, nature, content, delivery, and assessment of waste management in higher education and a framework for introducing a new degree in waste management and circular economy.

Keywords: circular economy, sustainability, stakeholders, stakeholder analysis, waste management

Advances in Agriculture and Food Technology innovations

Utilization of Cinnamon *(Cinnamomum verum)* to Suppress the Glycaemic Impact of Wheat Bread

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Abstract

Type II diabetes has reached pandemic dimensions, affecting and terminating the lives of people on a daily basis. Diet is a prominent factor in the onset and progression of type II diabetes, highlighting the importance of dietary interventions to prevent and manage the disease. Hence, the objective of the study was to determine the effectiveness of cinnamon in reducing the glycaemic index of wheat bread. Breads were formulated with different percentages of cinnamon powder, and the product with the best sensory perception was selected through sensory evaluations. The effectiveness of cinnamon in hindering the glycaemic impact of bread was evaluated by calculating the glycaemic index against a control via a human trial. The calculated glycaemic index of cinnamon-incorporated wheat bread was 45.06±12.3, which was a 21.08% reduction compared to control bread. Results indicate that the incorporation of functional ingredients such as cinnamon into high glycaemic foods could be a promising way of reducing glycaemic index and consequently aiding in controlling and managing type II diabetes.

Keywords: Diabetes, Glycaemic impact, Bread, Cinnamon

Development of green pepper (*Piper nigrum*) and garlic (*Allium sativum*) based sauce and evaluation of color degradation during the storage

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Abstract

Plant based supplementary foods have enormous attention due to their high therapeutic properties and health benefits. Green pepper (Piper nigrum) is an unmatured stage of the pepper and rich in piperine as active substances, antioxidants, and anti-diabetic properties, beneficial for decreasing gastritis, abdominal pain, and non communicable diseases (NCDs). Garlic offers an immune system boost to help prevent colds and the flu, lower cholesterol levels, and reduce the risk of cancer and heart diseases. The development of a green pepper (Piper nigrum) and garlic (Allium sativum) based sauce is facing challenges due to maintaining the green colour and other sensory parameters of the product. Cold water, lime, and citric acid extracts were tested for green pepper, and the prepared samples were stored at room temperature and refrigerated condition using glass bottles and amber-colored bottles for 60 days. The chlorophyll content according to ESS method 150.1 (1991) was measured. Formula-157 (56% green pepper pulp, 16% garlic paste, 14% sugar, 5% spicy mixture, 4% ginger pulp, and 3% salt) was selected as the most acceptable composition during the sensory evaluation. The 100g of final product contains 68.6±1.52 of moisture, 27.7±0.2 of carbohydrate, 19.3±0.05 of sugar, 1.8±0.05 of protein, 1.7±0.1 of crude fiber, 0.8±0.05 of ash, 0.6±0.1 of fat, and 0.5±0.1 of salt. According to the microbiological analysis, the final product has a three month shelf life, and the pH of the sauce varied from 4.62±0.11 to 4.18±0.05 during the storage period. The “cold water+citric acid” treatment

was the best method for green pepper, and then the final product should be stored in amber-colored bottles under refrigerated conditions to reduce the colour degradation during storage.

Keywords: Green pepper, green pepper based sauce, colour degradation, supplementary food

Electrically Assisted Membrane Separation Processes and Its Application in Food Industry Innovations

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Abstract

Electrically Assisted Membrane Separation Processes (EAMSP) are a promising innovation in the food industry, combining electric fields with membrane techniques for enhanced separation efficiency, reduced fouling, and improved selectivity. This approach is particularly beneficial for concentration, purification, and fractionation in food processing. EAMSP's gentle and precise separation preserves sensory and nutritional qualities while finding applications in juice concentration, protein separation, bioactive compound recovery, and contaminant removal. Beyond its functional advantages, EAMSP contributes to sustainability by minimizing energy usage, waste production, and reliance on harsh chemicals. This technology is poised to drive significant innovation in the food sector.

Keywords: Electrically assisted membrane Separation processes, Food processing, Electrodialysis, Nanofiltration, Fouling

Production of a Nutritional Composite Powder Mixture Using Selected Grains

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Abstract

Nutritional Powder Mixture, or breakfast cereal, is a good source of nutrients which is rich in protein and is developed using three main ingredients which are very rich and common in daily diets. Oats (*Avena sativa*), mung beans (*Vigna radiata*), and maize (*Zea mays l*) are mixed in ratios using Taguchi's method. Initially, eight samples were prepared and named T1-T8, and those samples were roasted using the dehydrator. The selected optimum time-temperature combination is 150^0C 15 Min. And ground finalized the best sample (T5) after conducting a sensory evaluation (30 untrained panelists) and using the Friedman and one-way ANOVA test, sensory evaluation results were calculated. The T5 sample was selected as the best sample (code-532) (Oats 60 g, Maize 25 g, Mung beans 10 g) and headed to further developments and for further proximate analysis and microbiological analysis. In the proximate analysis, the fat percentage was 7.8, the protein percentage was 17.5, the fiber percentage was 2.8, the ash percentage was 9.8, and the moisture percentage was 8.2. Microbiological stability was tested over three-week periods, and the coliforms and E. coli were absent in the respective samples, and the yeast and mold counts were observed at a lower limit. As a breakfast cereal, this product can be used, and the ingredients are also very natural and healthy.

Keywords: Breakfast cereal, Oats, Mung bean, Maize, Composite Flour Mixture

The goodness of Chlorophyll enriched Food, and beyond with Cactus and Hathawariya (Shathavari) – Nutritional advancements with Nature and Technology

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Abstract

Chlorophyll's prospective use in pharmacy as a treatment, diagnostic tool, and photosensitizer is highlighted by a review of its medical usage in contemporary medicine. It has a variety of therapeutic applications and contributes to the modification of genotoxic effects. The objective of this article is to produce nutritional advancements in cactus and hathawariya enriched chlorophyll food for human health. An overview of studies and advancements in the medicinal claims of chlorophyll is given in the review. The medicinal potential of these photosynthetic pigments and their derivatives includes antioxidant, antimutagenic, antigenotoxic, anti-cancer, and anti-obesogenic properties.

Key words - Chlorophyll; Chlorophyllin; Health, Immunity, Nutrition

Development of Artichoke (*Goepperia allouia*) and Sweet Potato (*Ipomoea batatas*) Based Instant Cream Soup

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Abstract

With the growing population, people increasingly move away from home for study and work, so the demand for Ready-to-Eat, Ready-to-Cook, and Ready-to-Serve foods has increased. Today's health-conscious consumers demand processed food products that are convenient, of high quality, shelf-stable, and packed with nutrients, such as instant soup, to maintain their well-being. The aim of the research work is to formulate an instant cream soup with natural Artichoke Yam, Sweet potato, Purple yam and Oyster mushroom. Sweet potato, Artichoke, and purple yam are chosen in this study for their nutritional richness, making them ideal ingredients to meet the demands of a balanced and nutrient-enriched diet. Four samples of Instant cream soup (Sample IS001, IS002, IS003, IS004 were made With Artichoke flour 20%,30%,20% and 30% respectively, Sweet potatoes flour 22%,22%,35% and 35% respectively and Purple yam flour 21 constantly) were prepared and The initial sensory evaluation was done using thirty non trained panelists, and the best sample was selected. The second phase of the sensory evaluation involved a comparative analysis between the selected sample and a control sample. Proximate and physicochemical properties were analyzed using AOAC methods. The data were analyzed with the MINITAB-19 version at the 0.01 significance level. The Instant cream soup

sample underwent proximate analysis, assessing moisture (4.76%), protein (12.7%), fat (2.4%), ash (1.54%), total sugar (6.08%), and pH value (6.5). Sample IS002 received the highest consumer acceptance. Coliform, Yeast, and mold, along with the total plate count, were within acceptable limits. Considering sensory, proximity, and microbial analyses, Artichoke and Sweet potato-based instant cream soups show potential for widespread consumption due to their high acceptability and health benefits.

Keywords: Artichoke, Purple yam, Sweet potato, Instant cream soup

Microbiology Quality Evaluation of Selected Cow Milk Products Collected from Small Scale Farmers in the Ratmalana Area, Sri Lanka

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Abstract

In the Sri Lankan context, the production of milk and dairy products is hampered by poor milking and processing processes, which results in microbial spoilage of milk, particularly in small-scale processing plants. The aim of this survey was to identify potential hazards and evaluate the microbial contamination of milk and dairy products in a small-scale dairy processing unit located in Ratmalana, Sri Lanka. A total of eight samples were analyzed, including ice cream, yoghurt, and curd samples from various processing units from small-scale processing plants in Ratmalana, Sri Lanka. Total plate count (TPC) and total Coliform count (TCC) were determined for the samples. Also, for yeast and mold. For milk product samples, the range of TPC and coliform was 6.9×105 to 1×105 cfu/ml and 16×106 to 6.9×105 cfu/ml, respectively. Preventive and corrective measures for milking and processing phases (thermal treatment, packaging, and storage) were defined based on microbiological outcomes and milk production flow characterization, with a focus on training farmers and dairy employees to improve the hygiene of the local milk and dairy production chain.

Keywords: Microbiological quality, Milk products, Food inspection, Microbial contamination, Food safety

Investigation of The Medicinal Plant, *Aporosa Lindleyana* (Wight) Baill. For Their Biochemical Composition and Proximate Analysis

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Abstract

Aporosa lindleyana (Wight) Baill. (Sri Lankan name: Kebella) is a widely used herbal plant in the treatment of Diabetes in Ayurveda, traditional and alternative medicine in Sri Lanka. Globally, very few studies are available on *Aporosa lindleyana*. Therefore, the present study was carried out to investigate the medicinal plant *Aporosa lindleyana* (Wight) Baill extract with other biochemical compositions and proximate analysis. Steam and simple distillations were carried out to isolate the Volatile oil from fresh plant leaves, and the isolated oil samples were analyzed using GC-MS. Maceration using methanol, followed by phytochemical screening, was done for air-dried samples. Alkaloids, Glycosides, Saponins, Phytosterols, Triterpenes, Diterpenes, and Flavones were present in *A. lindleyana* extract. Thin-layer chromatography was carried out to separate the macerated aqueous and methanolic extracts. The samples' proximate analyses (moisture, ash, crude fats, and proteins) were determined. *A. lindleyana* showed moisture = 2.30%, ash = 13.22%, and crude fat = 2.85%. The present study revealed that *A. lindleyana* is rich in secondary metabolites. As this study is planned to investigate the biochemical composition and antioxidant activity of *A. lindleyana* extracts, it will support the investigation of the medicinal values of *A. lindleyana* and help the community select better solutions for their diabetes.

Keywords: Diabetes, Kebella, Herbal plant, Biochemical

IoT Based Smart Greenhouse System

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Abstract

This project presents a model of a smart greenhouse designed to enhance farming methods by integrating modern technology to achieve better results. Within the enclosed structure of the greenhouse, plants are shielded from adverse elements such as wind, UV rays, and insect pests. Automatic drip irrigation is employed to precisely water the crops, with the system operating based on pre-set soil moisture thresholds to ensure plants receive the appropriate amount of water. Additionally, utilizing information from soil health cards, drip fertigation is employed to deliver precise quantities of essential nutrients like nitrogen, phosphorus, potassium, and other minerals. Sensors are used to measure the current water level, enabling the construction and filling of suitable water storage tanks. Humidity and temperature sensors, in conjunction with a fogger, control air temperature and humidity. A mobile app manages the entire system, with many processes automated for user convenience, such as automatically turning off the water pump once the optimal water level is reached. To address pollination, beehives are introduced into the greenhouse, benefiting both the crops and the bees. Smart greenhouses offer an innovative solution for contemporary agriculture, effectively controlling diseases and pests while conserving energy and water resources. These controlled environments enable data-driven decision-making, empowering farmers to allocate resources and manage crops with precision. Remote monitoring capabilities enable farmers to oversee operations from a distance, ensuring ideal conditions and swift responses to changing requirements. With core components that reduce chemical inputs and harness renewable energy sources, these greenhouses promote sustainability, significantly increasing crop productivity and quality, thus contributing to the advancement of modern agriculture.

Keywords: Internet of things, Sensors, Farming practices, Modern technology , Remote monitoring

Assessment of Knowledge of Pregnant Mothers on Maternal Nutrition and Associated Factors: Udubaddawa Divisional Secretariat, Kurunegala, Sri Lanka

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Abstract

This study investigates the knowledge, attitudes, and practices of pregnant mothers regarding maternal nutrition within the Udubaddawa Divisional Secretariat, Kurunegala, Sri Lanka. Employing a quantitative research approach, the research explores demographic characteristics, nutritional knowledge, attitudes, practices, and their correlations among study variables. Demographic profiles reveal a diverse representation of participants across various categories. Notably, nutritional knowledge displays varying levels of understanding, with specific areas well grasped while others require improvement. Attitudes towards nutrition show mixed positive inclinations and uncertainties, shaping dietary behaviors. While responsible practices such as awareness of alcohol and smoking risks during pregnancy are evident, areas like daily iron supplementation and animal product consumption suggest opportunities for enhancement. Correlational analysis underscores the influential role of maternal education in shaping attitudes and practices ($r = -0.113$, $p < 0.05$), highlighting its significance. Recommendations for further research encompass longitudinal studies to assess long-term effects, exploration of cultural influences on dietary practices, and tailored nutrition education interventions. Strategies involving healthcare providers, digital platforms, partner engagement, and socioeconomic factors are suggested. Comparative studies across regions could provide broader insights. Additionally, exploring the links between maternal nutrition and child development is suggested. The study contributes insights into maternal nutrition dynamics, offering pathways to enhance maternal and infant health outcomes through informed

interventions and policy actions. This research provides valuable context for advancing maternal care and underscores the pivotal role of education in promoting healthier behaviors during pregnancy.

Keywords: Maternal Nutrition, Pregnant Mothers, Knowledge, Attitudes, Practices, Sri Lanka

Detecting the Diseases of Potato Based on Leaves Using SVM and XG-Boost Classifiers

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Abstract

Potato, known as the superior food crop in Nepal, has been affected by microorganisms like the fungus Alternaria and the oomycete Phytophthora, causing early blight and late blight, profound diseases of potato leaves. To overcome the traditional disease detection technique in the leaves of potatoes, an accelerated approach is needed. The proposed paper focuses on identifying disease in potato leaves using SVM and XG-Boost classifiers. A balanced dataset of 1500 leaf images of potatoes is used in this study to classify three different classes, namely early blight, late blight, and healthy leaves. The performance achieved using the SVM classifier and XG-Boost classifier is 0.9933 and 0.9866, respectively.

Keywords: Image classification, Potato disease detection, Svm, Xg-Boost

Exploring a Versatile Carboxymethyl Cellulose Coating for Enhancing Passion Fruit Quality and Shelf Life

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Abstract

Approximately one-third of all fruit is lost during the agricultural and post-harvest phases before it reaches consumers. This research focused on addressing the issue of spoilage, especially in the case of highly perishable fruits like passion fruit, which have a limited shelf life due to dehydration and microbial growth. This limitation hampers their storage, transportation, and marketability. The study aimed to evaluate the impact of a protective coating on the shelf life and overall quality of passion fruit (*Passiflora edulis*) during storage. The investigation monitored chemical changes associated with weight loss, decay, and ripening over a four-week period under ambient conditions (20–25 °C and 70–85% Relative Humidity). The results revealed that passion fruit treated with a 3% CMC coating solution exhibited a significant reduction in weight loss, shrinkage index, and an extension of shelf life by 15 days. These findings demonstrate the effectiveness of the CMC coating solution in preventing oxidation, reducing water loss, and delaying the ripening of passion fruit. This research underscores the importance of passion fruit preservation, highlighting its potential for enhanced quality and economic benefits.

Keywords: Passion fruit, Carboxymethyl cellulose, Coating, Shelf life, Quality

Introducing a Natural Nutrient Enriched Organic Solid Baby Food to the Sri Lankan Market

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Abstract

Solid baby foods are defined as weaning foods, which are first introduced at the age of 6 months with breastfeeding. In Sri Lanka, it is called "Beribatha" which is enriched with the required nutrients for the baby. However, modern mothers often struggle with time limitations due to work commitments, and the scarcity of 100% organic in reasonable price options further complicates the situation. Therefore, a new solid baby food product was introduced to the market, enriched with natural nutrients and produced by 100% organic ingredients at an affordable price. Raw materials were selected concerning nutritional value, availability, sensory quality, function, and ability to process under minimal processing conditions. Four types of samples were formulated by considering health guidelines and nutritional composition. The sensory characteristics were evaluated separately using 35 untrained panelists, and the best formula (354) was selected. The proximate composition of the selected formula (354) contained 3.3 ± 0.01 % moisture, 8.86 ± 0.05 % crude protein, 2.52 ± 0.02 % total fat, and 1.45 ± 0.01 % ash. A comprehensive shelf life analysis was conducted, revealing that sensory attributes and microbiological counts remained within acceptable levels over a three-month storage period within the laminated metalized wrapper packaging (Material: BOPP 25 Micron + Met CPP 20 Micron). In conclusion, the developed natural nutrient-enriched organic solid baby food exhibits great potential for creating highly consumer accepted infant-based products, and it can be introduced as a main meal for babies.

Keywords: Solid baby food, Organic, Nutrient enriched, Weaning food

Development and Sensory Quality Evaluation of Rice Bran Oil Incorporated Ice Cream as a Functional Food

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Abstract

This study is focused on the development of a functional ice cream infused with Rice Bran Oil (RBO). Rice Bran Oil possesses the attributes of being odorless, light, and pale yellow, accompanied by a subtle nutty essence. Renowned for its health-enhancing qualities, Rice Bran Oil is commonly referred to as "heart oil" or "healthy oil" due to its well-balanced fatty acid composition, antioxidant content, and bioactive phytochemical constituents. This recognition stems from its capacity to confer physiological benefits, thus positioning Rice Bran Oil as a functional food source.

The ice cream formulations created encompassed distinct ratios of ingredients: 50% RBO and 50% Milk Fat (designated as S1), 75% RBO and 25% Milk Fat (S2), and 100% RBO (S3), in addition to a control sample. Following sensory evaluations conducted by an untrained panel comprising 30 individuals, the ice cream variant featuring 100% RBO (S3) garnered the highest preference. Consequently, this chosen formulation was subjected to a comparative analysis against the control sample, encompassing assessments of proximate composition, physical attributes, and physiochemical characteristics.

The ice cream variant integrated with 100% RBO displayed a Crude Protein content of 0.83±0.2% and a Crude Fat content of 11.5±0.5%. Microbiological investigations indicated that parameters such as Total Plate Count, Yeast, and Mold Count, as well as the presence of Coliform bacteria, remained well below the permissible thresholds stipulated by the Sri Lanka Standards (SLS).

Keywords: Rice (Oryza sativa), Rice bran, RBO (Rice Bran Oil), Ice cream, Functional food

Determinants of Fast Food Consumption Patterns and Nutritional Status among University Students in Sri Lanka: A Case Study of University of Vocational Technology

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Abstract

This study delves into the fast food consumption behaviors, attitudes, and their nexus with the nutritional status of University of Vocational Technology students. Focusing on the 2018 weekday (B1) batch, with a population of 450 students, a convenient sample of 100 students was selected. An online questionnaire was distributed via Google Forms and gathered data on demographics, fast food consumption patterns, and attitudes. Descriptive statistics were employed for the analysis. The respondents primarily consisted of males (62%) with mean BMI values of 21.9 (males) and 20.5 (females) and average waist measurements of 81 cm (males) and 76 cm (females). The study reveals that 54% of students are daily fast food consumers, with 21% consuming fast food more than once a day. Additionally, 46% reported occasional fast food consumption. Results reveal a substantial integration of fast food into daily routines, with 69% maintaining healthy nutritional statuses (normal BMI). Gender disparities are evident, emphasizing the need for targeted interventions. Taste serves as a major motivator, while convenience and affordability significantly influence consumption, with 86% strongly agreeing that fast foods are economically viable compared to restaurant meals. The study offers comprehensive insights into fast food consumption behaviors and attitudes and their impact on nutritional status. Findings stress the importance of holistic interventions considering taste preferences, health awareness, convenience, and affordability to promote healthier dietary choices. Despite

limitations, this research contributes to understanding dietary habits and attitudes, providing strategies for fostering healthier eating habits among university students.

Keywords: Dietary habits, Fast food consumption, Nutritional status, Sri Lanka, University students

Biodegradable Nursery Containers; a Sustainable Solution for Plant Growth

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Abstract

The global environmental crisis has heightened the need for sustainable alternatives in various industries, especially in agriculture and horticulture. In the plant cultivation field, traditional plastic nursery containers contribute to plastic waste accumulation and environmental degradation, and biodegradable nursery containers have gained significant attention as a sustainable solution. Through a comprehensive literature review, this study investigates the environmental impact, performance, and cost-effectiveness that biodegradable nursery containers offer. Plastic waste is a challenge for sustainable development because large quantities of fossil fuel are used to manufacture plastic containers, which take around 500 years to decompose and increase other environmental issues. Not only that, in Sri Lanka, regarding solid waste disposal, 54.50% of short-term biodegradable waste and 5.90% of long-term biodegradable waste are created as a result of activities in homes and industries and cause large-scale land and water pollution. Meanwhile, waste is a big problem in environmental pollution. Therefore, biodegradable waste needs to be managed as a success for a sustainable environment. It can be made into plantable or compostable containers made from organic materials, including livestock manure, postharvest agricultural waste, and agro-industrial residues that break down naturally over time, leaving no harmful residues. Thereof, the development of biodegradable nursery containers made from agricultural waste can reduce farm costs, reduce environmental contamination, and let the roots develop more naturally in the growing medium, either outdoors into the ground in an open field or indoors, as an eco-friendly solution for plant growth.

Keywords: Biodegradable, Nursery container, Sustainability, Plastic waste, Environmental impact

Identification of Pathogen Causing Tomato Canker Symptoms: a Sustainable Solution for Healthy Tomato Cultivation

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Abstract

Clavibacter michiganensis *subsp.* michiganensis is a causal agent of bacterial canker in tomatoes. It is a serious concern that drastically decreases the yield and quality of tomato production. Drawing on a comprehensive review of relevant literature, this study analyzed the identification of tomato canker, symptoms, phytosanitary risk, seed contamination and pathogen transmission, and preventive measures. Canker disease can affect a plant part or entire plant due to the scab or bird's eye spots that appear on fruits, plant leaf necrosis areas, yellowed or dead plants, steam discoloration, and the whole plant being dead. This disease can be spread by practices such as transplant production, water splash by rain, overhead irrigation, chemical sprays, and machinery movement, by working people, and from wet fields. Accordingly, tomato canker, a devastating disease affecting tomato crops globally, poses a significant threat to agricultural production and food security. Effective control measures can be applied, including the deployment of resistant cultivars, improved cultural practices, and biosecurity protocols, which contribute to safeguarding tomato production and enhancing global food supply chains in the face of emerging plant pathogens. This study shed light on the identification of the pathogen causing tomato canker symptoms, nursery management, and cultivation, emphasizing practical insights for maintaining healthy tomato cultivation systems while minimizing the impact to avoid the inadvertent spread of plant pathogens.

Keywords: Tomato canker, Phytosanitary Requirements, Pathogen transmission, Disease management

A Comprehensive Review of Production Methods, Nutritional Properties, Applications, and Future Perspectives of Single Cell Protein Technology

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Abstract

This review aims to explore the production methods, nutritional properties, applications, and prospects for the future of Single Cell Protein. The review will provide an in-depth understanding of SCP production methods, highlight its nutritional properties, examine its various applications, and discuss potential future directions for research and development in the field. Single-cell protein (SCP) has gained significant attention as a promising alternative protein source due to its efficient production methods, favorable nutritional properties, diverse applications, and potential contributions to addressing global food security challenges. This comprehensive review aims to provide an in-depth analysis of SCP, covering its production methods, nutritional composition, applications in various sectors, and future perspectives. The review synthesizes existing literature and highlights key SCP research and development advancements.

Keywords: Single cell protein, SCP, Submerged fermentation, Semi-solid-state fermentation

Review of 3D Food Printing Techniques: Advancements, Challenges, and Future Perspective

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Abstract

Numerous potential uses for 3D printing in the food sector include raising the products' tastiness, variety, personalization, healthfulness, wholeness, longevity, and general well-being. The unique nutritional needs of each person may be met with the help of this remarkable additive manufacturing technology. The technology's distinguishing feature is a manner of material deposition that builds up layers sequentially from a template file. Extrusion-based food printing, binder jetting, inkjet printing, and selective sintering printing are four primary technologies in this field.

To create a really unique layout while utilizing these technologies, there are a few key considerations. The structure of the food material, printing resolution, and precision were all impacted by this; these are briefly covered in the study. Due to the multiple ways, it enhances company operations, including quicker production times, streamlined supply chains, and a wider range of usable ingredients, additive manufacturing is seen as a cutting-edge element of the food industry of the future. Therefore, before 3D printing in the food industry is used more extensively, there are a few obstacles that must be overcome.

Keywords: *Three-dimensional food printing, Extrusion, Binder jetting, Inkjet, Selective Laser Sinter*

Advancements in Manufacturing Technology and Emerging role of Mechatronics

Automated Rice and Grain Cooker: Design and Development of a Smart Kitchen Appliance

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Abstract

In the modern world, busy lifestyles often lead to consuming fast foods, which can increase the risk of chronic health conditions and metabolic syndrome. To minimize these risks, individuals can prepare meals at home, gaining control over the cooking process. Rice cookers can be time-consuming. Though it may not seem significant in isolation, such tasks can become burdensome amidst a busy lifestyle. A new solution aims to streamline the rice cooking process, making it efficient, user-friendly, and time-saving. The cooker can cook various grains and is compact, requiring less space than traditional cookers. This space-saving design enhances its practicality and convenience, allowing busy individuals to enjoy home-cooked rice without the laborious efforts. This innovative solution envisions a future where rice cooking is a breeze, enriching lives and catering to the demands of modern-day living.

Keywords: Rice-grain cooker, Smart kitchen appliance

Mould Coating to Improve the Surface Finish of the Cast Iron Products

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Abstract

The importance of foundry coating to improve the surface quality of castings cannot be simplified. Surface finish is one of the most desired characteristics of a product surface. In this study, the impact of coating on surface finish was investigated by using different kinds of coating samples and evaluating whether coating gives effect to product surface finish. The experiment was conducted for four different compositions, and sand-casting process was used as the process to manufacture the final product. The surface quality of the cast components was assessed by measuring the surface roughness,
with the use "surf test instrument". The average reading of each sample was computed as a Roughness Average (RA) value. In this study, four components were cast using the same pattern, and the chosen "special additive" was the variable of chosen mould coating formulation. The common ingredients of the formulation are miniran powder, fire clay, kaolin and water. Special additives for the four products were coal powder, dextrin, furan resin and furnace oil. The comparison of surface quality was made among the four cast components. From the findings, it was shown that product surface covered with coal powder coating has the best surface finish.

Keywords: Mould coating; Sand casting; Special additives; Surface roughness

Change of Technical Properties of Polyvinyl Chloride Products in Outdoor Environment

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Abstract

Nowadays, polymers have captured a substantial component of human involvements in various fields, due to their diverse attractive properties. Poly Vinyl Chloride is one of the highly demanding thermoplastic polymers that is extensively used in various industries. Susceptibility to degradation when exposed to natural outdoor weathering is a key disadvantage of this polymer. This study was carried out to analyse the degradation characteristics of Poly Vinyl Chloride based products exposed to outdoor weathering for different time durations. The study was conducted using 63mm diameter Unplasticised Poly Vinyl Chloride commercially available pipes. Initially, tensile strength, percentage elongation at break, hardness and percentage water absorption values were measured for the unexposed (reference) set of samples. Next, the prepared samples were allowed to expose to natural outdoor weathering environment, including light/dark and wet cycle. Eight sets of samples were removed from the test environment at different time intervals (30, 60, 90, 120, 150, 180, 210 and 240 days). Tensile strength, percent elongation at break, hardness, percent water absorption and visual inspection tests were performed for these samples after each time interval. Test results obtained from actual weathering were compared with the reference sample's results. According to the experimental results, somewhat gradual and little reduction of tensile strength, percentage elongation at break and hardness were observed with the increase of outdoor exposure time of test samples. Original colour of the samples were gradually changed, and a noticeable colour change was observed at

the end of 150 days' exposure to outdoor environment. Samples exposed to outdoor environment for 240 days showed the maximum water absorption of 0.03%. Experimental results did not indicate a significant property variation after outdoor exposure of products. Property retention of tensile strength, percentage elongation at break and hardness were 94%, 91% and 96% respectively after exposure to 240 days.

Keywords: Polyvinyl chloride, Outdoor weathering, Property retention, Polymer

IOT Based Pet Feeding Machine

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Abstract

The increasing demand for efficient and convenient solutions in pet care has led to the development of automated systems that enhance the well-being of pets and alleviate the responsibilities of pet owners. In this research, we present the design, development, and implementation of an Automatic Pet Feeder Machine (APFM) that aims to provide a reliable and user-friendly solution for pet feeding.The APFM integrates modern technologies including Internet of Things (IoT), microcontroller systems, and user interfaces to create a seamless and adaptable feeding experience. The core functionalities of the APFM include accurate portion control, scheduled feeding times, remote control through a mobile application, and real-time monitoring of pet feeding activities. To achieve precise portion control, a combination of weight sensors and motorized dispensing mechanisms is employed. These components work synergistically to dispense the appropriate amount of pet food, tailored to the specific dietary requirements of different pets. The scheduling feature allows pet owners to customize feeding times, accommodating the unique routines of their pets. The IoT integration facilitates remote communication and control. Through a dedicated mobile application, users can monitor their pets' feeding activities in real-time, adjust feeding schedules on-the-go, and receive notifications about successful feedings or any operational anomalies. This real-time

interaction enhances the owner-pet connection, ensuring that pets are cared for even when owners are away.

Keywords: Iot, Automatic, Feeder, Remote, Mobile

A Role of IOT in Industrial Data Monitoring: A Review

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Abstract

The rapid development of the Internet of Things (IOT) has transformed industries through the integration of devices, sensors, and data analytics, allowing for seamless communication and data sharing. This paper provides an in-depth examination of IOT-based industrial data monitoring and control systems, with a focus on their design, applications, and problems. The review analyzes the significance of implementing IoT into industrial operations, emphasizing advantages such as real-time insights, predictive maintenance, cost savings, and improved decision-making. Recent research is evaluated, bringing insight into new approaches in a variety of industries ranging from manufacturing and healthcare to energy and logistics. The Industrial Internet of Things (IIOT) and its importance in data monitoring are reviewed, with an emphasis on the role of sensors in gathering real-time data for efficient operations. Regardless of the possible benefits, the issues of data security and privacy, scalability, interoperability, and reliability are addressed. Addressing these problems and capitalizing on the potential of IOT-based systems can help industries improve efficiency, production, and competitiveness.

Keywords: Internet of things, Data monitoring, Industrial internet of things, IIOT

Sustainable Product Recovery: A Review on Re-manufacturability Potential of Worn-out Journal Bearings Used in Locomotive Engines

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Abstract

Remanufacturing, a process that restores used products to a "like-new" functional state, offers a promising approach to sustainable production. This paper investigates the remanufacturing of connecting rod big-end bearings in locomotive engines in the local context, focusing on material identification, manufacturing processes, damage identification, and remanufacturing technologies. The study outlines the key steps in the remanufacturing process, encompassing collection, disassembly, cleaning, repair, quality assurance, and environmental considerations. Damage identification techniques include visual inspection, microscopic inspection, surface roughness measurement, dye penetrant inspection, magnetic particle inspection, and ultrasonic testing. Specific technologies for repairing journal bearings are examined, with High-Velocity Oxy-Fuel (HVOF) thermal spray identified as a suitable method for journal bearings. Testing methods to validate the functionality and performance of remanufactured bearings. This review paper serves as a foundation for future developments in journal-bearing remanufacturing technology and sustainable product recovery practices, emphasizing the need for further research to assess the cost-benefit of the process.

Keywords: Journal bearings, Remanufacturing process, Locomotive remanufacturing

IOT Based Real-Time Portable Weather Data Collecting Station

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Abstract

The challenge of obtaining real-time weather data is compounded by the labor-intensive installation and maintenance of wired sensors, necessitating frequent adjustments. To counter this, this study introduces a portable weather data collection station tailored for efficient data collection in rural settings. Using advanced wireless technologies, the station instantly transmits data to predetermined destinations or securely stores it on an online server, eliminating the limitations of wired connections.The project employs the DHT_11 and BMP_180 sensors for precise temperature, humidity, and pressure measurements. The NodeMCU V3 seamlessly transmits the collected data over Wi-Fi to a Google Sheet, ensuring secure data storage. Integration of the MQTT protocol enables efficient communication between the NodeMCU V3 and the designated server, ensuring reliable data transmission. Moreover, the system integrates Google Maps for location tracking and utilizes MATLAB for comprehensive data analysis, enhancing its capabilities for in-depth weather monitoring. This portable weather data collection station streamlines the acquisition of real-time weather information and offers a sustainable solution for monitoring weather conditions, especially in remote regions. By integrating cutting-edge wireless technologies and advanced data management tools, the system meets the escalating demand for accessible and comprehensive weather data, addressing the limitations of traditional wired weather monitoring systems.

Keywords: Portable weather station, Data collection, Location tracking

Design and Development of Electrically Operated Wheelchair

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Abstract

The prevalence of disability worldwide is about 15% of the global population. Among the various types of disabilities, mobility impairment stands out as the most prevalent, significantly impacting the daily lives of affected individuals. The conventional solution to address mobility limitations has been the traditional manual wheelchair. However, this approach often falls short in providing users with a sense of independence, as continuous assistance from others is necessary. While manual propulsion is an option, it demands considerable physical exertion from the user. The electric wheelchair is an innovative alternative that seeks to address the limitations of traditional manual wheelchairs by offering enhanced mobility and greater independence to users. This study presents the design and development of an electric wheelchair, enriched with a range of user-friendly features, including dedicated storage space for essential medical equipment, and adaptable control mechanisms for operation by either hand. The purpose of this research was to enhance the overall functionality and usability of the electric wheelchair, catering to the specific needs and preferences of users with mobility impairments. Through a systematic approach, the wheelchair's design was optimized to accommodate medical necessities while ensuring ease of use and versatility in its control mechanisms.

Keywords: Electric wheelchair, Joystick control, Low-cost wheelchair

Design and Development of an Efficient Portable Seed Sowing Machine

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Abstract

Sri Lanka, which is an agriculturally active country, should be ready to find solutions to the food crisis in the near future. Accordingly, there is an urgent need to increase the speed of agricultural activities around the country. Even now, various countries have increased the productivity of agricultural activities in their countries by using various research and new technical methods. Considering these facts, the main objective of this study was to find out how technical methods can be used to increase the productivity of seed nursery systems, which are one of the aspects of Sri Lankan agriculture. Accordingly, the areas cultivated by the farmers using seed nursery methods, the types of crops, and the different sowing practices followed by the farmers have also been analyzed. Using the analyzed details, mechatronics concepts were used to develop a low-cost automatic machine with facilities related to seed sowing, fertilizer collection, and water collection. This seed-sowing mechanism is designed so that the mechanism can be easily adjusted according to the size of the seed used for sowing, and separate containers are used for storing fertilizer and water with special equipment. After inserting soil-filled seed trays into the machine and starting the system, the seed tray automatically moves to each stage of the process, and after the process is completed, the nursery trays automatically come out of the machine with higher-quality seeds. As the time taken for this entire process is close to 19 seconds, we were able to increase the sowing productivity. This new machine will also enable farmers to engage in alternative income-generating activities and demonstrate the success of our project objective by convincing farmers that traditional farm machinery can be replaced with low-cost automation systems and new techniques to complete a labor-intensive task more efficiently.

Keywords: Agriculture, Farm machinery, Seed sowing, Nursery tray, Atmega 328p Microcontroller

Development of Semi-Automatic Ergonomic Smart Table

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Abstract

The semi-automatic ergonomic smart table provided answers to many of today's questions. The main purpose of creating this table was to do the work of several tables in one table. The ergonomic smart table consists of several features. The table is an equipment that very close to people. It can further develop using the technology. This smart table combined with the electrical, electronic and mechanical system. The table is designed to adjust the height of the table according to the sitting posture by moving the legs up and down. The maximum height of the table is 950mm and the minimum height of the table is 650mm. This mechanism is done by two linear actuators and height can adjust by the screen attached to the table. This smart table can carry 90 kg weight in total. Iron and wood are used as the main raw material in the design of the table.

This table attached with the dimensions of 7 inches of screen. The table is intended to be accessed by a central software with an LED screen that can be used as a table tab with Bluetooth Wi-Fi connectivity. The smart table is equipped with the Wi-Fi camera, Hot plate and a wireless charger. The height adjustment mechanism, hot plate, screen and all other functions of the table controlled by the Raspberry pi 4 model B. The user interface was created using QT software for the screen. With the investigation camera, you can see the person working in front of the table from anywhere in the world. Also, you can take a photo and a video with this. A 12v heat element was used for the hot plate and an emergency switch was also connected to it. The Ergonomic Smart table is specially designed for students, but anyone can easily work from the same table without changing

the table according to the work done.

Keywords: LED screen, QT software, raspberry pi, Wi-Fi camera

Smart LP Gas Cylinder Carrier and Safe Regulator

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Abstract

Liquid petroleum gas is widely used in households and industries because of its high calorific value and comparatively low environmental impacts. Gas leakage related accidents are major safety issues in industrial and residential premises. Another problem is the unawareness of the consumer about the daily rate of gas consumption and the remaining gas content in the cylinder. One of the preventive methods to stop accidents associated with the gas leakage is to install a smart gas regulator to identify gas leakage immediately.

This research study includes three main components. The significant designs are introduction of safety features to the smart gas regulator and weight monitoring system. When a gas leakage is detected, a buzzer is switched on and displays a message on the display unit. At the same time, it turns off the main gas supply, turns on exhaust fans and, in a few seconds, the main power supply of the residential area is shut down. Then the owner gets an alert as a message via mobile application.

The other component is the staircase climbing gas carriage. Any person who needs to take the filled gas cylinder from ground floor to another floor, it may help to carry the cylinder safely and quickly without any helper. Not only that but also it helps to carry the gas cylinder easily in long queues at thecrisis situation in the country as experienced in recent past.

Main objectives of this project is to monitor for gas leakage to avoid accidents providing house safety features where security has been an important issue these days and to design an easily movable carriage for the gas cylinder addressing the human safety and the comfort.

Keywords: Smart Regulator, Node MCU, Gas Leakage Detector, Data Analytics, Microcontroller

Emerging trends in ICT and media technology for resilient industries

Ensuring Resilient Software-Defined Networking Infrastructure against Advanced Persistent Threats

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Abstract

This research delves into the intersection of Software-Defined Networking (SDN) and the challenge posed by Advanced Persistent Threats (APTs). We navigate the realm of APT detection and mitigation within SDN environments, which present unique vulnerabilities. By unraveling the foundational principles of SDN, we establish a comprehensive understanding of its evolution, architectural components, and applications. Concurrently, we dissect the intricacies of APTs, revealing their stealthy nature and Command and Control (C & C) mechanisms.

The fusion of SDN and APTs highlights the imperative for robust defenses. We scrutinize the vulnerability landscape born from SDN's programmability, addressing the exploitation of flow entries, control plane compromise, and an array of attack vectors. Despite the scarcity of SDN-specific APT models, we analyze broader APT detection and SDN defense models. This paper propels the discourse forward, identifying potential research avenues and advocating for interdisciplinary collaboration to ensure the resilience of SDN infrastructure against relentless APT attacks.

Keywords: Software defined network, Advanced persistent threats, Network infrastructure resilient

Aspect Based Sentiment Analysis on Nepali Language Tweets related to COVID-19

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Abstract

Public sentiments and opinions concerning COVID-19, a highly infectious disease, were disseminated across several online platforms. Quantifying the sentiment and the related aspects expressed would help not only gauge the level of anxiety in the public but also provide useful directions to the authorities. This study performs Aspect Based Sentiment Analysis on COVID-19 related Nepali language tweets by focusing on identifying aspects and estimating the sentiment related to them. By focusing on both sentiment and the target it provides a more detailed understanding of opinions and attitudes expressed in the text. However, one of the challenges was the absence of a well-labeled aspect dataset for the Nepali text related to COVID-19. In this paper, a publicly available tweet dataset was collected and preprocessed. Next, aspect words and sentiment words were obtained by POS tagging then COVID-19 related aspect dataset was established. The aspect dataset is passed to the machine learning and deep learning models (such as SVM, GRU, and BiLSTM) to estimate the polarity of the COVID-19 tweets. Promising results were obtained with F1 scores of 0.73, 0.78, and 0.77 respectively for SVM, GRU, and BiLSTM. This study significantly contributes to the research domain by developing an aspect dataset related to COVID-19 for the Nepali language and verifying its usefulness by implementing machine learning and deep learning models for Aspect-Based Sentiment Analysis.

Keywords: COVID-19, Nepali language, tweets, aspect based sentiment analysis, Deep learning

E-Commerce Website for Astrology Services: Bridging Tradition with Technology

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Abstract

This research aims to bridge the gap between ancient wisdom and modern convenience by developing an e-commerce website tailored to astrology services. Our study explores user preferences, engagement, and overall user experience of the website. Results from user preference surveys shed light on the diverse needs and expectations of users regarding astrology e-commerce websites. The survey highlighted a strong interest in personalized birth charts and horoscope readings, as well as an emphasis on accurate astrological information. Participants expressed a desire for educational content, interactive tools such as birth chart generators, and community features like discussion boards. Data security and privacy emerged as key concerns, with users emphasizing the importance of secure payment processing and responsible data usage. The architecture of the astrology e-commerce website blends agile development methodologies resulting in a user-friendly interface and seamless navigation. The testing phase ensures the website's reliability through comprehensive functional testing, compatibility checks, and white box testing. Further, the integration of augmented reality and the exploration of personalization algorithms were recommended to enhance user engagement and customization. The research also underscores the significance of evaluating user experience and engagement levels. This involves assessing navigation, responsiveness, aesthetics, and the impact of interactive features. By gaining a deeper understanding of user interactions, preferences, and satisfaction, iterative improvements can be implemented to align the website more closely with user needs. In conclusion, this research contributes to the evolving landscape of astrology in the digital age by bridging tradition with technology. By creating an astrology e-commerce website that caters to user preferences and needs, while focusing on user experience and engagement,

the study opens new avenues for enhancing the accessibility and relevance of astrology services in the modern era.

Keywords: Astrology, E-commerce, Agile methodology, Website development

Catalyzing Data Efficiency: A Process Support System for Colombo Consumer Price Index (CCPI)

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Abstract

This research outlines the development of an advanced remote data collection system to enhance the calculation of the Colombo Consumer Price Index (CCPI) in Sri Lanka. The current CCPI estimation process relied on labor-intensive, manual data collection from 14 centers in Colombo, necessitating a modernized approach to streamline operations within the Prices and Wages Division. The study aimed to scrutinize the existing workflow, establish an efficient conceptual framework, create an information system to optimize CCPI calculations, prioritize data security, and develop a customizable CCPI calculation module to meet evolving statistical demands and market dynamics. The literature review uncovered the limitations of existing mobile data-gathering frameworks, prompting the proposal of a custom mobile data-gathering framework designed to address issues related to privacy, security, energy efficiency, and sensing capabilities. A comprehensive evaluation approach included a literature review, critical assessment, comparative analysis, and user feedback. Practical validation within the Prices and Wages Division confirmed the system's efficiency and utility, earning positive feedback from department officers. In conclusion, this research presents a robust and secure remote data collection system that significantly enhances the CCPI calculation process. The system's adaptability, data security, and efficiency make it a valuable asset for economic metric tracking. Future research may further refine and expand similar projects, emphasizing the importance of technological innovation in streamlining data collection processes for economic analysis and policy-making.

Keywords: Remote data collection, Colombo consumer price index, Data

security, Mobile application development, Database design, Data encryption, Statistical functions, System architecture

Rich Computer Network Infrastructure for the University of Vocational Technology (UoVT)

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Abstract

a robust and efficient university network infrastructure plays a pivotal role in fostering seamless academic pursuits for both students and academic staff. Within the precincts of the university's computer laboratories, the provision of wired network accessibility is imperative to enable students to engage with digital resources and connect with the shared storage drive, thereby facilitating the secure preservation of their academic and personal endeavors. Furthermore, the ubiquitous availability of the Wi-Fi network across the university premises assumes paramount significance, ensuring that students can engage in university-related activities without encountering disruptive interruptions. Concurrently, the academic faculty necessitates unimpeded access to the wired network to fulfill their professional obligations. Simultaneously, their access to the Wi-Fi network should remain unhindered, affording them the flexibility to seamlessly integrate digital tools and resources into their instructional practices. The University of Vocational Technology (UoVT) has a network infrastructure that encompasses these fundamental requisites, thereby catering to the essential needs of both students and faculty members. This study embarks on a comprehensive exploration and assessment of the existing network tools and technologies at UoVT. The primary objective is to identify and surmount the challenges posed by the current network framework. By delving into this endeavor, the research aims to propose an innovative network design that leverages cost-effective and pertinent technologies. These design recommendations are poised to enhance the efficiency,

reliability, and scalability of the university's network infrastructure, optimizing its capacity to support the diverse and evolving demands of academic endeavors. Through the discerning analysis of prevailing network paradigms and the strategic integration of advanced solutions, this research contributes to the ongoing enhancement of the academic landscape at UoVT.

Keywords: Wired/Wireless Network, Roaming, Ubiquitous Access

Conceptualizing the "Quality Teledrama" as the future of Sri Lankan Teledrama Art and Cultural Industry for 2023-2032, fifth decade

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Abstract

Sri Lankan 'Teledrama', a cultural industry with a four-decade evolution, has experienced a decline in artistic quality in the last decades due to consumerism and mis-commercialization. The genre's original progressive artistic qualities have been replaced by consumerism, leading to a disconnect between elite viewers and the new generation. This research study focuses on the evolutionary peculiarities of Sri Lankan 'Teledrama' influenced by Sri Lankan media policies. The study used a mixed research methodology, combining analytical and empirical approaches, and used sources such as books, research papers, commission reports, acts, research theses, and periodicals for data collection. The research identified four paradigm shifts: the establishment of “True” Sri Lankan Teledrama in the 1983-1992 decade, the stability of “True” Sri Lankan Teledrama in the 1993-2002 decade, and the challenge of “Fake” Mega Dailies in the 2003-2012 decade. The fourth paradigm shift, the 2013-2022 decade, was identified as the catastrophic decade of “Fake” Mega Dailies diminishing the quantity of “True” Sri Lankan Teledrama.' The main reason for this situation is the uncertain media policies implemented by every regime, which are directly responsible for the decline. To ensure the sustainability of Sri Lankan 'Teledrama' as a cultural industry and national art expression, the study proposes a consistent media policy titled 'Quality Teledrama Decade - 2023-2032' for the next decade.

Keywords: Mass media policies, Teledrama, Genres, Paradigm shift, Quality television

Customer Relationship Management Methods for Freelance Audio-Video Content Creators in Sri Lanka

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Abstract

This research aims to identify effective customer relationship management (CRM) methods for freelance audio-video content creators in Sri Lanka. The study utilized a combination of in-depth interviews and literature survey to gather insights from 09 freelancers, 02 top managerial officials and 09 customers. The interviews focused on the current workflow and CRM practices used by freelancers while the literature survey identified effective CRM techniques that could be implemented by freelancers in Sri Lanka. In accordance with the findings, successful CRM strategies can increase sales and improve customer satisfaction while leading to business success. The study revealed the importance of effective communication, responsiveness to client needs and personalized attention in building long lasting client relationship in the audio-video content creation industry in Sri Lanka.

Keywords: Customer relationship management, Customer retention, Customer satisfaction, Customer experience

Exploring Narrative Subjects for Contemporary Sri Lankan Cinema

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Abstract

Film, as a highly interactive medium with the audience, relies significantly on narrative to engage viewers. This research aims to identify a narrative subject that resonates with contemporary Sri Lankan cinema. Additionally, the study investigates the most popular movie genre and story structures preferred by Sri Lankan moviegoers. To achieve these objectives, a mixed-methods approach was employed, combining survey, in-depth interviews, and content analysis. Quantitative data analysis was utilized to identify the most favored narrative subjects, film genres, and story structures among the Sri Lankan film audience. The results indicate that a majority of moviegoers in Sri Lanka prefer films centered around social factors as the narrative subject. Moreover, Linear Narrative emerges as the primary storytelling structure preferred by Sri Lankan audiences. These findings provide valuable insights for filmmakers and the local film industry to create engaging content that aligns with the preferences of the Sri Lankan moviegoing community.

Keywords: Sri lankan cinema, Narrative, Film genre, Moviegoers, Film preferences

Challenges in Budgeting for Freelance Video Editors in Sri Lanka

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Abstract

This research endeavors to discern and explore the preliminary cost-related hurdles and budgeting complexities encountered by video editors in the management of video editing projects. The study employed a methodology centered on semi-structured interviews conducted with video editors in Sri Lanka, aimed at gathering pertinent data. The findings indicate that when budgeting, editors give top priority to a number of elements, including the complexity of the project, the editor's expertise and skill level, and the amount of time needed for editing. Editors often consider other factors, like the client's experience in the industry. The study suggests a number of approaches to deal with pre-costing issues and budgetary conundrums, including the maintenance of a comprehensive portfolio, the establishment of a Video Editors Community or Union, in-depth project discussions and pre-edit planning, and the utilization of a least-cost package rate system for budgeting.

Keywords: Video editors budgeting, Freelance video editors, Budgeting difficulties, Pre-costing issues, Costing methods

Use of Access Control Systems in Government Organizations in Sri Lanka

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Abstract

In the context of the Sri Lankan government sector number of government organizations are moving their manual systems to computer-based information systems today. Information security is a significant challenge in the organizational information systems environment. The use of the Access Control mechanism of the Sri Lankan government sector was studied in this study. Physical access control and logical access controls are the most significant types of access control mechanisms. Data collection was done through a structured questionnaire. The senior information security officer of the organization was the resource person for the study. In this study, access control mechanism using the username and password combination, defined access levels in the information systems, protecting the physical facility using fingerprint/biometrics, availability of security guards in the premises, sensitive documents secured with unauthorized access, availability of CCTV in the premises were considered as access control factors. Among these factors, the most used access control mechanism is the "defined access levels" for accessing information systems. 94.4 % of organizations have used this mechanism for their information security. The usage of fingerprint and other biometric devices for access control is significantly low in the Sri Lankan Government Sector. So, this factor needs to be developed to improve access control in government organizations.

Keywords: Access control, Information security,Government organizations

The Factors Effecting Number of Runs Gain in Sri Lanka Vs India One Day International Matches and Forecasting

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Abstract

In this article, try to find the factors effect to no of runs / team total acquired by the Sri Lanka and India. This article limit the analysis only matches between Sri Lanka and India. Cricket is one of the world famous sports such as Rugby, Football and Basketball. Winning of the match is important and it could depend on various factors such as Age of the player, Player performance, playing ground, playing country, support of the crowd, Toss, playing in day or day and night. Performance against the opposite team, Batting Style, Toss won or lost, match played as day or Day and night, Bowlers Name, No of Balls and Average. This article discusses the factors depend upon the number of runs taken by the each team. That will effect to the winning of the Team. The main target or aim of this article is to identify the factors effect to the no of runs taken by the each team. Important thing in here is individual player total collectively make the final team total.

Keywords: Cricket, number of runs, One day international (ODI) match, Asian cricket

Selection of Optimum Image Compression Technique for Mobile Communication

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Abstract

With the rapid growth in mobile communication technologies the transmission of high quality images have issues in handling resource consumption and the quality. The resource consumption is indicated by the bandwidth and energy consumption. In this research an optimum image compression technique depending on the mobile transmission capacity, type of the image and the average download time was presented. The research was conducted for five mobile communication standards, namely; GSM, GPRS, UMTS, HSPA and LTE where for each channel two image compression methodologies were analyzed. They are wavelet image compression technique and seam carving. The optimum compression was calculated based on entropy and PSNR of the compressed image. In this project the image types are defined as texture images with a complex background and images with clear cut background as for an object. The results show the effectiveness of the proposed methodology andMatLab™ was used for the comparisons.

Keywords: Mobile communication, Channel capacity, Compression, wavelet, Seam carving

Gap analysis of the standard propagation model with LTE band 38 in the suburban region

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Abstract

(The standard propagation model (SPM) calibration or tuning approach can be used for effective and efficient network planning for optimum region coverage. SPM functions in field implementation to improve the accuracy of predictions based on proper coverage planning outcomes.

This study presents a straightforward optimization approach utilizing the ATOLL planning tool for the Standard Propagation Model (SPM). A series of measurement campaigns were undertaken to gather data on Received Signal Strength from commercial base stations operating at a frequency of 2600 MHz. The assessment was conducted to evaluate the predictive accuracy of the standard propagation model. The model exhibited significant levels of prediction errors. The optimization technique encompasses the use of various components, including the Digital Terrain Model, clutter classes, clutter heights, vector maps, scanned photos, and Web Map Service. The weight of the clutter loss on each pixel, from the pixel with the receiver in the direction of the transmitter up to the specified maximum distance, was calculated using a logarithmic weighting formula.

The standard propagation model is widely employed for generating forecasts to assess predated coverage. However, it is necessary to further refine it in order to align with each specific region and get precise predictions. The utilization of gap analysis is vital in order to detect the factors of divergence during the fine-tuning phase.Times New Roman 11 pts, 1.5-spaced, Bold, Left aligned)

Keywords: LTE, Propagation model, Model tuning, Coverage simulation

Developing a Conceptual Framework for ICT Integration in the Sri Lankan Agricultural Sector

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Abstract

Information and Communication Technology (ICT) integrate to the Agriculture is one of the most important task in order to achieve sustainable agriculture. Agriculture is one of the important sectors and the key issues to be address these days are the food sustainability and the security. The recent COVID-19 pandemic has also reiterated the importance of food security for a developing nation such as Sri Lanka's. This COVID-19 has made us all dependent on digital technology, but we have to consider for increasing investment in technologies to help small-scale farmers that will yield far-reaching benefits long after the pandemic has passed. Permanent Crop Clinic Programme (PCCP) which is a plant pest and disease diagnostic and recommendation service implemented through farmer group structure. According to the PCCP concept, aim of the PCC is to provide beer advice on pest management to farmers when their crops are ill. The main objective of the proposed study is to develop a framework for ICT integration in agriculture taking into account the Sri Lankan agricultural sector observing the PCC program objectives.

To enhance the research, a systematic review of literature will be conducted to identify various domains and approaches of research, existing frameworks for ICT integration and global invasiveness for ICT integration in the agriculture sector. The Study will also survey major barriers and challenges in ICT integration and enhance local productivity, access market information and boost the GDP percentage gain from agriculture in the Sri Lankan economy.

Keywords: ICT integration, agriculture, Sri Lanka, permanent crop clinic programme, GDP (gross domestic product)

TVET and Resilient Industries: Industrial management practices, and Hospitality

Factors Affecting on the Small Businesses during the COVID-19 Pandemic Period with Special Reference to Mahipalagoda Grama Niladari Division

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Abstract

This study is conducted to find out the Factors affecting during the COVID-19 Period on the Small Businesses in Mahipalagoda Grama Niladari Division. The research questions are, how small businesses worked during the COVID-19 period in the Mahipalagoda Grama Nialadari division? and what are the factors affecting during the COVID- 19 period on small businesses? The objectives of the studies are, to review of the small businesses during the COVID-19 period in the Mahipalagoda Grama Niladari Division and to find out factors affecting during the COVID- 19 period on small businesses. In this research, critical issues were raw - material shortage due to transportation issues, inability to use the employees optimally due to health guidelines, demand decline due to loss of income of people, delivery issues, order cancellation, etc.

Keywords: Covid-19 Period, Factors, Small Business

Application of Creative Tourism Performs in Sri Lankan Ramayana Tourism to Achieve Creative Economic Development

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Abstract

The creative economy is a paradigm for developing an economy through value creation and innovation. Creative tourism is a model developed under the creative economy to enhance tourist experiences through creative tourism experiences. This study has been conducted to understand the opportunities and issues of developing creative tourism experiences to achieve economic development related to Ramayana tourism in Sri Lanka. Sri Lanka Tourism Promotion Bureau launched the Ramayanaya Trail with the private sector to target the Indian market over to Sri Lanka for religious reasons and other travel purposes. The study was conducted under the qualitative research approach to achieve the research objectives; to identify the opportunities to develop creative Ramayana tourism products in Sri Lanka to achieve economic development and to understand issues of developing creative Ramayana tourism products in Sri Lanka. By considering Ramayana tourism in Sri Lanka as a single case, the case study research design has been adopted for this study. The sample population includes tour operators and travel agents in Sri Lanka who are contributing to Ramayana tourism. 20 qualitative interviews were conducted to collect primary data from the sample and by the field observations, the findings of primary data collection were further verified. This study is important for the future development of Ramayana trail tourism between Sri Lanka and India.

Keywords: Ramayana, creative, economy, tourism, development

Empowering Middle Age (6–11) Children in Marginalized Communities: A Personality Development Project at Ashoka Primary School, Delgoda, Biyagama, Sri Lanka

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Abstract

The research paper discusses a community-based project called "C-2022" in Sri Lanka, aimed at empowering middle-aged children aged 6–11, particularly those from marginalized communities, by fostering holistic development, emotional intelligence, social skills, and critical thinking abilities. The project, initiated at Ashoka Primary School, aims to address the unique challenges faced by these children caused by the corona virus disease of the 2019 pandemic and the country's recession. The study emphasizes the importance of a student-centered approach to fostering positive values, self-expression, emotional intelligence, and critical thinking for personality development. The project involved a qualitative research design, with 185 children in grades 3, 4, and 5 engaged in recognized personal development activities. The research highlights the importance of using holistic approaches and psychological theories to improve the personality development of marginalized children through targeted interventions. It recommends improving the effectiveness of personality development projects by fulfilling basic needs, cognitive growth, social learning, and community involvement to foster empowered individuals capable of facing life's challenges confidently.

Keywords: Critical thinking abilities, Children's personality development, Middle childhood, Self-concept and Self-esteem

The Socio-cultural factors affecting the Vocational Education Stream students to become an entrepreneur

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Abstract

Entrepreneurship has captured the attention of both scholars and policymakers during the last decades. The main reason is the growing need for entrepreneurs who accelerate economic development by generating new ideas and converting them into profitable ventures. The study reveals that religion plays a significant role, with 70% of participants making decisions based on religious background when starting a business. Family support is another crucial factor, as 38% of parents express satisfaction with their child pursuing self-employment. However, the current business culture in Sri Lanka is viewed negatively by the majority, with 72% believing it favors a single person and 68% perceiving influence from senior businessmen. Despite society's overall recognition of entrepreneurship (65.3%), there remains a negative setback (42%) in supporting university students. Additionally, 53.1% perceive their living environment as conducive to entrepreneurship. These findings inform the development of a framework for analyzing socio-cultural factors influencing vocational education students' entrepreneurial engagement. Further research in this area can contribute to fostering entrepreneurship and formulating effective policies that support entrepreneurship development.

Keywords: Entrepreneurial activity, Entrepreneurship, Entrepreneurial emergence, Socio-cultural environment,Cultural factors

Analyzing the Adequacy of Soft Skills for Employability of TVET Diploma and Certificate Holders

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Abstract

This study was conducted to find out important soft skills for diploma and certificate holders for successful employability and to find out the gap between possession of each skill and employer expectations. Teamwork, time management, flexibility, self-management and interpersonal skills are the top five soft skills expected by the industry for TVET certificate holders while communication skills, time management, teamwork, planning and organizing and leadership skills are the top five soft skills for the TVET diploma holders. Results prove that there is a significant soft skills gap between industry expectations and possession of skills by the TVET diploma and certificate holders except for critical thinking skills for certificate holders. Employers expect teamwork and flexibility /adaptability skills in nearly equal proportion from the TVET diploma and certificate holders for employment while other skills tested are expected at a higher level from the TVET diploma holders than certificate holders. This study may help TVET students to identify the skills they have to improve for successful employability as well as helpful to the TVET teachers for teaching. Finally, this information can be utilized for developing Curricula and NCS, and also should be addressed in pedagogical trainings.

Keywords: Employability; Soft Skills; TVET

Innovative Pedagogies and developments in Language studies

Strategies Used by ESL Teachers Engaged in Emergency Remote Teaching to Overcome the Challenges in Using Activities for Developing Speaking Skills at the Secondary Level Grades of Government Schools in Sri Lanka

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Abstract

This research was conducted to identify strategies used by the teachers of English, who were engaged in emergency remote teaching, to overcome the challenges in using activities for developing speaking skills at the secondary level grades of 1C schools in the Colombo Education Zone. The study used mixed approach and survey research design. A sample of 75 teachers of English was selected and a questionnaire and semi structured Zoom interviews were used to collect data. Data was analyzed using both quantitative and qualitative techniques. It was found that conducting debates was the most challenging speaking activity for the teachers who teach English as a second language and getting students to do act outs was the least challenging one. Lack of interaction of students, teachers' lack of time to teach the vocabulary and structures required for speaking activities, inhibition of students, lack of sufficient time for students to practice and get prepared for oral tasks and lack of teacher training were some of the major challenges for effective implementation of speaking activities in emergency remote teaching situations. Teachers also used a number of effective strategies such as redesigning of the content to match with the emergency remote teaching environment, use of grammar games, use of online polls and incorporating the videos, cartoons and power points to make speaking lessons more interesting. It was recommended to organize School Based Professional Teacher Development programmes that target development of teachers at secondary level.

Keywords: ERT challenges, ERT strategies, ESL teachers, government schools, secondary level

Use of a Selected Neuro-Linguistic Programming Technique to Improve Public Speaking Skills in English among English as a Second Language Learners

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Abstract

Public speaking is considered a crucial skill that is classified under the intellectual and practical skills that should be mastered by English language learners. However, many second language learners in Sri Lanka lack the motivation to speak in English. Neuro-Linguistic Programming (NLP) techniques offer a potential solution to improve speaking abilities, particularly in public speaking. One such NLP technique is "Outcome Orientation," which emphasizes setting clear goals for language learning and communication. This study aims to investigate the effectiveness of using the NLP technique of "outcome orientation" to enhance the public speaking abilities of English language learners. The study primarily focused on addressing two specific research questions. 1). How effectively can the selected NLP technique be used in teaching public speaking in English? 2). How will the learners' learning experience be in learning to do public speaking in English using the selected NLP technique? This was a classroom action research. A pre-test and post-test as well as a quasi-experimental research design was carried out, employing the mixed method of both quantitative and qualitative methods. The participants of the study were 40 students from advanced-level classes at a government school in Sri Lanka. Quantitative data were collected through pre-tests and post-tests. Qualitative data was collected through a focus group discussion. In an effort to achieve the research aims, an NLP workshop for participants was conducted prior to the post-test. A qualified English language teacher was invited to take part in the study as an external observer and tester. paired sample t-test and thematic analysis were employed to analyze the data. The findings of the study reveal that the implementation of the NLP technique

can have a significant effect on the public speaking of advanced-level students. Besides, the NLP technique can be a valuable asset in boosting students' public speaking skills.

Keywords: English language learners, motivation, Neuro Linguistic Programming (NLP), outcome orientation, public speaking

Implementation of School-Based Management: School Leadership Challenges and Opportunities Faced by School Principals

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Abstract

This study examined school leadership challenges and opportunities faced by school principals in the implementation of School-Based Management (SBM). The main purpose of this study is to identify the opportunities of school leadership in the implementation of SBM. This study was focused on the objective of investigating the challenges and opportunities of school leadership faced by school principals in SBM. The population of this study was the schools in Colombo District and the sample was 41 principals of the schools in Colombo Central Education Division of Colombo Education Zone. The study was undertaken through mixed methods and data were collected using questionnaire and focused group discussions. The collected data were statistically analyzed using the SPSS software. There are six dimensions under SBM such as school leadership, internal stakeholders, external stakeholders, school improvements, resource management, and performance accountability and school leadership are considered as an important dimension of SBM when implementing decentralization policies at school level. The findings of the study stated that more than 90% of school principals face various opportunities in school leadership though there are challenges in school leadership of the implementation of SBM. Through the findings of the study, the implication has influenced further development of SBM.

Keywords: Decentralization, Dimensions of SBM, School-based management, School leadership

Assurance of Test Authenticity: Power of Table of Specification (TOS)

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Abstract

Table of Specification (TOS), or is called as Test Blue Print contextually, is a significant theory-laden techniques to be utilized in developing valid and reliable written tests despite either in primary, secondary or tertiary level of educational assessment. And TOS provides an overall picture whether the written tests are aligned to cognitive levels suggested in Bloom's taxonomy and balance the knowledge assessments categorically among low-order and higher-order knowledge accumulation. A descriptive survey was conducted to identify whether University lecturers are willingly following the so-called knowledge assessment requirement in undergraduate level technology courses. Fifty three lecturers responded for the online survey questionnaire distributed via emails. Qualitative data was thematically analysed and quantitative data was statistically analysed via graph and percentages. Significantly the survey revealed that majority of the lecturers are unaware of TOS and they have not been using it in written test development.

Keywords: Knowledge assessment, Table of specification (TOS), Teacher-made tests, Test development, Test validity and reliability

Challenges Faced in Understanding Subject Content Due to the Change of Medium of Instructions from L1 to L2: A Case Study Based on a Technical College in Sri Lanka

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Abstract

English Medium Education (EME) is a popular concept and is often used from primary to tertiary education. In school education, selected subjects are offered under English Medium Instructions (EMI) and at the tertiary level, most of the courses are offered under EMI. Even students who get an opportunity to select the medium of instruction at school, are not getting a chance to do the same at the tertiary level, apart from a few courses. The majority of Sri Lankan students follow the school education in Sinhala or Tamil (first language). Once they move to the tertiary level, they have to continue their study in English (second language). As a result, students are facing challenges and issues. Therefore, this study aims to find out the challenges students faced in understanding subject content due to the change of medium of instruction from first language to second language. This qualitative study was done as a case study of 15 students who are following Telecommunication Engineering (NVQ level 6) at a Technical College in Sri Lanka. A face-to-face interview was conducted to review the challenges in depth. Data were analyzed based on thematic analysis. Findings reveal that students who had exposure to EMI during school time are performing well at the tertiary level with fewer difficulties. Unlike reading, writing, and listening, students are afraid to speak in English. They face challenges in enhancing their English language while attempting to understand the subject content. Some practical solutions can be suggested to overcome challenges under EMI. EMI can be applied to the teaching-learning process from primary education onwards. Well-trained and professionally qualified English teachers should be recruited for technical

colleges to enhance grammar, vocabulary, and other aspects of language.

Keywords: Bilingual education, Challenges, English medium education, English medium instruction, Tertiary education

Strategies of Developing Speaking through Experiences of Teachers - A Narrative Inquiry

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Abstract

The English Language is taught as a compulsory subject in the curriculum of schools in Sri Lanka. Although the students have been learning English for thirteen years of schooling, the students have not reached the expected competent level in English especially, in speaking. However, many qualified and competent non-native English teachers who have obtained degrees and diplomas have been recruited in the schools and they have improved their speaking skills. They might have used many strategies to develop their speaking skills. The current study focused on exploring the strategies used by English teachers to improve their speaking skills. Eighteen English teachers from nine provinces of Sri Lankan government schools were selected as the sample. A semi-structured interview was conducted as the research tool and a narrative technique was adopted to obtain qualitative data. The data was analyzed using thematic analysis. According to the analyzed data, having an English-speaking family background, engaging in activities related to English in schools, neighbors' and friends' interaction, and developing reading, listening, writing skills, and speaking skills itself were affected positively to improve speaking skills. Furthermore, reading books, listening to songs, speeches, and news, writing speeches, poems, and essays, speaking to him or herself, talking to the mirror and the pet, and use of technology were some identified strategies. It could be recommended that four skills of English should be developed to improve speaking skills and practice speaking skills as much as possible assist to in developing speaking skills. Moreover, it could be recommended to use the explored strategies to improve the speaking skills of the students in Language classrooms.

Keywords: *english teachers, speaking, develop, strategies, language classroom*

Effectiveness of E-learning in Two "Type 1AB'' Schools in Kandy Educational Zone

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Abstract

E-learning is a learning platform that helps students with their learning by providing a variety of learning resources. E-learning is widely used globally with the support of new technologies and the latest electronic devices. This paves the way for communication for course work at any academic level for students to learn irrespective of geographical location despite barriers due to poor transportation facilities, restrictions under pandemic circumstances, and so forth. E-learning is cost-effective, time-saving, and an effective way to enhance learning skills additionally with technological knowledge. When the global education system was threatened by the COVID-19 pandemic, most countries around the world resorted to e-learning systems to avoid the deterioration of the educational process. This study mainly focused on examining how effective e-learning is in the Sri Lankan school education context. The target population was the Grade 12 students who follow the "Technology Stream'' for their A/L especially IT as one of the subjects. They were selected from two "Type 1AB'' schools in the Kandy Educational Zone. The sample comprised twelfth-grade students. Thirty students from each school were selected randomly for the sample. This was an exploratory study that strived to find more information about how effective e-learning is in the context of Sri Lankan schools. The data collection was conducted using a structured questionnaire and the finalized data was taken into consideration to identify how effective the e-learning platform was among the selected group of students. The key finding of this study was that most of the students in the sample group have a preference e-learning and they effectively learned through e-learning. This proved by the data gathered and summarized from the responses to the questionnaire. Though the sample size was limited, a higher percentage of students used to learn e-learning effectively for their learning.

Keywords: E-learning, *E-learning*, Type 1AB

YouTube as a Language Learning Tool – Exploring the Perceptions of ELT Undergraduates of UoVT

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Abstract

E-learning has become a new learning mode in higher education. Learners have become heavily dependent on social media and other technology-enhanced language learning platforms. YouTube which is considered an influential platform has become an inseparable part of student's lives. The study aimed to explore the perceptions of ELT undergraduates of UoVT regarding the usage of YouTube for the purpose of language learning. The method used in this research was a mixed-mode method (qualitative and quantitative). The study sample was 74 undergraduates from the ELT department of UoVT. Sources of data in this study were primary and secondary data sources. The primary data collection tools were a questionnaire and a semi-structured interview. The findings of this study demonstrated that the majority of undergraduates have positive perceptions that using YouTube as a language learning tool is a good choice for them inside and outside the classroom. Furthermore, they reported that they benefited from using you tube for preparing assignments, acquiring grammatical competence, preparing for examinations and being involved in speaking activities outside the classroom. Most of the undergraduates reported that YouTube helped them learn English vocabulary, make learning English very interesting, comprehend the contents of YouTube videos in a very easy manner, get suitable materials to learn the English language, acquire the English language better by writing down the major points, to develop speaking skills by watching YouTube videos, and to enhance listening comprehension. Moreover, it should be noted that YouTube plays a pivotal role in students' lives in developing the four skills of language. Therefore, based on the findings of this study, it can be concluded that the use of YouTube has numerous positive impacts on ESL

learners' English language proficiency.

Keywords: You tube, Language learning tool, Technology-enhanced learning, higher education, Undergraduate

Challenges Faced During Speaking Activities – A Survey Carried among the Mechatronics Students of UoVT

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Abstract

Language plays a vital role in communication during lectures. Significantly, in a multilingual classroom that employs English as the medium of instruction in the teaching-learning process. English is used as a common language for students with different native languages. Yet, it is significantly noted that the undergraduates of UoVT have faced challenges in speaking English though they are following English medium degrees. Therefore, this study focused on discussing the challenges of speaking among UoVT mechatronics students. The main objective of the study was to identify the challenges faced by students during speaking activities. This paper was developed by administering questionnaires that consist of closed and open-ended questions among fourty students of UoVT from the mechatronics department. And also conducted an interview with the 10 students from the same sample and conducted interviews with 3 lecturers. This study concluded that the undergraduates of UoVT faced challenges in speaking English such as lack of vocabulary, knowledge of grammar, feeling uncomfortable, frustrated, or worried when speaking English, not having a healthy environment to talk, shyness, etc. This study was supportive of coming to the conclusion and remedial measures for these challenges such as making learner learner-friendly environment, adding more speaking activities in the curriculum, and planning activities to enhance the learners' vocabulary, grammar, and pronunciation develop learners' speaking ability etc.

Keywords: challenges, speaking, pronunciation, vocabulary, grammar

Psychological Factors Affecting Speaking in English among Lower Secondary Level ESL Learners

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Abstract

Most Sri Lankan students face challenges when it comes to communicating effectively in English and engaging in class discussions or various conversational topics. The reasons for this are the complexity of the speaking skill and the impact of major psychological factors such as anxiety, shyness, lack of self-confidence, and lack of motivation. This research was carried out to explore the effects of main psychological factors on grade six students' second language speaking performance at Kg/Mw/Mawathagoda Rivisanda Central College. The objectives of the research was to find out the psychological problems faced by learners speaking the English language and to identify the reasons for those psychological problems. This explanatory study was carried out by the administration of a questionnaire to a sample of fourty students to reveal the effect of the main factors as well as an interview conducted with five teachers of English, which are teaching these students. According to the findings, the majority of students' poor speaking abilities were caused by psychological issues including anxiety, shyness, a lack of self-confidence, and lack of motivation, which in turn cause several issues such as less vocabulary, shyness, and fear of making mistakes. The study made some recommendations for education, such as the necessity of creating a suitable environment for motivating students to practice speaking in class and encouraging their motivation and confidence by organizing various speaking activities. Also, for a better level and fluency, students should practice speaking English both inside and outside of the classroom. The researcher was able to verify the psychological factors affecting English among lower secondary-level English as a second language learners.

Keywords: Psychological factors, second language learning, self-confidence, speaking activities, speaking skills

The Impediments To The Progression Of Oral Competence Of English As A Second Language Of Grade 13 Students Of The National Schools In Sri Lanka

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Abstract

The ability to speak in English is considered an invincible requirement in any field to secure a respectable and comfortable place on the pyramid of social level in Sri Lanka. Every year a considerable number of novice group of students enter the world of work after the G.C.E Advanced Level Examination. The doubt arises whether every one of them would be the best suited for the high demand of the labor market as it seemed that most of them lack oral proficiency in English. Hence, the main objective of this study was to investigate the reasons that obstruct the oral competence of English of grade 13 students of the national schools of Sri Lanka. Also, addressing the research problem of employing the Communicative Language Teaching method in a classroom context of English as the second language and potential obstructions to the advancement of oral competence of students in grade 13 was done with three hypotheses postulated and research questions. A mixed-method research framework was used in this study with direct classroom observations, semi-structured interviews with the teachers and students, administering a questionnaire for students, testing of grammar, vocabulary, and speaking skills of students, and the analysis of the textbook about speaking skills as main research instruments to collect data. The findings revealed that students' irregular attendance to classes, anxiety, self-esteem, lack of motivation and interest, prioritizing of main subjects, and teachers' ignorance of the use of Communicative Language Teaching, demotivation, less preparation for class and frailties of educational authorities to organize teacher training, workshops and maintaining systematical and regular processes to assess teachers' and students development through observations as the main factors that impede the oral progression of students of grade 13 in national schools of Sri

Lanka."

Keywords: Oral proficiency, Communicative language teaching, National schools, G.C.E. (advanced level) examination

Applying Bloom's Digital Taxonomy for the University Education.

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Abstract

The primary aim of Bloom's Digital Taxonomy is to gain knowledge on using technology and digital tools to facilitate students' learning experiences and outcomes. This research mainly focuses on connecting Bloom's Revised Taxonomy to Bloom's Digital Taxonomy features required for developing online learning activities to meet the demands of undergraduates. Bloom's Digital Taxonomy guides us through
the variety of digital resources available and helps us decide on the learning experiences we want our students to have. Here we search how to apply Bloom's Digital Taxonomy to undergraduates. The activity's difficulty level will determine the most appropriate digital action concerning Bloom's Revised
Taxonomy's cognitive levels. This study is mixed methods research. The questionnaire is designed in Google Form questionnaires.(About Technological Tools). The sampling method is the convenience sampling method. (Non-probability) The collected data was used for analysis through MS Excel and data was represented through line graphs, tables, Ven graphs, and bar graphs. The findings revealed that Bloom's Digital Taxonomy has intervened in the undergraduate's education, in disguise. Without proper attention or knowledge of BDT students try to learn with web tools.Besides, the results revealed that university has to apply BDT systematically so that students can easily apply digital verbs in their usual studies. Students are capable of web tools to some extent but the lack of facilities and knowledge to develop their learning through this new taxonomy. Here the research study shows a new aspect that universities should be concerned about immediately for university development and endurance.

Keywords: Bloom's digital taxonomy, Bloom's revised taxonomy, Higher order thinking skills, Lower order thinking skills

Sustainable construction practices and built environment, for sustainable future

Investigation Of The Effectiveness On Strength Of The Alluvial Deposit Mix With Rice Husk Ash For Soil Stabilization Of Back Filling

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Abstract

Dump soil is widely distributed all over the world, especially in river basins, desilting areas, and coastal areas. When construction is going on in those areas, the lot of existing soil behaves as waste material. In engineering practice, dump soil cannot be used to build any construction in its natural condition and needs to be improved or treated before being used in construction. Rice husk ash (RHA) is a byproduct of the milling process. Rice is the main meal in 70% of countries around the world. Every year, a large amount of rice and its byproduct, rice husk ash (RHA), is produced. A huge amount of Rice Husk was wasted annually. To improve the characteristics of the soil mixture, various percentages of alluvial soil from rivers were added as a geotechnical material. Where RHA can be a binding agent for improving soil characteristics. Both RHA and alluvial soil were waste materials. This addition helps in soil conservation and its use as a natural construction material, which helps reduction of excavation. The objective of this experiment is to investigate the optimum mix proportion of RHA and alluvial deposit to produce an improved filling material for earth backfilling. Various percentages like 10%, 20%, and 30% of RHA were added as a partial replacement to alluvial soil and tested for Compaction, LL, PI, and CBR. From the test results, it is identified that the addition of RHA to the Alluvial soil decreases the MDD and CBR values rapidly. But up to 30% of RHA will give MDD values up to 1500 kg/m3 and CBR values up to 12%. According to the results obtained by adding RHA to alluvial soil, adding more RHA does not have an effective result compared to rapid reduction. Both the selected soil sample and RHA were non-plastic materials. where the values of LL and PI were zero. Hence, according to the

results obtained from the research, by applying these soil mixtures for backfilling, settlement reduction can be beneficial in the construction industry.

Keywords: Rice husk ash, Alluvial soil, Maximum dry density, Optimum moisture content, California bearing ratio

Determination Of Effective Area of a Salinity Barrier to control Saltwater Intrusion to Paddy lands in Weligama, Matara

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Abstract

High salinity in the soil is a serious threat to coastal agriculture and has resulted in a significant reduction in agricultural output in many regions of Sri Lanka and by reducing agricultural productivity of the fertile coastal lands.

Weligama located in the Matara district of the southern province of Sri Lanka, is also a victim of the adverse effects of coastal salinity for cultivation. For the study, an area was selected near Weligama Bay which is known as "Jamburagodayaya". The selected land is approximately 3.5 km from the coast (Weligama Bay). The region is highly exposed to coastal hazards, including sea-level rise and flooding, which increases the risk of soil and aquifer salinization.

This study is mainly focused on finding the effective area of the existing salinity barrier. Five branch canals can be identified in this area, which is affected by tidal waves and seawater intrusion, The Pamanella canal is one of those which contains a salinity barrier across the canal. This study is mainly focused on finding the effectiveness and effective area of the existing salinity barrier. Soil samples were collected from the area and EC, and pH values were tested to determine the salinity. A control test was conducted to determine the interval at which the soil samples need to be collected. Accordingly, 200m intervals were selected and whole land was divided into 200m*200m grids.

Thereafter soil samples were collected from the area at selected locations (grids) . EC and pH readings were taken into account when creating the soil maps. By considering the soil map for EC and Ph values, the percentage of

land area that can be cultivated without effect from the salinity was calculated. It gives the effective area of the existing salinity barrier.

But this study shows that, by this existing salinity barrier, it can be cultivated in more than 75 % of the land. Only 25% of the land affected by salinity. If farmers can go for a paddy verity withstand for salinity for that 25% and cultivate the remaining 75% with the use of the existing salinity barrier it will be a very successful area to cultivate even if it is very close to the coastal belt.

Keywords: Effectiveness, Paddy cultivation, Salinity barrier, Salt water

Commuter preference analysis for the proposed light rail transit service from Malabe to the Colombo Fort

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Abstract

The purpose of this study was to identify commuters' perceptions of the proposed Light Rail Transit system (LRT system) from Malabe to Colombo Fort to relieve traffic congestion in Sri Lanka's Colombo Metropolitan District. The study's goal was to uncover demand characteristics that would encourage daily commuters to use LRT, and the data gathered will be used to create a model to demonstrate the user preferences in the LRT system. The random sampling procedure was used to collect a sample of hundred and thirty respondents. A questionnaire with twenty-six variables was created with a focus on public and private transport users. This study focuses on the proposed LRT system in Sri Lanka, aiming to make urban transport safer, more efficient, and more sustainable. Factor analysis was used to minimise the number of variables and generate new components. The eight factors influencing the LRT network has been identified from the twenty-six variables used that include, the use include transport service quality, accessibility, comfort, staff behaviour, ICT usage, convenience, punctuality, reliability, and ease toll payment structure. The LRT system, linked to intelligent technology, offers benefits such as congestion control, economics of scale, information and communication technologies, energy, conservation, and environmental pollution control. By upgrading urban transport infrastructure, the LRT system can increase commuter satisfaction, and further research is needed to explore the preference of the other proposed LRT system in the Colombo metropolitan area. The

development of the proposed light rail transit system in Malabe – the Colombo Fort corridor will help to increase the satisfaction level and to accelerate the growth in the urban transport structure of Sri Lanka.

Keywords: Commuter, Congestion, LRT

Optimising Technical Properties of Concrete Bricks with Waste Steel Powder

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Abstract

Modern-day building construction is mainly based on concrete bricks, rather than mud bricks. However, with the economic crisis and inflation rates of prices on raw materials and manufacture, both the construction industry and consumers are in a problematic situation. As a result, alternative ways for cost reduction are being attempted by the researchers. Besides, the environmental issues with industrial discards are now greatly exacerbated. Since steel is the most widely consumable category of metals, steel industry discards, which aren't easily degradable are accumulated and occupy valuable land areas. This study was attempted by considering both of these factors. Waste steel powder has been considered an additive material of concrete bricks. It also tries to add value to non-degradable waste. In this study, the physical and mechanical properties of concrete bricks prepared by adding this waste in different percentages were presented. Visual appearance, percentage of water absorption, density and compressive strength were the considered properties. The best and optimum amount of steel powder to preserve the expected properties and minimise the cost was revealed as 30%.

Keywords: Concrete bricks, Steel powder, Technical properties, Waste management

Impact of Unexpected Rapid Price Fluctuations on Medium-Scale Building Construction Projects in Sri Lanka: A Case Study

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Abstract

The construction industry is facing a severe recession. This scenario spreads throughout the country, and contractors related to the construction industry are critically affected. The general objective of this research is to investigate the variation in material prices in the construction industry and its impact on medium-scale building construction projects. This research investigates the effects of unexpected rapid price fluctuations on the capacity of local contractors. The study concepts are developed through a literature survey to identify relevant variables, and project case studies are used to assess the problem. According to the research, market survey details show that the material price increased dramatically after June of 2021, and these followed a steep upward trajectory until June of 2022. When considering other materials, the price of cement is reduced. Figure 2. Most of the material prices increased above 200% compared to the year 2019. The highest increase in the price of the material is cement and increased to 268% in June 2022 compared to 2019. Not only the material but also the labour daily charges have been escalated, as an example, Blacksmith, Plumber, Specials sk labour and Tinker prices are inflated up to 90% in December of 2022 compared to the year 2019. The results presented by the case studies collectively demonstrate a pattern of price fluctuation across multiple projects and all the projects which are selected for the case study work suffered from the price escalation. The project which completion date is falling under the month October in year 2022 (3rd part of 2022), shows the significant price increase. The actual completion dates of projects are significantly delayed compared to their scheduled completion dates and it is the major reason for the price increment.

Keywords: Price escalation, Price indices, Construction in- puts, Price fluctuation

Crack Investigation and Proposing Remedies: A Case Study in "Jeewaka Hostel, Borella

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Abstract

This paper discusses the crack investigation and the proposed corrective and preventive measures for the newly constructed 3-story building named "Jeewaka" hostel in Borella. The building was found to have many cracks, including thermal cracks in the joints between the masonry wall and the RCC (Reinforced Cement Concrete) columns and beams, and shrinkage cracks below the window openings. This paper outlines the type of crack and the cause and suggests preventive and corrective measures to improve building safety and usability. Causes, corrective measures, and preventive measures were taken from expert interviews and analyzed using the Delphi technique. According to the findings, it is strongly recommended to provide a chicken wire mesh between the RCC and the masonry joint before starting plaster work. In addition, expansion and construction joints are recommended as good practices. Furthermore, the findings reveal that most cracks under the windows are shrinkage cracks, and it can be recommended to have preventive measures such as providing the sill beam, avoiding the use of rich cement mortar in masonry and by delaying plaster work until the masonry has dried after proper curing.

Keywords: Thermal cracks, Shrinkage cracks, Structural cracks, Non-structural cracks, Delphi technique

Economic Analysis of an Inverter and Non-Inverter Type Split Unit Air- Conditioners for Hotel Buildings in Coastal Belt of Sri Lanka (Case Study)

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Abstract

This study presents an analysis to investigate the life cycle cost between inverter and non- inverter split type air-conditioners for hotel room application in "The Villas ABC" in coastal belt. The selected air conditioners used in this study are 24000BTU inverter and non-inverter type spilt air conditioner units. The operating cost for each air conditioner was determined from the data provided by the manufacturers as well as the data collected during the study. In this analysis, the life cycle cost of the inverter type split unit air conditioner was compared with same aspect of non-inverter type split unit air conditioner. It is found that an inverter type air conditioner life cycle cost with considering its maintenance cost is Sri Lankan Rupees 5,600,971.00. The percentage of energy saving has dominant effect on life cycle cost followed by the effect of operating hours per day. Inverter type split air conditioner has higher maintenance cost compared with non-inverter type. The life cycle cost calculated including maintenance cost of non invertor type air conditioner is Sri Lankan Rupees 5,502,425.00. The results of the study show that there is no cost saving for the option of for invertor type AC and non-invertor AC has saving of Sri Lankan Rupees 98,546 compared to inverter type split air conditioner with percentage of 2%. During this study it was found that the non- inverter type is more economical to the Hotel "The Villas –ABC" due to the higher maintenance cost. Other than the cost saving the low breakdown rate minimized the additional stress on maintenance staff and the guests were not disappointed.

Keywords: Life cycle cost , inverter type air conditioner, repair cost ,cost of energy use, main

Investigation of Acceptability of Offshore Sand for the Construction Industry in Sri Lanka

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Abstract

The construction industry in Sri Lanka faces a critical challenge in the supply of river sand, for various construction applications. To address this issue, offshore sand has emerged as a potential alternative for river sand in construction. However, despite its abundance in coastal areas, offshore sand's acceptability in the construction industry remains limited due to concerns about its quality and suitability.

This research aims to bridge the gap between public perceptions and the technical suitability of offshore sand. The study identifies the factors influencing the acceptability of offshore sand through a questionnaire survey, expert interviews, and a comprehensive literature review. Experimental investigations concluded that the properties of offshore sand are in accordance with British and Sri Lankan Standards. The results demonstrate that offshore sand meets the required standards for compressive strength, workability, chloride content, shell content, and other impurities, making it a suitable alternative for river sand in construction applications.

Based on the research findings, a set of recommendations was formulated to enhance the acceptance and usage of offshore sand. These recommendations include conducting awareness, updating mix design guidelines to accommodate offshore sand properties, and implementing policy decisions to promote its use in government projects.

Keywords: compressive strength, workability, chlorine, construction material, river sand

Identifying Issues Related to Domestic Plumbing, Corrective and Preventive Measures: A Case Study

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Abstract

Plumbing-related issues (Blockages, Leakages, and damages etc.) after construction are common in any type of buildings. Mostly it leads to damage the building structure, water waste, safety issues of users and as unexpected high maintenance cost etc. This study focuses on proposing corrective and preventive measures for common issues in plumbing and sanitary related. As a case study, three site locations that have plumbing problems have been selected in the Western South Department of Buildings, Survey Department, and Foreign Ministry Quarters. The most common issues have been identified by a technical inspection in the above three locations and using the analysis of financial cost usage for past 5 years of time. The main issues highlighted are leaks and damage to pipe fittings, pipes, sanitary fittings, and blockages in waste lines. It was established through a questionnaire that problems with most caused by poor maintenance. Then, corrective and preventive measures have been identified for these issues. Corrective measures have been proposed to repair, replace, and clean chemical blockages. As preventive measures, implementation of planned maintenance mechanism and facilitation of training for plumbers is recommended. Finally, it is recommended to focus more on preventive measures rather than corrective measures to minimize problems and reduce expenses.

Keywords: plumbing, sanitary fittings, leakages, blockages, relative importance index value

Surge Protection Device Monitoring System

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Abstract

Surge protection devices are commonly used in street lighting applications to reduce the effects caused by lightning surges. Street lighting systems are highly prone to lightning since they are installed in outdoors. Surge protection devices are used in order to protect street lights from lightning however these devices can fail after being in operation for some time and such devices should be replaced immediately since the street light and the power distribution system will be at a risk. The device contains an indicator which shows the operational status. Since the street lights are installed at a considerable height it is not practically possible to monitor the working status of the surge protection device. This paper describes the development of a IR sensor based system to monitor the status of the surge protection device and when it fails the system will generate a notification. The architecture and design of the system is discussed in detail. The practical challenges were identified while developing the prototype and innovative solutions that were implemented in order to overcome the issues and maintain accurate detection are discussed. The developed prototype was able to successfully identify the surge protection devices and it was verified through testing. The paper also proposes future improvements that are needed to use the system in real life situations since the module may have to install in adverse outdoor conditions.

Keywords: surge protection device, failure notification, maintenance

Energy management and quantity surveying best practices for resilient industries

Exploring the Potential of Economies of Scale during the Market Sluggishness

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Abstract

Economies of scale (EOS) is a widely adopted economic principle in many industries including construction. A decline in the average cost can yield high fixed costs, lower input prices due to high-volume purchasing, or learning economies. Beyond a certain point, diseconomies of scale occur. Scale economies can serve as the basis for cost leadership in the construction industry. However, Covid 19 and the recent economic recession have garnered a considerable risk of holding excess capacity, and various other barriers that hamper the ability to yield economies of scale.
This research therefore explored the application of the Economics of Scale in the current context of construction. A comprehensive literature survey was carried out to identify the attributes of scale economics. A structured questionnaire survey was administered among 100 individual practitioners to gauge their perceptions and experience. 83 were considered valid for analysis. Data collected were then analyzed using the relative importance index. As per findings "Division of labor" was the most prevalent factor that fosters Economics of Scale at site level, followed by descaling and de-scoping. The least rank RII identified was Parallel engineering.

Keywords: construction projects, economies of scale, new normal

Mitigation of Financial Risks Involved in the Budget Performance of Building Construction Projects

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Abstract

The impact of financial risks involved in budget performance and the mitigation of those risks are important to achieving project success. The study focused on the impact of contractor's financial risks on budget performance and the mitigation of those risks in building construction projects. The sample is selected from Sri Lankan Colombo suburbs with high-rise buildings costing more than 100 million rupees. The research utilized quantitative and qualitative approaches, including a validated questionnaire survey and structured interviews. The review of the literature identified thirteen financial risk factors and examined four variables related to budget performance issues in these projects. The findings revealed that among the financial risk factors, unmanaged cash flows, inadequate financial management, bankruptcy, errors in estimating, liquidity risk, changes in government legislation, and the fluctuation of the inflation rate showed the highest impact on budget performance issues. In contrast, insurance risk had the lowest impact. Further, based on expert interviews, building an emergency fund, ensuring risk retention, and having a contingency plan were highly recommended methods for mitigating financial risks. Diversifying income sources and clear communication between project stakeholders were least preferred.

Keywords: financial risks, budget performance, mitigation of financial risks, building construction projects

The impact of challenges of current economic crisis on the performance of Sri Lankan building construction projects

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Abstract

Sri Lankan building construction projects face significant obstacles specifically, as a result of the economic crisis in the year 2019-2022. This research is conducted to identify the correlation between the critical challenges of the Economic Crisis of the construction sector of Sri Lanka (2019-2022), on project performance variables, and derive corrective measures to mitigate the impacts.

The research focuses as objectives on identifying the critical challenges of a construction project, and further identifying the Project performance criteria for building construction projects. Research also identified the correlation between the most critical challenges of the Economic Crisis, with construction project performance. It also suggested corrective measures to mitigate the impacts. The mixed method was applied in the methodology. Data was analyzed using Excel and SPSS software. Among 21 critical challenges, 12 most preferred factors were identified over the ranking of factors by Relative Importance Index (RII)/ Further, the correlation between the ranged 12 critical challenges, with project performance variables: time, cost, and quality were identified. As per the findings, it was found that, considered three project performance indices: time, cost and quality. Key 12 performance metrics have impact positive and negative versions, on the current building construction performance.

Keywords: construction, challenges, economic crisis, correlation, immediate attention

A Review of Emission Filtering and Controlling Systems Applicable for Fossil Fuel-Based Electricity Generators

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Abstract

The increasing electricity demand has led to the widespread utilization of fossil fuel-based electricity generators, which, in turn, has raised concerns about their environmental impact due to emissions of pollutants. This paper presents a thorough review of emission filtering and controlling systems suited for fossil fuel-based electricity generators. The study encompasses various technologies aimed at mitigating the adverse effects of emissions, encompassing both emission filtering systems and advanced control strategies. Through an in-depth analysis of these systems, this paper aims to provide insights into their effectiveness, challenges, and prospects in the context of environmental sustainability and regulatory compliance.

Keywords: emission filtering, emission control systems, fossil fuel-based generators, environmental impact

Guidelines to improve supply characteristics of Solar PV system components to improve sustainable supply chain practice

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Abstract

Sri Lanka has a considerable solar energy potential as, over two-thirds of the land mass attains a 4.0–4.5 kilowatt-hours per square meter per day (kWh/m2 /day), as solar radiation in general. Yet, as per earlier research findings it was found out that, because of the lack of detailed market data in supply and demand statistics, it was difficult to develop a comprehensive solar PV-based energy supply chain in Sri Lanka.

This research is conducted to find the frequency of correlated Performance characteristics related to the supply of Solar PV systems for buildings in Sri Lanka, to provide supply-side recommendations for improvement. Thus, the Literature review finds variables for supply components of a Solar PV system for buildings such as PV panels, Inverters, DC Cables, Surge Arresters, Mounting structures, Batteries, and Charge Controllers. Among the criteria of Solar PV system for residential buildings Cost, Efficiency and Durability was considered for performance evaluation. Accordingly, the frequency of correlations of each interpolated variable was identified. Further in the research strategies suggested for improving the supply characteristics of Solar PV system components to improve supply characteristics to the market.

Keywords: supply components of a solar PV system, performance characteristics, effective mechanism

A Study on Lighting Technologies Used in Homes in Sri Lanka and its Impact on the Energy Demand of the Country

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Abstract

Lighting accounts for significant energy usage of household consumers. In Sri Lanka, morning and evening peak in the energy demand curve occurs mainly due to the household energy demand. The lighting technologies used in households will impact the energy consumed since the energy efficiency of different lighting technologies are different. This study investigates lighting technologies used by household consumers through a survey and the possibility of reducing the peak demand by changing the lighting to more energy efficient technologies is explored. The survey covers a sample of 1000 houses randomly selected, and the results are extrapolated to the total number of houses in the country to arrive at national level data. The lighting technologies considered are incandescent, compact fluorescent lamps and light emitting diodes. Further, some other aspects regarding other characteristics of the household lighting systems are also investigated. The findings indicate that the majority of the households now use light emitting diode technology. However, the lighting load can be further reduced by converting the incandescent and compact fluorescent lamps used to light emitting diodes. This conversion can reduce the thermal energy usage for electricity generation at peak load situations which can immensely contribute to reduce the electricity generation cost and also reduce the carbon footprint of the power generation system of the country.

Keywords: lighting technologies, households, Sri Lanka, energy efficiency, peak demand

Energy management for the sustainability of Sri Lanka: Transition through green energy, Challenges & Future Prospects

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Abstract

It is evident that the existence of mankind on earth is dependent on "energy". However, human inclination to use non-renewable sources of energy such as fossil fuels exert considerable pressure on the environment and human health. This has made the countries to adopt the renewable sources of energy such as "green energy". Thus, it has become a goal of modern governance to implement "green energy management" to achieve sustainable development. The author has adopted a qualitative approach as the methodology and objective is to elaborate on the applicability of the concept of "sustainable green energy" in the landmass of Sri Lanka, the challenges in implementation and the future aspects. The author has identified that the corporate sector must implement sustainable green energy strategies. However, this has several obstacles which are economical, educational and socio-cultural. The shortage of investments, technological support, data and the norms of the society are prominent impediments in the context of Sri Lanka. It is evident that the government and relevant authorities on energy are entrusted with the obligation to consider the prospects of green energy management by imposing laws and policies in setting targets, increasing the private sector interference in providing financial support, enhancing the institutional support in exploring the sources of green energy and the promoting common initiatives. The ultimate success is based on the manner in which Sri Lanka interacts with foreign nations. The conclusion of the paper has elaborated that, "green energy management" is an imperative component in the governance of Sri Lanka which can be developed by global collaboration.

Keywords: energy, green energy management, sustainability, strategies

Development of a solar photovoltaic system with single-axis tracking

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Abstract

As the global demand for renewable energy sources intensifies to mitigate climate change and reduce greenhouse gas emissions, the solar energy sector has garnered significant attention. The increasing demand for clean and sustainable energy sources has prompted the development of advanced solar photovoltaic (PV) systems. While solar installations have proliferated, the quest for optimizing energy generation remains a pertinent challenge. In this research paper, we present the design, development, and analysis of a solar photovoltaic system equipped with a single-axis tracking mechanism. This system aims to enhance the overall energy output of solar panels by optimizing their orientation to the sun throughout the day. The system outlined in this study integrates advanced controllers and sensors, which autonomously govern solar tracking, optimizing energy generation. Additionally, it incorporates an innovative water sprinkling mechanism to regulate panel temperature and cleanliness, further elevating energy output and system durability.

Keywords: solar panel moving system, single axis solar tracking, photovoltaic solar tracking

Design and Development of Foot Step Power Generation System

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Abstract

Energy is an important requirement in our daily life. The resources we use are limited and many of them considerably lead to environmental pollution. Therefore, there is a need to find a way to establish methods to get the maximum use of natural resources to generate energy. The project aims to generate electrical energy by harnessing the force and vibration of the earth's surface when people walk. We designed a method for generating and storing energy using a piezoelectric plate. We wanted to find a solution using our energy source. This is a non-traditional innovative solution. Our source holds the model in place and uses the same vibration generated by humans to generate energy. It generates electrical energy that can be used to apply street lamps and phone charger points. This saves energy due to its survival and is easy to use even in the event of a power outage.

Keywords: Environmental pollution, Natural resources, Piezoelectric and vibration

Improving the Viability Assessment Process of Unsolicited Development Projects in Sri Lanka

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Abstract

A trend concept used by many governments in the modern world to achieve infrastructure development goals with the contribution of private sector capital and technical know-how is unsolicited development projects. Sri Lanka has been associating with unsolicited projects during the last two decades, targeting infrastructure development needs, but the lack of transparency in the process has created a paradox among the public. To achieve the aims of this research, a literature survey was conducted to understand the features and potentials identified by others on unsolicited projects, along with a desk study to compare the weaknesses and strengths of the procurement processes and the guidelines followed by the Sri Lankan authorities at present with similar arrangements practiced by Philippines, South Korea, and South Africa. Moreover, survey interviews were conducted to identify the existing problematic issues in connection with unsolicited projects and to collect suggestions for amendments to be introduced to the prevailing guidelines for overcoming those issues. Finally, to overcome those issues, it is recommended to introduce a few reforms to the existing system based on four policies.

Keywords: Accountability, Solicitation, Transparency, Vviability

The Adoptability of the Construction Industry Security of Payment Acts Enforced in Developed Countries to the Sri Lankan Construction Industry

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Abstract

This study investigates the feasibility of adopting the Construction Industry Security of Payment Acts practiced in developed countries by the Sri Lankan construction industry to tackle persistent payment delays and non-payment issues faced by the main contractors and subcontractors in the Sri Lankan construction industry. Thus, the primary aim is to evaluate the suitability of these Acts for the Sri Lankan context and determine the potential effective provisions and strategies to overcome long-term payment delays and non-payment for the main contractors and subcontractors. The research employs a comprehensive methodology, including a literature review, a desk study, and a questionnaire survey involving industry professionals. The outcomes of the research include key insights and recommendations to enhance payment practices in the Sri Lankan construction industry. To elaborate further, this research provides valuable guidance on the matter for policymakers and practitioners, ultimately leading to improved payment processes, reduced delays, and mitigation of non-payment problems in the construction industry.

Keywords: construction industry, security of payment acts, payment delays, non-payment, subcontractor payments

Possibility of Using Solar Panels as a Replacement of Roof Structure

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Abstract

Rooftop solar power generation has become very popular recent years not only it as a source of renewable energy to replace fossil based energy generation, but also to reuse the roof space which has not being used for other purposes. However, existing roof top requires the roof used by houses and on top of that the solar panels being fixed. In this research we explore the possibility of completely replacing the traditional roof with solar panels. By doing this it is possible to save the cost for the roof of the house, remove unnecessary health risks such as when using asbestos, and also to provide much needed energy from a renewable energy source. Sample implementation in Kallarawa shows the feasibility of such implementation, especially suited for rural areas where no electricity supply from the main grid.

Keywords: Solar, Solar panel, Rooftop solar, Renewable energy

Analysing the Impact of Behavioral Changes on Residential Building Energy Consumption: A Case study of Raddolugama National Housing Scheme

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Abstract

Human behaviour stands as a pivotal determinant impacting household energy consumption. While a building's technical attributes wield significant influence, occupant behaviour remains crucial. Our study aims to explore the intricate interplay between energy use and occupant behaviour. Data was gathered through questionnaires and interviews, with 103 residents from the National Housing Scheme of Raddolugama participating. The questionnaire encompassed thirteen parameters, including comparisons like Hours Spent vs. Energy Costs, Total Energy vs. Family Income, and Total Energy vs. Family Size. The analysis utilized the Minitab software, facilitating the exploration of relationships between energy consumption and the mentioned parameters. The collected data was rigorously examined using the Minitab software.

Keywords: Human behaviour, Energy consumption, Residential building, Household energy use

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