RIRC2019

Expanding Horizons Through Research, Innovation & Communication

Abstract Proceedings

RAJARATA INTERNATIONAL RESEARCH CONFERENCE

6-7 November

Mihintale

Rajarata University of Sri Lanka

RIRC 2019 ABSTRACT PROCEEDINGS

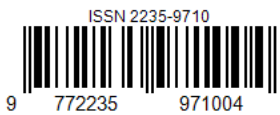
Program and abstracts of RIRC 2019 International Research Conference

6 - 7 November 2019

Edited by: Rajnish Vandercone, Chamika De Silva, Kaushalya Premachandra, Kanishka Ukuwela, Ranjan Dissanayake, Nishantha Weerakoon & Ajith Rajapaksha

First edition

ISSN 2235-9710



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About

RIRC 2019

RIRC 2019 is the **5th Annual International Research Conference** organized by Rajarata University of Sri Lanka. RIRC 2019 aims to provide an arena for local and international researchers to disseminate their research findings and to foster academic dialogues leading to future research and collaborations. The Faculty of Applied Sciences of Rajarata University of Sri Lanka coordinates the organizing of the year 2019 session of the conference.

Conference Tracks

BE	Business and Economics
ET	Engineering and Technology
MHS	Medicine and Health Sciences
NSM	Natural Sciences and Mathematics
SSH	Social Sciences and Humanities

Mihintale, Sri Lanka

Mihintale is located East of the historic city of Anuradhapura. According to historical records, Anuradhapura was established as the capital of ancient Sri Lanka n the 5th Century BC. The mountain peak located within the main Mihintale archaeological site is believed to be the site of the meeting between the enlightened monk Mahinda and King Devanampiyatissa, which established Buddhism in Sri Lanka. Mihintale is now a sacred site for Sri Lankan Buddhists. Similar to Anuradhapura, a multitude of ancient ruins, such as stupas and monastic buildings are scattered around in Mihintale. Mihinatale is also the home for the main campus of the Rajarata University of Sri Lanka, which was established in 1995 as the eleventh national University of Sri Lanka.

RIRC 2019 Organizing Committee

RIRC 2019 is organized by the Faculty of Applied Sciences (FAS) at Rajarata University of Sri Lanka.

Mr. Mr. Nishantha Weerakoon	Dr. Rajnish Vandercone	Dr. Kanishka Ukuwela
Mr. Ranjan Dissanayake	Dr. Ajith Rajapaksha	Dr. Kaushalya Premachandra
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Technology	Dr. RGPT Jayasooriya	Dr. P Kumarage

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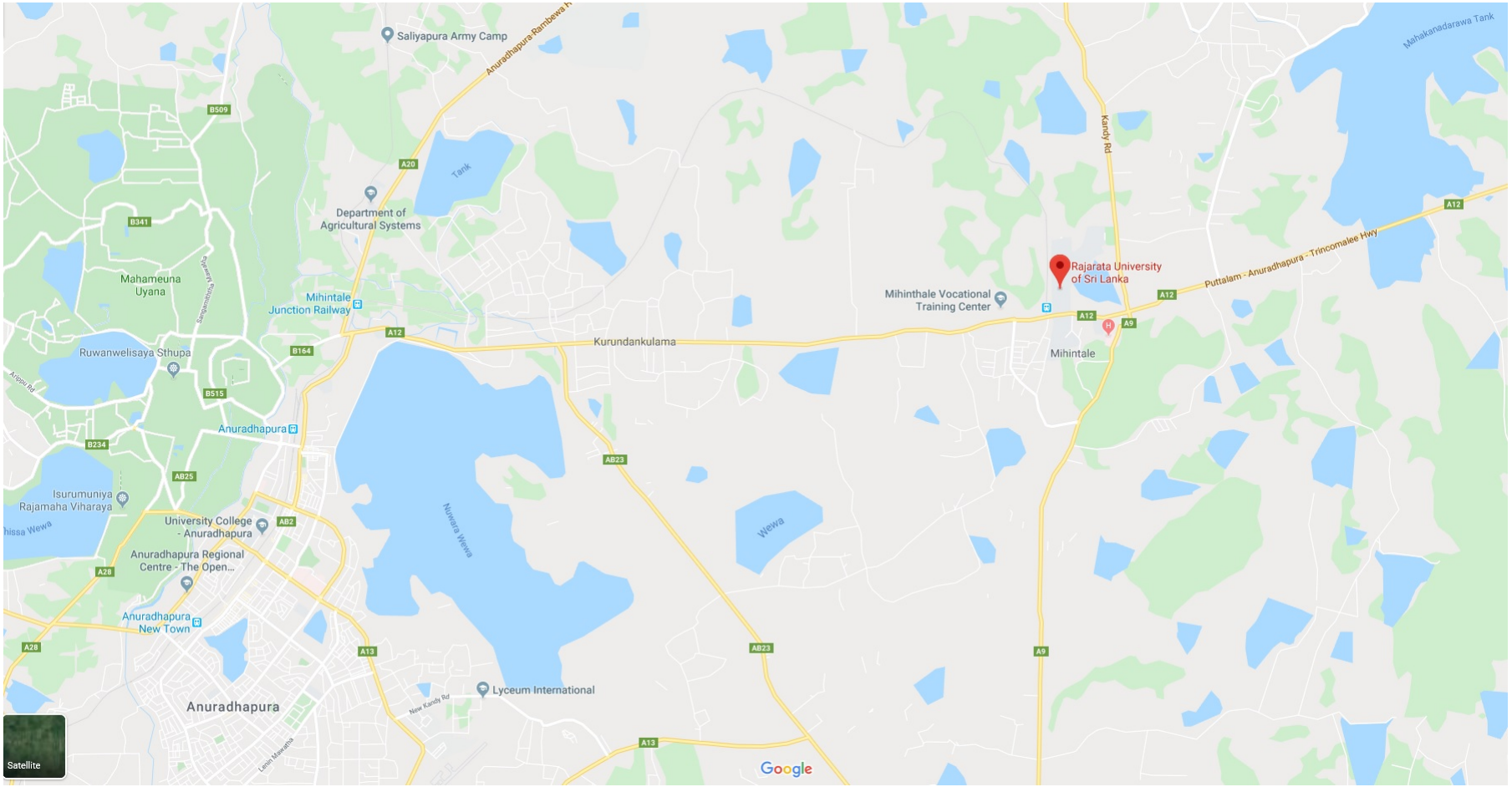


Figure 0.1: Map of Mihintale and Anuradhapura [Map Source: www.google.com, (Oct, 2019)]

Participating Institutes

University of Colombo	Colombo, Sri Lanka
Rajarata University of Sri Lanka	Mihintale, Sri Lanka
University of Peradeniya	Peradeniya, Sri Lanka
University of Kelaniya	Kelaniya, Sri Lanka
North Carolina State University	Raleigh, NC, USA
Gampaha Wickramarachchi Ayurveda Institute	Gampaha, Sri Lanka
QIMR Berghofer Medical Research Institute	Queensland, Australia
The University of Queensland	Queensland, Australia
James Cook University	Queensland, Australia
University of Vienna	Vienna, Austria
National Institute of Fundamental Studies	Kandy, Sri Lanka
Teaching Hospital	Kandy, Sri Lanka
The Open University of Sri Lanka	Nawala, Sri Lanka
University of Sri Jayewardenepura	Colombo, Sri Lanka
Sabaragamuwa University of Sri Lanka	Balangoda, Sri Lanka
University of Jaffna	Jaffna, Sri Lanka
Engineering College, Pokhara University,	Nepal
Centre for Water Resources, Anna University	Chennai, India
SaciWATERs	Hyderabad, India
General Sir John Kotelawala Defence University	Rathmalana, Sri Lanka
Shimane University	Japan
University College of Jaffna	Jaffna, Sri Lanka
Bhiksu University	Anuradhapura, Sri Lanka
University of the Visual and Performing Arts	Colombo, Sri Lanka
University of Moratuwa	Moratuwa, Sri Lanka
Australian National University	Canberra, Australia
Karnatak University	KS, India
The Hebrew University of Jerusalem	Jerusalem, Israel
University of Waikato	Hamilton, New Zealand
Inst. for Res. and Dev. in Health & Social Care	Battaramulla, Sri Lanka
National Science Foundation	Sri Lanka,
Sri Lanka Institute of Nanotechnology	Homagama, Sri Lanka
Wayamba University of Sri Lanka	Kuliyapitiya, Sri Lanka
Ministry of Health	Sri Lanka
Postgraduate Institute of Medicine	Sri Lanka

CodeGen International	Colombo, Sri Lanka
South Eastern University of Sri Lanka	Oluvil, Sri Lanka
Uva Wellassa University of Sri Lanka	Badulla, Sri Lanka
Sri Lanka Institute of Information Technology	Malabe, Sri Lanka
Department of Export Agriculture	Matale, Sri Lanka
Industrial Technology Institute (ITI)	Malabe, Sri Lanka
Eastern University	Chenkaladi,Sri Lanka
University of Ruhuna	Kamburupitiya, Sri Lanka
Field Museum of Natural History	Chicago, Illinois, USA
Horizon Campus	Malabe, Sri Lanka
Almarai Company	Riyadh, Saudi Arabia
Plant Virus Indexing Centre	Homagama, Sri Lanka
Royal Botanic Gardens	Peradeniya, Sri Lanka
International College of Business and Technology	Sri Lanka
Amphibia & Reptile Research Organization	Gampola, Sri Lanka
Troy University	Troy, AL, USA
University of Tennessee	Chattanooga, TN, USA
Sri Jayewardenepura General Hospital	Kotte, Sri Lanka
University of the West Indies	Trinidad and Tobago
University of Southern Queensland	Brisbane, Australia

Message from the Conference Chair

Dr. Eustace Fernando Conference Chair of the RIRC 2019

It is a pleasure to welcome you to the Rajarata International Research Conference 2019 (RIRC 2019), the 5th annual international research conference of the Rajarata University. In its brief history of eight years, the Rajarata University Research Conference has grown to be one of the premier annual research meetings in Sri Lanka. Since the inception of this event in the year of 2011, this is the second instance in which the Faculty of Applied Sciences is presiding over the organizational aspects of the conference. Just as the events that preceded this, RIRC 2019 will be a multidisciplinary colloquium, that will draw research ranging from the humanities to the natural sciences. RIRC 2019 carries the theme "**Expanding Horizons through Research, Innovation and Communication**" and aims to continue its tradition of disseminating high-quality research with broad local and international participation. RIRC 2019 aims to provide a platform for local scholars, industries, students and international participants from a wide range of disciplines ranging from the sciences to humanities, to disseminate their research findings to the general public and academics alike.

In planning RIRC 2019, I had the fullest support of dedicated and a dynamic organizing committee. As the chair of RIRC 2019, I take this opportunity to extend my sincerest gratitude to the organizing committee members of the RIRC 2019 and to all academic and non-academic staff of the Rajarata University who have been working in various committees, in bringing this event to fruition.

Conference Schedule

Wednesday, 6 of November

08.30a.m. - 09.00a.m.	**Registration**	**Stage I Building Lobby**
09.00a.m. - 10.05a.m.	**Inauguration and Keynote Speeches**	**Auditorium**
10.10a.m. - 10.30a.m.	**Morning Tea (Stage I & II Building Lobby Areas)**	
10.30a.m. - 12.30p.m.	**Morning Sessions**	**Rooms L01 - L09**
	Natural Sciences & Mathematics,	**Rooms L01 - L09**
	Engineering & Technology	**Rooms L01 - L09**
	Medicine & Health Sciences	**Rooms L01 - L09**
12.30p.m. - 01.15p.m.	**Lunch (Stage I & II Building Dining Areas)**	
01.15p.m. - 03.45p.m.	**Afternoon Sessions**	**Rooms L01 - L09**
	Natural Sciences & Mathematics,	**Rooms L01 - L09**
	Engineering & Technology	**Rooms L01 - L09**
	Medicine & Health Sciences	**Rooms L01 - L09**
03.45p.m. - 04.30p.m.	**Evening Tea (Stage I & II Building Lobby Areas)**	
7.00pm onwards	**Conference Dinner**	**Nuwarawewa Hotel**

Room L01	(MHS) Ayurvedic and Indigenous Medicine
Room L02	(MHS) Infectious Disease and Biochemistry
Room L05	(MHS) Public Health and Health Administration
Room L09	(ET) Engineering
Room L07	(ET) Technology
Room L08	(NSM) Agriculture, Biology and Food Science
Room L09	(NSM) Mathematics and Statistics
Interactive Lecture Theater	(NSM) Chemistry

Thursday, 7 of November

08.30a.m. - 08.50a.m.	**Registration**	**Stage I Building Lobby**
08.50a.m. - 9.30a.m.	**Keynote speeches**	**Auditorium**
9.30a.m. - 9.45a.m.	**Morning Tea (Stage I & II Building Lobby Areas)**	
9.45a.m. - 12.30p.m.	**Morning Sessions**	**Rooms L01 - L09**
	Business & Economics,	**Rooms L01 - L09**
	Social Sciences & Humanities	**Rooms L01 - L09**
		Rooms L01 - L09
12.30p.m. - 01.00p.m.	**Lunch (Stage I & II Building Dining Areas)**	
01.00p.m. - 03.30p.m.	**Afternoon Sessions**	**Rooms L01 - L09**
	Business & Economics,	**Rooms L01 - L09**
	Social Sciences & Humanities	**Rooms L01 - L09**
		Rooms L01 - L09
03.30p.m. - 03.45p.m.	**Evening Tea (Stage I & II Building Lobby Areas)**	
3.50p.m. - 04.30.pm	**Awards & Closing Remarks**	**Auditorium**

Room L08	(SHS) Social Sciences
Room L07	(SHS) Humanities
Room L01	(SHS) Languages
Room L09	(SHS) Archeology and Heritage Management
Room L04	(SHS) Environmental Management
Room L05	(BE) Human Resource and Tourism and Hospitality Management
Room L02	(BE) Accounting
Industrial Math. Lab.	(BE) Economics and Information Technology
Interactive lecture Theater	(BE) Management

Message from the Vice Chancellor

Dr. Ananda Karunaratne, Vice Chancellor Rajarata University of Sri Lanka

It is indeed a pleasure to issue this message on the occasion of the Rajarata International Research Conference 2019 (RIRC 2019).

Cutting-edge research represents the frontier of human imagination and effort. RIRC 2019 being a multidisciplinary research forum, showcases latest research trends and developments in different fields ranging from natural sciences to the humanities. While it is important to emphasize the creation of new knowledge through research, disseminating the outcomes of research to society cannot be overlooked. For such as RIRC 2019 are encouraged as in effort to disseminate research not only within the academic community, but also to the general public. The RIRC 2019 theme **"Expanding horizons through research, innovation and communication"** emphasizes this purpose.

Over the years, the Rajarata annual research conference has grown to such as extent that this year, it features numerous high-quality research work from both local and international scholars. This years event also featuring several global experts in their respective fields conducting pre-conference workshops and providing keynote addresses during the conference. I am thrilled to announce that the annual research conference of Rajarata University has now become one of the premier research meetings in Sri Lanka.

I would like to take this opportunity to thank the RIRC 2019 organizing committee and everyone else who have contributed in numerous ways to make this event a reality. I am sure that RIRC 2019 will be both educative and intellectually stimulating discussion forum for all those who are taking part. I wish the participants and the organizers of RIRC 2019, all success.

Guest Speakers

Alun Lloyd,
Drexel Professor of Mathematics,
North Carolina State University, Raleigh, NC, USA

Prof. Alun Lloyd is a mathematical biologist and a Professor of Mathematics at the Department of Mathematics at the North Carolina State University. He is also the Director of Centre for Quantitative Sciences in Biomedicine, the Biomathematics Graduate Program and the Research Training Group in Mathematical Biology at North Carolina State University. Prof. Lloyd's main research work concerns mathematical biology with a particular interest in mosquito-borne infections. He obtained his B.Sc. degree in Mathematics from Trinity College, Cambridge and Ph.D. from Oxford University, UK in 1996. He also had his postdoctoral training at Oxford University before moving to North Carolina State University as Faculty in 2003.

Dirk Kindermann,
Assistant Professor of Philosophy,
University of Vienna, Austria

Dr. Dirk Kindermann is a philosopher of language and an Assistant Professor in Philosophy at the University of Vienna in Austria. His main research concerns the interaction of linguistic meaning with context in semantics and pragmatics. Dirk's wider research interests include issues in the philosophy of mind, epistemology, and feminist philosophy. Dirk has written on relativism, truth, mental attitudes and content, knowledge, and communication, and matters of taste. He is co-editor of two books forthcoming with Oxford University Press, "Unstructured Content" and "The Fragmented Mind", and a member of the German research network "The Semantics and Metasemantics of Context-Sensitive Language".

Harshana Liyanage,
Research Fellow,
Department of Primary Health Care Science, University of Oxford, UK

Dr. Harshana Liyanage is a Research Fellow in Clinical Informatics at the Department of Primary Health Care Science, University of Oxford. He is the secretary of the Primary Care Health Informatics Working Group in both the European Federation of Medical Informatics and the International Medical Informatics Association. Harshana serves as an associate editor of the British Medical Journal - Health & Care Informatics. During the past few years, Harshana has been involved in a number of European projects profiling and linking health databases for epidemiological studies. His current research focus is on developing case-finding algorithms and ontologies for supporting routine health data analysis.

Herath Manthrithilake,
Senior Researcher,
International Water Management Institute (IWMI), Sri Lanka

Dr. Herath Manthrithilake is a Senior Researcher and the Head of Sri Lanka Development Initiative of International Water Management Institute (IWMI) of Sri Lanka. His main research concerns stochastic hydrology and focuses on river flow regimes as Markov Chains, modeling and simulation for the management of river cascades regulation, and use for agricultural and hydro power production.He obtained his M.Sc. in Water Resource Engineering from International Friendship University in Moscow USSR and Ph.D. in Hydrology and Water Resource Management from the Moscow Civil Engineering Institute, Moscow, USSR. Dr. Manthrithilake has over 35 years of experience in dealing with water-related issues and irrigation management. He has experience in leading multidisciplinary and multicultural research teams in many countries and has extensive experience in serving in many National Science committees. He served as the Director of Planning and Monitoring Unit of Mahaweli Authority, Sri Lanka before joining IWMI as a Senior Researcher in 2002.

Maithree Wickramasinghe,
Department Chair and Senior Professor of English,
Department of English, University of Kelaniya, Sri Lanka

Prof. Maithree Wickramasinghe is a Professor of English and the founding Director of the Center for Gender Studies at University of Kelaniya, Sri Lanka. Maithree is also a visiting Professor at the Center for Higher Education and Equity Research (CHEER), School of Education and Social Work, University of Sussex, UK. Maithree s main research interests includes gender studies such as gender equality, a scan of gender sensitive laws, feminist-research methodology, etc. She is an Associate Director for the forthcoming Wiley Blackwell Encyclopedia on Gender and Sexuality Studies.

Message from the Hosting Dean

Prof. (Ms.) Sriyani Wickramasinghe Dean Faculty of Applied Sciences Rajarata University of Sri Lanka

It is an honor to be serving as the Dean of the Faculty of Applied Sciences (FAS) at the Rajarata University of Sri Lanka (RUSL) when the FAS is hosting the 5th International Annual Research Conference of the RUSL. On behalf of FAS, I warmly welcome all the presenters, guest speakers, reviewers, panel chairs and all the participants. I wish you all an intellectually stimulating experience at the conference (RIRC 2019).

Research and scholarly activities are essential to the RUSL mission. Universities have a responsibility to provide expertise to solve the problems important to society. Holding university-wide research sessions to disseminate the generated knowledge is an ideal way to commit to this duty.

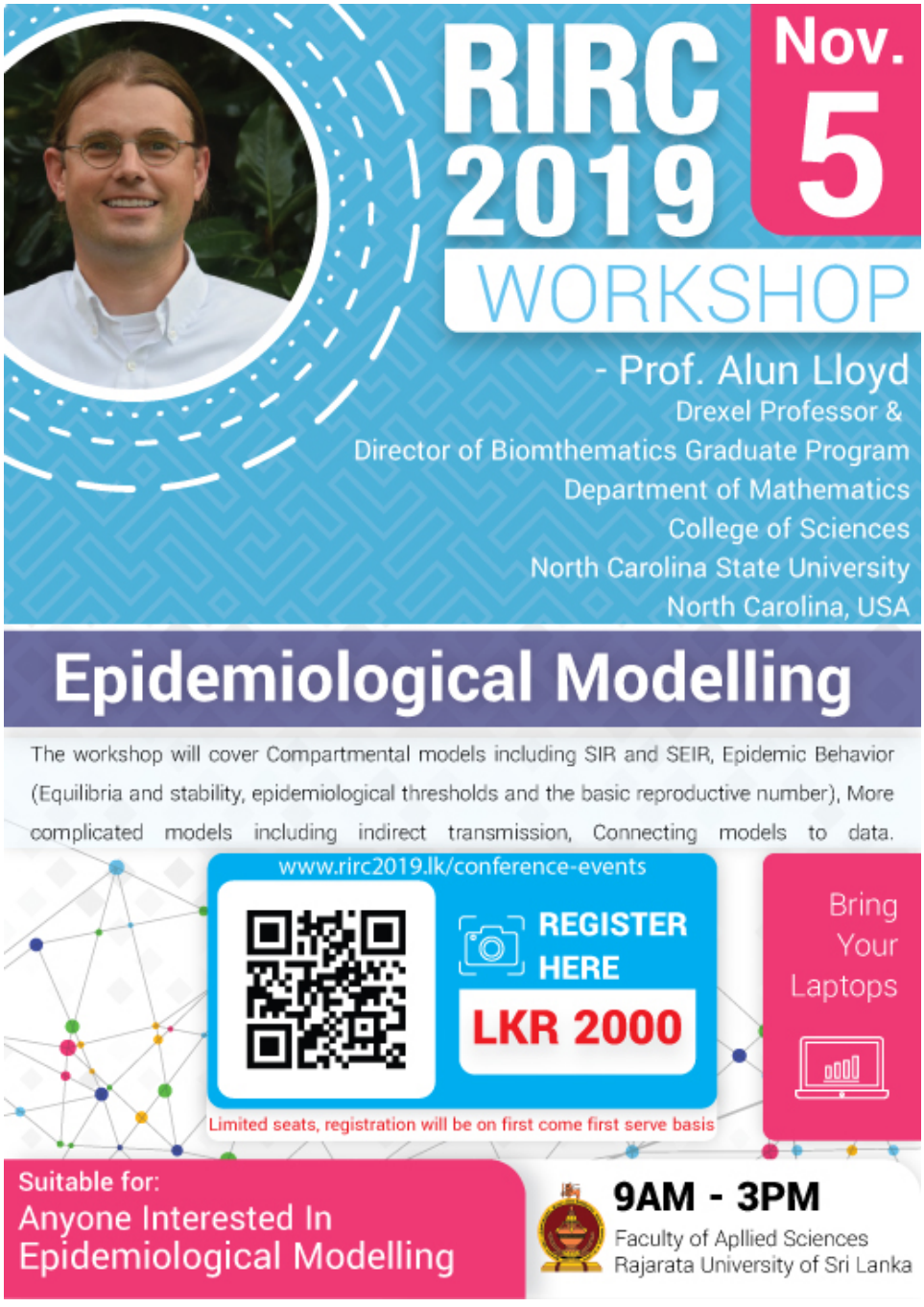
Universities facilitate creating big thinkers, innovative research and leaders for the future with soft skills to explore the world with new knowledge and creativity. RIRC 2019 is a unique opportunity for academics to come together and discuss different aspects of research related to their disciplines.

I hereby thank the organizing committee of the 5th Annual International Research Conference. I also acknowledge all administrative, academic, and non-academic staff members whose support was essential to making the RIRC 2019 a reality.

Pre-Conference Workshops

Developing Biomedical Ontologies

Epidemiological Modeling



Keynote Speeches

Mathematical Modelling of Dengue Virus: Insights into Spread and Control of Infection

Alun L. Lloyd, North Carolina St. University, Raleigh, NC, USA KS

In this talk I will give an overview of mathematical modelling of the transmission of dengue virus. Starting with the simplest models for transmission of mosquito-borne infections, I shall discuss the insights that have been gained using modelling approaches. The Aedes aegypti mosquito that is the vector for dengue lives in close proximity to humans, typically only disperses over short distances and its population density is often highly variable across space. As a result, the transmission dynamics of dengue, and the other infections it vectors, are subject to significant heterogeneity. These heterogeneities must be accounted for when modelling the spread and control of dengue. Through a series of vignettes, I will discuss some of this modelling, utilizing a number of different mathematical and simulation frameworks. Pros and cons of the various approaches will be discussed. If time permits, I will discuss some of the novel approaches, involving genetically modified mosquitoes or other biocontrol measures such as Wolbachia, that have been proposed as control measures to aid in the fight against dengue.

Freedom of Speech and Discrimination

Dirk Kindermann, University of Vienna, Vienna Austria

KS

With the rise of hate speech or better: discriminatory speech in social media, public discourse and, worryingly, also in state institutions, many democratic societies around the world face the question: How free should speech bedoes the right to freedom of speech legitimize discriminatory speech? Both yes and no responses have been given. Curiously, a defense of freedom of speech plays a major role in the justifications of either response. Those who wish to legitimize discriminatory speech appeal to freedom of speech, but those who want to delegitimize and excoriate discriminatory speech also appeal to freedom of speech. In this talk, I will look at the main varieties of discriminatory speech, oppressive speech, silencing speech, pejorative speech, and forms of appellation, and argue that we need a fuller understanding of what language, speech and discrimination are to be able to weigh freedom of speech against various forms of discriminatory speech. This, in turn, requires us to take into account the structural power dimensions (of gender, race, ethnicity, class, age,) in society and their interconnections with language. Our attention, I conclude, should extend from issues about freedom of speech to the possibilities of and political responsibility for non-discriminatory ways of speaking.

Open and Reproducible Research

Harshana Liyanage, Nuffield Department of Primary Health Care Sciences, University of Oxford, UK KS

Reproducibility of scientific investigations has been extensively discussed in literature during the last decade. Studies are often difficult to reproduce due to having poorly documented (or missing) study protocols or presenting findings using inappropriate tools of statistical inference. The scientific community has been working towards increasing reproducibility and transparency in research. A range of reproducibility standards, platforms and tools have been developed to address these issues.

Health care research datasets cannot be readily shared due to the legislative requirements to maintain the privacy of patient data. These datasets are underutilised and not readily accessible for studies that intend to demonstrate reproducibility. Limited opportunity to reproduce studies leads stakeholders, including policymakers and the public, to believe that public health research has less credibility than other types of data-driven research.

Funding bodies and other stakeholders of research have established FAIR principles (Findability, Accessibility, Interoperability, and Reusability) for improved scientific data management and stewardship of research data. Privacy legislations and limited reproducibility associated with health data limits the ability to adhere to these principles. Despite having such limitations, large consortia frequently collaborate to investigate global public health issues by combining their data sources using ontological data harmonisation or common data models that facilitate interoperability.

Gender

Maithree Wickramasinghe, Department of English, University of Kelaniya KS

Disciplines in the sciences are understood as being located in the Positivist paradigm of knowledge, which value facts or information gained through observations and experimentations as objective, reliable, replicable, and generalizable; and as transcending cultural constraints, personal values and political interests. Yet, recent scholarship on epistemology has argued that science is by no means value neutral and that assumptions relating to sex and gender (as well as other social categories) can be unrecognized influencing agents in all stages of research in all disciplines.

This keynote will consider the significance of sex and gender analysis in expanding knowledge horizons through research, innovation and communication. Drawing from secondary research in the fields of medicine, engineering and communication, it will discuss how gender blindness and gender bias can lead to research outcomes and innovations that are at the least negligent and at the most perilous. It will also touch on ways and means of integrating sex and gender into research and innovation so that outcomes can be both gender sensitive and responsive. The end-result of such research is expected to be the fostering of social responsibility and inclusivity as well as sustainability in keeping with the dominant developmental agendas of contemporary times.

Why Research & Development are important?

H. Manthrithilake, International Water Management Institute (IWMI), Sri Lanka
KS

Establishing great traditions of science and knowledge can be done by better understanding our resources. Raking up indigenous knowledge is a good start. Similarly, it is important to understand that the economic foundation and the social structure upon this base are now different. We need to be mindful about societal resilience of fragile dry zone districts, given that they host 46% to 80% of poor people. Economic crises along with climate calamities compound fragility and aggravate the challenges faced by these people in achieving sustainable development.

There is a real need for scientific knowledge and innovations to do better. Similarly, there is a need to apply existing proven solutions to address ongoing economic and climate crises, and avert such crises in the future. Prioritization is key and research should focus on achieving maximum impact.

Progress made in science should be measurable. One cannot continue to live on previous achievements alone. The once through approach is a thing of the past. For gaining efficiency and productivity, we already possess significant knowledge and proven technologies in all aspects of sciences. We also have the technical means to identify, enhance and disseminate that knowledge. Calling for a change in mind-set is the easiest. Innovations in planning, utilization of scarce resources, and creating great science and using it with caution and wisdom to avert crises is an art. Therefore, conducting research, creating new knowledge and technologies to harness potential, turning risks into opportunities, and removing hazards from the environment is highly encouraged. I An honest discussion on what we do know and what we do not know is needed. This will help us to be effective and focus on research that is most needed. In summation, I would like to reiterate the importance of creating great science to prevent future crises.

Talks: Business & Economics

The Impact of Behavioral Biases on Individual Investors' Investment Decisions at the Colombo Stock Exchange

07 Nov.
BE03

A. P. W. Abeygunawardana[1], T. K. G. Sameera[2(*)]

[1]*Department of Accountancy and Finance, Faculty of Management Studies, Rajarata University of Sri Lanka, Mihintale, Sri Lanka,* [2]*Department of Accountancy and Finance, Faculty of Management Studies, Rajarata University of Sri Lanka, Mihintale, Sri Lanka*

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Over the past few decades, finance theories have evolved from standard theories to behavioral theories. Standard finance theories indicate the rationality of the investors, while behavioral finance explains the irrationality of the investors in financial markets. It indicates that investors are affected by different psychological biases that drive them towards irrational decisions and effect desired goals and returns of the investments. The decisions made by investors are very much important for the better performance of the market as well as the economic growth of the country. Thus, behavioral finance has become a great interest for economists, academics and practitioners because, they can identify behavioral biases affect investors and assist with taking necessary actions to prevent from taking partial investment decisions. In this light, the main objective of this study is exploring the impact of behavioral biases on individual investors' decisions. Overconfidence, representativeness, availability bias, regret aversion and loss aversion were considered as independent variables, whereas, individual investors decisions as dependent variable. The study selected 100 individual investors registered in Colombo Stock Exchange by using convenience sampling method and a questionnaire was used to collect the data. The data were analyzed through descriptive statistics, correlation coefficient and regression analysis in order to test the hypotheses. The results of the study statistically confirmed that representativeness, loss aversion and regret aversion have a significant impact on investment decisions, whereas overconfidence and availability bias have no significant impact. This study suggests that the investors are induced by these behavioral biases, which direct them towards irrational investment decisions.

Keywords: Behavioral finance, Behavioral biases, Investment decisions

Impact of Personality Traits on Occupational Stress: A Study on Executive Employees of Licensed Specialized Banks in Anuradhapura District

07 Nov.
BE05

S. S. Anuruddha(*), C. M. Y. S. S. Bandara

Department of Business Management, Faculty of Management Studies, Rajarata University of Sri Lanka

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Occupational stress receives a substantial attention as a key factor, which results in physical, psychological and behavioral deviations among organizational members. Though available literature widely discusses the role a persons personality plays in determining the degree to which he/she becomes stressed due to his/her job conditions, this phenomenon has hardly researched in the context of Sri Lankan banking industry, especially in the context of licensed specialized banks. Featured with low employee retention and low employment growth rates, the two biggest licensed specialized banks in Sri Lanka indicate adverse outcomes associated with occupational stress, and thus an in-depth study of occupational stress is warranted. The main objective of this explanatory study was to examine the impact of personality traits on occupational stress of executive employees of licensed specialized banks through a quantitative approach. Accordingly, personality traits and occupational stress were tested in a sample of 102 executives employed in Anuradhapura district using a structured questionnaire, attached to two licensed specialized banks. The data were analyzed using basic descriptive statistics and correlation and regression analysis. Results revealed that there is a significant negative relationship between occupational stress and personality traits represented by all components of the big five model, except openness and neuroticism, where personality traits have a substantial impact on employee stress. Thus, it implies that implementing carefully designed personality development programs for employees followed by proper evaluation, and maintaining a strong congruence between employees capabilities and job requirements would produce effective results in addressing the occupational stress issues of the employees through their personality traits.

Keywords: Licensed specialized banks, occupational stress, personality traits

Impact of Computerized Accounting Systems on Financial Performance of Small and Medium Enterprises: Special Reference to Kurunegala District

07 Nov.
BE06

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Previous studies on Small and Medium Enterprises (SMEs) in Sri Lanka have identified the lack of impact of Computerized Accounting Systems (CASs) as a key issue in the sector. Therefore, the general objective of this study is to investigate the impact of CASs on financial performance of SMEs in Kurunegala District. This study adopted an explanatory survey design. Therefore, the independent variables of the study were user perception, management support, government support, external environment and ease of use, while the dependent variable was financial performance. The target population for this study was 5426 SMEs in Kurunegala District. The study selected 153 SMEs based on the random sampling method and used a structured questionnaire to collect the data for the study. The study used descriptive statistics analysis to understand the behavior of the data. Research hypotheses were tested using correlation analysis and regression analysis. The findings of the study show that, government support had no significant positive relationship with financial performance. But, other independent variables have significant positive relationship with financial performance.

Keywords: Computerized Accounting Systems, financial performance, small and medium enterprises.

07 Nov.
BE07

Qualitative Review on Impact of Technology for Sustainable Entre-Agriculture (Special Reference to Uva Province)

H. M. I. U. Herath[1(*)], N. A. B. Attanayake[2]

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Sri Lanka being a tropical country, with an agricultural based economy, development and expansion through sustainable technological knowledge is a vital necessity. Hence, this study was carried out to explore the impact of technology on entrepreneurial agriculture. A cross sectional qualitative analysis was carried out with a random sample of 50 entrepreneurial farmers in 5 areas in the Uva Province. The data were collected through an interviewer administered questionnaire and analyzed through thematic analytical method. Impact of technology was assessed based on; input gaining ways, method of using fertilizer, interaction with the foreign technologies and growth of the harvest through years. A majority (51.1%) of farmers purchase plants from private sectors and majority of them (73.8%) use chemical fertilizer, which they purchase through private companies and only 16.3% receive subsidies. Out of total expenses, 80% is allocated towards pesticides, which is largely driven by the lack of knowledge with regards to weed control. Though the farmers spent much of their time on cultivation, only 3% of farmers were able to meet their basic needs. As a result, farmers are not motivated to search knowledge or for new technology. This situation is further exacerbated by the lack of proper outreach by the government to enhance the knowledge of farmers. During an agricultural season, farmers scarifies their time and finances to purchase basic inputs, fertilizers and pesticides but do not gain satisfactory income. They also do not use technology due to lack of guidance and knowledge about available technologies and lack of support from the government. Practices such as continuous training sessions, acknowledge and guidance to interact with technology are recommended.

Keywords: Technology, entre-Agriculture, sustainability, satisfaction, Uva Province.

Qualitative Review on Impact of Technology for Sustainable Entre-Agriculture (Special Reference to Uva Province)

07 Nov.
BE08

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Banks generally face various kind of risks such as credit risk, credit deficiency risk, portfolio risk, interest rate risk, operational risk and liquidity risk. But, credit risk is the key challenge that banks encounter because the provision of credit is the main business activity of the banks. Hence, credit risk becomes an important consideration in the banking sector. The main objective of this study is to investigate the impact of credit risk on the profitability of banking sector in Sri Lanka. The study used two measures of profitability, namely return on equity and return on assets, as the dependent variables and four measures Credit Risk indicators, Non-Performing Loan Ratio, Loan to Deposit Ratio, Net Charge off Ratio and Capital Adequacy Ratio as the independent variables. The data were collected from thirteen banks for a period of five years commencing from 2010 to 2017. The study employed Pooled Data Regression Analysis and Panel Data Regression Analysis to investigate the impact of credit disk on the profitability. The study shows that non-performing loan and loan to deposit ratio have negative and significant impact onreturn on equity but insignificant impact on return on assets. Further, On the other hand, the study found that Capital Adequacy Ratio has a positive and significant impact on both return on equity and return on assets but net charge off ratio is not a significant variable for deciding the banks profitability. Our study indicates that credit risk has a significant impact on the profitability of banking sector in Sri Lanka. The finding are useful for bankers, depositors, investors and government policy makers for decision making purpose.

Keywords: Credit risk, profitability, return on equity, return on assets, non-performing loan ratio, loan to deposit ratio, net charge off ratio, capital adequacy ratio

07 Nov.
BE09

Impact of Selected Human Resource Practices on Organizational Citizenship Behavior: An Empirical Study of Lanka Jathika Sarvodaya Shramadana Sangamaya, Sri Lanka

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Lanka Jathika Sarvodaya Shramadana Sangamaya (LJSSS) is one of the largest Non-Governmental organization which has more than sixty years of experience as a civil society organization. As a community organization as well as a nonprofit oriented service organization LJSSS employees should work beyond their job description to provide a quality service to their beneficiaries. But the negative symptoms such as high absenteeism rates, high turnover rates, lower rate of their involvement to extracurricular activities within the organization and low preference to human resource (HR) practices leads to conduct this study. The study was conducted with a purpose of examining the impact of HR practices on Organizational Citizenship Behavior (OCB) among employees at LJSSS. The model developed by Ahmed (2016) was used as the conceptual Framework for this study and considered HR practices (Recruitment and Selection, Training and Development, Performance Appraisal and Compensation and reward) as independent variables while OCB as dependent variable. A 257 sample from a total population of 287 was selected using cluster and random sampling. Response rate was 78.2%. Pearson correlation analysis and multiple regression analysis were used respectively to investigate the relationship and impact of selected HR practices against OCB. Based on the analysis, it can be concluded that recruitment and selection process, compensation and reward system have a moderate positive impact on OCB while training and development, performance appraisal system have a weak positive impact on OCB. This study recommends the employers to ensure effective and fair recruitment process followed by good reward and motivation and career growth to enhance OCB among the employees in the workplace for long term employment relationships.

Keywords: Non-Governmental organization, NGO, turnover, absenteeism, human resource practices

Impact of Selected Grievance Handling Practices on Employee Engagement in Sri Lankan Apparel Industry, With Special Reference to Lower Level Employees in Katunayake Export Processing Zone

07 Nov.
BE10

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Employee engagement (EE) has been identified as one of the important determinants of human resource effectiveness in organizations. In the scope of modern human resource management, which aims at ensuring the maximum contribution of employees in achieving organizational goals while retaining a satisfied workforce, grievance handling practices (GHP) play a vital role in reaching its aim. Sri Lankan apparel sector employs over 600,000 employees contributing to almost 3% for the GDP. Though the impact of grievance handling practices on employee engagement has been focused in few studies in the global arena, there are hardly any studies on the same in Sri Lankan context, especially referring to apparel industry. Thus, the present study aims at assessing what practices are being used by the organizations, if the employees preferred to use GHPs in their work place and finally identify any impact of selected GHPs on employee engagement in Sri Lankan apparel industry relating to lower level employees in KEPZ. The study adopts a quantitative research design and gathered data from 100 lower level employees out of 5103 lower level employees in two apparel firms which have largest number of employees in KEPZ through structured questionnaires based on the consideration of Krejcie and Morgan table (1970). The correlation analysis and regression analysis were used as the tool of data analysis. The study found that engagement level of the lower level employees of KEPZ is relatively high and from among the three types of GH practices according to the theory of dispute resolution by Goldberg (1988), interest-based methods are mostly adopted by the organizations where the second and third preferences were with right-based methods and power-based methods respectively. The engagement level is notified that the employees are highly engaged in cognitively and behaviorally than emotionally (μ=4.5). The employees agreed that their organizations are practicing GHPs and prefer those adopted GHPs. Accordingly, the findings imply that the first two GH methods have the potential to improve EE, though with a slight impact.

Keywords: Grievance handling practices, employee engagement, apparel industry, Katunayake export processing zone, lower level employees

07 Nov.
BE11

The Effect of Bank-specific Factors on Profitability of Licensed Commercial Banks in Sri Lanka

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Financial intermediaries play major financial roles in the economy such as create opportunities to meet demand and supply in the market and providing payment mechanisms. Commercial banks are as one of the major financial intermediaries in the country, plays a crucial role in the economy and in the resource allocation process. The objective of this study is to examine the effect of bank-specific factors, namely; capital strength (CS), bank size (BS), credit risk (CR), liquidity risk (LR), operating expenses (OEs) and customer deposits (CD) on profitability of Licensed Commercial Banks (LCBs) in Sri Lanka. Profitability has measured by three proxies, namely; Return on Assets, Return on Equity and Net Interest Margin. The panel data were used for ten LCBs during the sample period of five years from 2013 to 2017 and the required data were extracted from the relevant financial statements. Results of the present study revealed the CS is statistically significant on LCBs profitability at a 1% level for ROA, ROE and NIM. Similarly, BS is statistically significant at a 1% level for both ROA and ROE, whereas a 5% level for NIM. Moreover, LR is also statistically significant at a 1% level in each model. However, in contrast to the expectation, CR, OEs, and CD are statistically insignificant in each model. Based on these results, it is reasonable to conclude that CS, BS, and LR are the bank-specific factors of LCBs' profitability in Sri Lanka. To draw these conclusions, the researchers used only domestic LCBs operating in Sri Lanka, where it has ignored the foreign LCBs due to the unavailability of required data. Thus, future researchers are recommended to consider both domestic and foreign LCBs for their studies.

Keywords: Bank-specific factors, Licensed Commercial Banks, profitability

Corporate Social Responsibility and Employer Branding in Hotel Industry in Sri Lanka: The Mediating Effect of Job Satisfaction

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Corporate Social Responsibility (CSR) is identified as a vital strategy in business operations towards internal and external stakeholders. Employer brand is identified as an effective tool to create a competitive advantage. At present, business organizations are increasingly adopting CSR in their employer branding strategy to improve attractiveness and engage current and potential employees, and to ensure consistency in employee brand behaviours. Thus, this strategy is particularly true for the companies in hospitality industry as they have to rely on the talent of the people to provide a greater service to their customers comparative to their rivals. Hence, the study based on two objectives; first it assesses the impact of CSR on employer branding in achieving higher brand position for hospitality industry in Sri Lanka and second, to identify how job satisfaction mediates the relationship between CSR and employer branding. Questionnaires were distributed using convenience sampling method to gather primary data from 150 operational level employees working in top five hotels in Sri Lanka based on TripAdvisor Travelers' choice awards. The data were analyzed using correlation coefficient, Baron and Kenny Mediator Analysis method as well as the Sobel test. The study results showed that there is significance and strong positive association between CSR and employer branding with special references to the hotel industry in Sri Lanka. Analysis of the mediator and the Sobel test identified that job satisfaction partially mediates the relationship between CSR and employer branding. The findings of the study will be beneficial to organizations to streamline their CSR strategies in the future.

Keywords: Corporate Social Responsibility, CSR, employer branding, hospitality industry, job satisfaction, mediator analysis

Impact of Entrepreneurial Knowledge on Organizational Agility, With Special Reference to SMEs Owner-Managers in Badulla Secretariat Division

07 Nov.
BE15

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Dealing with dynamic business environmental changes is a challenge for Sri Lankan SMEs owners. It emphasizes organizational agility as an interpreter for dealing with unexpected changes, eliminating unprecedented treats of work environment and using changes as opportunities. Entrepreneurial knowledge of the owner-managers will be used to develop organizational capabilities to face growing market discontinuities and technology distributed, while encouraging organizational agility of SMEs. There is a dearth of literature examining this link between entrepreneurial knowledge on organizational agility. Hence, the objective of the study is to examine the impact of entrepreneurial knowledge on organizational agility. A sample of 50 SMEs owner-managers in Badulla Divisional Secretariat were selected with the aim of identifying the impact of entrepreneurial knowledge on organizational agility. A structured questionnaire was used to collect data. Overall level of organizational agility of the studied sample was at a medium level while the entrepreneurial knowledge level was at a high level according to the mean values. The regression model confirmed that entrepreneurial knowledge is a predictor of organizational agility and the findings reveal that there is an impact of entrepreneurial knowledge (Business General Knowledge, Venture General Knowledge, Opportunity Specific Knowledge, Venture Specific Knowledge) on organizational agility (Shared Leadership and Identity, Adaptive Organizational Design, Robust Strategy). The study informs SMEs owner managers to utilize entrepreneurial knowledge, blending it with available opportunities, technologies and current government business development initiatives. These findings are also useful to provincial-level policymakers to develop technological initiatives and facilitate government aid for future entrepreneur development and enhance the organizational agility for SME sector in Sri Lanka.

Keywords: Entrepreneurial knowledge, organizational agility, SMEs owner-managers

Determinants of Stock Liquidity in Listed Diversified Holdings in Sri Lanka

07 Nov.
BE17

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Stock liquidity (SL) is vital to both the internal and external analysts as its adjacent relationship with financial market. Thus, it is of paramount important to investigate the factors that influence SL in Diversified Holdings (DHs). The present study is aimed to explore the determinants of SL in DHs listed in the Colombo Stock Exchange (CSE). Fourteen DHs were selected as the study sample as those companies own a controlling interest in multiple companies. A comprehensive literature survey was conducted to identify the variables for the present study. Accordingly, SL is selected as the dependent variable while independent variables are chosen as firm size, profitability, earnings per share (EPS), stock dividend, leverage, and tangibility. SL was proxied by the number of shares traded during the year. The independent variables were measured respectively by the natural logarithm of market capitalization, return on assets, earnings per common stock, divided per shares (DPS), long term debt to total assets and fixed assets to total assets ratio. Descriptive statistics, correlation analysis, and panel data regression analysis were utilized to analyze the collected data. As per the analysis results, DPS, EPS and, tangibility negatively and significantly impacted on SL. However, in contrast to our expectations, the other three variables; firm size, profitability, and leverage did not show any significance in determinants of SL. It can be concluded that these results contribute to the existing literature on stock liquidity.

Keywords: Stock liquidity, diversified holdings, Sri Lanka

07 Nov.
BE19

Service Quality in Sri Lankan Tourist Hotels: An Assessment of Online Guest Reviews

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Sri Lanka has emerged as an emerging market for international tourism and experienced significant growth in its tourism and hospitality industry in the last decade. Since a hotel is a complex and experience based product, service quality of the hotels is of paramount important for long term and sustainable development of the industry. Although researchers and practitioners agree on the importance of understanding the hotel sector, there are limited studies on customer satisfaction about the hotel services in Sri Lankan context. Therefore, this study aims to assess the service quality of Sri Lankan tourist hotels using guest online feedbacks. Seven quality attributes namely staff responsiveness, location, facilities, cleanliness, comfort, value for money and availability of free internet facility were used as dimensions of the service quality. A sample of 221 tourist hotels was selected covering all the districts in the country. Data on specified quality attributes were extracted from online review statistics of booking.com website. Descriptive statistics, ANOVA, independent samples t-test were used in data analysis. Results indicate that although Sri Lankan hotels are in a better position in terms of staff, cleanliness, location, facilities and comfort, value for money and provisions for free internet facility are in a premise where significant improvements are necessary. The result further shows that tourist hotels in the peripheral districts should also pay their attention to improvement of facilities and cleanliness in order to meet guest expections.

Keywords: Tourist hotels, online guest reviews, service quality

The Impact of Job Satisfaction and Organization Commitment on Organizational Citizenship Behavior of Public School Teachers in Anuradhapura District

07 Nov.
BE20

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Organization Citizenship Behavior (OCB) is one of the critical factors that decide the organization success and it is shaped by many factors. Among them job satisfaction and organization commitment play major role in deciding OCB. In the educational sector, many problems because of weak organizational citizenship behavior among teachers. Therefore, this study aims to examine the impact of job satisfaction and organization commitment on organizational citizenship behavior among public school teachers. This research is a basic research and a quantitative study. The Advance Level Science stream teachers of public schools in Anuradhapura educational zone was the population of this study. A sample of 100 teachers was selected through proportionate stratified sampling technique using a questionnaire. Univariate, bivariate and multivariate methods of data analysis were used in the data analysis such as central tendency, measures of dispersion, Multiple Linear Regression, Correlation Coefficient. The results revealed that there was a moderate positive relationship between job satisfaction and organizational citizenship behavior and a weak positive relationship between organization commitment and organizational citizenship behavior. These findings lead to important managerial and policy implications.

Keywords: Job Satisfaction, Organizational Citizenship Behavior, Organizational Commitment, Teachers

07 Nov.
BE21

The Political Economy of Instrumenting Informalization in Labor Exploitation and Labor Conditioning

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The construction industry can be identified as a specific production context that shaped its existence in the capitalist mode of production under various political economic realities, while crafting unique material forms to each existing economy. A significant amount of studies focused on the instrumentality of informalization under the capitalist mode of production in global economies and their contending nature of attaining a higher-dynamic level of productivity, the literature is vacant to the instrumentality of informalization in labour exploitation and labour conditioning for the process of profit maximization and industrial expansion in Sri Lanka. The primary objective of the research is to study the evidence of labour exploitation and labour conditioning which instrumented through informalization of labour for profit maximizing in the construction industry of Sri Lanka. The primary source of data is from 60 labourers employed in a large scale road development project and a housing project in *Katugastota area*. The research fundamentally uses and consists of qualitative and quantitative features and numerous secondary data sources. It has instrumented critical realism as its philosophical point of departure and *structuralist approach* as its methodological influx. The informalization is deep rooted and plays a significant role. It is revealed that the labourers that come under sub contract and man power labour with an economy that is agricultural in orientation are highly impacted by informalization. Informalization is used by the capitalist mode of production in the construction industry, as a strategy to ensure the survival of that mode of production.

Keywords: Informalization, conditioning, exploitation

Factors Influencing Electronic Word-of-Mouth Adoption of Online Consumers in the Western Province of Sri Lanka

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Emerging of new technologies, internet and electronic businesses have created new online platforms for consumers to share their shopping experiences with others. Consumers purposely participate in scanning and adopting opinions and comments posted by others, before they make a final purchasing decision. The purpose of this research is to gain a better understanding about the factors influencing the electronic word-of-mouth adoption of online consumers in the Western Province of Sri Lanka. Any negative or positive statements about a product or service, by current, former or potential consumers are called electronic word of mouth. The conceptual framework which provides the foundation for the research was adapted from a previous study. The model has identified three factors which influence the electronic word-of-mouth adoption of online consumers (information usefulness, information credibility and electronic platform). Data were collected from 150 respondents who are engaging in online purchasing from Western Province through a self-administered questionnaire. According to correlation analysis, all independent variables have a positive relationship with the dependent variable. Regression analysis has confirmed the impact of independent variables except information usefulness. The study demonstrates that online consumers adapt information credibility and platform of electronic word-of-mouth rather than information usefulness. With the advent of new technologies, information sharing of consumers has changed and electronic word-of-mouth has become an important source of information.

Keywords: Electronic word-of-mouth, information usefulness, information credibility, electronic platform

07 Nov.
BE23

Effective Internal Control Implementation on Private Banks Financial Performance: Special Reference to Central Province of Sri Lanka

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Internal control system is a system design and implemented by the management to safeguard assets, ensuring accuracy and reliability of information and increasing the effectiveness of entitys operations. The need for the internal control system in Banks cannot be undermined due to the fact that the banking sector has a crucial role to play in the economic stability and rapid growth in real economic activities. Nevertheless, effective implementation of internal controls on private banks financial performance is under studied. Therefore, the study investigates the impact of internal control components on Financial performance of private banks in the Central province of Sri Lanka. Internal controls are measured by the COSO Model of internal controls and five hypotheses were developed using components of internal control. Financial performance measured based on scales used by previous scholars. The Sample of the study was selected using the stratified sampling technique which comprises of 70 executive level employees from private commercial banks in Central province. The study approach is quantitative and thus a deductive approach and data was collected through questionnaire. Hypotheses were tested using Multiple regression analysis. As per the multiple regression analysis control environment, risk assessment, information and communication, and monitoring have a significant impact while control activities have an insignificant impact on the financial performance of private banks in central province. Hence, it can be concluded that there is a need for much consideration of the control environment, risk assessment, information and communication, and monitoring which predict the financial performance of private banks in central province through budgetary controls, ongoing and separate financial performance reviews, controls over extra expenditure and expanding current product portfolio.

Keywords: Internal controls, financial performance, private banks

Impact of Budgetary Management Process on the Financial Performance of Small and Medium Enterprises in Kurunegala District

07 Nov.
BE24

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The purpose of this study is to examine the impact and relationship of budgetary management process on financial performance of Small and Medium Enterprises (SMEs) in Kurunegala district. 130 SMEs had been selected based on the stratified sampling method from a population of 1749 SMEs. This study adopted an explanatory survey design. The researcher has collected primary data by distributing a structured questionnaire to the respondents such as owners, managers and accountants. Reliability analysis, descriptive analysis, correlation and regression analysis were done using Statistical Package for Social Sciences (SPSS) to analyze the data. The study was conducted on six hypotheses which were constructed to reveal whether budgetary planning, coordination, monitoring, control, communication and budgetary evaluation have significantly influenced the financial performance of SMEs in Kurunegala district. Correlation results highlighted that all six independent variables are positively and significantly correlated with financial performance. Hypotheses were tested based on regression results and it indicated that budgetary monitoring and evaluation have insignificant effects on financial performance while the other four variables have positive and significant impacts. Therefore, the study recommended that the management and owners of SMEs should enhance the budgetary planning, coordination, control and budgetary communication to improve the financial performance. The findings of the study hold practical implications for policymakers, managers, financial staff and investors. In addition, the study confirms that budgetary process and selected control variables contribute to higher levels of financial performance.

Keywords: Budgetary Process; financial performance; small and medium enterprises

07 Nov.
BE25

The Value Relevance of Financial Statements and Their Impact on Stock Prices: With Reference to the Listed Companies in Colombo Stock Exchange

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This research aims to examine the value relevance of financial statements. Though, the generally accepted accounting principles attempt to reflect a true and fair view of financial statements, the reality may differ from the expectation over the existence of emerging concepts of creative accounting and window dressing that might result in deviating earning figures from their original values and may mislead the market participants and decision makers regarding the return earning relation. Thus, the problem of the present study is, whether the red flags affect the return earnings relation and whether there is an issue of earnings value relevance in Sri Lankan context. To realize this, a model that includes red flag ratios were developed, which has proved to be the possible fraud indicators of falsified financial statements in different contexts and by estimating accruals quality, measured both by discretionary and non-discretionary accruals as per the modified Jones model. The data was collected from a sample of 91 non-financial companies listed in the Colombo Stock Exchange over the recent five years (2014-2018) and the OLS regression models were used to analyze the data. The ratios of profitability, liquidity, solvency and asset utilization indicated poor financial performance and financial condition attesting that financial information disseminated by financial statements is less value relevant. The results indicated that ratios of net profits to total assets and receivables to sales negatively impact on stock returns, while ratios of net profits to sales and working capital to total assets affect positively. Moreover, both types of accruals have significant importance in explaining stock price movements while non-discretionary accruals become more important than discretionary accruals confirming that the business conditions and managerial interventions determine earnings variability while business conditions seemed to be more important than managerial interventions. The use of this study could be of assistance to investors, analysts, auditors, state authorities to have a comprehensive view of value relevance of financial statements produced to them and for the scholars who endeavor for further research.

Keywords: Accruals quality, Financial statements, Value relevance

An Empirical Investigation of Value Creation Processes in Sri Lankan Software Companies with Aid of Knowledge Sharing

07 Nov.
BE26

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Although there are several software companies throughout the island, only few companies have achieved reputation among customers and companies which are willing to give software services. It can be seen that the value added to end product and the quality is the main reason for the reputation. The objective of this research was to examine the value creation processes of Sri Lankan software companies which have used knowledge sharing as a business strategy. Since the employees involved in different projects use different technologies, there is a better usage of knowledge sharing. The methodology was to conduct a survey using a questionnaire. It was created including questions based on the details which should be collected and relevant to the objective. Data was collected from the employees within software companies in Sri Lanka. Five-point Likert scale was used as the scaling method, the level of agreement to the response was considered. The questionnaire was designed by considering two main areas; Individual Factors and Organizational Factors. The data was quantitatively analyzed using measurement model analysis, correlation analysis and structural model analysis. The analysis was conducted using SPSS 20 software. According to performed analysis the proposed research model was transformed into conceptual model and it consists of factors that positively affect the value creation processes that are; the attitude about knowledge sharing, strategies for share knowledge and knowledge sharing as a knowledge sharing practice in software companies. Most importantly this investigation emphasizes that knowledge sharing among employees positively affects value creation processes within software companies.

Keywords: knowledge sharing, Five-point Liker scale, structural model, correlation

07 Nov.
BE27

The Cash Conversion Cycle and Profitability: A Study of Beverage, Foods and Tobacco Sector in Sri Lanka

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The cash conversion cycle (CCC) is simply defined as the time taken to convert its investments in inventory and other resources into cash flows from sales. The study is carried out based on a sample selected using simple random sampling method and included 17 beverage, food and tobacco companies listed in Colombo Stock Exchange in Sri Lanka for the period from 20112018. CCC is considered as the independent variable. Measures such as profitability return on assets (ROA) and return on equity (ROE) are considered as the dependent variable. Firm size and sales were considered as control variables for the study. Based on the pooled OLS regression analysis using E-views 8 application, it was evident that CCC has significant negative impact on ROA and insignificant impact on ROE for beverage, food and tobacco companies in Sri Lanka. Firm size shows a significant negative impact on ROA and firm sales has a insignificant impact on ROA. Since CCC has a significant impact on profitability of the companies, it is important to the management to effectively maintain the optimal level of CCC.

Keywords: Cash conversion cycle, return on assets, return on equity, beverage, food and Tobacco companies.

Analysis of Mobile Energy Expenditure with Internet Usage Patterns for Efficient Mobile Internet Usage

07 Nov.
BE28

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Energy consumption of the internet and the study of its' effects are significant. Internet-related activities emit CO_2 that directly or indirectly cost for the carbon footprint of the internet. Mobile energy consumption has been heavily examined in recent years. But the relation between mobile energy consumption and usage patterns of the end-user has not been studied deeply. Therefore, we did a systematic review of the literature to find out frequent mobile internet usage patterns and a survey was conducted to recognize current usage patterns and the trend of users to follow best practices. To study the usage patterns and behaviors, we performed usage patterns using a control experiment by an android application followed by three test cases. In the control experiment, we compared the power consumption when mobile data and mobile phone notifications are on and off. Our experiments indicate that the power consumption of the mobile phone increases when the number of notification (on/off) transitions increases. At some point, it also helped to keep battery power. There is a direct connection between mobile energy consumption and usage patterns of the end-user. It can be concluded that turn on notifications for selected applications and keep it off for at least 2-3 times within the available time period will be an effective method for a 6-hour power plan.

Keywords: Internet, mobile power consumption, usage patterns, best practices

07 Nov.
BE29

Impact of Financial Literacy on Firm Performance (With Special Reference to SMEs in Anuradhapura District)

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This study examined the impact of financial literacy to firm performance in the Anuradhapura District. The researcher used primary data from a sample of 100 Small and Medium Enterprises (SME) owners/managers in Anuradhapura District. The information was obtained from the structured questionnaire. The aim of this study was to identify the impact of financial literacy to the financial knowledge, financial attitude and financial behavior. The collected data were analyzed using descriptive statistics and the relationship between the variables of the model was tested using correlation analysis and multiple linear regression analysis. The results of the regression analysis were used to test the hypothesis. The first hypothesis was tested at 5% significant level and the p-value was 0.021. These results demonstrate that, there is a positive relationship between financial knowledge and firm performance. The second hypothesis was tested at 1% significant level and the p-value was 0.000. This shows that there is a positive relationship between financial attitude and firm performance. Furthermore, the last hypothesis was tested at 1% level of significance and the p-value was 0.000 indicating a positive relationship between financial attitude and firm performance. According to these findings it is recommended to conduct training programs on budgeting and planning, debt management, record keeping, savings and knowledge about finance services to increase the financial literacy, since it will be help achieve the economic development of the country.

Keywords: Financial Literacy, Financial Knowledge, Financial Attitude, Financial Behavior, Firm performance

Integrated Reporting: Perceived Mythical Perspectives

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As a recent innovation in corporate reporting arena, Integrated Reporting (IR) is embraced by corporate entities around the world. Adoption of IR is not a mandatory requirement in Sri Lankan reporting context, notwithstanding entities incline to adopt IR in their reporting practices. The purpose of this study is to explore the understandings and "mythical" dimensions of IR that perceived by academics and practitioners. This study is a purely qualitative study and unstructured interviews were used to collect the data. Practitioners who are dealing with corporate reporting and academics who research in the field of financial reporting were selected as the interviewees for this study and overall 9 interviewees were interviewed. The objectives of this study are limited to explore the gap between academics' and practitioners' understandings of IR concept and perceived mythical dimensions of this reporting practice. The findings demonstrate that there are two different views in perceptions of IR between practitioners and academics. Many research academics have articulated various research studies that emphasize the value relevance of IR. Most academics appreciate and embrace IR whereas some researchers evince IR as one of most disruptive innovations in the field of corporate reporting. Finance officer, a practitioner of a service sector company depicted that their company has adopted IR as a trend without having precise understanding. Twenty five percent of practitioners viewed that cost benefit ratio of adopting IR is not favourable for their company. Nevertheless, more than half of the academics demonstrate IR as a best practice, and theoretically it adds value to the company. This contradictory picture emphasises the necessity of further researches to combine theoretical concepts with practical aspects.

Keywords: Academics, Integrated reporting, interviews, practitioners

07 Nov.
BE31

Beyond Traditional Marketing Era: Social Media Marketing Adoption by Small and Medium Enterprises (SMEs)

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In the web 2.0 arena, social media marketing involves marketing goods, services, information and ideas to support firms operations by offering unique opportunities, but because of technology adoption barriers, applying this novel technology might produce a big issue within the SMEs. Accordingly, the study mainly focused on identifying the factors affecting over adoption of social media marketing by SMEs in Anuradhapura city area. Past literature summarized that top management perception, ease of use, facilitating conditions and social influence as influential factors in the adoption of social media marketing. Data were collected from 150 SMEs through a structured questionnaire using purposive sampling technique and the data were analyzed using statistical techniques such as descriptive statistics, correlation analysis and regression analysis. Results revealed that top management perception, social influence and ease of use has a significantly positive impact over social media marketing adoption by SMEs. Accordingly, it is suggested that top management necessity to change their mindset from traditional marketing view to new social media marketing view while identifying opportunities in the market place.

Keywords: Small and medium enterprises, social media, social media marketing

An Empirical Study on the Effect of Internal Audit Function on Financial Performance of Commercial Banks in Sri Lanka

07 Nov.
BE32

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Internal audit function is an independent, objective assurance and consulting activity designed to add value and improve an organization's operations. When banks operations do not adequately consider internal audit function, they are unable to encounter its objectives as desired. The study aims to examine the effect of internal audit function on the financial performance of commercial Banks of Sri Lanka. Internal Audit Standards (IAS), Professional Competence (PC), Internal Controls (IC) and Independence of Internal Audit (IIA) were identified as independent variables, while financial performance was used as the dependent variable. The study administrated five-point Likert scale survey questionnaires to executives of both finance and internal audit departments of the selected commercial banks, to assess both primary and secondary variables under study, while secondary data were obtained from published annual financial statements to assure the financial performance. Among 26 commercial banks in Sri Lanka, 12 were selected for the sample based on market capitalization. The links between the variables were hypothesized and tested through multiple regression analysis using SPSS software. The study established that IAS, PC and IC have positive relationships with financial performance of commercial banks where as IIA had no significant effect on financial performance. Thus, it is recommended to utilize independent internal auditors and compensate them reasonably to guarantee that the administration is prompted appropriately through quality internal audit reports while adhering to frequent internal audit software upgrades.

Keywords: Internal audit, financial performance, commercial banks, internal controls

07 Nov.
BE33

Work Simplification and Its Implications on Organizational Development: A Critique

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The current study reviews, summarizes and critiques on how modern business organizations could apply work simplification as a strategy in Organizational Development (OD), featuring job designing and redesigning as a dimension of OD. Building on the Job Characteristics Model (JCM), a qualitative content analysis of the relevant research papers which built on the same model was conducted. It was found that work simplification is not a novel concept in terms of job designing as it has been introduced by Taylor and Gilbreth in the earliest 1900's. Traditionally, it was foreseen as an industrial engineering technique which was defined as a tool of increasing the production per unit of time, and consequently, reducing the unit cost. However, afterwards it began to articulate as an Organizational Development (OD) strategy after the research conducted by Allan Mogensen (1937) across various industries and domains in the commercial world. Therefore, in today's business, work simplification does not demarcate only to division of labor and specialization, but also making the jobs as simple as possible with a greater degree of flexibility, recombining tasks and duties into more enriched and non-routine patterns. Ideally, the ultimate purpose of work simplification should be the Organizational Development, as well as creating more benefits for employees, customers, entrepreneurs and the society at large. In conclusion, this study elaborates work simplification from a different perspective of job designing to meet both efficiency and behavioral outcomes from the employees, leading the Organizational Development.

Keywords: Work simplification, job redesigning, Organizational Development

Problems Associated with Maintenance Budgeting: The Management Perspectives through Expert Survey in Sri Lanka

07 Nov.
BE34

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Conducting building maintenance without having a proper cost planning outline can be very difficult. Therefore, having a good Building Maintenance Budget (BMB), will help to understand that the building is in good condition or will be in poor condition. Even though, there are number of researches related to maintenance works, maintenance funding, maintenance safety and maintenance components, there are less number of researches that have been carried out on the subject of BMB both in global and Sri Lankan context. Hence, existing literature does not give a clear picture on the problems associated with BMB practices. Therefore, in order to address the identified gap, this study attempts to investigate the problems associated with the BMB practices in Sri Lankan organizations. This study initiated with a comprehensive literature review which identified eleven (11) numbers of problems related to BMB in the global and local contexts namely, "budgeting for newly completed buildings", "lack of proper policies and procedures", "lack of proper maintenance information", "lack of industry standards", "over-reliance on historical budget", "exogenous information and uncertainties", "fear of underestimation", "small scale and intangible services", "cost-led procurement", "short tender period" and "fresh tenderers". Subsequently, ten (10) experts who are in managerial positions and dealing with BMB from different industrial backgrounds in Sri Lanka have been chosen to investigate the relevancy of identified problems associated with BMB in Sri Lankan context. The required data were collected through semi structured interviews and the collected data were analysed using content analysis method. The majority of the industrial professionals accepted that they face most of the problems which have identified through the literature review but, the most common problem among the identified problems is "over- reliance on historical budgeting". Moreover, "lack of proper policies and procedures", "lack of proper maintenance information", "lack of industry standards" and "fear of underestimation" are the problems which are notified by majority of the respondents. Few of the respondents agreed that "budgeting for newly completed buildings", "exogenous information and uncertainties" and "cost-led procedure" are also some issues faced by them in practice. Finally, "small scale and intangible services", "short tender period" and "fresh tenders" have not been faced by any of the respondents. Therefore, proper concentration on BMB is essential to overcome the problems associated with BMB and to carry out the business activities to gain more benefits.

Keywords: Building Maintenance Budget (BMB), Problems associated with BMB, Sri Lankan context

07 Nov.
BE35

Problems Associated with Maintenance Budgeting: The Management Perspectives through Expert Survey in Sri Lanka

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The main aim of this study was to identify the factors affecting married nurses' work-life balance in Government Hospitals in Anuradhapura District. Work-life balance is a major concern that directly impact on employee performance and indirectly impact on organizational productivity. Working hours, organizational support, family structure and spouses occupation were selected as independent variables and work-life balance was selected as the dependent variable. Based on the previous literature, a conceptual framework was developed and four directional hypotheses were formulated for this study. The type of the study was quantitative and the design was fundamentally cross-sectional in nature. Deductive approach was used in non-contrived setting. Three government hospitals in Anuradhapura District were selected as the sample (Teaching Hospitals in Anuradhapura, Thalawa and Mihintale). 120 married nurses were selected through proportionate stratified sampling technique. Data collection was done using a structured questionnaire through convenience sampling method. The data were analyzed using the regression and correlation analysis using SPSS. The results indicated that there is a weak positive relationship between working hours and work-life balance, a significant positive relationship between organizational support and work-life balance, a moderate positive relationship between family structure and work-life balance and a significant positive relationship between spouse's occupation and work-life balance of married nurses. This research can be served as a guideline for all the researchers interested in studying behavioral sciences as a part of that work-life balance. Finally, suitable recommendations were made by the researcher to improve work-life balance of married nurses in Government Hospitals in Anuradhapura District.

Keywords: Work-life balance, working hours, organization support, family structure, spouse's occupation

Contribution of Academic Staff to Promote Open Innovation in Sri Lanka (With Reference to Management Faculties of Selected State Universities in Sri Lanka)

07 Nov.
BE36

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University itself has an open environment by nature in which universities make its scientific output freely available with the aim that it would be picked up by the researcher for further development or industry for application. Further, in an open innovative environment industrial issues should be addressed by university researches, in which research output may be a form of new product, service or business process improvement that can be commercialized through patent and licensing. In this knowledge exchange process, academics who are deemed as a strategic group of this innovation process should take the lead. Hence, the study was directed to identify the contribution of academic staff to promote open innovation in the Sri Lankan economy. The contribution of academic staff to promote open innovation was measured through the scientific contribution of university staff. Here, research partnership and research service, commercialization intellectual property, informal knowledge transfer, and productivity publication were important dimensions of academic's scientific contribution. The study was limited to the academic staff of Management Faculties in state universities and 300 academics were selected randomly for the study. A self-administrated questionnaire was utilized for this purpose. Descriptive statistics, correlation and regression tests were conducted on purified data set for testing hypotheses. The results on correlation analysis showed that there are four statistically significant correlations between all independent variables and the dependent variable, however, regression analysis rejected the impact of the research partnership and productivity of publications on the open innovation in Sri Lanka. Accordingly, commercialization of intellectual property and informal knowledge transfer promote open innovation of the Sri Lankan economy. Hence, the university should develop a mechanism to commercialized its scientific findings and facilitate for informal knowledge transfer process between university and industry to boost the national innovative ecosystem.

Keywords: Open innovation, commercialization of intellectual property, informal knowledge transfer, research partnership, productivity publication

07 Nov.
BE37

Implementation of Environmental Management Accounting (EMA) practice in The Hotel Industry: Evidence from North Central & Central Provinces in Sri Lanka

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The aim of this study was to fill theoretical and empirical gaps in environmental management literature. In particular, this study examines the extent of use of EMA in the hotel industry in Sri Lanka and the influence of contingent factors on implementation of EMA in the hotel industry. The research was explanatory and the approach used for this study was quantitative in nature. Data were collected from the hotel industry of North Central and Central provinces in Sri Lanka. Data was collected from 50 hotels through simple random sampling technique which are registered in Sri Lanka Tourist Development Authority (SLTDA), across North Central Province and Central province of Sri Lanka through questionnaires. Reliability analysis, descriptive statistics, correlation analysis, regression analysis were used to analyze the data through Statistical Package for the Social Sciences (SPSS) version 21. The study found that the comprehensiveness of Environmental Management System, Environmental Strategy, Environmental Uncertainty and top management support influenced implementation of EMA in the hotel industry. The study identified 12 EMA practices. Particularly, the extent to which EMA is practice in the hotel industry in Sri Lanka was moderate according to the descriptive statistics. Our results indicated that a number of variables influences the implementation of EMA.

Keywords: Environmental Management Accounting, hotel industry, Sri Lanka

Relationship Between Organizational Environment and Employees Self-Perceived Service Quality at the Mihintale Divisional Secretariat in Sri Lanka)

07 Nov.
BE39

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Service quality (SQ) is a widely discussed concern in the modern research arena related to organizational and marketing contexts. As the ground which largely shapes the organizational performances and outcomes, organizational climate (OC) holds an important role in determining the quality of services provided by a particular organization. Being criticized frequently for the poor SQ and negative behavioural aspects, Sri Lankan public sector (SLPS) is in a compelling need to assess the factors underlying this detrimental condition. The possibility of drawing useful insights for bridging the SQ gaps through employees' assessments on their own SQ and the organizational environment has been largely neglected. Having noticed the clear dearth of studies in this regard, the present study aims to examine the relationship between OC and SQ in SLPS. Responses were collected from a sample of 130 non managerial employees of the divisional secretariat office at Mihintale by using a standard questionnaire. Statistical tools including correlation analysis and regression analysis were used to analyze data and it represented that OC positively effects the SQ. Employees' self-perceived SQ was high (μ = 4.262) in tangibility, reliability, assurance, empathy and responsiveness, where OC of the selected organization was featured with high human relation climate (μ = 4.2462), high rational goal climate (μ = 4.223) and high open system (μ = 4.0833). The findings conclude that a strong connection exists between the components of OC and SQ [human relation climate (r = 0.508), rational goal climate (r = 0.512) and open system (r = 0.073)] of divisional secretariat, Mihintale, indicating the substantial possibility of enhancing the SQ through supporting these components relevantly.

Keywords: Service quality, organizational climate, public sector

Factors Affecting the Turnover Intention of Non-Managerial Employees in Apparel Industry: With Special Reference to Anuradhapura District

07 Nov.
BE40

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Apparel industry has remarked its name in Sri Lankan economy by becoming an eminent industry and recording a significant contribution to the countrys economy. However, being a labor-intensive industry, the apparel industry has been confronting an issue of employee turnover largely since last few decades. Hence, the study was focused on investigating the problem and find out factors that prompt turnover intention of employees. Developed conceptual framework included job satisfaction, job stress, work-family conflict, alternative job opportunities, and learning purpose as independent variables and employee turnover intention as the dependent variable. 200 non-managerial employees, who work in garment factories were selected as the random sample. A self-administrated close-ended questionnaire was used to reach the respondents and different statistical tests were conducted on the collected responses to address the research question. Hypotheses were tested with multiple regression analysis using Statistical Package for Social Science (SPSS). The regression analysis indicated that job stress (0.194), work-family conflict (0.268), and alternative job opportunities (0.468) have a positive significant impact on the employee turnover intention. However, job satisfaction (-0.245) recorded a negative significant impact on the turnover intention but learning purpose (0.085) failed to make a significant impact to employee turnover intention (0.113>0.05). Among the significant factors, alternative job opportunities was the most predictive factor impacted on the turnover intention in the apparel industry. Accordingly, progressive payment system, target based bonus, solid coworkers relationships, appropriate leisure time in working, career progress opportunities, and effective career consultation were identified as effective retention strategies.

Keywords: Non-managerial employees, turnover intention, Apparel Industry

The Management of psychological Capital for Excellent Academic Performance: With Reference to Undergraduates of Rajarata University of Sri Lanka

07 Nov.
BE42

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Psychological capital is now passing its golden era and it has therefore been received global attention of academia and professionals, however, its impact on academic performance of students has not been inquired adequately yet in Sri Lanka. Thus, contribution to existing knowledge of psychological capital was the preliminary objective of the study. Accordingly, study inspected the impact of psychological capital on academic performance of undergraduates in the Rajarata University of Sri Lanka. Data were randomly collected from a sample of 300 students from all faculties of the university. A structured questionnaire was employed and few statistical tests such as correlation and regression tests were conducted to achieve the research objective. The light of the regression realized that there were statistically significant positive impacts of optimism, resilience, self-efficacy on academic performance of undergraduates. However, hope of undergraduates was not significant statistically to their academic performance. Accordingly, the swell of students optimism, resilience, and self-efficacy may result in the higher academic performance of students. This would be achieved motivating students to organize a different kind of extracurricular and group activities during the university period. Further, students could be educated to manage and handle stressful works and studies carefully. Moreover, existing curricula and program structure should be effectively redesigned and reconfigured to uplift the knowledge, skills, attitude, and mindset of students which is essential to have a strong psychological capital.

Keywords: Academic performance; psychological capital

07 Nov.
BE43

Factors Affecting the Customers Retail Bank Selection Decision: With Special Reference to Anuradhapura District

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Commercial banks play a major role in the economic development of Sri Lanka and should face a tough competition in retail banking industry due to the wide range of choice that the customers have. With this rapidly increasing competitiveness in the banking industry it has become a major challenge for them to expand their retail banking market share by retaining the existing customers while attracting new customers. Therefore, this study attempted to investigate factors affecting the customers' retail bank selection decision. A literature survey was carried out and five independent variables were identified. The study selected banking customers in Anuradhapura district as the population and data was collected from 200 customers using a self-administrated questionnaire. The collected data was analyzed by employing descriptive statistics, correlation analysis and multiple regressions analysis. The results of the study revealed that it has 79.8% explanatory power with the R square value and further results indicated that the financial benefits, bank staff friendliness, electronic facilities and the convenience of the bank have a significant impact on customers' retail bank selection decision, while the reputation of the bank was not a significant factor. As per the results of the study, managers of commercial bank industry must pay their attention on identified significant factors in creating a suitable retail banking service package to their customers.

Keywords: Retail Banking Services, Commercial Banks, bank selection

Mediating the Role of Job Satisfaction on the Nexus between Employee Engagement and Work-life Balance: Evidence from IT Professionals in Sri Lanka

07 Nov.
BE45

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(*)E.mail: dananjaya@kln.ac.lk Work-life balance problems are increasingly reported among Information Technology (IT) professionals in Sri Lanka at present. Theoretically, employee engagement and job satisfaction are found to be significant determinants of work-life balance of employees. Similarly, job satisfaction is identified as an outcome of employee engagement which in turn affect the work-life balance, in extant literature. However, the role of job satisfaction is not clear and consistent in work-life balance studies up to date. Hence, the current study was initiated to identify whether job satisfaction is a mediator; if so, to assess the mediation effect of job satisfaction on the aforementioned nexus. The study is a more basic research in which researchers attempted to answer a problem that is concerned with filling a contextual gap in the empirical knowledge. Deductive approach was predominantly applied, and the study is mainly explanatory. Hence, this was carried out as a cross-sectional, quantitative field-study among a sample of 1100 IT professionals selected from four IT companies in Sri Lanka following the stratified random sampling technique. Primary data was collected through a standard questionnaire which has met the accepted standards of reliability and validity. Correlation test, regression test for direct and indirect effects, Sobel test for mediator significance were conducted with the aid of Statistical Package for Social Sciences (SPSS) and R software. It is found that job satisfaction is a significant partial mediator on the aforementioned nexus. Both paths; direct and indirect, are significant in the theorized research model. Thus, it is strongly recommended to engage IT professionals at work in a way that helps them to have a 'trade-off' between work and the non-work lives leading to experience a satisfying life.

Keywords: Employee engagement, job satisfaction, work life balance, IT professionals

07 Nov.
BE46

Exploration of the Corporate Social Responsibility Disclosure Pattern of the Hotel Industry: Evidence from Sri Lanka

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The Corporate Social Responsibility (CSR) disclosure in hotel industry in Sri Lanka is low. Meanwhile, the hotel industry in Sri Lankan context does not have an established pattern which shows an important level of CSR disclosure. As a result, current study aims to develop a pattern incorporating the level of importance of CSR dimensions applicable in Sri Lankan hotel industry. The study adopted the mixed research philosophy (qualitative and quantitative) and mixed research method (content and thematic analysis) in analyzing the data available in annual reports of ten listed hotel corporations for the period of 2014-2018 which were selected using systematic sampling techniques. Set of decision rules were developed to maintain consistency in analyzing annual reports. Data were then converted into Nila Units to measure CSR disclosure. The study first formed a list of 190 codes from the literature for the content analysis; second by analyzing the data and the codes employing thematic analysis study, established 62 higher order codes; and then finally, based on the Nila units attributed to the higher order codes, five themes were found. The results of the study reinforced the pattern of CSR disclosure for which the Sri Lankan hotel industry has given highest importance *viz.* employee relations, community and environment.

Keywords: Corporate social responsibility, tourism industry, Sri Lanka

Key Purchase Determinants and Consumer Attitudes Towards Organic Food Products; Case Study Among Families of Undergraduate Students in Sri Lanka

07 Nov.
BE47

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There is an increasing demand for organic food products all over the world as a result of rising health and environmental concerns associated with inorganic farming. Yet, the current organic food market of Sri Lanka is not operating at its full potential. An understanding about consumer behavior and motives related to organic food purchase is helpful for expansion of the organic food market of the country. This study was carried out to identify the key purchase determinants and consumer attitudes about organic food products among families of undergraduates of Sri Lanka. Data was gathered through a pretested questionnaire from 08 universities in Sri Lanka. 50 undergraduates were randomly selected from each university, representing various fields of study. Results revealed that 54.2% of families consume organic foods, while 45.8% never or rarely purchase organic foods. ANOVA and Chi square test were used assess the impact of different socio economic factors (income, education level and settlement (Rural/urban) on purchase decisions. Income, education level and settlement were not significantly associated with organic purchase decisions. Fresh vegetables and fruits are among the organic foods in highest demand, followed by spices. Majority get their organic food from home gardens, supermarkets or directly from farmers. More than half of the respondents (62.5%) prefer to look for organic certification during purchase. Organic product consumption is mainly motivated by health concerns, followed by quality and environmental concerns, while high price, insufficient availability in the market and uncertainty about the organic status act as limiting factors.

Keywords: Consumer attitudes, organic food, purchase determinants, undergraduates

07 Nov.
BE49

Impact of Social Networking Websites on Education Performance of the Secondary School Students in Maskelia Area

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As a result of technological revolution, the world has become one unit. It has obtained by the masses as consequences of the usage of internet and other telecommunication media for transferring data, information and lots of things. However, most people have addicted to the usage of social media networks; specially the school students are badly affected by the social media usage. Most researchers have indicated that school students have been mostly addicted to the use of social media which has inversely affected their educational performances. This study intends to measure the impact of social networking websites on the education performance of the secondary school students in Maskeliya area. Through a literature review survey, researcher identified time duration that the student used for social media roaming, friends and relationships developed, number of social media websites, and health addiction as independent variables. Education performance of the students was used as the dependent variable. The relationship between independent and dependent variables was tested through various tests including descriptive statistics, regression analysis, correlational analysis, independent sample t-test, ANOVA and etc. Questionnaires were used to gather data from 100 school students in Maskeliya area. These respondents belonged to five different schools in Maskeliya. As a result, time spent on social media, friends and relationships, and Health addiction had a significant relationship on education performance. Nevertheless, the number of social media websites did not maintain a significant relationship with education performance. Further research should be conducted on other successful factors that influences the impact of social media on education performance in secondary schools.

Keywords: Education performance, impact, social networking

Saving and Share Market Participation by Women

07 Nov.
BE50

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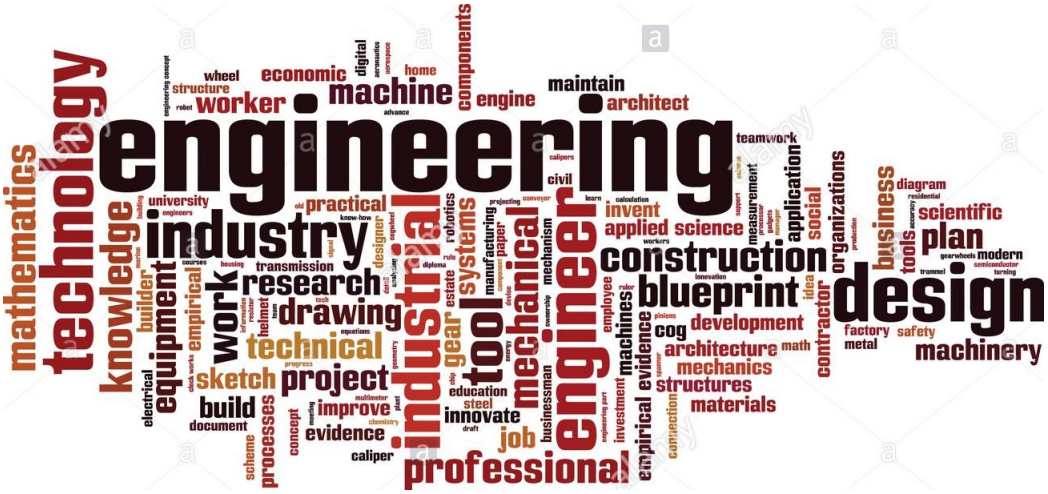
The share market of a country plays a vital role in the growth of its industry and commerce. Government, economists, market analysts and even the central bank of the country keeps a close watch on the activities of the share market. The participation of women in share market or in any kind of investment option is important for the growth of the country. Despite the fact that women are financially successful and have the control on investment decisions than ever before, they are showing less participation in the share market. Therefore, this study has made an attempt to understand the saving patterns of women and to see whether any association exists between the saving patterns and share market participation, and finally to find out factors for less participation. The data for the study were collected, using purposive sampling from employed females using a structured questionnaire. The findings of the study revealed that women are more risk averse. Among the factors identified, lack of interest and risk factor have the highest influence as a reason for lower participation of women. Compared to other investment options such as savings accounts, property, jewelry, women find the share market as unfamiliar and uncomfortable. Significant proportion of women are not willing to take a risk to gain higher benefits. Even though the necessary information and support are provided women are not interested in participating in the share market. Furthermore, when it comes to existing female investors most of them are not active shareholders and they have strong backup from the male family members. In conclusion, women save but their choice of investment modes are limited. Therefore, increasing awareness is important to ensure that their savings are productive to them and the country. Even for the few female share market investors they would be further encouraged if some institutional support is provided.

Keywords: Colombo Stock Exchange, female shareholders, risk averse, share market

Talks: Engineering & Technology



Telecommunication Customer Segmentation Based on the Profitability with a Novel Data Mining Approach

06 Nov.
ET04

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Technological advancement and globalization give high priority to telecommunication industry and it is highly competitive because of multiple service providers that provide different solutions to their customers. As a result, customers are rapidly moving from one service provider to another based on their requirements. Furthermore, human communications have been moving far from traditional to modern such as Skype, FaceTime and Social Media. Therefore, mobile operators are under a real threat of loosing revenue. To solve this issue, they need to increase their capabilities on understanding customer behavior patterns and preferences. The major aim of this study is to cluster the customers based on the profit which service provider earns and develop a model to predict customer profitability level in the future and clustering the customers to provide different promotions. This study was carried in three phases. First phase was the comparison of K-means and K-means++ approaches of clustering algorithm and choosing the best one by using Within Cluster Sum of Square (WCSS) and processing time. The result was K-means++ algorithm. Second phase was focusing on clustering the customers based on their behaviors by using K-means++ and developing an Artificial Neural Network (ANN) model to predict customer profitability level in the future. Finally, choose the highest profitable customer cluster and apply K-means++ algorithm to provide different promotions. Dataset consists of 12,000 prepaid customer details of service provider-x with 15 attributes such as monthly service charge, monthly outgoing call duration, duration of roaming calls, customer care calls, customer lifetime revenue, device' web capability and so. Confusion matrix was used to evaluate the performance of ANN model and the constructed ANN model gave the accuracy of 97.53%. Existing researches use unsupervised or supervised learning algorithms separately. But this study integrates both algorithms and getting high prediction accuracy of 97.53%. Therefore, this model fits well for telecommunication industries.

Keywords: Profitability, clustering, neural network, K-means

06 Nov.
ET05

Identification of Factors in Road Accidents Through Classification and Regression Tree; Machine Learning Approach

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Road accidents are the most influential factors which cause untimely deaths for citizens as well the economic loss to the country while damaging properties. In order to overcome road accidents, planning and implementing countermeasures is an essential part of road safety. Decision making and judgments on road accidents are crucial when the damage of the road accident is high. Analyzing the patterns within the data is one way of establishing strategies on road safety. The main objective of this study is to accurately identify driver characteristics and the ages which are more prone to accidents by using imperative factors towards it. CART (Classification and Regression Tree) has used to accurately predict the respective factors and age within the selected Colombo Batticaloa road. Human behavior identified using CART was analyzed with 8 characteristics (speeding, negligent driving, error of judgment, influenced by alcohol/drugs, fatigue/fall asleep, inattentiveness, poor eyesight, sudden illness) while age was critically analyzed with 10 age groups from 15-80 years. The used CART approach showed accuracies of 80.06% and 91.19% with the factor of identifying the age. Results revealed that speeding, wrong judgment and negligent driving as the main human characteristics, which lead to road accidents and drivers who are at age group 25- 34 years are most vulnerable to accidents. In order to reduce the accident risks the drivers should be critically tested, when issuing the driving license. The study provides the information needed to guide the relevant decision-makers in adopting suitable measures to reduce the accident rate.

Keywords: CART

Application of Neural Networks for Flood Prediction in Rathnapura Town in Sri Lanka

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Floods are a kind of major natural disaster in the world as well as in Sri Lanka. In Sri Lanka, major floods are associated with the two monsoon seasons namely south-west and north-east. During south-west monsoon; the western, southern and Sabaragamuwa provinces are vulnerable to floods. The threats of floods have presented destruction of human lives, property, infrastructure and economy. Hence, an effective flood prediction system could help mitigate the worst effects of floods. This study proposes a novel flood prediction model for Rathnapura town in Sri Lanka. Rainfall of five meteorological stations namely Alupola, Hapugasthenna, Guruluwana, Lelopitiya, and Rathnapura impacts the water level of the Kalu River during monsoons and hence the main reason for floods. This study was conducted in two phases. In the first phase, K-mean clustering was used to cluster the water level of the Kalu River according to the rainfall of five meteorological stations. In the second phase, an Artificial Neural Network model was implemented for forecasting floods in Rathnapura town according to the rainfall of above-mentioned five stations. The dataset for this study was obtained from the Department of Irrigation, Sri Lanka and it contained 1955 records. The proposed model showed 96% accuracy for flood prediction in the testing phase. By using this model, we can provide a prior warning for floods in Rathnapura town. Hence, it will be useful to minimize the social and economic losses that may occur due to flood.

Keywords: Flood prediction, K-mean clustering, Artificial Neural Network

06 Nov.
ET13

Automated Tablet Dispenser and Liquid Measuring System for Medicines

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Proper management of medication is essential for a safe and effective healing process. Due to busy lifestyle, majority of people completely forget to take medication or take it properly at the recommended time of the day. This has proven to be fatal in several occasions. Although there are different types of pharmaceutical tablet dispensers in the market, it is extremely difficult to find a reliable and an affordable system. As a solution, an automated pharmaceutical tablet dispenser was built to remind the relevant time and the dosage for the patient by sending a message via global system for mobile communications (GSM) module. It was based on the ATmega328 microcontroller. The time is calculated using a real time clock (RTC) module and the relevant time is reminded to the patients to take medicines by ringing an alarm. The correct doses of tablets are automatically released to the patient. In addition, it sends a message to the patient or the caretaker to refill the tablets when the numbers of tablets are running low. The system is compatible with any type of mobile phone and does not require information and communication skills to utilize it. In addition to the tablet dispenser, a liquid measuring system was designed and built especially for paracetamol, salbutamol, piriton and domperidone medicines. The proper dose of medication is released by the system once the caretaker enters the illness, age and the weight of the patient into the system. The results were tested with above medications several times and the accuracy was confirmed to be above 0.1 ml. This project can be further improved by connecting RTC module and a GSM module to remind the patient or caretaker to attend to the task of taking medicines.

Keywords: Microcontroller, liquid measuring, global system for mobile communication module, real time clock module, tablet dispenser

Enhancing Economic Viability of Road Construction Industry in Sri Lanka by Integrating Lean Construction Concept

06 Nov.
ET17

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The interconnection of activities required for the design and construction of building and infrastructure involves the interplay between people, technology, situations, and decisions. It requires the astute coordination of labor, materials, and plant to realize the planned progress of work. Minimizing waste and maximizing value with continuous improvement is the concept of lean. Lean construction has proven to satisfy clients by creating customer value. Through its origins in the Toyota Production System, lean is now applied as an innovative way to manage the design and construction of projects with the use of tools which address project constraints, such as complexities and uncertainties, among others. This research is an effort to implement lean construction concept to the Sri Lankan road construction industry. Research approach involved the use of primary data, collected from questionnaire survey and semi-structured interviews with qualitative and quantitative mixed type research. The foremost objective was to optimize the cost, quality and time in road construction with the application of lean construction concept and identify most important lean tool among 5S, Construction process analysis, just in time, Value stream mapping, Kanban and last planner as adapted to road construction industry. Finally, the most important lean construction tool for road construction improvement is identified.

Keywords: Lean construction concept, road construction, Toyota production system

06 Nov.
ET21

Comparative Analysis to Investigate Appropriate Machine Learning Approach for Landslide Susceptibility Mapping

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A Landslide is defined as a collapse of a mass of earth. Irregular development activities on mountains and inadequate attention to construction aspects have led to the increase of landslide and consequently sustaining damages to lives and properties. Of the 3275 sq.km of the area in the Ratnapura District; 2178 sq.km is considered to be highly prone to landslides. If proper investigations were performed on time, most of the landslides could be predicted relatively accurately. The main objective of this study was to map ares prone to landslide-hazards to discover the real scope of landslide processes, where this knowledge will be highly beneficial to the general public in avoiding the landslide hazards and in mitigating the losses. Machine learning approaches based on Support Vector Machine (SVM), Naïve Bayes and Ensemble Learning technique were used to develop the Landslide prediction models and multiple approaches were compared to investigate the most appropriate prediction model. This study has a strong capability to predicting landslides by considering triggering factors such as rainfall and causative factors such as slope angle, land cover, elevation, intensity, bedrock geology and soil materials. Application of Ensemble Learning techniques such as Voting, Bagging, Boosting (AdaBoostM1) and Stacking produced 98%, 74%, 94% and 76% accuracy rates respectively. Moreover, experimental results after applying SVM and Nave Bayes showed the accuracy rates to be 96% and 94% respectively. This research discovered that the ensemble approach has the best degree to fit for building a prediction model. Moreover, the study found that all the factors had relatively positive effects on the landslide.

Keywords: Ensemble approach, Support Vector Machine (SVM), Naïve Bayes

An Analysis of the Distribution of Educational Resources in Sri Lanka Using Data Mining Techniques

06 Nov.
ET22

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Sri Lankan government invests 2.8% of GDP for the education sector. Therefore, it is vital to analyze the dispersion of educational facilities of the country on the district basis, as the administration of the education sector follows the same basis. The objective of this research is to cluster the districts based on the existing educational resources. The data for the study was gathered from the annual report issued by the Census and Statistical Department established in the Ministry of Education. The dataset consists of 21 features, which describe the properties of schools, teachers and students. The gathered data were clustered using the K-means clustering algorithm by assigning random initial seeds. The resulted clusters are validated using the silhouette coefficient. Clustering and data visualization were conducted using the orange data mining toolkit. The reordered silhouette values were decreasing, respectively, with 5, 4, 3, and 6 clusters. The clustering resulted in five clusters of hierarchical clustering algorithm with the method of average linkage being very similar to the clusters constructed from the K- means algorithm. This indicates that educational resources in Sri Lanka can be accurately mapped into five clusters, which express the diversity of dispersion of educational facilities among districts. As this disparity existing in distributing the educational facilities, it is worthwhile to select students for inter-zonal competitions based on the uniformity of educational facilities. This study emphasizes the importance of the consideration of the distribution of educational resources in Sri Lanka while revealing the existing diversity where the facilities are idling and overused among districts.

Keywords: Educational data mining, Hierarchical clustering, K-means clustering, orange data mining tool, silhouette coefficient

06 Nov.
ET23

An Unsupervised Machine Learning Approach for the Identification of the Churn Behavior of Customers

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It is true and practical that customers are the most precious asset for any successful organization in the present business world. Therefore, it is inevitable for an organization to retain its customer base in a stable position. In order to do this, a very effective churn prediction strategy should be followed by the organization concerned. As per certain churn predictions carried out in the past, researchers in this field had been motivated in establishing and administering much more successful businesses. Most of the instances in the business fields, the supervised machine learning techniques had been taken into consideration in the process of churn prediction. On the contrary to the above, the unsupervised machine learning techniques have been utilized in this study. In this process, 10, 000 post-paid subscriber details from a local "Telecommunication Company" which consists of 20 attributes have been obtained and analyzed. Further, the Principal Component Analysis (PCA) and K-Means clustering algorithm have been employed aiming at minimizing the dimensionality between the said attributes and to make clusters to find the churners and non-churners respectively. The results obtained from the above mentioned PCA have revealed that the specific 16 principal components represent the whole 20 features that are considered as important to cover the entire data. Further, totally 6 clusters have been generated and it was noted that some particular features tend to show higher contribution. This characteristic was identified during PCA. This was further analyzed through each cluster. In conclusion, the proposed approach revealed that out of the 6 clusters three (3) representing 4888 are churners and the other three (3) representing 5112 are non-churners.

Keywords: Churn, Principal Component Analysis (PCA), K-Means clustering, Unsupervised Machine Learning

Architecture for an Open Source IOT (Internet of Things) Based Solution for Water Quality Monitoring and Prediction of Natural Water Sources in Sri Lanka

06 Nov.
ET23

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Unavailability of a proper water quality monitoring and prediction mechanism has impacted negatively towards water quality management in Sri Lanka. The available Supervisory Control and Data Acquisition (SCADA) systems contain drawbacks such as high cost, low interoperability and flexibility. Hence, a proper architecture is proposed through this study to support efficient water quality management. The workflow was designed after a proper requirement analysis. The components, tools and technologies to be used were selected separately for a device to obtain water quality measurements, optimized backend server architecture, and a model for future predictions. The connectivity diagram was designed to provide architecture for water quality monitoring and prediction. The validation was conducted through implementation through proof of concept. The Arduino Uno based device obtains measurements in pH, conductivity, turbidity, temperature and dissolved oxygen. A separate device named ANDalyze obtains heavy metal readings of raw water. Then sensor data is transmitted to Mosquitto Message Queuing Telemetry Transport (MQTT) Broker. Next to NiFi, which manages the flow of data and transmits to Kafka and Hive servers where real time streaming and predictions happens. Prediction model is designed using ARIMA Time Series prediction. Data was visualized through Spark. The proof of concept was implemented excluding dissolved oxygen and heavy metal sensing due to budgetary limitations. The model architecture is applicable to be implemented to monitor and predict raw water quality in natural water sources in Sri Lanka that has direct impact on water safety of the nation.

Keywords: Water Quality, Internet of Things (IOT), Architecture.

An Application to Predict the Risk Level of Chronic Kidney Disease

06 Nov.
ET32

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Data mining has been an emerging field of research which is a powerful technology with great potential to help in decision making and predictive analytics. The ability to extract hidden predictive information from data has become the major advantage of data mining. There are various data mining techniques such as classification, clustering, regression analysis, time series analysis and etc. In the health care industry, the data mining is mainly used for predicting the diseases from the available data on the diagnosis. Chronic Kidney Disease (CKD) is a gradual decrease in renal function over a period of several months or years. The primary objective of this research was to determine the CKD risk level in CKD patients. A risk evaluation system is developed in order to predict the probability of any individual bearing the disease using *Two Class Logistic Regression* and *Support Vector Machine*. The application automates a prospective analysis of the progressive kidney disease and offers a prediction for each individual indicating their own level of risk of bearing CKD with an accuracy of 96%. Since the mechanism predicts the risk for each individual bearing CKD, the users get the opportunity to obtain early medical attention. This certainly paves the way to raise kidney disease awareness around the country, guiding people to be more responsible towards eliminating CKD.

Keywords: Machine learning, chronic kidney disease, disease prediction, support vector machine, two class logistic regression

e-Public Health Inspector (ePHI) Application to Ensure the Quality of Consuming Food

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"Healthy Food in Healthy Environment" is the main concept of the e-Public Health Inspector (ePHI) application. This is to protect the public from foodborne illnesses and promote safe food handling techniques among restaurants and food vendors. Both Public Health Authorities and the community are playing a vital role in the ePHI. The system contains a mobile application which is capable of accessing and updating the system by Public Health Inspector (PHI) as well as the community that utilizes the resources. The system users can send data (images, description) to the system on the spot. The data comprises of geotagging by Global Positioning System (GPS) and the time to reduce the forged details. Further, the information on the application is kept up-to-date and PHI will be able to see the locations that they must visit. They can take relevant action that is required to solve the reported health violations. After inspection, PHI should update the system by uploading images of the relevant investigation. This system is developed using Hypertext Mark-up Language (HTML), Hypertext Pre-processor (PHP), MySQL, Cascading Style Sheet (CSS), JavaScript, AJAX, JQuery and Android Studio. This process not only increases the efficiency of the PHI but also it reduces the ability of the PHI to misguide the authorities. Finally, it reduces the health issues of the community due to consuming food to produce a healthier society in the journey of sustainable development.

Keywords: ePHI, Global Positioning System, Public Health Inspector

06 Nov.
ET37

An Effective Method of Conversion of Pulmoddai Zircon Sand into Zirconia

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This study describes an effective and a suitable method of converting Pulmoddai Zircon ($ZrSiO_4$) sand into Zirconia (ZrO_2). Although few other methods have been reported in the literature to do this conversion, none of them were used in Sri Lanka. This could probably be because of its ineffectiveness or high cost. The proposed conversion method is an effective and low cost method because a comparatively low temperature is used for the conversion. The beach sand at Pulmoddai consists of 65% ilmenite, 10% zircon, 10% rutile and the rest are non-heavy minerals. Zircon is an oxide ceramic material which is used in industrial applications due to its special optical, chemical, electrical, thermal and mechanical properties. Although there are valuable zircon deposits in Sri Lanka, it is a major drawback that the country still does not give any value addition to it. In this study it was revealed that zirconia can be synthesized using zircon sand which can be separated directly from raw sand. After the preliminary preparation, the zircon sand was mixed with a solution of aqueous caustic soda (NaOH) and heat treatment was conducted at comparatively low temperatures for a short period. Solvent evaporation method was used to obtain zirconia from Zirconium Hydroxide, which was obtained by mixing NH_4OH with zirconium Oxychloride crystals. The resulting powder was analysed using X-Ray Diffraction method and it was confirmed that the final product was Zirconia.

Keywords: Zircon, Zirconia

Talks: Medicine & Health Sciences

The Efficacy of Dhuththura Oil in the Management of Kalithya

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Abnormal falling of scalp hair is one of the diseases, which is known as "Kalithya" in Ayurveda. Nevertheless, losing and re-growing hair is a normal phenomenon and as per the American Academy of Dermatology, an average person, generally loses around 50-100 strands of hair each day. Hence anything above this cut off is considered abnormal hair loss. There are various reasons for hair loss including auto immune diseases, poor nutrition, mineral deficiency, stress, medications, and inadequate hair care. This study was aimed at finding efficacy of Dhuththura oil which is known to be a safe and effective external mode of therapy for kalithya without side effects. Daily hair fall, ponytail ring diameter, hair length, hair colour, hair type, splitting of hair and dandruff were the parameters assessed, and the treatment effect was assessed in terms of improvement of clinical features of kalithya using a grading system. Thirty patients of Gampaha Wickramarachchi Ayurveda Hospital were recruited for the clinical study for one month. They were given Dhuththura oil treatment and advised to avoid other treatments for kalithya. Patients were assessed and the data recording was done at the recruitment and one month after the specified treatment. Analysis was done by the Statistical Package for the Social Sciences. The treatment showed a significant improvement with the number of hair fell per day (27/30, 90%) hair length (30/30, 100%) hair colour (26/30, 86.66%) and dandruff (22/30, 73.33%) (P value <0.05). However there was no any significant effect of the treatment on pony tail ring diameter, hair type and splitting of hair. The study demonstrated that the Dhuththura oil treatment can partly reduce the symptoms, and would potentially be an effective treatment of kalithya.

Keywords: Kalithya, Dhuththura oil, falling hair

In Vitro Screening of Anti-Diabetic Properties of Commonly used Ayurvedic Plants in Sri Lanka

06 Nov.
MHS05

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Diabetes mellitus (DM) has become a pandemic worldwide affecting more than 8% of the adult population. Due to the negative side effects of insulin and synthetic anti-diabetic agents, the interest in the use of medicinal plants for the treatment of DM has increased. The present study was undertaken to assess the anti-diabetic activity of water extracts of ten commonly used Sri Lankan Ayurvedic plants in vitro; Nelli (*Phyllanthus emblica*), Ranawara (*Cassia auriculata*), Belimal (*Aegle marmelos*), Beligeta (*Aegle marmelos*), Iramusu (*Hemidesmus indicus*), Walkottamalli (*Scoparia dulcis*), Rasakinda (*Tinospora cordifolia*), Polpala (*Aerva lanata*), Babila (*Sida rhombifolia*) and Venivel (*Coscinium fenestratum*). Alpha amylase and α-glucosidase enzyme inhibitory activities of the extracts were determined using the glucose oxidase (GOD) and the p-nitrophenyl glucopyranoside (pNPG) methods respectively. All experiments were carried out in triplicates and results were analysed using the SAS version 9.1 statistical software. CRD model was used to evaluate the differences in anti-diabetic properties. According to the results, α-amylase and α-glucosidase enzyme inhibitory activities of plant extracts varied from 0.04 ± 0.005 - 9.75 ± 0.53 mg/mL and 0.31 ± 0.0057 - 20.71 ± 0.50 mg/mL respectively. Nelli extract showed the highest α-amylase and α-glucosidase inhibitory activity while the least α-amylase activity was observed in Babila extract. Water extract of Nelli, Iramusu, Ranawara and Walkottamalli showed strong inhibitory effects against α-glucosidase while other extracts did not show any significant activity ($P \leq 0.05$). Nelli extract had promising anti-diabetic activity among selected plants and could have a potential in treating type 2 DM with minimum side effects.

Keywords: Medicinal plants, Diabetes mellitus, Anti-diabetic activity

06 Nov.
MHS06

National Survey on Medical Officers and Dental Surgeons to Identify the Distribution of Medical Officers and Dental Surgeons

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Ministry of Health appoints Medical Officers (MOs) and Dental Surgeons (DS) based on the existing cadre norms. However, discrepancy in the distribution and the shortage of doctors are reported frequently. To identify the distribution of MOs and DS, an island wide survey was conducted on 2019.04.01, from 8.00 am 4.00 pm. In 182 institutions, 325 management assistants collected the data from personal files and payrolls using predefine data extraction form. The collected data was uploaded to electronic form on survey day. Including postgraduate (PG) trainees, there were 17910 MOs and 1510 DS in the country. 11000 (61.42%) MOs were under the line ministry and 6910 (38.58%) were under the provincial ministry. Uva province had the lowest number (772 (5.09%)) of MOs and Western province had the highest number (5347 (35.28%)) of MOs which were distributed among the provinces (n=15155). Doctor patient ratio for Sri Lanka was 0.81 per 1000 individuals; which was also highest in Colombo Regional Director of Health Services (RDHS) area (1.35) and lowest in Nuwara Eliya RDHS Area (0.37). Male MOs (n=9011,50.31%) were slightly higher than females (n=8899,49.69%). 698 (46.23%) DS were under the line ministry and 812 (53.77%) were under the provincial ministry. North Central Province had the lowest number 87 (6.3%) of DS and Western province had the highest number of 360 (26.09%) DS out of which were distributed among provinces (n=1390). 645 (42.72%) DS were males and 865 (57.28%) were females. Distribution of medical officers over the island is inequitable. Rural retention of the MOs were comparatively low. MOs were predominantly males while DS showed female predominance.

Keywords: Distribution, medical officers, dental surgeons

Reasons and Characteristics of School Dropouts in Adolescent and youth Not on Education Employment or Training (NEET) in Anuradhapura

06 Nov.
MHS12

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Adolescent and youth NEET is a problem to health and development. NEETs are difficult to reach and are subjected to social exclusion. The objective of this study was to explore the reasons and characteristics of school dropouts among adolescent and youth NEET in Anuradhapura district. We conducted a mixed method study in which the phase 1 (qualitative) focused on group discussions (fifteen) and in-depth interviews (six) conducted on adolescents and youth NEET, teachers, parents, health officers and community dwellers, in four different communities in Anuradhapura. Thematic analysis was also conducted in phase 1. During Phase 2 a descriptive cross-sectional study among adolescents and youth NEET in Nuwaragam Palatha Central Medical Officer of Health area assessed sociodemographic factors, reasons and implications of school dropouts. Results for Phase 1 showed that the main reasons for dropouts were discouragement, personal decision, financial problems, family issues and problems of education system. While some left school due to actual financial difficulty, others left to earn money as desired. Females regretted about school leaving. The results for Phase 2 showed that of the 197 adolescents and youth the mean age was 20-22 years and 63.5% had sat for ordinary level examination. Of the parents 35.3% were happy or did not care about their childrens education. 17.3% of the participants had dropped out because of financial problems and 18.3% had stopped schooling for no reason. However, of the participants, 87.7% always or often liked schooling. Hence, it can be concluded that school dropout is influenced by many socio-cultural and economic factors which can be intervened at school and at community.

Keywords: social exclusion, sociodemographic factors, discouragement, financial problems

06 Nov.
MHS13

Headphones: Do They Pose A Threat?

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Sharing of public headphones available in medical faculties can be a potential health threat as they play a role as vectors for nosocomial pathogens including deadly methicillin resistant *Staphylococcus aureus* (MRSA), as medical students are constantly exposed to the hospital environment. Hence this study was conducted in order to assess microbial contamination in headphones at Information Technology laboratory (IT Lab) of Faculty of Medicine and Allied Sciences, Rajarata University of Sri Lanka. Both earpieces of twenty headphones, which were selected from the IT lab of the faculty, were swabbed and the swabs were vortexed with sterile saline, and 0.1ml each was introduced to Blood Agar, MacConky Agar and Sabourauds Dextrose Agar. They were spread plated, and incubated for isolation of bacteria and fungi. Standard techniques were carried out for the enumeration and identification of microorganisms and MRSA screening was carried out. Bacteria were found in all 20 (100%) headphones each having >300 CFU/swab, including *Staphylococcus aureus*, coagulase negative *Staphylococci, Streptococcus spp.*, gram negative cocci, gram positive bacilli, oxidase negative non lactose fermenting organisms and *Pseudomonas spp*. Four out of 20 (20%) headphones had MRSA. Fungi were found in 8/20 (40%) headphones, including *Aspergillus fumigates*, *Aspergillus niger*, and *Penicillium spp*. In conclusion the headphones tested contaminated with potentially pathogenic microbes including MRSA. Regular cleaning of headphones with non-damaging disinfectants and good hand hygiene is recommended for users in order to prevent this health hazard. Permitting use of private headphones within the IT Lab would be helpful in preventing the spread of potentially pathogenic infections.

Keywords: Headphones, bacteria, fungi, MRSA

Bacterial Load in Respiratory Specimens in Lung Cancer and Bronchiectasis Suspected Patients; a Molecular Approach

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Many bacteria are associated with human diseases as the causative agent. Some bacteria might play a different role in disease progression. Lung cancer and bronchiectasis patients are immunologically suppressed. We aimed to quantify bacteria in lungs of the patients suspected of the two diseases. The ethical clearance was obtained by Teaching Hospital, Kandy. Lung cancer suspects (LCS) (n=20), bronchiectasis suspects (BRS) (n=20) along with a healthy population (HP) (n=20) were recruited for the study. Bronchoalveolar lavage and oropharyngeal swabs were collected from patients representing upper and lower respiratory tract (URT and LRT) whereas sputum was collected from healthy population. Bacterial DNA was extracted and forward primer- 5TCCTACGGGAGGCAGCAGT3, reverse primer 5GGACTACCAGGGTATCTAATCCTGTT3 and probe (6-FAM)-5-CGTATTACCGCGGCTGCTGGCAC3-(TAMRA) was used to amplify and detect 16S rRNA gene. Bacterial load was calculated compared to a standard curve using Escherichia coli. Total bacterial load was observed as means of 8.14×10^4, 1.4×10^4 and 6.06×10^4 cells/mL, respectively in lung cancer and bronchiectasis suspects, and the healthy group. In URT samples, highest cell concentration was observed in LCS with 1.93×10^4 cells/mL whereas BRS exhibited lowest among the three groups being 1.49×10^4 cells/mL. In LRT samples, the highest bacterial cell number was seen in healthy individuals accounting 8.4×10^4 cells/mL, the lowest being 1.32×10^4 cells/mL in BRS. The three groups involved in this study has shown variations of bacterial load. The highest respiratory bacterial load was observed with LCS, whereas bronchiectasis showed the lowest bacterial load. This concluded that the lung bacterial microbiota numerically does not necessarily depend with these two chronic respiratory conditions.

Keywords: bacteria, lung microbiome, real-time PCR

06 Nov.
MHS15

Review on Anticancer Effect of Selected Medicinal Plants for Gynecologic and Breast Cancer

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Cancer is the second most common cause of death for both genders after cardiovascular disease. Gynecologic cancer and breast cancer are common in the female population. Many cancer patients seek alternative and complementary treatment methods due to the serious side effects of chemotherapy, radiation therapy and high death rate with cancer. Medicinal herbs and their phytocompounds are being recognized as useful complementary treatments for cancer. Hence, an attempt was made to review the anticancer properties of medicinal plants used in the treatment of gynecologic and breast cancers. Botanical descriptions with Ayurveda properties were collected on 15 medicinal plants and cancer cell line articles were reviewed. Cell line methods and the main actions of the herbal plants such as anti-cancer, anti-tumor, anti- proliferative, anti-inflammatory, anti-oxidant, cytotoxic, apoptotic were listed. Ayurveda properties and main actions of medicinal plants were analyzed. *Flueggea leucopyrus*, *Morringa oleifera*, *Aloe vera*, *Azadirachta indica*, and *Cucumi semelo* plants were effective in gynecologic cancers. *Datura metel*, *Aloe vera, Phyllanthus emblica, Coriandrum sativum, Syzygium aromaticum, Vitex negundo, Azadirachta indica, Annona squamosa, Manilkara zapota, Tinospora cordifolia, Piper nigrum*, and *Cassia auriculata* plants were effective in breast cancers. Among them 8 plants showed anti-cancer actions, 6 plants showed Anti-oxidant actions, 4 plants showed cytotoxic actions, 3 plants showed anti-proliferative actions, 3 plants showed anti-tumor actions, 1 plant showed anti-inflammatory action and 1 plant showed apoptotic action. *Tikta, katu rasa, lagu guna, ushna veerya* and *katu vipaka* were the most prominent Ayurveda properties in these medicinal plants that were effective against gynecologic and breast cancers. Further studies are required to determine the plant-derived chemical compounds with anticancer properties and the efficacy of these compounds in treating gynecologic and breast cancers.

Keywords: Gynecologic cancer, breast cancer, medicinal plants, Ayurveda, anticancer agents

Awareness On Snakebite Among Military Personnel: A Cross Sectional Survey

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Snakebite is associated with significant morbidity and mortality worldwide. This may be a serious occupational hazard for the military personnel as the troops are exposed to snakes particularly during deployment in the battlefield. We aimed to evaluate the awareness and the experience on snakebite among military personnel. This cross-sectional survey was conducted among military personnel deployed in Puthukudiyiruppu, Sri Lanka, in September 2013. All data were collected using a self-administered questionnaire. A total of 304 Sri Lankan Army personnel with the average age of 29.6 years (SD,6.6) were included in the study. Majority (n = 253, 83.2%) had been in the battlefield with an average battlefield experience of 8.3 years (SD = 5.6). Of the total, only 109 (35.9%) had participated in snakebite awareness programs in terms of workshops (52 (17.1%)) or as a component of professional training (89(29.3%)). 33(10.9%) personnel had a past history of snake bite of which only 6 (18.2%) occurred during duty hours. Identified snakes causing those bites were, hump nosed vipers (n=11, 28.9%), Cobras (n = 5, 13.2%), Cat snakes (n=5, 13.2%), Russells vipers (n = 4, 10.5%) and Indian kraits (n = 3, 7.9%), and 8 (21.1%) were unidentified snakes. More than 20% of the total were not aware of most of the deadly venomous snakes in Sri Lanka, and over 60% did not have a good understanding about the recommended first aid following a snakebite. Despite encountering snakes during military work is very common, the awareness on snakes, snakebites and relevant first-aid among military personnel is very low. Improved awareness on such aspects would be imperative in minimizing potential health risks associated with snakebites among military troops.

Keywords: Snakebite, Snakes, Military, Awareness

06 Nov.
MHS19

Calculation of Climatic Indices for Daily Temperature and Precipitation During 1990-2015 in the Kelani River Basin, Sri Lanka

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Evaluation of trends in the historical climate of the Kelani River Basin will essentially provide useful insights in future decision making and planning of activities related to climate vulnerable sectors. This particular study uses the RClimDex software to calculate nine precipitation related and six temperature related extreme indices during 1990-2015 at four rainfall gauging and two meteorological stations in the Kelani River Basin, Sri Lanka. Increasing trends of tropical nights (TR 20), summer days (SU 25) and monthly maximum value of daily minimum temperature (TNx) signify that the Kelani River Basin is also under the threat of warming. Notably, monthly maximum value of daily maximum temperature (TXx) and monthly maximum value of daily minimum temperature (TXn) show small negative trends at both Colombo and Katunayake meteorological stations. Consecutive wet days (CWD) and dry days (CDD) exhibit mixed trends in this study. Maximum 1-day precipitation (R1) shows positive trends in three rainfall stations while maximum 5-day precipitation (R5) shows negative trends in three rainfall stations during the period of analysis. Positive trends in total precipitation in extremely wet day related indices reported at three of the rainfall stations clearly indicate that the intensity of rainfall has increased during 1990-2015. The results of this study are in line with the findings of previous researches conducted in Sri Lanka related to precipitation and temperature indices. The outcomes and recommendations of this study can be mainstreamed into the national adaptation planning of climate change to develop climate resilient frameworks and adaptation policies.

Keywords: Rainfall, temperature; RClimDex, climatic indices, Kelani River Basin

Empowering a Youth Group Against Tobacco Smoking Through Health Promotion Intervention at Yowunpura in Hambanthota

06 Nov.
MHS20

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Youth is the backbone of a nation. Means through which youth are assisted to succeed is called youth empowerment. There are 1.8 billion young people in the world today. Youth population in Sri Lanka is about 3,160,210. Tobacco smoking is the major cause for avoidable deaths in Sri Lanka today. Annually, 20000-25000 Sri Lankans die from tobacco smoking. Health Promotion is an approach which has been successfully practiced in empowering communities to address various health issues in their lives. The aim of the study was to empower the youth against tobacco consumption using health promotion intervention. This study was carried out with the youth participated at Yowunpura-2019 in Hambanthota, Sri Lanka. Participants were divided into girls and boys purposely. Then they were grouped according to their district. Discussion was carried out by a facilitator. Physical appearance of the smokers was discussed using the mirror tool. In the mirror tool the face of a smoker and a non-smoker was given to compare and identify the smoker. The real harm of tobacco smoking was discussed including diseases, sexual impotence and economic harm with the active participation of them. At the end of the discussion, industrial strategies of promoting tobacco were discussed and a plan was made with them to be implemented in their villages to reduce smoking among the villagers. Data collection was done as pre- and post-assessment using the same questionnaire. Their comments were assessed thematically at the end. 222 (90%) of the participants had changed their attitudes and knowledge related to the attractiveness of smoking. 185 (75%) of the participated youth were empowered to get an action to reduce tobacco smoking. Therefore, Health Promotion which provides strategies to improve knowledge, change attitudes and develop skills is an effective approach to empower the youth against tobacco smoking.

Keywords: tobacco smoking, mirror tool, sexual impotence

06 Nov.
MHS26

Comparison of Fluoride and Calcium Levels in Drinking Water Before and After the Water Treatment

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This study was conducted to compare the calcium and fluoride levels in drinking water before and after water purification in dry and wet zones. Low Fluoride intake results-in dental caries and high intake leads to Fluorosis. Low Calcium intake results in osteoporosis and high intake leads to urinary stones. According to WHO recommendations the optimal range for fluoride in drinking water is 0.51.0mg/L and the minimum level of calcium in drinking water is 40mg/L. Water samples were collected from 6 different water sources used in water purification in 3 different districts, namely Anuradhapura (Nuwara wewa-NW, Tissa wewa-TSW, Thuruwila wewa-TRW), Polonnaruwa (Parakrama samudraya-PS, ZD canal-ZD), Kandy (Mahaweli river-MR). Water samples were obtained before and after the purification process. Ion levels were measured using Ion meter (JEN-WAY3340). Lowest fluoride difference was observed in PS (-0.005mg/L) and highest fluoride difference was observed in the NW(-0.37mg/L). Lowest Calcium level difference was observed in MR (+1.15mg/L) and highest Calcium level difference was observed in TRW(+6.35mg/L). The fluoride levels in NW, ZD, MR were in the range of 0-0.5mg/L and TSW, TRW, PS fell in the range of 0.5-1.0mg/L after the purification. Fluoride levels after the purification were lower than WHO recommended level in NW, ZD, MR. Calcium levels of all water sources after the purification were in the range of 6.85-28.7mg/L which is lower than the WHO recommended level. Reduction of Fluoride levels and increase of Calcium levels were observed after the water treatment.

Keywords: Drinking water, Calcium, Fluoride

Nearly One Third of Drug Resistant Mycobacterium tuberculosis Strains reported in Sri Lanka Belong to Beijing Lineage; A Preliminary Investigation

06 Nov.
MHS27

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Mycobacterium tuberculosis (MTB), the causative bacterium of Tuberculosis (TB), has seven lineages, wherein; Beijing Lineage (BL) is predilected with Drug Resistance (DR) elsewhere. Herein, we intended to study the association of DR and BL in Sri Lanka; as such information is limited in the country. 77 MTB isolates obtained from pulmonary TB patients diagnosed from Kandy and Welisara (Period; Feb 2018-May 2019) were tested for drug susceptibility using proportion method and Mycobacterial Growth Indicator Tube. DNA was extracted from isolates with resistance to at least one drug. A multiplex PCR was conducted using primers targeting Rv0627c, a gene with single nucleotide polymorphism unique to BL. Reaction mixture, contained 0.33 mM dNTP, 0.33 μM primers; Fw-GTCACTGAACGTGGCCGGCTC, R1-TCGGTCACCGTTT TTGTAGGT GACCGTC, 0.13 μM R2-AGCAACCTCGCAATCTGACC, 1xPCR buffer, 2.25 mM $MgCl_2$ and 0.8U Taq-DNA polymerase. Thermo-cycle program was set at 95^0C-1min denaturation, 35 cycles (denaturation at 95^0C-10s, annealing at 66^0C-30s, and elongation at 72^0C-30s), final extension at 72^0C-3 min. A confirmed Beijing strain and H_{37}Rv were used as positive and negative controls. Accordingly, one Extensively-Drug Resistant (XDR), two Multi-Drug Resistant, four resistant to RIF and EMB, one resistant to INH and EMB and eight mono-resistant isolates (two INH, four EMB, two RIF) were identified (16/77;20.77%), amongst which one INH-resistant, one RIF-resistant, one EMB-resistant, one isolate resistant to RIF and EMB and another XDR-TB isolate belonged to BL (5/18;27.77%). Accordingly, approximately one third of the drug resistant TB strains belonged to BL and it is significant that XDR-TB is from Beijing, which should be further studied through molecular methods.

Keywords: Beijing Lineage, Tuberculosis

06 Nov.
MHS31

Effectiveness of a Health Promotion Intervention to Reduce Aggressive Behavior of School Students in Walisinghe Harischandra Maha Vidyalaya, Sri Lanka

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The aggressive behavior of students in classroom leads to lower academic performances. The aim of this study was to reduce the aggressive behavior of students in classroom. This health promotion study was conducted in above secondary school setting with a randomly selected sample of 150 students in grades 6, 7 and 8 for a period of one year. Discussions were conducted with students about their aggressive behaviors such as bullying, fighting, assaulting, and stigmatization, which were identified as one of the major problems through group activities. The underline factors for these behaviors were then discussed and the students were empowered to take actions. Accordingly, students created a 'Punishment Book' called 'Danduwam potha'- a common book for class, which students noted down aggressive behavior of students in the classroom. At the end of the month, those who behaved aggressively were given healthy punishments. Data was collected through focus group discussions and behavioral changes were analyzed by using qualitative and quantitative methods. The average aggressive behavior of students in classroom was reduced by 31.4% according to the 'Danduwam Potha'. Responsibilities were given to students who behaved more aggressively as healthy punishments. These actions changed the opinions of teachers about those students, which improved the relationships among students through it. The study results show that, this intervention was effective to reduce the aggressive behaviors of school students in the classroom. Therefore, this health promotion approach can be suggested as an effective method to empower school students to reduce aggressive behavior in classrooms in secondary schools of Sri Lanka.

Keywords: Academic performance, secondary school, punishment book

Investigation of the Effect of Guest Plant Varieties on Raja Kulaya according to Vanaraja Nighantuwa - A Survey

06 Nov.
MHS33

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The identification of plants in their original names is of profound significance in producing the desired effects during the process of drug manufacture. However, most of the plants have been identified through a range of indigenous names in different parts of the country. This situation has been aggravated by the emergence of new plant varieties due to geographical expansion. Consequently, the original herbal plants have been considerably misused. This study was primarily designed to investigate the effect of guest plant varieties on *Raja kulaya* (a Srilankan native plant family) according to *Vanaraja nighantuwa* such as *Iraraja, Sandaraja, Wanaraja, Garundaraja* and *Guruluraja*. The study comprised of collection of plant-based information through secondary sources including ancient Ayurveda texts and other documents as well as primary sources including original data through field studies. These data were categorized and then analyzed using pre-determined subjective criteria to identify the plant varieties currently being misused. The results revealed that a large number of indigenous plants are being currently identified through the names originally used for identification of exotic plants. The plant *Iraraja* is substituted with a number of guest plant names such as *Tradescantia zebrina* while *Sandaraja* is substituted by names such as *Fittonia albivenis (nLindle. ex Veitch) Brummit* Inevitably, the substitution of names for exotic plants has negative impact on clinical applications. The study, therefore, recommends a well-defined criterion for the access of plant varieties.

Keywords: Guest plant, Raja Kulaya Plants, Vanaraja Nighantuwa, Indigenous Plants

06 Nov.
MHS35

The Knowledge and Practice on Safe Handling of Anticancer Drugs among Staff of Government Hospitals in Sri Lanka

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Healthcare workers are exposed to anticancer drugs unnecessarily and they suffer from unwanted side effects due to lack of knowledge and improper handling of anticancer drugs. This study investigated the knowledge and practice on the safe handling of anticancer drugs among nurses and pharmacists in government hospitals with cancer treatment facilities. A cross-sectional study was conducted at the National Cancer Institute, Maharagama and the Teaching Hospitals at Kandy and Karapitiya. A self-administered questionnaire, containing standard methods to measure knowledge, practice, and challenges for safe handling of anticancer drugs, was used to collect data from 203 participants. Chi-squared test was used to assess the association among knowledge and practice. There were 17 pharmacists and 186 nurses in the sample. Although, 191 (94%) participants had adequate knowledge, only 52 (26%) participants had special training on the safe handling of anticancer drugs. Many participants showed a good level of safe handling practice in receiving, storage and administration of drug and cytotoxic waste disposal. However, among 72, 62 (86%) participants did not do well in preparation practices and among 102 participants 100 (98%) participants did not do well in cleaning practices. There was no significant association between knowledge and practices on safe handling of anticancer drugs (p value= 0.84). Unavailability of Personal Protective Equipment (PPE), less opportunity for training, lack of supervision and high workload were the main challenges reported. Although, pharmacists and nurses had adequate knowledge, the standard level of safe handling practices was not performed. Therefore, proper training, guidelines, procedures, and PPE are essential for enhancing safe handling practices.

Keywords: Anticancer drugs, safe handling, occupational exposure

Using Health Promotion Approach for Improving Early Childhood Care & Development (ECCD) Practices of Caregivers having Children Under Five Years in a Rural Village Welankulama, Sri Lanka

06 Nov.
MHS36

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Early Childhood Care and Development (ECCD) practices of children under five years is important as they receive school readiness from family prior to primary education. Change agents can change others' behaviors and this study describes how they are involved in improving ECCD practices among caregivers having children under five years using health promotion approach in a rural village. The study was conducted with 160 participants including children and parents in Welankulama village, Anuradhapura. Members of the Children's society were considered as the change agents and they identified poor ECCD practices among caregivers through observations and key informant interviews. During focus group discussions they identified and prioritized determinants to be low family happiness, children's low foods appetite and poor knowledge of caregivers. Children's society developed structures of innovative tools like 'baby rooms', 'pregnant rooms, 'five sensors stimulation tools and 'happiness calendar' to address these determinants. The play area where all children gathered was used for collective feeding practices. Data were collected using focus group discussions and the change was analyzed using qualitative and quantitative methods. The results showed that the weight of the children increased by 35% (n = 30), ECCD practices among caregivers and knowledge on ECCD practices improved by 38% (n = 80) and 50% (n = 80) from the current situation. There were 03 pregnant rooms, 11 baby rooms, 15 five senses stimulation tools and 12 happiness calendars. Interestingly, happiness of the children improved by 40% (n = 40) and the participation of children for collective feeding practices improved by 56% (n=80). Moreover, interpersonal relationships among children improved. It can be concluded that children are good change agents in improving ECCD practices among caregivers and the health promotion approach is very effective.

Keywords: Health promotion approach, ECCD, Change agents

06 Nov.
MHS37

Anti-Urolithiatic Activity of Andrographis Paniculata On Calcium Oxalate Crystals: A preliminary in-vitro Study

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Since centuries ago, uses of medicinal herbs to cure diseases are precious in folk and ayurvedic medicinal practices. Kidney stone formation is an unbearable disease which can be found everywhere in the world. Even in Sri Lanka the patients suffering from urolithiasis are gradually increasing. An *in-vitro* experimental model was prepared to evaluate the anti-urolithiatic activity of methanolic extract of *Andrographis paniculata* plant on pure calcium oxalate crystals. To estimate the anti-urolithiatic activity of *Andrographis paniculata* plant extract, the dissolution percentage of pure calcium oxalate crystals by the plant extract was calculated and was compared with that of a standard cystone polyherbal drug. The methanolic extract of *Andrographis paniculata* was prepared by soxhlet extraction and ethanolic and aqueous extractions were prepared by soaking the powder materials for 24 hours. The titrimetric method was used to evaluate the anti-urolithiatic activity at four different concentrations such as 100 mg/L, 200 mg/L, 300 mg/L, and 400 mg/L. Laboratory experiments were carried out on the above extract to identify the presence of constituent organic molecules such as alkaloids, tannin, phytosterols, terpenoids, etc. Dissolution percentage of the calcium oxalate crystals by the Andrographis paniculata plant at above concentrations were found as 71.4 (± 0.490) %, 74.6 (± 0.283) %, 86.3 (± 0.838) %, and 90.4 (± 0.490) % respectively. 59.6 (± 0.432) %, 64.2(± 0.163) %, 74.8(± 0.283) %, and 78.3(± 0.249) % of calcium oxalate crystals were dissolved by the standard drug at the same concentration gradient. Qualitative analysis of ethanolic and aqueous extracts of *Andrographis paniculata* showed the presence of saponin, Tannin, and Terpenoids. This preliminary research revealed the enhanced dissolution ability of calcium oxalate crystals by Andrographis paniculata plant extract. Further *in-vitro* and clinical studies are required to estimate the anti-urolithiatic activity of *Andrographis paniculata*. Subsequently, the separation of active compounds in *Andrographis paniculata* plant extract can lead to the discovery of new drugs in the future.

Keywords: Anti-urolithiatic, Methanolic, *in-vitro*, *Andrographis paniculata*

Effect of Latex of "Jatropha multifida" (Coral Bush) on Blood Coagulation

06 Nov.
MHS39

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Latex of *Jatropha multifida* is widely used in indigenous medicine as an external blood coagulant in treating wounds. However, blood clotting property of this plant has not been studied widely. This study was carried out to determine the effects of the latex of *J. multifida* on human blood coagulation using Lee and White method. Twenty five healthy individuals of both sexes (age range: 22-25 years) participated in the study. The test and the control were run separately at the same time. Latex of *J. multifida* (0.5 mL each) was added to three Kahn tubes. Same volume of normal saline containing separate three Kahn tubes were set as the control. 1 ml of drawn blood was added to each six Kahn tubes immediately and all tubes were incubated in a water bath adjusted to 37^0C. Every tube was observed for clotting without disturbing. The average clotting time of each control set of tubes and test set of tubes were calculated separately. The test was carried out for all 25 individuals and average clotting time of test sample per individual was compared with that of the control set. There was a statistically significant reduction in the average clotting time ($p \leq 0.5$) of the test samples containing the latex of *J. multifida* than the average clotting time of control. Therefore, it can be concluded that latex of *J. multifida* is an effective external blood coagulant.

Keywords: Clotting time, *Jatropha multifida*, coagulation

06 Nov.
MHS40

Toxoplasmosis In Women With Adverse Pregnancy Outcomes: A Single Centre Case-Control Study

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Toxoplasmosis is caused by the tissue protozoan parasite *Toxoplasma gondii* which infects a range of warm-blooded animals in addition to humans. Toxoplasmosis is widespread across the globe. The women who become primarily infected with *T. gondii* during the pregnancy may transmit the disease to the foetus. This study aims to investigate the role of maternal seropositivity of toxoplasmosis in miscarriage or stillbirth, among pregnant woman. This unmatched case-control study, was conducted from March to August 2019. Women with miscarriages, presenting to the professorial Gynaecology and Obstetrics unit, Teaching Hospital, Anuradhapura, were considered as cases, and immediate post-partum mothers who delivered healthy babies were the controls. Basic demographic data were gathered using an interviewer-administered questionnaire and the serological status was assessed using anti-toxoplasma IgM/IgG rapid diagnostic lateral-flow assay. There were 116 cases and 102 controls, with the average ages of 29.5 years (SD = ±6.0) and 28.5 years (SD = ±5.0) respectively. Average POA of controls at the delivery was 38.8 (SD = ±1.3) weeks, while the average POA at the time of miscarriage of cases was 12.2 (SD = ±5.2) weeks. Majority of the miscarriages occurred during the first trimester (n = 62, 53.4%). Of the cases 19 (16.4%) were positive for IgG against *T. gondii* and 19(18.6%) of the controls were also positive for toxoplasma IgG. There was no any significant association between the past maternal exposure to *T. gondii* and miscarriages (OR, 0.86(95%CI: 0.4-1.7). However, one of the toxoplasma IgG positive cases was also positive for toxoplasma IgM, indicating the presence of acute toxoplasmosis. Association between adverse pregnancy outcomes and the past exposure to *T. gondii* is not significant, however the potential impact of acute infections need to be further explored.

Keywords: Toxoplasmosis, *Toxoplasma gondii*, Pregnancy, Miscarriages

Comparison Between Transcriptome And Proteome Response In Human T-Cells During Activation

06 Nov.
MHS42

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Transcriptomic studies are the commonly used approach in characterizing molecular events following T-cell receptor mediated activation of T-cells; the key event in adaptive immunity. However, large discordance between transcriptomic and proteomic profiles has been identified in relation to different physiological and pathological conditions. Aim of this study was to identify the relationship between transcriptomic and proteomic expression profiles during T-cell activation where biology of the cells is rapidly changing. Next generation RNA-sequencing and label free shotgun proteomics were performed on *in vitro* activated human T-cells at five different time points (0h, 6h, 12h, 24h, 3d and 7d) over 7 days. These transcriptomic and proteomic data were compared to identify their correlation at expression, pathway and network levels. Principal component analysis showed clustering of RNA-sequencing and proteomics data according to the time points indicating donor independent *in vitro* T-cell activation process. Expression profiles of majority of genes at transcriptomic level were poorly correlated with that of the proteomic profiles. At 6 hours, only 10% of differentially expressed genes were concordant with differentially expressed proteins. However, a strong correlation was observed in 50% of genes at later time points, indicative of a time-delay for transcriptome changes to be reflected at proteome level. Pathway and network analysis also showed a poor relationship between temporal proteomic and transcriptomic expression profiles. This integrative multi-omic evaluation of T-cell activation showed a poor relationship between transcriptomic and proteomic data with rapid molecular changes in cells. Hence, the dynamic functional changes of these cells cannot be characterized using transcriptomic data only.

Keywords: Proteomics, Transcriptomics, human T-cells

06 Nov.
MHS43

Changing Attitudes Towards Smoking by Creating an Empowered Youth Female Community Using Health Promotion Approach in Yowunpura Exhibition in Sri Lanka

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Tobacco death toll grows 13.71% every year in globally but tobacco industry ensures the complacency of consumers hiding the bitter truth. Tobacco control advocates must reach out to other communities and resources to strengthen their efforts and create attitude change. The aim of this study was to develop an empowered youth barrier against smoking through changing positive image towards smoking using health promotion approach in Yowunpura exhibition, Sri Lanka. The study was conducted with a voluntarily participated sample of 202 girls in the age range 15-24 years in Yowunpura exhibition in Hambanthota, Sri Lanka. Group discussions were facilitated with the active participation of the participants. Topics discussed were, real harm of smoking and industrial strategies of creating a positive image towards smoking. Their attitudes towards smoking were assessed as base line before conducting the discussion using a questionnaire. Discussions were conducted focusing on real harm of smoking and industrial strategies of developing a positive image. For example, the positive attitude of the girls towards smokers were taken into discussion. Girls were engaged with intervention actively through writing their own suggestions for changing positive image towards smoking with the support of facilitators. An evaluation was conducted after the discussion using a questionnaire. Thematic analysis was conducted to analyze qualitative data. Conducting the discussion by dividing participants in to groups according to their hometowns were recorded highly responsive. 90% of participants changed positive image towards “smoking” after the discussions.75% of them were empowered to act against smoking. Participants were encouraged to develop counter measures to tackle positive image and drafted a plan to implement in their home towns. Group discussions with active participation of the youth females can change the positive attitudes on smoking and health promotion is a better intervention in changing attitudes and empowering youth against tobacco smoking.

Keywords: Tobacco death, smoking

A study of the prevalence of vitamin D deficiency and association of its determinants in a population from Western province, Sri Lanka

06 Nov.
MHS44

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As in most of the South Asian countries, vitamin D deficiency is a significant nutritional problem in Sri Lanka too. But to date, only few studies have been conducted on vitamin D deficiency and its determinants in Sri Lankan adults. The aim of this study is to determine the prevalence of vitamin D deficiency in a randomly selected population in the Western province and to compare the prevalence rates with age, sex, sun exposure, skin colour and their occupation. The study was a descriptive cross-sectional study. 262 participants were randomly recruited from Colombo, Gampaha and Kalutara districts. Structured interviewer administered questionnaires were used to collect information on socio-demographic factors, medical background and use of vitamin supplements. Sun exposure was assessed by using a validated sun exposure questionnaire. Skin colour was objectively determined by using a validated skin colour chart. All the serum samples were analyzed for serum 25-hydroxyvitamin D. In order to find the prevalence of vitamin D status and statistical significance between vitamin D level and its determinants, the data were analyzed using following statistical methods, Independent sample t-test, Pearson Chi-square test and One- Way ANOVA test. The study revealed high prevalence of vitamin D deficiency (35.88%) and insufficiency (46.92%) among the selected population. There was an association between serum vitamin D levels and skin colour ($p < 0.05$). Dark skinned people had higher prevalence in vitamin D deficiency and insufficiency while most of the light skinned people had normal vitamin D levels. There was a significant association between serum vitamin D levels and gender ($p < 0.05$). The deficiency was higher in females (44.36%) than in males (26.36%). Mean vitamin D level did not seem to significantly vary with respect to different age groups. In conclusion, there were high percentage of cases vitamin D insufficiency than vitamin D deficiency and further females were the most vulnerable group to have vitamin D deficiency than males. Skin colour and gender has shown strong association with vitamin D levels, whilst other factors did not express a significant association with vitamin D levels. Though the other factors like as sun exposure, age, occupation have not shown significant association with vitamin D levels in this study, it does not mean that these factors would ever had some impact on vitamin D deficiency. Therefore, it is recommended that retrospective studies should be performed to identify the impact of different factors on vitamin D deficiency.

Keywords: Vitamin D deficiency, descriptive cross-sectional study, Chi-square, Kalutara,

Quality of Psychiatric Service Care from Patients Perspective and Factors Affecting the Service Quality at the National Hospital of Sri Lanka

06 Nov.
MHS45

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In Sri Lanka, mental health has been given a low priority despite one out of ten in the population estimated to suffer from a mental illness. Majority of the psychiatric patients in the country are treated and followed up at psychiatric clinics at government hospitals. The objective of the study was to assess the quality of the services provided at the psychiatric clinics from patients perspective and the factors affecting quality of the service. The study was a descriptive cross sectional, conducted at the Psychiatric clinics in the National Hospital of Sri Lanka (NHSL). 292 clinic attendees in remission, followed up at the clinics for ≥1 year, decided by treating team as capable to give the informed consent were recruited using systematic sampling method. Perception and expectations on five quality dimensions of SERVQUAL model (tangibles, reliability, responsiveness, assurance and empathy) were assessed using pre-tested, interviewer administered questionnaire with 30 items, on 5 points Likerts scale. Strongly agree to disagree 5 1 points. The maximum marks an individual can obtain is 150 and the minimum was 30 for each expectation and perception. Minimum of 120 marks or above should be obtained for favourable level of expectation and perception tangibility dimension scored highest mean (1.4816, SD = 0.0014), assurance scored the least mean (1.1054, SD = 0.0003), for expectations. Responsiveness scored the highest mean (2.9816, SD = 0.1636) while tangibility scored least mean (2.1379, SD = 0.0004) for perceptions. Overall perception mean (2.548, SD = 0.66218) regarding quality of service was higher than expectations mean (1.218, SD = 1.357) and hence, a positive quality gap (1.2) was received. Perception of tangibility was associated with level of education (p = 0.004), and ethnicity (p = 0.010); empathy with unemployment (p = 0.03). Perception was high with the level of education and Ethnicity; Patients expect more tangible facilities than what they perceived as low. They perceived service as patient centered or responsive. They were not concerned about the capability or competency of the service provider.

Keywords: Perception, expectation, service quality gap

A Reduction of Unhealthy Dietary Patterns Causing Non-Communicable Diseases: A Health Promotion Intervention in Karuwalagashinna Village Anuradhapura District, Sri Lanka

06 Nov.
MHS46

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Non-communicable diseases (NCDs) cause more than three quarter of all deaths in Sri Lanka. Unhealthy dietary patterns, smoking, physical inactivity and alcohol consumption are the key risk factors of NCDs. Among them, unhealthy dietary patterns play a major role in developing NCDs. A Health promotion intervention was designed to address unhealthy dietary patterns of mothers and children in Karuwalagashinna village in Anuradhapura district, Sri Lanka with the aim to reduce their NCDs risk. The sample size was 33 families. Determinants affecting NCDs were discussed with mothers and children separately. They identified that high consumption of sugar, salt and coconut oil as the major three underlying unhealthy dietary factors affecting NCDs and planned interventions to address these three main determinants. The intervention "Suwa Potha" (healthy book) is a book which is used to mark the amount of sugar, salt and oil consumption per month. Through suwa potha they determined the monthly consumption amount of these three dietary constituents and hence understood the amount that they could reduce. With the intervention, 45.4% of families reduced their sugar consumption while15.1% and 21.2% of families reduced their salt and oil intake compared to the previous months. Participation of all mothers and children in this study showed that their knowledge on the risk factors of NCDs, have improved. It can be concluded that the health promotion approach is effective and vital to empower people in reducing their unhealthy dietary patterns.

Keywords: Non-communicable diseases, NCD, Unhealthy dietary patterns, smoking, physical inactivity and alcohol consumption

Awareness and Perspective of School Teachers of the Anuradhapura District towards Children with Attention Deficit Hyperactive Disorder

06 Nov.
MHS46

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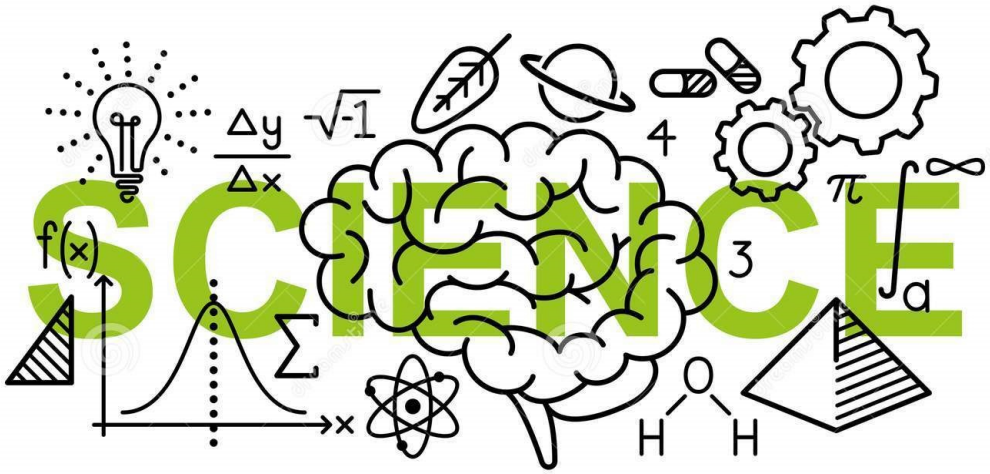
Attention Deficit Hyperactivity Disorder (ADHD) is a common child psychiatric disorder with a global prevalence of 5.5%. Sufficient knowledge regarding ADHD among teachers is vital to provide the necessary support for children with ADHD. The objective of the study was to assess the knowledge and the attitude of school teachers of the Anuradhapura district, Sri Lanka towards ADHD. A descriptive cross sectional study was conducted with systematic cluster sampling with probability proportionate to size. The sample size was 458 teachers from 21 different schools covering all five educational zones of the Anuradhapura district. Study instruments comprised of the Knowledge of Attention Deficit Disorder Scale (KADD), the Teachers Attitude towards Inclusion Scale (TAIS) 1 and 2. The KADD knowledge score median was 11 with an interquartile range (IQR) of 8-14. 61.0% of the teachers have misconceptions and 61.9% of teachers lack knowledge about ADHD. The level of knowledge on ADHD correlated with age (Spearmans correlation (r_s = 0.031, 0.533), service period (r_s=0.025, 0.599), student contact hours (r_s= - 0.006, 0.904) and higher educational qualifications (r_s = 0.07, 0.163). The median of the TAIS 1 is 46 with an IQR of 36-58 and the median of TAIS 2 is 49 with an IQR of 40-59. According to TAIS 1 and TAIS 2, 68.4% have a positive attitude towards children with ADHD. The knowledge regarding ADHD is poor among the studied population with 60% having misconceptions and 61.9% lacking knowledge about ADHD. However, the attitude regarding children with ADHD is positive. The education system and teacher training programs should focus on improvement of teachers knowledge regarding children with ADHD.

Keywords: Child psychiatric disorders, attention deficit hyperactivity disorder, school teachers, attitude, knowledge

Talks: Natural Sciences & Math.



06 Nov.
NSM03

Time Series Decomposition: An Application to Dengue Data with Climatic Variables

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Time series decomposition is a method which employs the division of a series into seasonal, trend and random components. Additive decomposition is appropriate when variation around the trend does not vary with the level of the series whereas, multiplicative decomposition is applicable when it varies. This method was applied to dengue data with climatic variables to find the relationships of decomposed components of the mentioned series. This is particularly important because understanding relationships of decomposed components of these variables will lead to better modelling of dengue. Data consists of weekly reported dengue cases, weekly average rainfall, weekly average maximum temperature and weekly average minimum temperature in Colombo district from 2009 to 2017. The main hypothesis tested in the study is whether the seasonality in the dengue data can be explained by the seasonality of other climatic variables in the study. Alternatively, explanatory ability of the trend component and the random component of the dengue series by the same components of other climatic variables were investigated. A stepwise regression analysis was applied to model the relationships of components of the series. Results revealed that 57% of the variability in multiplicative seasonality and 53% additive seasonality of dengue series can be explained by multiplicative seasonal components of three climatic variables. Only 38% of the variability in the trend component of dengue series can explain by trend components of three climatic variables. The random component of dengue series represents poor fit with random components of three climatic variables and hence, may not be modelled with random components of three climatic variables. Ours study indicates that dengue incidence may not be predicted with sufficient accuracy only with trend and seasonality of climatic variables.

Keywords: Random, seasonal, stepwise regression, time series decomposition, trend

Non-Enzymatic Electrochemical Glucose Sensing Using Graphite Pencil Electrodes

06 Nov.
NSM07

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Glucose is an important water-soluble substance present in many biological fluids, pharmaceuticals, foods, and soft drinks. Hence, the development of a rapid and simple method of glucose detection could be beneficial to many fields such as medical, pharmaceutical, and food industry. Although electrodes based on glucose oxidase enzyme are currently extensively used for glucose detection in biological samples, they are plagued by drawbacks such as bad stability, high cost of enzymes and unfavorable operative conditions giving erroneous results. In order to overcome some of these limitations of enzymatic sensors, a graphite pencil electrode (GPE) is introduced as a non-enzymatic glucose sensor. All types of pencils from B-8B from one selected brand were tested. Among them, 3B exhibited the best results as a glucose sensor. It gave linear calibration for 1-10 ppm (R^2 = 0.7825, sensitivity = 7×10^{-5}), 10-100 ppm (R^2 = 0.9885, sensitivity = 8×10^{-6}) and 100-1000 ppm (R^2 = 0.9285, sensitivity =6×10^{-7}) working ranges. It showed the highest linearity and sensitivity in the 10-100 ppm glucose concentration. The GPE responds considerably well in the presence of other substances such as sodium chloride (R^2 = 0.9868, sensitivity =8×10^{-6}) and citric acid. Citric acid interfered only when present in high concentrations such as 1:1 and 1:2 citric acid: glucose concentrations. Interference was negligible at 1:3 citric and higher acid: glucose ratios (R^2 = 0.9807, sensitivity =1×10^{-5}). The 3B pencil response stability is good as it responds to glucose even after a two-month period with only slight loss of sensitivity and linearity. GPE was utilized successfully to determine glucose concentrations in glucose injection samples.

Keywords: Glucose, 3B pencil, graphite

06 Nov.
NSM10

Decolorization and Detoxification of Real Textile Wastewater by the Isolated Bacterium: Micrococcus luteus

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The wastewater generated from textile based industries is one of the most hazardous effluents and is difficult to treated using conventional physico-chemical treatment methods. Hence, the objective of the present study was to carry out decolorization and detoxification of real textile wastewater effluent using the bacterium *Micrococcus luteus* (MK166783). Overnight grown bacterial suspension was equalized (A_{590} = 0.35) and introduced (5% v/v) into the filter sterilized textile wastewater solution and incubated at 28 ± 1^0C under static conditions. Decolorization was quantitatively determined through the changes of absorbance measured at 605 nm using UV-Vis spectrophotometer. Seed germination assay for *Oryza sativa* (monocot) and *Vigna radiata* (dicot) seeds was employed to assess the toxicity of decolorized dye solution by *M. luteus*. All the experiments were carried out in triplicates and the controls were maintained without addition of bacteria. *M. luteus* showed complete decolorization (100%) of textile wastewater within 48 h of incubation at 28 ± 1^0C under static conditions without supplement of additional nutrients, while control showed no decolorization. Both *O. sativa* and *V. radiata* seeds showed 100% germination in control and decolorized wastewater solution by *M. luteus*. However, *O. sativa* and *V. radiata* seeds treated with textile wastewater showed only 6±1% and 5±1% of germination respectively. Thus, the results of the present study emphasize the potential of using of *M. luteus* as a viable alternative to high cost physico-chemical treatment methods to remove and detoxification of real textile wastewater.

Keywords: Decolorization, textile wastewater, *Micrococcus luteus*

Cyanidin Dye Isolated from Mangosteen Peel Waste: Higher Performance Efficiency in Dye-Sensitized Solar Cells

06 Nov.
NSM11

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TMangosteen (*Garcinia mangostana L.*) is a species that contains significant levels of anthocyanins (0.1-1% of dry weight), which exhibits promising electron-donating and electron-accepting abilities. A key anthocyanin in mangosteen peel is cyanidin-3-glucoside having a glucosyl substitution at 3-position. However, other major bioactive compounds such as phenolic acids and xanthone derivatives reduce the photovoltaic measurements to a considerable extent. Hence, purification of an acidified methanolic anthocyanin extract was carried out using preparative chromatographic techniques such as silica and Sephadex LH-20 columns. Moreover, cyanidin-3-glucoside was identified as the major anthocyanin in the purified fraction based on LC-MS and UV-visible absorption spectra. The results demonstrated a molecular cation, $[M+H]^+$ at m/z = 448.9 Da (1+) and a fragmentation at m/z = 286.8 Da (1+) at t_R=34.08 min and also a visible maximum wavelength, λ_{max}, at 516 nm implying that the isolated fraction is cyanidin-3-glucoside. Hydrolyzation of anthocyanins to anthocyanidins was achieved under acidic (2 M HCl) conditions and at a temperature of 100. The resulting cyanidin, was characterized using LC-MS analyses exhibiting a molecular cation (M^+) at m/z = 322.70 Da (1+) at t_R=16.96 min and a visible maximum wavelength, λ_{max}, at 535 nm implying that the isolated fraction is in the form of cyanidin chloride. A solar cell prepared exhibited an efficiency of 0.99%, short circuit photocurrent density of 0.256 mA cm^{-2} and an open circuit voltage of 387 mV implying that further modifications in the donor structure could lead to enhanced results.

Keywords: Anthocyanin, mangosteen, cyanidin, dye-sensitized solar cells

06 Nov.
NSM16

Nano to Nano: Electrodeposition of ZnO Nanoparticles using Scanning Electrochemical Microscopy

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A "nano to nano" electrodeposition approach is very fascinating for preparing nanostructured thin films from the dispersion of nano-objects without altering morphologies. Typically, this approach is based on altering the ionic strength at the vicinity of the electrode surface by applying a potential. Moreover, localized electrodeposition of anisotropic metal nanoobjects has been successfully accomplished using scanning electrochemical microscopy (SECM), where metal nanoparticles are generated from the corresponding metal microelectrodes. ZnO nanoparticles (∼50 nm) were locally electrodeposited onto transparent ITO conductive glass from an aqueous dispersion of ZnO in HCl at pH 6.5 without adding any polymers or surfactants. Chronoamperometry technique was employed to oxidize Au microelectrode (25 m) to generate ions, which subsequently bound to ZnO nanoparticles and reduced on the conductive surface. Deposition time varied from 5 s to 10 s at different applied potentials from +0.92 V to +0.97 V with respect to a Ag/AgCl reference electrode. The amount of Au present in the ZnO was controlled by controlling the deposition time and applied potential to the electrode and substrate. Electrodeposited Au/ ZnO nanoparticles were characterized by SEM and XPS techniques. This localized nano to nano approach exhibited the potential of the ZnO/Au system.

Keywords: ZnO/Au nano particles, SECM, chronoamperometry, electrodeposition

Evaluation of Chronic Toxicity of FADNA EZY herbal tea in Wistar Rat Model

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FADNA EZY tea is a commercially available herbal tea in Sri Lanka, comprising of freeze-dried product of *Coriandrum sativum* (Koththamalli), *Oroxylum indicum* (Thotila), *Tribulus terrestris* (Heen nerenchi), *Apium graveolens* (Asamodhagum), *Boerhavia diffusa* (Beheth sarana) and *Embelia ribes* (Walangasahal). This tea is recommended as a readily available remedy for women suffering from severe menstrual cramps. The present study investigates the chronic toxicity of FADNA EZY tea using a rat model to ensure its safety for consumption. For the chronic toxicity assay, a human equivalent dose of 2.5 mL/kg BW of FADNA EZY tea (3 cups per day) was (water extract) administered orally to Wistar rats as the test group, and distilled water as the control (n=6/group) for consecutive 90 days. Morphological, haematological, liver and kidney toxic parameters were measured in both groups and statistically compared to evaluate the toxic effects. Further, proximate analysis and chemical fingerprinting were conducted to identify the physical and chemical properties of the tea. Chronic administration of FADNA EZY tea did not cause any mortality, abnormal behaviour or changes in body weight, food and water intake. Further, there were no significat differences in haematology, liver (liver enzymes), kidney (urea and creatinine) and biochemical parameters (serum LDH and total protein) between treatment and control groups ($p > 0.05$). In conclusion, oral administration of FADNA EZY tea for 90 days did not cause any significant alterations in behavioural, haematological, liver, kidney and biochemical parameters of rats. Thus, ensures the safety of the FADNA EZY tea in terms of a rat model.

Keywords: FADNA EZY tea, Toxicity, Wistar rat, Menstrual cramp

Antifungal Activity of Plant Extracts against Dandruff Causing Yeasts

06 Nov.
NSM20

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Yeasts in the genus of *Malassezia* cause dandruff and other linked skin diseases. Currently available treatment options for management of dandruff are of synthetic origin, with certain limitations and also are unable to prevent reoccurrence. Research aksi indicates that the commercially available anti-dandruff products differ in their effectiveness. The objective of the current study was to isolate and characterize fungal species that cause dandruff, and to find out satisfactory combination of plant extracts to control dandruff in effective Minimal Inhibition Concentrations (MIC) to be used in cosmetics. Dandruff flakes were collected and cleared for the confirmation of fungal dandruff using a flow chart in Karhoot et al and yeast isolates were identified on the basis of biochemical tests. Antifungal effect of herbal extracts were screened as potential sources of anti-dandruff herbals by measuring the MIC values. The most suitable combination of plant extracts were developed based on LD_{50} (Lethal Dose) and effective exposure time. Antimicrobial agents of extracts were separated and checked by bioautography using *Malazessia spp*. *Malassezia furfur*, *Malassezia obtusa* and *Malassezia pachydermatis* were the identified dandruff causing yeasts. The MIC values of *Terminalia chebula*, *Terminalia bellirica* and *Phyllanthus emblica* was 0.15 g/ml, while *Hibiscus rosa* was 0.1 g/ml and *Allium sativum* was 0.05 g/ml with respect to 0.02 g/ml of *Miconozole*. The negative control was water. The well method diffusion was better (Mean values; Well = 0.91 cm >Disk = 0.70 cm). The oil diffusion was higher with Peg40 Hydrogenated Castor oil ($p \leq 0.05$). Clove, peppermint, Rosemary and Thyme had the highest antifungal effect out of the essential oils tested.

Keywords: Malessezia spp., lethal dose, MIC, antifungal, scalp microbiome

Investigating Action Potential Initiation and Death in Human Cortex Using a Novel Modelling Approach

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Although the biophysics of individual neurons is well understood, the behaviour of large populations of spiking neurons is not completely understood. A common approach to the study of populations of neurons, is the use of mean-field models that describe population activity in terms of population-average action potential (spike) rates. But these models neglect local fluctuations and correlations in the firing activity. As a better approach, we use a new model that provides a more accurate mapping from single neuron-level events to the macroscopic level: a bottom-up neural regridding referred to as true-field. We consider a 2D continuum of identical neurons that are coupled via both chemical and electrical synapses. The spiking behaviour of these single neurons is described by the H. R. Wilson type-I (human neuron) model. We reblock this microscale lattice to form a coarser-grained network by eliminating high-frequency spatial modes. We locate the steady states of this new model as we increase the dc stimulus current (I_{dc}), our control parameter. We then compute the Jacobian matrix of partial derivatives at each equilibrium point and perform an eigenvalue analysis to predict the linear stability of the system for small perturbations about steady-state. We confirm stability predictions by doing simulations for several values of I_{dc}. Furthermore, we find that the nature of spike initiation and death in the reblocked true-field cortex is consistent with the behaviour of the standard Wilson type-I neuron. This demonstrates the percolation of the spiking behaviour of single neuron up to the level of the neural population.

Keywords: spiking neurons, cortical modelling, spike-rates, neural population

06 Nov.
NSM27

In-Silico Development of Multi-epitope Antigens as Candidate Sero-diagnostic Markers for Diagnosis of Leptospirosis

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Leptospirosis is a bacterial zoonosis with a worldwide distribution. Laboratory tests are required for disease confirmation as clinical manifestations of leptospirosis are non-specific. Accurate laboratory diagnosis is challenging due to the high species diversity of the *Leptospira* genus. This study represents a series of *in-silico* approaches to design genus-specific multi-epitope antigens as candidate sero-diagnostic markers. A total of 1556 genes were analyzed from the genome sequence of L*eptospira interrogans (L. interrogans)* serovar Lai strain 56601. SignalP and LipoP programs were used to predict the outer membrane protein (OMP) localization. PRED-TMBB and TMHMM programs were used to predict the transmembrane (TM) β-barrel structure and reconfirmed by RaptorX and SWISS-MODEL software. Protein conservation and B-cell epitope analysis were performed using pBLAST and IEDB webservers, respectively. Epitopes were assembled into single proteins using flexible linkers to form multi-epitope antigens. Antigenicities of multi-epitopes and OMPs were comparatively analyzed using ANTIGENpro tool. A total of 19 TM β-barrel OMPs were found to be conserved across the *Leptospira* genus. Thirty-three genus-specific linear B-cell epitopes were predicted. Antigenicity analysis showed that some multi-epitope antigens to bear higher B-cell reactivity than native OMPs. In conclusion, the use of multi-epitope antigens in sero-diagnostic assays may result in higher specificity than native antigens and can be used to diagnose leptospirosis regardless of the infecting *Leptospira* species. These markers may be particularly useful in the diagnosis of leptospirosis in geographical areas with high species diversity. The study provides a useful starting point for studies investigating the potential use of multi-epitope antigens as sero-diagnostic markers.

Keywords: *Leptospira*, outer membrane proteins, ELISA, multi-epitope antigen

Development of an Optimized Polymerase Chain Reaction Protocol for the Successful Amplification of Nuclear C-mos Gene in Endemic Skink Genus Lankascincus

06 Nov.
NSM29

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Lankascincus is a skink genus endemic to Sri Lanka. The genus is represented by ten species and are commonly referred to as Lanka skinks. Studies on the phylogenetics og these species have used different mitochondrial genes and nuclear genes such as *c-mos*. This study was carried out to developf an optimized protocol for the polymerase chain reaction (PCR) amplification of nuclear *c-mos* gene in endemic skink species to aid in their phylogenetic relationship estimation. Genomic DNA extraction from tail tissue was performed using commercial DNeasy® Blood and Tissue kit. Potential primers were designed using NCBI primer BLAST tool considering their lengths, GC content, melting temperatures and amplicon size. Amplifications were done on a final volume of 20 μL containing 1X FIREPol® Master Mix, PCR grade water and varied PCR conditions; primer concentration, template DNA concentration, annealing temperature, and cycle parameters. The amplicons mixed with loading dye were electrophoresed in agarose gel at 60 V for 2 hours along with a 100 bp DNA ladder. The PCR conditions; 0.1 μM primer concentration (forward: 5'-AGAACCGTTTGGCATCACGA-3', reverse: 5'- GTGAATGGAGAAAGACCAAGCC-3'), 10 ng/μl DNA concentration together with cycle conditions; initial denaturation at 94 ^{0}C for 3 minutes, denaturation at 94 ^{0}C for 30 seconds, annealing at 54 ^{0}C for 40 seconds, extension at 72 ^{0}C for 45 seconds, final extension at 72 ^{0}C for 5 minutes, and final hold at 4 ^{0}C, yielded the optimal amplification of 300 bp *c-mos* gene fragment.

Keywords: Skinks, *Lankascincus*, *c-mos*, PCR

06 Nov.
NSM32

Isolation and Characterization of Acetic Acid Bacteria from Toddy to Produce a High Yield of Vinegar

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The aim of this study was to produce vinegar by isolating and identifying Acetic Acid Bacterial (AAB) species from toddy that has the highest capability for acetic acid production. Coconut toddy samples were collected from various toddy shops located in Sri Lanka. The toddy samples were exposed to air and AAB were isolated using Carrs Ethanol medium. From the preliminary screening, 06 Gram negative bacterial isolates produced yellow colorization around the colonies that indicated the acetic acid production. Motility and endospore staining also were carried out. Furthermore, biochemical characterization of the 06 bacterial isolates resulted Acetobacter aceti, *Acetobacter xylinus*, *Gluconobacter hansenii* and *Gluconobacter liquefaciens*. Three isolates were identified as *A. aceti* strains. Isolates were tested for acetic acid productivity, ethanol tolerance, temperature tolerance and acetic acid tolerance. All the Isolates were allowed to ferment 5ml of ethanol-yeast extract medium (ethanol 5%) for 14 days and was titrated against NaOH at 2 day intervals. This was repeated thrice and the Isolate 05 (*Acetobacter aceti*) resulted the highest acetic acid concentration of 5.62% within 14 days of shaking incubation. It was able to grow at temperatures of 30^0C, 37^0C, 40^0C, was able to tolerate ethanol concentrations of 4-10% and remained viable at acetic acid concentrations of 2-4%. This organism was able to produce vinegar consisting of 5.62% acetic acid concentration under laboratory conditions. This *Acetobacter aceti* bacterium has the potential to generate high yields of acetic acid.

Keywords: Acetic acid bacteria, toddy, ethanol

Variation in above-ground carbon stock of selected tropical rainforests of Sri Lanka along an altitudinal gradient

06 Nov.
NSM37

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Tropical rain forests (TRFs) function as a major terrestrial carbon sink by absorbing ca. 40% of global CO_2 emissions. Strength of this carbon sink varies both spatially and temporally as a result of varying climatic and soil factors. Furthermore, biomass carbon storage of TRFs could diminish with global warming and climate change. In this study, we aimed to determine how the standing carbon stock of selected TRFs in Sri Lanka varies along an altitudinal gradient. Five one-hectare permanent sampling plots were established in Kanneliya (KDN 1 and KDN 2, altitudes 134 and 152 m *asl*), Pitadeniya-Sinharaja (PTD 1 and PTD 2, 606 and 509 m *asl*) and Rilagala (RLG, 1667 m *asl*) Forest Reserves. All trees with DBH $\geq$ 10 cm were measured and identified. Aboveground biomass (AGB) was calculated by using a published allometric equation for tropical rainforests. Carbon fraction of biomass was considered as 0.5. A total of 3781 trees was recorded, with a total basal area of 203.68 m^2. Maximum DBH ranged from 71 cm (KDN 1) to 137 cm (PTD 2). In the lower altitude plots over 60% of plants were in the 0-20 cm DBH range, while in the higher altitude plot, 95% of plants had DBH within 0-20 cm. Highest plant density was recorded in KDN 1 (974 plants ha^{-1}) and lowest was in PTD 1 (545 plants ha^{-1}). Even though, KDN 1 had a high plant density, PTD 2 (604 plants ha^{-1}) had the highest total aboveground carbon (ABGC) stock (380.75 Mg C ha^{-1}) while RLG had the lowest (34.8 Mg C ha^{-1}). Total DBH per ha showed a significant (p=0.0019; Adjusted-R^2=0.964) linear decline with increasing altitude (6.99 cm ha-1 DBH m^{-1} altitude). In contrast, both total tree basal area (>10 cm DBH) and ABGC stock per ha increased with altitude up to 636 and 741 m *asl* respectively and declined subsequently, thus showing second-order polynomial relationships (p=0.053, Adjusted R^2=0.893; p=0.095, Adjusted R^2=0.810). These findings provide important indicators of the response of TRFs to varying altitude and to the associated environmental variations. Further investigations

are needed to elucidate the underlying basis for the above response patterns.

Keywords: Tropical rainforests, altitude, above-ground carbon, basal area

Synthesis of Hydroxyapatite Magnesium Oxide Nanocomposites from Naturally Occurring Dolomite and Their Antimicrobial Activity

06 Nov.
NSM42

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Hydroxyapatite (HA), $Ca_{10}(PO_4)_6(OH)_2$ is the most abundant calcium phosphate mineral in vertebrate hard tissues and teeth. Nanocomposites of hydroxyapatite nanoparticles (HANPs) composed of biocompatible polymers, carbon nanomaterials, metals such as Mg(II), Ti(IV), Ag(I), Cu(II), and Zn(II) have shown potential applications in industry, medicine and agriculture. Development of antimicrobial materials based on HANPs has emerged in the modern biomedical field especially in bone implantation and dentistry to prevent post implantation infections. Therefore, we have synthesized MgO incorporated antimicrobial HA nanocomposite using naturally occurring dolomite minerals via a cost effective novel method. In this method, Calsine-Dolamite was reacted with calcium sucrate solution followed by the addition of a solution of ammonium phosphate. The resulted HA was reacted with $MgCl_2$ which was also synthesized from the same dolomite sample, in the presence of NH_3 to get the final product of MgO incorporated antimicrobial HA nanocomposite. Synthesized product was analyzed for its crystallinity, crystallite size, morphology, and composition, by X-ray diffraction (XRD), Scanning Electron Microscopy (SEM) and Thermo Gravimetric Analysis (TGA). Their antimicrobial efficacies on gram-negative *Escherichia coli* and gram-positive *Staphylococcus aurous* were studied. Synthesized composite showed largest inhibition zones for both bacteria but better performance on gram-negative *Escherichia coli*.. The results suggest that MgO incorporated antimicrobial HA nanocomposite may be a viable candidate for bone implantation and dentistry to prevent post implantation infections and to increase the antimicrobial resistance of the hydroxyapatite nanocomposites.

Keywords: Hydroxyapatite, Magnesium Oxide, antimicrobial activity

Comparison of Terrestrial Gastropod Diversity in Montane Zone Forests in the Five Divisional Secretariats of the Nuwara Eliya District, Sri Lanka

06 Nov.
NSM43

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The wet zone of Sri Lanka has the highest land mollusk's species richness and the highest number of endemics. The major vegetation types in the wet zone are wet and dry patana and lower and upper montane rainforests. Of these, montane rainforests have the highest land mollusk diversity. However, only a handful of studies have explored this rich gastropod diversity in montane rainforests in the Nuwara Eliya district. Hence, this study was aimed at examining the gastropod diversity of montane rainforests in the five divisional secretariats in this district. A total of 60 sites covering lower and upper montane rainforests were sampled from July 2018 to June 2019. Sampling was based on ten 1 m^2 sampling plots per site. Species abundance, species richness, species density and the Shannon wiener index (H') were used to compare the land snail diversity in the five secretariats. A total of 1,224 individuals of 38 species (66% endemics) belonging to 15 families were recorded. The most diverse divisional secretariat was Hanguranketha (H'=2.49) and the least diverse was Ambagamuwa (H'=1.83). Species richness was highest in Nuwara Eliya (63%) and lowest in Ambagamuwa (24%). The highest number of endemic species was recorded from Hanguranketha (56%) and the lowest from Ambagamuwa (12%). The most abundant species in Ambagamuwa and Hanguranketha were two endemic species, *Euplecta elimina* (5%) and *Ruthvenia clathratula* (5%) respectively. In Walapane the most abundant snail was a native species, *Cryptozona bistrialis* (4%). However, in Nuwara Eliya and Kothmale, the most abundant synanthropic snail species were the exotics, *Bradybaena similaris* (8%) and *Lissacchatina fulica* (5%). A third exotic species, the slug *Deroceros* laeve was also recorded from montane rainforests in Nuwara Eliya, albeit at low abundances (<1%). All three of the exotic species recorded in this study are agricultural pests. This study indicates that Hanguranketha montane rainforests supports the most species-rich *mollusk fauna*. The study also suggests that some exotic pest species have been able to invade natural forest systems. This could be a threat to the native fauna and flora if proper management plans are not developed.

Keywords: Terrestrial mollusks, diversity, Montane zone, rainforest, Nuwara Eliya

Systematics of the Shrub Frogs of the Pseudophilautus popularis Complex

06 Nov.
NSM50

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Alpha taxonomy and species delimitation are cornerstones of biodiversity conservation. However, species delimitation can be convoluted in certain instances, making it relatively difficult to determine the geographic limits and population status of certain species. This situation is exemplified by *Pseudophilautus popularis* and *Pseudophilautus regius*, two morphologically similar endemic rhachophorid shrub frogs of Sri Lanka, which are difficult to distinguish in the field. Hence, the species boundaries of these two species were evaluated using an integrative approach. Specimens, tissue samples and bioacoustic data were collected from four distinct locations covering all bioclimatic zones of Sri Lanka where the two species are known to occur naturally. Species identification was done using their original descriptions. A total of eighteen morphological features and thirty morphometric measurements were taken from the collected specimens and type specimens of the two species. An approximately 540 base pair fragment of mitochondrial 16S rRNA gene was sequenced from the tissue samples and phylogenetic analysis was conducted using both Maximum Likelihood and Bayesian methods. The statistical analysis of morphometric data and bioacoustic properties showed no clear distinction between the two species. Similarly, the phylogenetic analyses showed no monophyletic clades corresponding to the two species and the pairwise genetic distance between the locations, ranged between 0.51-1.59%. Thus, integrative evidence provided here does not support the presence of the two distinct species, *P. popularis* and *P. regius*. The study highlights the significance of using integrative approaches in delimiting species limits.

Keywords: Amphibian, Sri Lanka, species delimitation, DNA barcoding, Bioacoustics

Synthesis, Characterization and Anodic Dissolution of Reduced Graphene Nano Zero Valent Iron Composite in Aqueous Solution of Na_2SO_4

06 Nov.
NSM55

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Electrocoagulation (EC) is a proven technology for water treatment. One of the serious issues in Al based EC is the residual aluminium in treated water is known to be toxic. Iron is non-toxic and low cost as an alternative substitute for Al and therefore is encouraged in EC. However, rapid corrosion of iron is the biggest problem in iron-based EC. With an intention of reduction of corrosion of iron, Reduced Graphene Nano Zero Valent Iron (RGnZVI) composite was synthesized and tested for corrosion. Modified Hummers method was employed to fabricate RGnZVI. Graphene oxide was prepared and then incorporated with $FeCl_2$. Under facile conditions, one step reduction method was used to synthesize RG nZVI composite through $NaBH_4$ reductant. TEM analysis shows, folding nature of graphene sheet with a maximum length of 4.12 nm, relatively dense and randomly, spherical nano zero valent iron particles dispersed on the graphene sheet. The full scan XPS spectra show photoelectron lines at binding energies 286.2, 530, and 719.6 eV attributed to C 1s, O 1s and Fe 2p. The peaks at 711.5 eV, 725 eV for Fe $2p_{3/2}$ and Fe $2p_{1/2}$ correspond respectively to oxidized iron (III) due to the surface oxidation during the synthesis process. In electrochemical analysis of RGnZVI, it was found that the open circuit potential to be -0.467 V, in 0.2 M Na_2SO_4 electrolyte and polarization resistance was found to be 0.04 Ω. at room temperature (25^0C). Exchange current density calculated by Tafel plots showed slow anodic dissolution.

Keywords: Electrocoagulation, grapheneoxide, nanozerovalent iron, opencircuit potential, corrosion

Study of Energy Conversion Efficiency of D-131 Dye-Sensitized Solid-State Solar Cell by Changing Absorbed Dye Amount

06 Nov.
NSM58

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Dye-sensitized solar cells (DSC) based on liquid electrolytes show high efficiency. However, the evaporation of the liquid when the cell is imperfectly sealed and corrosion by the volatile redox mediator may limit device stability. In this study, dye-sensitized solid-state solar cells (DSSC) were prepared and higher efficiencies were obtained by changing the amount of dye absorbed. A layer of TiO_2 nanoparticles was deposited on fluorine-doped tin oxide (FTO) glass plates by drop coating followed by sintering. TiO_2 coated electrodes were preheated and dipped in a 0.3 mM solution of D-131 dye for 12, 15, 24, and 48 hours for varying the amount of dye absorbed. CuI in acetonitrile and triethylamine thiocyanate solution was deposited on a 0.25 $cm^2$of the oven-dried D-131 dye sensitized TiO_2 electrode. Pt-coated glass plate was attached to the TiO_2 photoanode in the construction of the solid-state dye sensitized solar cell. The DSSC prepared by dipping the TiO2 electrode in D-131 dye solution for 24 hours showed a highest energy conversion efficiency (η) of 2.579% compared to that of other different dipped times. The energy conversion efficiency was measured by using solar simulator. Highest values for V_{OC} = 0.466 V, and JSC = 10.293 mA/cm^2 were also observed. The incident photon-to-current conversion efficiency (IPCE) measured by a xenon light source showed a maximum IPCE value of 57% at 425 nm. HOMO and LUMO energies calculated by cyclic voltammetry and UV absorption spectra of D-131 dye were -5.30 eV, and -2.98 eV respectively.

Keywords: Dye-sensitized solar-cell, Dye-sensitized solid-state solar cell, Fluorine-doped tin oxide

06 Nov.
NSM59

Fabrication of 5,10,15-Tris(Phenyl)-20-(4-Hydroxyphenyl) Porphyrin Sensitized n-Cu_2O Photodetector

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There has been an increasing interest in non-toxic, earth-abundant and self-powered materials in photodetector industry. This is largely because currently used materials are high toxic and high fabrication costs. Mostly, state-of-art photodetectors tend to use these toxic and rare earth inorganic materials due to their high performance. Even though, organic materials have the ability to reduce toxicity and fabrication cost, their optoelectronic and stability performance is still low. Hence, to addressing these drawbacks, an organic-inorganic hybrid photodetector was fabricated and characterized. Environmentally friendly n-Cu_2O layer was fabricated on top of Cu substrate and 5,10,15-tris (phenyl)-20-(4-hydroxyphenyl) porphyrin dye was used as an organic sensitizer. The device was fabricated by using atmospheric hydrothermal method followed by a step of immersing in the dye. The sensitivity and detectivity were calculated using IV characterization. The observed highest responsivity was 11.21 mA W^{-1} to blue (near UV, 465 nm) light at 0 bias. The sensitivity reached 6.601×10^3 and the highest detectivity of 2.182×10^{11} was observed under blue (465 nm) LED at 0 bias. The photodetector at its self-powered mode demonstrated fast rise and fall times of 862.9 μs and 855.6 μs at 35 kHz, respectively. These results indicate that the photodetector is more responsive toward near UV range with medium level stability. Furthermore, it can be concluded that Florine doped Tin Oxide/Cu/n-Cu_2O/5,10,15-tris(phenyl)-20-(4-hydroxyphenyl) porphyrin photodetector has considerable potential towards optoelectronic applications by having self-powered, green and low cost properties.

Keywords: organic-inorganic photodetector; n-Cu_2O; 5,10,15-tris(phenyl)-20-(4-hydroxyphenyl) porphyrin; green, self-powered

Talks: Social Sci. & Humanities

RIRC 2019

Soul of Dido: An Analysis of Dido's Character in Book IV of the Aeneid Through the Platonic Idea of the Tripartite Soul in the Republic

07 Nov.
SSH04

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Plato, in the lines, 586- 597 of the *Republic states*, the soul has three parts; *the Desires*, *the Spirited* and *the Reason*. This paper illustrates how Plato's idea of the tripartite soul has been depicted through the character of Dido in the *Aeneid* by Virgil. An in depth analysis of the character of Dido is conducted by studying the characters mental framework in the lines, 586- 597 in the Book IV. These lines illustrate the mental state of Dido at her sight of the leaving fleet of the Trojans. In addition, the idea of the tripartite soul has been used to analyze the frenzied mental state of Dido in the mentioned lines. The desires of her mind are reflected through the lines, 586-590, when the queen sees and feels the departure of Aeneas. This makes her mind to go into an array of *Desires*. In lines 590-594, Dido tries some futile actions that she thinks will help her in reversing the situation. This depicts the *Spirited* part of the soul which runs in between the baser desires and higher reason. Finally in the lines, 595-597, Dido attains *Reason* and is able to question her own misdeeds in the past, showing the rationality of the supreme state of the soul. This discussion shows that Plato's Republic which was written around 380 B.C. would have been of direct influence on creating the character of Dido in the *Aeneid* which was written between 29 and 19 B.C.

Keywords: Plato's Republic, three partite soul, Virgil's Aeneid, Dido's frame of mind

Womens Development Societies (Kantha Sagwardana Samithies) in Sri Lanka and Participatory Development: A Case Study on Womens Development Societies in Peliyagoda Urban Council in Gampaha District

07 Nov.
SSH05

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Enhancement of women's participation in the participatory development (PD) is important for a country to attain its social, economic and political sustainability. PD is a wide range of phenomena attached to political, social and economic elements which have been in existence in development discourse and debates for the last few decades in Sri Lanka. The purpose of this study is to examine the contribution of the women's development societies (DS) in PD, identify the weaknesses of the women's development societies (WDS) and uncover the role of women's societies in Sri Lanka. The aim of this research is also to evaluate to what extent the focus of the research is influenced by the determinant factors of colonial and neo-colonial oppression, such as modern patriarchal system, self-reliance, political, social and economic structure, and exploitation and so on. To achieve this purpose, qualitative and quantitative methodology was used, with secondary sources as an instrument of data collection. Data were collected using semi-structured questionnaires, focused group discussions and in-depth interviews. Two women's development societies (TWDS) were selected for this study namely, Malwaththa WDS and Peliyagodawaththa WDS. These TWDS have women's development based objectives and they target the underprivileged women in the society. Based on the data analyzed, findings show that the role of the TWDS have different social, political and economic dimensions. PD aspects are not fulfilled by these TWDS. The research shows that the economic empowerment (EE) alone is not sufficient to gain the PD. In some instances these women's societies (WS) help EE. However, unfortunately social upward movement, personal growth, domestic responsibilities, self-reliance or other values of the lives cannot be granted through programs of the women's DS. Research findings show both women's DS play only a debt provider (DP) role. DP role has established and maintained poor power relations between the rich and the poor. As an empowerment tool women's DS had not integrated women into development by targeting women directly through empowerment. It diminishes self-reliance within women. Hence, it can be concluded that the stakeholders should have strong commitment to empower WS and utilize the potential of the government to bring about PD through WS.

Keywords: Participatory Development, Women's Development, Empowerment

07 Nov.
SSH07

Implementation of Effective Teaching Techniques for Teaching Environment Related Activities at Primary Level

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Primary education is accepted as a significant period which provides the foundation for the lifelong learning. Thus, Sri Lankan government has taken several initiatives to enhance the quality of primary education. Nevertheless, several empirical studies have emphasized serious issues related to primary education and malpractices of teaching environment related activities (ERA). Therefore, the present study attempted to identify the effective teaching techniques for ERA at primary level, to examine the awareness of effective teaching techniques and to investigate the implementation of techniques in the actual teaching and learning process. A survey research design was implemented for the study. The study was conducted in Gampaha and Anuradhapura educational zones. One hundred and forty four (144) teachers were selected by using the stratified random sampling method. In addition, eight key informants in the field of primary education were selected for the sample. Statistical Package for Social Sciences was applied to analyze numerical data while qualitative data was analyzed descriptively. Teachers, identified field trips, creative activities and use of audio-visual material were identified as the most effective teaching techniques while exercise, experiments, role play and puzzles were specified as moderately effective. Describing, print materials, simulation, demonstration and illustration were identified as least effective teaching techniques. Similar identification emerged from key informants as well. Majority of the teachers have proper awareness of effective teaching techniques irrespective of zonal differences. Teachers have considered the nature of students, the subject and the practicality of those techniques when ranking teaching techniques according to their effectiveness. Majority of teachers had rarely implemented those effective teaching techniques on a regular basis though they have satisfactory level of awareness. Instead of considering the effectiveness of techniques, teachers tried to fulfill the short-term requirements related to the scholarship examination. Accordingly, a significant gap occurred between teachers awareness and their implementation of effective teaching techniques when teaching ERA at key stage III.

Keywords: Environment related activities, effective teaching techniques, primary education

Sri Lankan English: A Unique Variety of English as Manifested in Sri Lankan Postcolonial Literary Works

07 Nov.
SSH09

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Sri Lankan English is a unique variety of English that emerged in post-independence Sri Lanka when the standardized variety of British English came into contact with the indigenous languages like Sinhala in the country. Sri Lankan English can be identified as a "new" variety of English which has the capacity to perfectly encapsulate the Sri Lankan experience as opposed to any other variety of English. This study explores the characteristics which makes Sri Lankan English a unique variety of English as manifested in the Sri Lankan postcolonial literature. A theoretical survey of some Sri Lankan postcolonial writers and their English works was conducted in order to underline the unique features of Sri Lankan English: *The Call of the Kirala*, *The Jam Fruit Tree*, *The Cobra*, *The Scorpion*, *From the Life of a Folk Poet*, *Ysinno* and *Action and Reaction* by James Goonewardene, Carl Muller, Lakdasa Wickramasinghe and Chitra Fernando respectively. I incorporated theoretical ideas and concepts like "fulguration", the idea of Sri Lankan English as a variety of "New Englishes", the concept of "De-hegemonizing Language Standards" and the idea of Sri Lankan English as "a language without metaphor" presented by renowned linguists like Thiru Kandiah, Arjuna Parakrama, Godfrey Gunatillake, Siromi Fernando and Manique Gunasekara to support my argument. The study revealed that there are morphological, phonological, syntactic and semantic structures that are unique to Sri Lankan English. Furthermore, the idiomatic language, the colloquialisms, code switching and code mixing, direct literal translations, compound words and reduplications that shape the local identity were discovered to be some unique features which makes Sri Lankan English a unique variety of English. Thus, it is conclusive that Sri Lankan English is an exceptional variety of English.

Keywords: Sri Lankan English, unique variety, postcolonial literature, local identity

07 Nov.
SSH10

Expanding Right to Life Through Legislative Interventions: A study of the Fishing Community of Sri Lanka

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After the Universal Declaration of Human Rights, the international community had become more sensitive towards human rights. Right to life is an important right among all other rights. The right to life, in its textual meaning, is the right of man to exist as a human person. This literal thinking has expanded today to reach the widest meaning including all other rights i.e. right to livelihood. Although it is not recognized directly by the Constitution, the judiciary in several occasions included the right to life into the fundamental rights jurisprudence. Due to uniqueness of Sri Lanka as an island, fishing industry became one of the ancient forms of livelihood in the country. It has been a mainstay of the country's economy since the early centuries and continues to provide significant income to the nation. Sri Lanka and India being two neighboring States, share the resources of Indian Ocean. The objective of this research is to examine, the extent Sri Lanka attempts to protect the right to livelihood of her fishing community through legislative interventions. It is proposed here to discuss the legally binding international mechanism regarding sustainability of the fishing industry in both countries while focusing on illegal, unreported and unregulated fishing activities. It also raises the question as to what extent it amounts to violate the right to livelihood of a fishing community. This study also discussed the legislative interventions to protect the right of the fishing community, major lacunas in the existing mechanisms and the way ahead on the part of the State. The researcher having relied on doctrinal method of research, examined the current international legal framework on human rights and fishing industry, constitutional and legislative provisions of Sri Lanka and India, while relying on journal articles, textbooks, case law of jurisprudence.

Keywords: Right to Life, Right to Livelihood, Legislations, Fishing Communities, State Obligations

Use of Plato's Parable 'Ship of State' in Political Cartoons

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The parable, "Ship of State" was introduced by Plato in Book IV, lines 488a-489d of *the Republic* to compare a ship to a city state. This parable later became an effective tool in political cartoons to transmit political messages in a playful manner. Such cartoons appear in the political settings of United States of America, European and Asian countries alike. This study uses a qualitative approach to analyze the selected political cartoons on *Ship of State*, focusing on textual and graphic elements. The study examines why Plato uses the parable, what context is it pertaining to and on the other hand why editorial cartoonists use the parable and what issues do they try to address. The political cartoons which depict *Ship of State* are analyzed under Symbolism, Labeling, Exaggeration, Analogy and Irony to understand, compare and contrast political communication of the day. Political Cartoonists use the parable of Plato to criticize leadership and decisions of the state. This contemporary usage defines that the political setting of Plato's era has not been subjected to major changes. For the three main personnel in the parable, the fake captain, demagogues and the true leaders are apparent throughout the history up until now as the political cartoons attested. Hence, *Ship of State* derived from the philosophical discourse is used by the editorial cartoonists to break down complex political issues in a simple way for people to understand.

Keywords: Ship of State, political cartoons, Plato, criticism, leadership

07 Nov.
SSH13

A Study of Veddas' Culture and Life Style in the 20th Century through the Perspective of 'White Blood Brother' alias R. L. Spittel. (Based on R. L Spittel's Selected Novels)

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Little is known about the origin of Vedda community but they possess a continuous history of more than 2500 years. Focusing on Veddas' distinguished external features and restricted cultural aspects which are unique to their identity, it could be assumed that they are the descendants of the primitive generation. A historical chronicle, the Mahavamsha, mentions that the Vedda community originates from Jeewahattha and Dissala. Jeewahatthas and Dissala's father was Prince Vijaya and mother was Kuveni or Kuvanna (dark hued one) who represented Yakkha community in ancient Ceylon. Various ethnographers have given various definitions of the word 'Veddo'. According to the definition of R.L. Spittel, the word **"Veddo"**, was derived from the word **"Beddo"** which means the people who live in bedda or thick jungles The definition of Spittel takes prominence far and above the other definitions. Richard Lionel Spittel (18811969) was born in Sri Lanka. He was a physician, novelist, poet and an ethnographer. As an avid nature-lover, he gained much knowledge of the jungle and the Vedda community in Sri Lanka. The novels related to this study are namely **Savage Sanctuary (1941)**, **Vanished Trails (1950)**, **Where the White Sambhur Roams (1951)**, **Wild White Boy (1958)** written by R.L. Spittel. The research problem in this study is whether Spittel has highlighted many aspects about the Vedda, their simple life style and cultural aspects in his four above mentioned novels. The research is based on socio-linguistic approach. In this study the main attention was drawn to Veddas way of life which was hunting. In addition, food culture, customs of marriage, social and cultural phenomena, beliefs and superstition, ritual performances were studied. It can be concluded that these four selected novels depict the transformation period of the Vedda community in Sri Lanka.

Keywords: Culture, novel, physical appearance, primitive, Veddas' community

Revelation of Conservation of Vegetation through Mihintale Slab Inscription in the 10^{th} Century A.D

07 Nov.
SSH14

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Environmentalists currently view deforestation as a severe problem in the making that threatens all life forms on the planet; including humans. The loss of vegetation is experienced , as consequences of deforestation, industrialization, political ideology and acknowledgement of westernization attitudes, growing population, lucrative timber trade etc. The forest cover has now been reduced down to 27% in Sri Lanka. It is known that deforestation leads to undesirable outcomes such as drought and torrential rain pouring within short time. These are affected to agrarian economy, adversely. The research problem of this study is to find out whether there would have been foresight anticipation of our ancient kings who reigned even a millennium ago, for protecting vegetation. The doctrine of Buddhism as well as Hinduism promoted conservation of trees and encouraged to adore them. The concept of protection of environment had been engraved on stones by several kings, the most trustworthy information of ancient times. Among them, the inscription erected by King Mahinda the fourth (952 - 972 A.D.) warned directly that not to cut vegetation namely; **"Tal"** - Talipot Palm (*Corpha umbraculiferu*) and **"Mee"** - honey or butter trees (*Bassia longifolia*) growing in the premises of a monastery at Mihintale. The methodology of this research is based on primary and secondary sources. Epigraphia Zelanica has been used as primary source. It can be concluded that our kings would have had foresight perspective of protecting vegetation to avoid the imbalance of environment.

Keywords: Conservation, environment, inscription, vegetation, water

07 Nov.
SSH15

Horace's Thoughts on 'Wealth'

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Humans are in competition to acquire wealth and always attempt to overshadow the other. Therefore, wealth has taken over the entire life of humans rather than being only a necessity. This has deviated humans from leading a free and normal life from fear and worry. In such a context, the current research examines how Horace attempts to bring the futility of riches into the attention of the society through an examination of the reflections on wealth in his poetry. The study investigates the practicality of these moral advices through reflecting into Horace's life experiences. Moreover, the study observes the suitability of these reflections to the modern society. The study is carried out as a library research and the primary sources are Horace's *Odes, Epodes, Satires* and *Epistles*. Apart from the primary sources, other contemporary literary works and modern scholarship is used for further substantiation. A profound study of Horace's poetry unveils many reflections on wealth. Horace points out the ephemerality of possessing wealth and the futility of wealth as death is common to both rich and poor. He encourages the people to lead a simple life with limited needs than a stressful life by accumulating wealth. His image of a happy man is of someone who knows the limits of acquiring wealth and uses it to fight against poverty. Horace has presented these ideas through self-realization and practice which reveals the practical use of them. Since present human love for riches is the same as Horaces time, it can be concluded that these morals are applicable to modern society.

Keywords: Horace, wealth, morals, poetry, society

"Thirst for Knowledge": A Study of Ambitious Oedipus and Sinhabahu

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Living a lie for a long time is similar to living in a matrix where ignorance and false realities coexist. To escape this false reality would be the same as it was for Platos cave-prisoner leaving the cave. Everything he thought real was only an illusion. The way one reacts to the new-found knowledge depends on the individual. This quest in search of truth is visible in Sophocles' *King Oedipus* and Sarachchandra's *Sinhabahu*. The comparative method is used to examine the protagonists and it offers cross-cultural perspectives regarding this issue. Both of them question about who they are and their thirst for knowledge makes them ambitious and leads to turmoil. From the moment Oedipus and Sinhabahu enter Thebes and Vanga, chaos befalls. Oedipus being the impious criminal brings a plague to the city, and Sinhabahu for running away from the cave brings the wrath of the Lion to the city. They are quick to decide and act. Oedipus accuses Tiresias and Creon for conspiring to dethrone him. Sinhabahu at first aspires to be the king of the jungle and later on ruling the people of Vanga. These hasty decisions show their greediness to gain and retain power. They seek knowledge for their personal benefit. Neither one of them is altruistic about their goals as saviours of their cities. They embody the idea of a ruler who pursues power and lives with much insecurity. Thus, this thirst for knowledge is to retain their authority or for their own security.

Keywords: King Oedipus, Sinhabahu, comparative study, theatre, myths

07 Nov.
SSH17

Using Virtual Blended Mode for Preparing Graduates for International English Language Testing System

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The number of engineering graduates applying for the International English Language Testing System (IELTS), seeking jobs abroad is increasing annually. As many find it challenging to achieve the required band score in reading component, the study explored whether different delivery modes (of face to face, online and blended) influenced their outcome achievement. Study duration was 3 months. Setting was the Department of Multidisciplinary Studies in the Faculty of Engineering, University of Sri Jayewardenepura. With the face to face mode continuing as a control group (n=15), the blended (n=15) and online (n=15) groups received six online modules on reading. Practising materials included 12 reading passages prepared for the study, with ten questions at the end of each passage. Instructions on skimming and scanning were given online for the experimental groups. While the online group received all lessons online with no face to face instructions; the blended group received 70% of the course materials in the format of online activities with six face to face lessons to cover up the balance 30%. The control group too received the same learning materials in printed formats and practised these only in their face to face classes with one tutor of English. While the three groups showed the performance as Blended mean =43.07, Online mean = 39.27, Face to face mean =45.00 at the pre-test having the reading skills tested in three reading passages with 20 questions, a similar course-end test showed the blended group participants to have scored significantly increased marks (mean = 51.20, t = 7.176, p = .000), compared to their counterparts (Online mean = 47.60, t = 5.593, p = .000, Face to face mean = 50.67, t= 5.330, p = 000) at the significance level of $p < .005$. This study can have implications for teaching English in the context of International English Language Testing System (IELTS) exam.

Keywords: Virtual Blended Mode, IELTS, Higher Education

The Link between Relationship Quality and Life Satisfaction of Individuals Across Countries

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Establishing and maintaining good interpersonal relationships with others play an important role in achieving happiness and well-being. The aim of this investigation was to examine the key role of relationship quality in predicting life satisfaction in three countries. In addition, we examined gender difference in relaitonship quality. A sample of 308 Sri Lankan, 103 Indian, and 196 American adults living in their respective countries were selected using convenience sampling method and they responded to a questionnaire assessing interpersonal relationship quality, positive relations with others, and satisfaction with life. Mean levels of these measures significantly varied by country. Also, there was a significant gender difference in positive relations with others. Self-reports of relationship quality significantly predicted life satisfaction and the link between relationship quality and life satisfaction varied across countries. Findings suggest that interpersonal relationship quality play a vital role in ones life satisfaction and also the relationship between relationship quality and life satisfaction may vary across cultures depending on the way individuals value interpersonal relationships in a given context.

Keywords: Relationship quality, life satisfaction, gender, collectivist culture

07 Nov.
SSH19

Transmitting Ideologies through Popular Cinema: A Textual Analysis of Marvel Studio's Avengers: Endgame (2019)

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Since cinema has been identified as an effective method of ideological transmission, it is widely accepted that the commercial cinema has been utilized to strategically inculcate and naturalize certain believes in the mind of the audience. In this regard, it can be assumed that the Marvel Studios, which is one of the prominent American film studios, has also attempted to embed such believes in their productions. Marvel Cinematic Universe (MCU) is a fictional universe that appears in the main stream Hollywood commercial movies, produced by Marvel Studio. The study, thereby, attempts to comprehend the afore discussed phenomenon by carefully scrutinizing one of the most anticipated and recent movies based on MCU, namely; *Avengers: Endgame* (2019), by Marvel Studios. Qualitative method, in the form of textual analysis, is entertained in the study, which does not have a particular theoretical framework as it is carried out rather as an empirical study. However, to contextualize the findings, the contemporary writings on America will be used. Consequently, the analysis would elucidate how certain stereotypical and ideal concepts on American society, such as racial equality, empowerment of women, and American superiority, are promoted through the movie.

Keywords: Ideology, Marvel Cinematic Universe (MCU), popular cinema, super heroes

Issues and Challenges in Testing and Evaluating Student Writing in English as a Second Language (ESL)

07 Nov.
SSH20

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Testing and evaluation is a key component of the teaching-learning process in the area of English Language Teaching/Learning (ELT/L) and assessment literacy is regarded as one of the most important skills an educator should possess. The current research attempts to identify issues and challenges faced by teachers in evaluating student writing. For the purpose of this research, 20 instructors from the ELTU, Faculty of Arts, University of Peradeniya were selected to mark a standardized in-class writing test given to First year undergraduates of Faculty of Arts. The instructors were requested to select and define constructs/criteria based on which student performance should be assessed while randomly selected 40 students were given questionnaires to assess student understanding of the test purpose and criteria of evaluation. Data pertinent to the research were collected through group discussion (instructors) and questionnaires administered to instructors (20) and students (40). It was found that there was a noticeable gap between student and teacher evaluation of "good" writing and that there was a vast difference of definition of the constructs as well as overlap in definition between constructs introduced by instructors. The study highlights the importance of educating students on teacher expectations when administering writing tests and of practices such as pilot/conference marking to ensure the participation of teachers in designing assessment schemes so as to avoid measurement error and to interpret test results effectively to enable students to attain higher levels of academic achievement.

Keywords: ELT/L, ESL writing, testing and evaluation

Designing a Physical Literacy Model for Sri Lankan Children of Grades 4 to 6 (Aged 8 to 12)

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This research examined the action taken to design a physical literacy model for Sri Lankan children of grades 4 to 6 (aged 8-12). The aim of this study was to find the low level of development of physical literacy as one of the main factors for low level of sport achievements at international level. Physical literacy mainly concerns of fundamental motor skills (FMS) as well as fundamental sports skills. Pretest-Posttest pre experimental design was used as the research design. Hundred (N=100) subjects were taken from Karawita central college, Rathnapura by using the random sampling method. Data were gathered using cognitive, psychomotor and affective tests and observations. Especially FMS cycle was used to develop physical literacy level in students within the course of 8 weeks. Paired t test was used to analyse the data by using MS Office and Minitab 17. According to the cognitive test, there was a significant difference between pre-test and post-test with a p-value of 0.000 (α<0.05). While the psychomotor test showed a significant difference between pre-test and post-test with a p-value of 0.000 (α<0.05), the affective test showed a significant difference between pre-test and post-test with a p-value of 0.000 (α<0.05). Hence it can be concluded that the physical literacy model designed could be used to develop physical literacy level of Sri Lankan students of grades 4-6 (aged 8-12). Monitoring these measures enhances our understanding of childrens physical literacy and assist with the identification of areas where additional support is required.

Keywords: Literacy, physical literacy, fundamental motor skills, fundamental sports skills

Spatial and Temporal Variations and Community Perception of CKDu as a Societal Hazard: A Case Study from Medawachchiya, Sri Lanka

07 Nov.
SSH23

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Chronic Kidney Disease of unknown etiology (CKDu) is one of the serious societal hazards in the North Central Dry Zone of Sri Lanka. Though, various researchers carried out numerous researches on CKDu, still the cause of CKDu remains unknown. The number of CKDu patients and deaths are rapidly increasing. Hence, this research aimed at identifying the spatial and temporal variations and community perception of CKDu in Medawachchiya Divisional Secretariat Division (DSD). Primary data were collected through a questionnaire survey conducted using 645 persons in 9 Grama Niladari Divisions (GND). Secondary data were collected from Divisional Secretariat Office, Medawachchiya, and CKDu prevention and research unit, Anuradhapura. Data were analyzed using the mixed method - both qualitative and quantitative with Statistical Package for Social Sciences (SPSS) and Geographic Information System (GIS). The results highlighted that 10% of total population in Medawachchiya have been affected by CKDu in 2018. There is a spatial and temporal variation of CKDu patients in Medawachchiya DSD area during 2010-2018. Extreme prevalence of CKD could be observed in adjoining GNDs of Medawachchiya DSD such as Puhudivula and Heeralugama, Puleliya and Kubukgollewa. There are 34 factors responsible for development of CKDu as mentioned by the respondents. Most prominent cause is the drinking water (64%) and next is the use of agrochemicals (26%). The highest satisfaction level of people on mitigation measures taken by various parties is moderate ranging from 40-49%. Proactive, preventing approach must be adopted to mitigate occurrence of CKDu and achieve resilience in the long term.

Keywords: CKDu, societal hazard, drinking water, agro-chemicals, resilience

07 Nov.
SSH24

Challenges in Translating Registers with Special Reference to Sinhala, Tamil, and English Languages

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No two languages are ever similar owing to their unique characteristics. These language diversities have made the communication process complex but alive. Translators play a vital role in enabling the communication process of two different language communities. The study discusses the definition and categories of language registers, using the widely used three languages of Sri Lanka. The primary purpose of the study is to identify the issues that those registers bring out if they exist and then find out feasible solutions to them according to the perception of the sample group which consists of 25 government translators. While questionnaires and interviews are used as the primary data collection method, online sources and books are used as secondary sources. When analysing the data, it is found that the majority of translators struggle when translating registers, especially in literary texts. For example, when translating intimate registers to a target Sinhala reader, the translator struggles because it is very hard to present sex-related incidents in Sinhala. This struggle is clearly visible in "*The Lover of Lady Chatterley*", work of D. H. Lawrence translated by Shamel Jayakody. The results of this study further emphasize that for translators, registers can both be a blessing and a curse. In conclusion, the study recommends the translators to have a sound knowledge about the registers of both languages he or she is dealing with to provide the target reader with what he or she expects.

Keywords: Registers, challenges, translation, target reader

Differences in perception of Climate Change: A Case Study on Bhotechaur Village in Nepal

07 Nov.
SSH25

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Developing countries are highly vulnerable to global climate change and its consequences. Climatologists and scientists play a key role in determining climatic trends, climate change vulnerability analysis and identifying suitable adaptation and mitigation measures. However, the real sufferers of climate change are the local communities and the farmers around the world who are struggling to adapt to the climate change realities. This study aims to understand, how a person discerns long-term changes in climatic parameters. Since the peoples' perception play a critical role in adaptation and mitigation activities, it is necessary to assess the factors which contribute to the peoples' perception of climate change. A study was conducted in Bhotechaur village in Melamchi Municipality of Sindhupalchowk district in Nepal using a questionnaire survey, key informant and in-depth interviews for the data collection. The questionnaire survey was facilitated with 26 individuals representing both men and women. According to the results, perceptional differences of climate change were based on the location of houses within the village, level of income and education, gendered roles, culture and caste. There is a high impact on people living away from the village economic center (the bazzar) and small-scale land holders due to dependency on agriculture, animal husbandry and poor living conditions and lack of infrastructure. Additionally, the gender bias of climate change perception was based on their roles and responsibilities. This study identified the importance of incorporating peoples' perception on climate change to decision making, planning of adaptation activities to gain optimum benefits.

Keywords: Climate change, social disparities, perception

07 Nov.
SSH26

Institutional Capacity as an Institutional Challenge of Implementing Cooperative Governance in Sri Lanka

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Cooperative governance approach creates a new era of the public administration in Sri Lanka. This research analyzes the institutional challenges of implementing cooperative governance in Sri Lanka. Although many countries successfully practice cooperative governance, the developing countries have some issues and challenges while implementing cooperative governance. This research also identifies the institutional challenges of implementing cooperative governance in Sri Lanka and to propose certain solutions to those challenges. The study is based on primary and secondary data. Primary data is collected through structured questionnaire and open-ended question based interviews from public, government, NGO and private sector officers. The sample size is sixty. Cooperative governance consists of four major pillars; transparency, accountability, institutional capacity and responsibility. The institutional capacity is based on the competence and size of staff, the degree of hierarchical control of decision-making process and the degree of open communication within the organization. According to the findings the major institutional challenge for the implementation of cooperative governance is lack of staff and technical knowledge to implement cooperative governance. Even though there are many stakeholders involving in implementing cooperative governance, it is led by the government sector. However, due to insufficient staff and technical knowledge of the government sector employees the implementation of cooperative governance has slowed down. To increase the institutional capacity, the government should appoint skillful staff with technical knowledge and implement another section of staff who has the theoretical knowledge about cooperative governance.

Keywords: Cooperative Governance, Public Sector Reforms, development goals, policy implementation

Compensation: Employee Retrenchments or Layoffs Due to Non-Disciplinary Termination of Employment of Private Sector

07 Nov.
SSH27

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During 1971 Sri Lanka was faced with a financial crisis due to political instability prevailed at that time. Hence, the government of Sri Lanka was compelled to impose drastic control on imported goods. During that time the government only applied the provisions of Industrial Act for termination of employment due to retrenchment or layoffs and it was not sufficient to serve a large number of retrenchments effected by the employers. During this period of the closed economy in 1971 the Termination of Employment of Workman (special provisions) Act No 5 was enacted. This became a land mark in the history of labor law of our country. The Act has wide coverage to all employee retrenchments or layoffs due to non-disciplinary termination of employment of private sector. Act was amended three times in the years 1976, 2003 and 2005 respectively. This research adopted both the methods of research namely, Empirical Research as well as Doctrinal Research. Within the qualitative paradigm an exploratory case study was used to investigate the phenomenon being studied. The researchers used judgments, principles and Acts relating to this study while consulting different books, journals, magazines and papers presented in seminars and conferences. The researchers also referred a number of books published in periodicals related to labour law. The Termination of Employment of Workman (special provision) Act No. 5 of 1971 undertook various ameliorative legislative measures to provide safety and protection measures to workers from non-disciplinary termination or closures, but in practice the employers do not seem to be complied with provisions of this Act.

Keywords: Compensation, employee, retrenchment, termination

07 Nov.
SSH28

A Philosophical Study on the Applicability of Zen Buddhism in Photography

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Zen is a branch of Mahayana Buddhism. Zen Buddhism has great emphasis on meditation and insight into the true nature of things. Zen is the direct experience of truth, beyond the reach of thoughts and feelings, and beyond the words used to express thoughts and feelings. This school has a rich development of artistic principles to enhance its Zen practice. The objective of the study is to examine the application of aesthetic techniques of Zen in photographic composition and to manifest how a photographer develops mindfulness in the process of photography by using Zen practice. With the development of photographic art, most prominent photographers in the twentieth century such as Ansell Adams, Edward Weston, and Minor White attempt to embody Zen spirit in their work and outlook. Zen in photography is used as literary sources and the information gathered are analytically and critically organized to reach a conclusion. The Zen photographer tries to focus on the inherent nature of the aesthetic object. The job of the Zen photographer is to suggest the essence and the eternal qualities of the object. In conclusion, this paper is carried out to discuss the experience of being an 'observer' of the self in the act of photography and use photography as a meditative vehicle for achieving 'Satori' or 'Nirvana', which is the ultimate goal of Zen practice.

Keywords: Zen, Photography, aesthetic techniques

Impact of Commercial Laws on Nature, Quality and Existence of Lands in Land Contracts: A Critical Analysis of Sri Lankan Perspective

07 Nov.
SSH29

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The person or body who wishes to buy or supply goods or services can enter into business or commercial contracts. If there is a breach of term or there is an issue regarding the quality or availability of the goods or services in the contract; the Law of Contract provides provisions to question, sue or claim compensation on the matter. Similarly, Sales of Goods Ordinance No.11 of 1896 provides provisions to question sue or claim compensation on issues regarding the quality and existence of the goods or services. In Sri Lanka, presently, it can be seen people are ceaselessly entering into business contracts on conveyance of property through deeds. However, the land conveyed by a contract which has issues regarding quality, existence or facilities, is not covered by principles of Law of Contract or Sales of Goods Ordinance. Therefore, the question arises how to ascertain a mechanism to provide a concession to people who are affected by the quality and availability of the land after the conveyance. The objectives of this study are to critically analyse the existing system to overcome the arising issues on good quality and safety of a land in a land contract and finally to provide corrective recommendations in view of the drawbacks. Critical content analysis of this study underpinned by qualitative methodology allowed a mixed method of conceptual, analytical and empirical assessment. The study analytically illustrates that the enforcement of existing commercial law as Acts, Ordinance, rules and regulations, negatively impacts the issues that arise on quality, existence or facilities related to land after its conveyance. Therefore, the study recommends that, the standing commercial or business laws should be amended to include in its scope land contracts, considering lands as goods to ensure the protection of the interests of parties to land contracts.

Keywords: Goods, lands, conveyance, contracts

Sri Lanka's Right to Information Act: A legislation to deny the right

07 Nov.
SSH30

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The right to information in Sri Lanka was formally institutionalized by the 19^{th} Amendment to the Constitution. The government passed the Right to Information Act No.12 of 2016, claiming to give effect to this constitutional right. This study discusses the impact of this Right to information Act which has sweeping provisions to deny the access to information. The Supreme Court determination on the constitutionality of the case is also critically discussed. The Act was analyzed by adopting doctrinal research methodology/black letter approach and used case judgments and statutes as primary sources, and books, articles and other relevant materials as secondary sources. According to this Act, this right is vested in citizens against public authority. On the other hand, it provides for avenues to deny the right to information, duties of the ministers and public authorities, establishment of the Right to Information Commission, appointment of information officers, procedure for gaining access to information, appeals against rejections and some general provisions such as offenses, regulations etc. This right is also recognized in India and Canada, where there is a rich resource of judicial pronouncements. The several exceptions to the right as provided in the Act are encompassing and include national security, defense and territorial integrity. Serious prejudice to economy is an exception that can even extend to the extent of repudiation of the sole purpose of the right. It can be concluded that contrary to the claims that the Act protects the right to information, it is designed to make severe restrictions on the right of access to information.

Keywords: Information, law, constitution, rights

An Analysis on Gender Dynamics of (Para)linguistic Features Used by a Selected Sample of Social Network Users in Sri Lanka

07 Nov.
SSH31

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Online platforms can be considered as an ideal canvas to explore the interplay between language and gender. In view of that, this study attempts to reconceptualise gender from a social constructivist perspective, with the expectation that the study of online discourse can contribute to evaluate the impracticality of understanding gender in dualistic terms of male and female. Accordingly, it focuses on investigating what gender-based (para)linguistic features may be found in Computer-Mediated Communication (CMC) and whether there exists a difference in the manner women and men use (para)linguistic features in public and private platforms. Therefore, this study takes a Computer-Mediated Discourse Analysis approach in analysing 160 language samples/chat history from Facebook, WhatsApp and Viber, authored by 20 participants who are a selection of Sri Lankan social network users, aged 20-35 years. Further, follow-up interviews were conducted with the same sample to elicit reasons behind certain usage of (para)linguistic devices. The findings challenge the binary categorisation and typicality attributed to discursive features of language used by females and males as language samples did not at all times possessed features of Typically Female and Typically Male discursive binaries ascribed by previous researchers. The mere deviance in discourse and strategies used by participants in private and public online platforms, destabilized conventional notions about mens and womens discursive styles in virtual spaces while questioning the fixity of gender. It further invited gender to be perceived as a plural, with a range of femininities and masculinities performed in context-appropriate ways. Finally, the findings highlighted that, besides gender, the context and the relationship between interlocutors were considered to be pivotal in shaping online discursive practices.

Keywords: Gender binaries, (para)linguistic features, online discourses, femininities, masculinities

07 Nov.
SSH33

A Study on Communication Anxiety Among the Chinese Languages Learners in Sri Lanka

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In recent years, due to China's rapid development of economic and comprehensive international cooperation, China has rapidly become the focus of the world in order to enhance good diplomatic relationships and trade exchange partnerships. Therefore, more and more Sri Lankan students are motivated to learn Chinese language because of its necessity in contemporary Sri Lankan society. This study mainly focuses on exploring the factors which may influence the Chinese language communication anxiety and the countermeasures to develop the communication competency of the learner. This quantitative research study comprises of 45 first year students engaged in learning Chinese language at the University of Kelaniya. The data were collected using questionnaire and interview. It can be concluded that new teaching strategies such as group activities, practical classroom sessions (e.g. language camps and educational trips with Chinese natives, playing Chinese word games) and daily activities such as motivate the students to listen to Chinese music and watch Chinese movies should be arranged in order to reduce the communication anxiety. In addition, during classroom sessions it is important for the teacher to communicate in Chinese language. Usage of facial expressions and body language to reduce the students' anxiety is also recommended. This enhances the Chinese language teaching and learning effectiveness.

Keywords: Anxiety, communication, Chinese language as a foreign language

A Philosophical Study of the Applicability of Confucius Teachings to the Contemporary Sri Lankan Education System

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Confucius is credited for establishing the context and methods of teaching. This study mainly focuses on the educational implications that can be derived from the Confucianism teachings. The research problem of this study is to inquire whether Confucius teachings are applicable in Sri Lankan context. The objective of this study is to identify the applicability of Confucian teachings of contemporary Sri Lankan education system. Comparative and analytical methods have been used. For Confucius, anyone and everyone should be educated regardless of physical, mental and social inequalities. The methods of teaching are different from one student to another. Student centered learning system is being admired by Confucianism. The priority should be given to the student and they should be encouraged to assess knowledge on their own. These teachings can be used to improve the effectiveness of the contemporary education system. A textual analysis of *Analects* has done in this study and it reveals that Confucianism has admired critical and creative thinking. Confucianism emphasizes three principles; Li, Jen and Chun-Tzu. Li means that there is an order or the way that something should be done by respecting the socially accepted things. It provides the structure for human interaction. Jen is the virtue of virtue and benevolence. Li represents the customs as ideals. Confucianism teaches students to find the way (*Dao*) through humanity normative behavior. Confucianism use education to be in accordance with the culture of the country. Then only the process would be effective.

Keywords: Analects, Confucianism, Education, Sri Lanka

07 Nov.
SSH36

"Should English Teachers Teach Science?"- An Action Research on the Foundation English Program of Applied Sciences

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The purpose of the present study is to investigate the desirable proportions of Specific English Content (SEC) and General English Content (GEC) in the Foundation English Program (FEP) at the Faculty of Applied Sciences of the Rajarata University of Sri Lanka, where the students need English for academic and general communication purposes. The study is an action research, which is an investigation to improve the teaching process. The study uses comparison of Placement Test (PT) and Mid-semester Test (MT) results, item analysis of the MT results, and analysis of students and teachers surveys as its methods of study. The results of the study show that the average mark a student scored at the PT, 60%, has risen to 64% in the MT although the former comprised more GEC and the latter more SEC. The item analysis of the MT reveals that out of the 6 SEC items, 4 show desirable Item Facility values. With the 6 GEC items, however, only one item shows such desirability. Analysis of stakeholder surveys reveals that overall desirability of the staff over the GEC of the FEP is 48%, whereas with the students the same percentage is over the SEC. The results lead to the conclusion that the students in the setting can acquire SEC efficiently with proper teaching intervention. As the test results and students feedback depict a slightly more desirability of the GEC, efficient handling of the GEC, with the revealed proportions of both, is recommended.

Keywords: Content, action research, item facility

Factors Affecting the Labor Force Participation of Married Women in Sri Lanka: A Study Based on Ambalantota Divisional Secretariat

07 Nov.
SSH37

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Participation of married Sri Lankan women in the labor market has been receiving greater attention. It has a crucial contribution to socioeconomic development by providing an additional income to maintain the standards of living, childrens education, health, consumption and other expenditure and the pressure of family debts. Therefore, a married woman in the labor market is an important driver of household economy. The study identifies various individual factors and demographic factors that influence the labor force participation of married women in Sri Lanka in Ambalantota Divisional Secretariat. This study is based on a field survey conducted in the Hambantota District. A sample of 209 married women of ages 18-65 living in the Ambalantota Divisional Secretariat is selected using convenience sampling method by conducting the questionnaire. The Logit model is used to identify the factors affecting labor-force participation of married women and a regression model using several explanatory variables is used to estimate the decision of married women partaking in the labor-force. The dependent variables consist of two binary values: 1 if the married woman is employed and 0 if the married woman is not employed. The results indicate that age, education, number of children in the family of married women have positive and significant impact on the labor force participation. Among these variables age and education are perceived as major characteristics for the decision of the married woman participating in the labor force. Variables such as depending on the husband, number of family members, number of children under 5 years of age and number of prime-age children in the household, act as barriers for women to join the labor force. Furthermore, this study analyzes the reasons behind low participation rates of women in economic activities. The factors affect the reduction of married female labor force participation are looking after children and elders, traditional family background, lack of child care facilities, traditional gender role attitudes and housework.

Keywords: Labor force, logit model, married women

07 Nov.
SSH39

Geochemical and Archaeological Evidence in Proto Historic Iron Age in Sri Lanka

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The protohistoric people had settled in Kok-ebe megalithic burial site situated in Kahatagasdegiliya 2800 years ago. They have constructed several types of burials for burying remains such as bones and ash of their dead. This work reports evidence gathered through site excavation and geochemical analysis. Four soil profile samples (n= 24) are analyzed using X-Ray Fluorescence for 22 major and trace elements. Archaeological data of the study area from over the past two decades suggests that the Mesolithic period was formally superseded by the protohistoric Iron Age. During archaeological explorations 267 stone burials including cist burials, Cairn heap/cairn mounds, cairn circle, Alignment and Urn pot are identified. The soils are basic with significantly high content of Zr. Concentrations of Ni, Cr, Fe_2O_3 and TiO_2 show that the source material may be intermediate to basic in composition. Soils were less weathered and of homogeneous in composition when evaluated using moderate contents of CaO and Sr, and depicts lower LOI values. Lower concentration values of Zn and Cu show the absence of remains of metal manufacturing. The main phase of burial at Kok-ebe is accordingly dated between 790-540 cal BC, 770-415 cal BC and 5-125 cal AD. The carbon dating results and cultural sequence of the site indicates a multi-phase burial site from protohistoric Iron Age to early historic.

Keywords: Geochemical, archaeological, burial site, soil, Kok-abe

Interpreting Aspects of Meaning: Denotation, Connotation and Appropriateness

07 Nov.
SSH40

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The meaning of a word is primarily what it refers to in the real world - its Denotation. A less discernible component of the meaning of a word is its Connotation. Associations of the meaning, either positive or negative sentiments evoked by a word are generated via the underlying notion of the word i.e. the connotation. The aim of this study is to examine the role played by the denotation and the connotation during the process of transferring an utterance spoken in source language (Sinhalese) to target language (English). The analysis is conducted with regards to two words in the source language, namely Ballá (dog) which denotes an animal; more specifically, a common, domestic, omnivorous mammal and Atha (hand) in which the denotative meaning suggests the body part at the end of your arm that includes the wrist and fingers. The Context of Situation Theory introduced by Malinowski (1923) is employed in the study to ascertain the connotative meaning of afore mentioned words depending upon the context they appear in the interpretation. Despite of the same denotation, varying connotations are attributed in the target language to transfer the precise meaning with relevant to the context. The choice of term made during the interpretation stands as a testament to the appropriateness of the word in the respective context. Accordingly, in interpretation, pertinent to denotation and connotation, the appropriateness to the context is rather a pivotal element to achieve equivalence of meaning amongst the two languages.

Keywords: Appropriateness, connotation, denotation, interpretation, meaning

07 Nov.
SSH41

Study of Emergence of Mahayana according to the Pancasatika-kandhaka

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Many different theories exist among both Western & Eastern scholars about the origin and development of "Mahayana Tradition". However, the common belief would be that it was a result after the Second Buddhist Council (SBC). Although, the facts of the formation of the Mahayana goes back to the Budhha era the most ancient record of the First Buddhist Council (FBC); Pancasatika-kandhaka, Chullavagga-pali, Vinaya Pitaka, shows that the Mahayana tradition has originated and flourished at an adjacent time to Budha's Parinirwana. Thus, in this study the common belief of the origination of Mahayana after SBC is analysed using content and textual analysis methods. The Pancasatika-kandhaka, Chullavagga-pali, Vinaya Pitaka were used as main sources and Western and Eastern philosophical literature and reviews as secondary sources. The study of the Panchasathika-kandhaka illustrated that the behavior of non-enlightened ordinary monks & religious followers after Budha's Parinirwana created ideologies of "Living Symbolic Leaderless" practices that led to the origin of "Lokottaravda" ideologies; the seeds of Mahayana tradition. The triumph of the traditional ideologies, classical theories and concepts at the debate of the "kuddhanu-kuddhaka principles" indicate the initiation of the Mahayana tradition. At the end of FBC monks could not consent to one ideology but 5 different Vinaya principles, traditions, concepts and ideologies established among monks. The allegations made by the "Maha Theras" to Ananda Thera for 'not inviting the Budha to live forever' indicates the uncertainty of not having a "Living Symbolic Leader" for the continuation of tradition. This created the foundation of Mahayana trikayavadaya (trinity). Nevertheless, the ideology of the "Purana Thera's Council" gives an indication of beginning of a "new Budha tradition". Hence, it can be concluded that, emergence of the Mahayana can be identified at the time of the FBC.

Keywords: Mahayana, Pancasatika-kandhaka, Buddhist tradition, Buddhist councils, Western and Eastern philosophers' reviews

Script Writing for the Drama of National Security at the Theatre of International Terrorism

07 Nov.
SSH42

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International Terrorism does not possess an accepted broad definition. It has been playing a major role in the international scenario since September 9, 2011 and the society started to question the safety of each aspect of life. Uncertainty triggered to exist, without confining to a boarder, it began to appear everywhere. Inspired by this context, this study explores the impact of international terrorism on national security. Author limits not to address the evaluation of international terrorism. Two arguments are developed in the discussion, whether there is no impact of terrorism in developed countries, if so, why? and whether national security being affected by international terrorism halts national development. Author follows an open, unstructured and flexible approach to the enquiry, basically utilizing the study of Neo- Realism. Since: Some governments may develop tendencies of exploiting their citizens in exchange for national security and economy Steven L. Lany, NeoRealism speaks of the necessity of national security to the wellbeing of the economy of a country. Both qualitative and quantitative data are gathered predominantly through secondary data sources such as electronic media. Author selects four country profiles as case studies to precede the two arguments. Countries are selected on the basis of economic strength and are designated from three different areas; USA from North America, Nigeria from Africa, Pakistan and Sri Lanka from South Asia. The case studies from the four countries are chosen pertaining to different timelines. With the findings and analysis, it can be summarized that to write the script of the drama of national security, a few components are compulsory. Starting from economy, politics, and infrastructure to human rights. Once the drama has to be played in the theatre of international terrorism, whole drama is impacted affecting all its components. As long as the countrys economy and politics are stable any impact on national security is short term and the effect does not halt national development by any means. However, in a country where the structure is corrupted and disputed while the economy is more interdependent a terrorist attack on national security could bring adverse effects. In Sri Lanka it is still early to review on national development since the national security has not yet recovered.

Keywords: Globalization, International Terrorism, National Security, development.

07 Nov.
SSH44

The Ideal English as a Second Language (ESL) Teacher: From the Second Language (L2) Learners' Perspective

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This study investigates the qualities of an English as a Second Language (ESL) teacher from the L2 learners' perspective. The ESL teacher has a significant role in the ESL classroom in Sri Lanka due to the lack of opportunities for the majority of L2 learners to acquire the L2. School is the first place for most of the L2 learners to begin their L2 learning in Sri Lanka. This study was conducted among 30 Sri Lankan public university students by using the mixed method. There were non-English major students among the participants and participation was voluntary. The questionnaire data were analyzed by using SPSS statistical software and group discussion data were analyzed by categorizing. The results of the questionnaire survey indicated that L2 learners highly expect the competent ESL teachers with a good command of English, training, ability of motivating the students and good personal qualities. Further, through the discussion data it was highlighted that the majority of the learners had lost their motivation due to the role of the ESL teacher at school. More importantly, these learners were motivated to start their L2 learning later due to an inspiring ESL teacher either in a tuition class or in an institute. In fact, the findings suggest that the role of the ESL teacher in an L2 classroom is significant for the L2 motivation of the learners in Sri Lanka. These findings can be applied for development of the educational policies of the countries like Sri Lanka.

Keywords: ESL teacher, L2 learners, L2 motivation, classroom experiences, L2 motivational self-system

A Sociological Study on Child Rights and Problems in Reintegration of Children on Probation in Sri Lanka

07 Nov.
SSH45

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Probation is an important social process. The rehabilitation of offenders and victims of various degrading practices leads to a better social life. Previous research studies on reintegration of children on probation are very rare. Some children on probation are abused. It is important to study the external impacts that these children have on their rehabilitation and reintegration in the society. Probation can be cited as an indirect act of protecting the rights of children through the United Nations children's rights convention. This research investigates the problems related to reintegration of children on probation and their impact on children's rights and civil rights. The purpose of this is to identify the probation process and to examine the quality of the rehabilitation process. The research method of this study was qualitative and 50 people were used in open interviews. The preliminary results of the study indicate that, most of the children on probation are subject to bad labeling and most of the children under the age of 18 had their basic rights violated during that period. In addition, it was found out that during reintegration probationary children are faced with various problems related to marriage and employment that cause them to violate their rights. Furthermore, the study showed that these children may later suffer from mental illness due to these reasons. Hence, it can be concluded that reintegration of probationary children is negatively labeled and thereby creates problems for their rights.

Keywords: Abuse, delinquency, rehabilitation, labelling, child rights

07 Nov.
SSH46

An Assessment on the Philosophical and Psychological Aspects of the Traditional Devil Dance Practices of Sri Lanka

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In a scientifically developed society like today, the traditional devil dance practices are being out rightly rejected as forms of mystic practices. This study aims to prove the psychological and philosophical value manifested in these so called mystic devil dance practices, with special reference to psychoanalysis and the concept of *catharsis*. The '*Poetics*' by Aristotle and secondary sources related to the devil dance practices in Sri Lanka are used in this research. The qualitative data gained through literary analysis are critically and comparatively analysed to reach a conclusion. Traditional Sri Lankan devil dance practices have a deep psychological value, underlying the scientific claim that certain ailments and mental instability are caused by distorted and destructive feelings that are being suppressed in mind. As Sigmund Freud has claimed, the destructive and distorted feelings that are trapped in the unconsciousness create mental and (sometimes) physical disabilities, therefore they should be brought up to the conscious level and should be released. The devil dance practices, going a step further from modern psychological explanations, try to cure mental and physical instabilities created by fear and insecurity (which is symbolically represented through the concept of *Yakas*) through the invocation of fear itself, using devil figured masks, exaggerated folk poems describing *yakas* and sound effects of drums. Apart from this psychological value, the philosophical value of the devil dance practices can be seen with its relation to the concept of catharsis presented by Aristotle in '*Poetics*'. *Catharsis* is aimed at purgation of destructive human emotions by evoking fear and pity in people through tragedies, providing an outlet to the free flow of these negative emotions. Therefore, it can be concluded that these two Eastern and Western practices share similarities despite the geographical and cultural differences.

Keywords: Mystic devil dance, catharsis, yakas, Aristotle, Eastern, Western

Origin of the Bhikkhu Katikavat in Inscriptions: Content Analysis from Historical and Archaeological Perspectives

07 Nov.
SSH47

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Some Inscriptions of the late Anuradhapura period have been categorized as codes of disciplinary rules for the perpetuation of the *Buddha Sasana*. The kings in order to protect the *Buddha Sasana* worked for the purification of the order of the monks when it was beset by corrupt practices. The documentation of regulation of the Buddhist Order by the kings, form of the rock edicts continued up to the late Anuradhapura period as *Kathika*, which later came to be known as *Kathikawathas*. With the formal introduction of Buddhism to the island in the 3^{rd} century B.C. by the mission led by *Arahant Mahinda*, the *Sangha* was established in a more organized manner. What we witnessed after that was the rapid expansion of the *Sangha* with overt royal patronage. The rapid expansion and institutionalization of the *sangha* created the need, from time to time, to protect it from deviations, disorders and interpretations. As a result, the enactment of disciplinary rules (*Patimokkha*) for the *sangha* took place to address the need of the day. In this process, the conventions reached for the protection and progress of the *sangha* are identified as *Bhikkhu Katikavat*. This research is meant to analyze the content of this *Bhikkhu Katikavat* as depicted in inscriptions of the period from the 8^{th} to the 15^{th} centuries AD. The *Bhikkhu Katikavat*, as depicted in both the archaeological and the literary sources, can be categorized into two branches: the *Sasana Katikavat* and the *Vihara Katikavat*. The content of the *Katikavatas* was analyzed in comparison with the relevant sections of the *Vinaya Pitaka*. Under the impact of a variety of economic, political, social and environmental forces, the *Bhikkhus*, collectively as an order and also individually, underwent a marked transformation in relation to the attitude and moral behavior in the latter part of the Anuradhapura period. In this context it became necessary to have an agreement between the political leadership (the King) and the *sangha* to develop conventions to maintain the disciplinary code and the monastic life that was expected from the *Bhikkhus*. The research, by analyzing the content of these agreements reached between the *Sangha* and the political leadership traced the impact of the *Katikavat* on the *Bhikkhu* order. At the same time, attention was paid to the internal situation of the *Bhikkhu* order and how the *Katikavatas* addressed these issues.

Keywords: Deviations, disorders, Katikavat, Patimokkha, convention

07 Nov.
SSH49

The Novel Jane Eyre Reveals the Social Standings of the Victorian Era

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The English novel Jane Eyre is a fabulous artistic achievement in the 19^{th} century by a major Victorian woman writer. The masterpiece can be credited as an authentic captivation of the Victorian era and the social standings of its time. Wanting to conceal her identity, Bronte got it published in 1947 under the masculine pen-name of "Currer Bell" and when the novel was first published, Bronte was accused of desperate radicalism. However, the writer created the novel Jane Eyre as an unorthodox manifest against the society of her time. The piece of writing is a critique of the importance of the strict social class hierarchy in Victorian England. The young, adoring protagonist of the novel, rebels against the restraining customs of the Victorian society. The novel is significant because it is the first English novel to have presented a realistic view of women's position in the society. This research deals with the idea that the fiction Jane Eyre is an exploration of social standings in the Victorian era. This perception is elaborated through secondary data such as internet and library books. True, the novel is multi-faceted wish fulfillment fantasy in which the heroine marries her true lover while retaining her independence, but the problems faced by a single woman in the Victorian society are examined at length.

Keywords: Social standings, position of women, Victorian era

Presence of Absurdism in Shakespeares King Lear related to the Theatre of the Absurd

07 Nov.
SSH50

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The dictionary definition of the term 'Absurd' is "out of harmony with reason or property; incongruous, unreasonable, illogical", yet the Theatre of Absurd does not refer to the dictionary definition of the word"absurd". Their work concentrated predominantly on the concept of existentialism and explored the meaningless or purposeless existence of human life. The term 'Theatre of the Absurd' was coined by Martin Esslin in his book (1962) by that title. Shakespeare's magnum opus King Lear (1605), is a basis of the theatre of absurd and unintentionally furnished with fine elements of absurd drama. Later these elements prevailed in the theatre of absurd which was a reaction for the world War II. This paper deals with the idea that in King Lear Shakespeare uses the features like the plays of the Theatre of the Absurd, presenting a disillusioned, harsh, and stark picture of the world. The nature of the research is Qualitative and descriptive. "King Lear" is the text which is taken as a sample to explain the presence of absurdism. Library and internet sources have been used as secondary data in the study. Theatre of the Absurd endeavors the senselessness of human condition. This same absurdist idea is present in King Lear. King Lear is pioneer in presenting concept of the meaninglessness of life. Accordingly, common features between King Lear and the Absurd plays extend beyond the thematic concern with the meaningless existence of mankind in an adamant world.

Keywords: Absurdism, existentialism, Shakespeare, meaninglessness

07 Nov.
SSH51

Enhancing Speaking Skills in Adult ELT Classrooms: A Research Conducted at the Faculty of Arts, University of Peradeniya

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The study was set out to enhance the oral communication skills in adult English Language Teaching (ELT) classrooms. The survey was conducted at the Faculty of Arts, University of Peradeniya. For the purpose of this study 20 undergraduates were randomly chosen from the first year batch belonging to the basic level group. The study involved both qualitative and quantitative methods of data collection. The main questions focused on the tasks used by these undergraduates in developing their speaking skills, how they overcame the weaknesses related to speaking and thereby created a sense of motivation and influenced students in an attitude change. These selected students were presented with questionnaires and on the basis of the data collected, the findings were categorized. The collected data were analyzed and the findings were discussed. The study revealed that students who learn English as a Second Language (ESL) face many problems related to speaking, i.e. confusion and embarrassment; students did not learn speaking correctly at school and face difficulty in pronouncing certain words. The results also represented that limited amount of vocabulary was a major problem among students while the least common problem was depicted as difficulty in understanding questions. Based on the findings this research showed some appropriate solutions to overcome weaknesses related to speaking English as a foreign language (FL).

Keywords: English language teaching, English as a second language, foreign language

How Career Guidance Counselling Can Help in Tackling the Impact of Social Media on Unemployment of Post-Millennials: A Qualitative Analysis of Sri Lankan Post-Millennials

07 Nov.
SSH52

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Unemployment can be considered as one of the major issues of post-Millennials in the present context. Social Media, being a part of the everyday life of the post-Millennial has an impact on individual's behaviours, thoughts, beliefs, knowledge and norms. Hence, individual's realities also gets moulded by it. As a result of "habitualization", the social reality will become the reality that is shown by social media. This can deviate the career ambitions of post-Millennials or they might tend to set unrealistic ambitions as per what they experience through social media. Career guidance counselling specifically focuses on guiding individuals and supporting them to find suitable career paths and opportunities to make them employed in society. Hence, this study was focused on the research problem on how to tackle the unemployment of post-Millenials caused by unrealistic social realities generated by social media. This is a qualitative study where three case studies are used to gather empirical data. The case studies were selected using purposive sampling method. Further, to gather supportive data literature, web-references and statistics were used as secondary sources. The analysis showed how social media content and social media influencers can create unrealistic social realities. In addition, it showed how the social media fuels an individuals unrealistic lifeworlds and how it impacts his/her career choice. Finally, it can be concluded that career guidance counselling can refocus them to find suitable and achievable employment as per their preferences and thereby help the post-Millenials to be employed with satisfaction in the society.

Keywords: Post-Millenials, social media, unemployment, habitualization, career guidance counselling

07 Nov.
SSH53

A Study on the Image of Women Representation in the French Novels Une si longue lettre and Le Voile de Draupadi

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There is a strong connection between the role of women and French literature. Writers focus on the image of women represented in their literary texts. Among French-speaking writers, Mariama Bâ and Ananda Devi are recognized as feminist writers. This research does an in-depth analysis of the two books, *Une si longue lettre* by Mariama Bâ and *Le Voile de Draupadi* by Ananda Devi. The research question of the study is to identify how the image of women is being treated in the two novels. The main objectives of the analysis are to identify the situation of women in the two societies presented and to find out how they succeed in facing the obstacles of the society. The research hypothesis is that the woman is portrayed as a victim. The research is based on the deep analysis of the two novels and the analysis of the qualitative data collected by different sources and interviews. The study is carried out thematically focusing on different themes tackled by the two writers. According to the analysis, it turns out that the two writers highlight two images of the woman: the victimized woman and the stoic woman by highlighting the evolution that happens within the woman. Taking the results into account, it turned out that the situation of women in both societies is rather tragic and despite the struggles, the woman remains strong owing to her perseverance which is supported by their education, friendship and understanding.

Keywords: French literature, stoicism, victimization, women

Going Beyond the Discourses on Common European Asylum System

07 Nov.
SSH54

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The notion of common asylum polices first emerged within the European Union (EU) through the Maastricht Treaty which promoted the intergovernmental cooperation on Asylum procedures. This concept became more dominant after the establishment of Common European Asylum System (CEAS) in 1999. With the eruption of Syrian refugee crisis, EU encountered adverse outcomes of divergent border control polices of member states. It is a well-known reality that the border controls are prerequisites for territorial identity of states. In this milieu, the backbone of CEAS namely Asylum Procedure Directives (APD) and the Dublin regulations stipulate the fact that claims of the asylum seekers should proceed within the first EU country where they initially arrived. This has led to push back asylum seekers to frontline states like Greece and Italy where they first entered during their journey. In contrast, countries like Germany has opened borders for all refugees who come through Greece and Balkan states. On the other hand, the concept of Safe Third Countries (STC) that comes under CEAS, has provided an opportunity for member countries to deport refugees to another country. These realities have resulted in creating a massive burden for frontline states. In this regard, as states are getting an opportunity to send these asylum seekers to frontline states under CEAS, an unequal burden sharing mechanisms have been established within the union. Grounded on this setting, main objective of this study is to examine the lapses of the CEAS by using the Qualitative research method. The theories including realism and neo realism will be also employed in this study. Finally, this study concludes that CEAS cannot be recognized as an effective method to address ongoing refugee crises within the EU.

Keywords: European Union, Common European Asylum System, Safe Third Countries, Asylum Procedure Directives, Dublin Regulations

07 Nov.
SSH57

The Expansion of Mahayana Religion in the Anuradhapura Period: Evidence using the Buddha Statues

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The main objective of this study is to explore the Mahayana religion during the Anuradhapura period. Buddhism came to Sri Lanka as a result of its relationship with India. During the reign of King Devanampiyatissa, Buddhism was named as the state religion. Due to the social influence in India, Buddhism was divided into sects and as a result, Mahayana Buddhism was born. Mahayana Buddhism came to Sri Lanka due to migration, invasion and trade. The main sources show that during this time Theravada Buddhism which was centered on Mahavihara has its roots in the country and that Mahavihara and Theravada religion were sponsored by the state. It is said that the Theravada religion was powerful. However, a careful study of these sources and the spread of Buddha statues, have fond information on Mahayana Buddhism. These Mahayana inspired Buddha statues have been found in the Mahavihara area, and the ruins have been found near Theravada Buddhist religious centers spread throughout Sri Lanka. Among these ruins are statues of Bodhisattva, Avalokitheshvara and various deities. Due to the fascinating features of the Mahayana religion and the fact that sectarianism was not an issue, people may have turned to the Mahayana religion. According to information found in the Mahayana tradition, statues and sources, the Mahayana Buddhism has been spreading extensively in comparison to Theravada Buddhism.

Keywords: Theravada Buddhism, Mahayana Buddhism, Mahayana statues

Impact of Social Media Driven Mind-Wandering Control Failure on Cognitive Psychology of State University Students in Sri Lanka

07 Nov.
SSH58

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In this information era, many individuals treat social media as a vital part of their personality. Availability of smartphones has accelerated the social media usage and consequently, people are disconnected even if they are physically available to each other. The social media is continually affecting the cognitive psychology of human beings. Hence, this study was aimed at investigating the impact of social media driven mind wandering control failure on cognitive psychology with a special reference to the state university students in Sri Lanka. The data were collected through online distributed structured questionnaire by selecting 250 undergraduates based on simple random sampling method. Correlation analysis and regression analysis were applied to analyze data by employing SPSS 21.0. The results of the correlation analysis showed significant negative relationship between the independent and dependent variables while regression analysis confirmed it. In brief; social media driven mind wandering has 0.68, 0.62, 0.66, and 0.65 negative impact on working memory function, memory retention, reading comprehension, and decision-making abilities respectively. The research findings convey that, if students spend more time on social media, it can be a reason for high level of social media driven mind wandering and if the students fail to control it, their working memory function may be damaged. Furthermore, high level of social media driven mind wandering may cause damage to memory retention, reading comprehension and decision-making abilities.

Keywords: Social media, mind wandering, cognitive psychology

07 Nov.
SSH59

Geopolitical Importance of Sri Lanka in the 21st Century: The Case of the Belt & Road Initiative

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Sri Lanka has established itself as an essential node in commercial and security activities in the Indian Ocean due to its central location and equidistance in the east-west maritime corridor. Sri Lanka has received greater attention since its subscription to Chinas Belt & Road Initiative (BRI) and its preceding programmes in 2013. Therefore, this study examines how Sri Lanka can maximise its geo-strategic importance in the modern era, with its subscription to the BRI. As a descriptive study, it utilises the BRI as its case study. The objectives of this research are to analyse the challenges and the opportunities afforded by the BRI; and to illustrate what mechanisms Sri Lanka needs to take to reap its benefits. The research identifies that Sri Lanka's engagement with the BRI has raised concerns such as indebtedness, over-reliance on infrastructure development and has entangled itself in the power rivalry between Japan, India, the United States (US) and China. However, the BRI affords many opportunities, such as, attracting competitive foreign direct investment and the island being considered a key partner in Japan's, India's and US's economic and security initiatives. Furthermore, it is important for Sri Lanka to fully implement its non-aligned foreign policy, in order to indicate that it is providing a level-playing field for actors, both new and old alike, in working with Sri Lanka. Thus, this research concludes that whilst the BRI affords many opportunities to Sri Lanka, maximising it is in favour of the island overcoming modern geopolitical concerns in the Indian Ocean Region.

Keywords: Belt & Road Initiative, China, geopolitics, geo-strategic location, Sri Lanka

Social Bonding Capital and People's Involvement in the Sri Lankan Tourism Industry

07 Nov.
SSH60

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Social Bonding Capital plays an important role in the sustainable Community Based Tourism. The people's involvement (Personal Involvement) in the tourism development activities is affected by Social Bonding Capital. Four variables related to Social Bonding Capital in tourism development; namely social trust, social relation, social interaction and social mutual helps were identified. These variables fall under the catergary of independent variables and Personal Involvement comes under the catergory of dependent variables. The purpose of the study was to investigate the relationship between Social Bonding Capital and Personal Involvement in Community Based Tourism. Data were collected from 50 respondents who were involved with Homestay Services in Heeloya Tourism Village in Kandy district, Sri Lanka. The correlation analysis was used to examine the association between Social Bonding Capital and Personal Involvement. The results revealed that social mutual help and social trust are associated with Personal Involvement. Furthermore, social relationship and social interaction have no significant influence on Personal involvement. Thereforeit can be concluded that social mutual help and social trust should be strengthened to enhance the Personal Involvement in Community Based Tourism.

Keywords: Social Bonding Capital, People's Involvement, Community Based Tourism

07 Nov.
SSH61

Temporal Changes of Socio-Economic Factors in Chena Cultivation of the Dry Zone of Sri Lanka

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Chena cultivation holds a prominent place in Sri Lankan agriculture, due to its prevalence over long periods of time. At present, the traditional Chena cultivation is undergoing drastic changes. Though there were specific cultivation patterns, labor use, water use and land use in the traditional Chena cultivation, they have undergone various changes due to population increase, developments, and socio-economic transitions. Therefore, the aim of this study was to examine the alternations that have occurred in the selected geographical area. Pahala Mattala Grama Niladari division of Lunugamwehera Divisional Secretariat in Southern province has been chosen as the study area and it consists of 278 families; of which 96% is engaged in Chena cultivation. As the sample, 45 of families have been selected by using random sampling method and data was collected through questionnaires, interviews and direct observations. Data was analyzed qualitatively and simple statistical parameters were used. It was evident through results that the traditional cultivation practices have changed temporally due to the socio-economic transitions. The findings revealed that the temporal socio-economic changes in the selected study area has resulted in significant changes in the factors such as patterns of land use, labor and cultivation in Chena traditions and has affected the changes in the life style of the farmers. In conclusion, it can be emphasised that changes need to be made to aspects such as permanent land use instead of alternative land use, hired labor instead of collective labor and crop specification instead of crop diversification.

Keywords: Chena cultivation, socio-economic, temporal

A Study on Challenges Encountered by the Consumer Affairs Authority in Protecting Consumer Rights in Sri Lanka

07 Nov.
SSH62

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It is a human being who becomes a consumer and hence all rights related to a human being should apply to a consumer as well. Accordingly, modern democratic states have accepted that consumer rights should be treated as legal rights. In Sri Lanka, there is machinery including laws, acts and regulations working towards this end. The main objective of this research is to study the questions, challenges and requirements faced by the Consumer Affairs Authority in protecting consumer rights. Head Office of the Consumer Affairs Authority in Colombo was selected as the subject of study. Under the simple and probable model system, 10 officers engaged in various jobs, working in Consumer Affairs and responsible for consumer rights, 20 persons from two Consumer Organizations Centered on Consumer Authority in Colombo, and 10 businessman from the area were selected. Questionnaires, interviews, letters, reports, documents and the internet were used to obtain, to collect data. For the overall data analysis, descriptive system was used. The study indicated that dearth of resources, ignorance on the part of the public, unnecessary political interference, lack of strong consumer organizations. Moreover, the results also showed that due to problems of security it has become difficult for the Consumer Authority to safeguard consumer protection. In order to avoid these shortcomings, steps should be taken to create a consumer protection policy and include a policy of creating advisory centers in the school curriculum.

Keywords: Consumer, Consumer Affairs Authority, consumer rights, human rights, policy

07 Nov.
SSH63

The Role of Women in Post Sangam Period A Study Based on Nālaṭiyār

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The Post Sangam period was seen as a priority for morality. In this period, the Jains of Tamilnadu created many kinds of literature. Among them, Nālaṭiyār is still popular which is capable of manipulating people. Nālaṭiyār places emphasis on revealing many details about women. However, most details seem to be discrediting them. Hence, this study aims to critically examine the role of women in post Sangam period and the purpose of degradation of women under the title "The role of women in post Sangam period A study based on Nālaṭiyār." This analysis is carried out with analytical and descriptive research methodologies and socio, cultural and historical approaches by using Nālaṭiyār as the primary resource. In Nālaṭiyār, the women and their body has been shown as impediment for charity. In chapters kaṟpuaiya makair and kāmanutaliyal women are raised by the character but they discredited by the jains as a barrier to men's emotions. According to the chapter potumakaḷir, the woman who lives beyond family structure was excluded from the society as a prostitute and she is also depicted in the joy of men. However, Nālaṭiyār expressed, whatever the woman she is, born as a woman is in degradation and she can only give a sense of humiliation. This does not only cause women to be hated by men but also encourages them to be abandoned. Therefore, the purpose of the Jains is revealed by the way that woman gives her the only means of suffering for the male.

Keywords: women in Nālaṭiyār, degradation of women, role of women

Educational Benefits for Undergraduates in Sri Lanka by Using Video-Based e-Learning: Special Reference to Sri Palee Campus & University of Colombo

07 Nov.
SSH64

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Video-based learning has a long history as far as World War II. During World War II, soldiers were trained using collection of audio and film strips. By the late 1960s, educational television was used as an additional tool in the classroom. By the 2000s, classrooms were integrated into the internet with interactive digital video as well as video conferencing. Since then, new technologies such as smartphones, tabs, and social media such as YouTube, have contributed to improving social interactions and making video applications in education easier than ever. The main purpose of this research is to identify the educational benefits of using video-based e-learning methodology for undergraduates of Sri Lankan universities. A sample of 100 undergraduate students who are following Mass Communication as a subject at the Sri Pali Campus and the University of Colombo, was selected. The research was conducted using the mixed method. Quantitative and qualitative data collection methods were also used. Questionnaire and Group discussions were used as primary data, while library data, books and articles on the internet were used as secondary data. Data shows that video-based e-learning is an effective method for many undergraduates. It was concluded that video-based e-learning can provide knowledge in an attractive and consistent way. Furthermore, learners skills show statistically significant differences. Learners preferred to follow a step-by-step cognitive approach to learning video lectures. Some students mentioned that there is no statistically significant benefit and that video-based learning in the classroom provides equal educational benefits. Overall, the results of the peer reviewed research showed that the use of video technology alone does not help the learning process.

Keywords: e-Learning, video-based eLearning, undergraduates, educational benefits

07 Nov.
SSH66

The Paradox of Diplomatic Immunity: A Comparative Approach with Practices from Sri Lanka, South Africa and India

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There is the sharp distinction between the rationale for granting diplomatic status based on functional necessity and the practice of personal advantages sought and gained through diplomatic immunity. These practices of abuse are contrary with the uplifting of the said rationale. While many countries have both signed and ratified the Vienna Convention on Diplomatic Relations of 1961 (VCDR), which is seen as an incorporation of the customary international laws on the subject, there are some gray areas which have been continuously abusive. The immunity granted for the diplomatic mission and for the diplomatic bag has been the most abused in the contemporary practices. Using a comparative method by analysing the laws and practices of Sri Lanka, India and South Africa this research endeavours to find the paradox of the law and practices. While reforms from isolating abusive countries to creating funds to compensate the victims have been suggested, at the practical level none of these solutions have worked and some have not even been tried out. While there are instances of abuse, no country has ever doubted the importance of the VCDR on the subject and many attempt to reduce the instances of abuse of diplomatic immunities. The VCDR being a treaty based international legal instrument needs reform to remove the paradoxical phenomena created by state practices and creating of a separate insurance fund has been the most talked about reform in ceasing diplomatic abuse.

Keywords: International Law, diplomatic immunity, Vienna Convention on Diplomatic Relations

Investigating Freires Banking Concept of Education with Reference to English Language Teaching in Tertiary Level in Sri Lanka

07 Nov.
SSH67

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The research was conducted with reference to the Freirian praxis on "banking" concept of education in relation to English language teaching (ELT) in Sri Lanka. Education through the act of depositing, which is prevalent in ELT in tertiary level has obstructed the development of a critical consciousness of the student. Assigning an 'unalloyed ignorance' to the incompetent speaker of English, the teacher substantiates the distinction between the student and themselves through intimidating narration of structuralist ideologies of language teaching. An acquiescent inclination towards 'banking' concept is perceptible among ESL learners in school and tertiary levels since it is convenient. Yet, the convenience of the banking approach, as Freire posits, dehumanizes the student and creates a dichotomy between the man and the world. Interviews, questionnaires and activities were conducted with 25 undergraduates of two state universities in Sri Lanka to analyze the manner in which the 'banking' concept has hindered their creative power. A dearth of learner autonomy and creativity was conspicuous among the undergraduates, resulting from teacher's narration that they are accustomed to since primary education. The gravity of depriving the learners from *conscientização* in the school level, its repercussions and the significance of introducing the undergraduate to critical consciousness through lesson materials were understood in the research.

Keywords: Banking concept, *conscientizaçã*, , dehumanization

07 Nov.
SSH68

Marital Satisfaction in Family: The Need of Intervention in Pre-marital and Marital Counseling

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Marital satisfaction is a mental state that reflects the perceived benefits and costs of marriage to a particular person. Multitude of factors have contributed to a satisfactory marital union which include feelings of love, trust, respect and fidelity, social support, commitment, equity of tasks, gender roles, and sexual interaction. However, developing countries like Sri Lanka still face unsolved and serious issues within families. Within this backdrop, the main objective of this research was to explore the marital satisfaction among married couples. A field study was conducted in this regard in three Grama Niladhari Divisions named Julampitiya, Ulahitiyawa and Pahalaobada in Hambantota district. Based on purposive sampling of forty-five married couples were selected for the study. The KANSAS Marital Satisfaction Scale (KMS) and in-depth interviews were utilized for primary data collection. The key sources of secondary data were official documents and representations. The findings revealed that the marital satisfaction among married couples was significantly low. Further to that the study revealed that more than 85% of married couples have marital problems such as economic problems, job insecurity, irritating habits, relationship problems, household responsibilities, communication problems, sexual problems and personality problems. When comparing gender differences towards marital satisfaction, the study revealed that married females have low marital satisfaction compared to the male. In this backdrop, intervention of pre-marital counseling and marital counseling has become a prime need for marital satisfaction. Family counselor can be an educator, guide, advocator, trainer and a motivator in enhancing their marital satisfaction through establishment of a healthy family.

Keywords: Counselling intervention, family, marital satisfaction, pre-marital and marital counseling

Need for Legislating the Responsibilities of Stakeholders Engaged in Disaster Management in Sri Lanka

07 Nov.
SSH69

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During the previous few decades, the occurrence of disasters has seen an increase in Sri Lanka and globally. Loss of lives, economic and social damages were identified as major consequences of disasters. Pertaining to the number of affected people around the world, floods dominated followed by droughts, storms, extreme temperatures, earthquakes, tsunamis, landslides and wildfires. Within the period of 2006 and 2016, 7,174,663 people were affected, 264 died 18,685 houses were completely destroyed and 74,189 houses were partially damaged due to floods in Sri Lanka. Moreover, 112,231 people were affected and 206 people died while 1328 houses were completely destroyed and 6667 houses were partially damaged by landslides in Sri Lanka. The catastrophic tsunami event in 2004 caused the biggest ever reported damage by a natural disaster in the country. The research was conducted with the aim of identifying the performance of roles and responsibilities of stakeholders who engage in disaster management in Sri Lanka and to find issues and defects in operations. Empirical data were collected through discussions with relevant government officers. Descriptive method was used to analyze primary and secondary data. The results showed that a number of responsible agencies have not been performing their duties properly in respective stages of disaster management cycle because they have no mandated responsibilities specified by the law. Even the main body established under the provisions of Disaster Management Act, No.13 of 2005, the Disaster Management Centre (DMC) has power only to coordinate the agencies, but no authority to have judiciary actions through Court of Justice against incidences which create disasters and violations. It was identified that particularly in district, divisional and village level, although the DMC, District Secretaries, Divisional Secretaries, Security Forces, Police and few more agencies had worked to manage the disasters. Some stakeholders who have responsibilities in managing disasters were not engaged properly. The author could identify that the absence of specified roles and responsibilities for stakeholders was responsible for this malfunction. In conclusion, powerful enactment of roles and responsibilities of stakeholder agencies with proper management mechanism should be established to reduce the possible disaster risk.

Keywords: Disaster management, legal provisions, mechanism, roles and responsibilities, stakeholders

07 Nov.
SSH70

The Kandyan Flintlock: A Historical Investigation of King Rajasinghe II's Flintlock Guns

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The main objective of this study is to explore the Mahayana religion during the Anuradhapura period. Buddhism came to Sri Lanka as a result of its relationship with India. During the reign of King Devanampiyatissa, Buddhism was named as the state religion. Due to the social influence in India, Buddhism was divided into sects and as a result, Mahayana Buddhism was born. Mahayana Buddhism came to Sri Lanka due to migration, invasion and trade. The main sources show that during this time Theravada Buddhism which was centered on Mahavihara has its roots in the country and that Mahavihara and Theravada religion were sponsored by the state. It is said that the Theravada religion was powerful. However, a careful study of these sources and the spread of Buddha statues, have fond information on Mahayana Buddhism. These Mahayana inspired Buddha statues have been found in the Mahavihara area, and the ruins have been found near Theravada Buddhist religious centers spread throughout Sri Lanka. Among these ruins are statues of Bodhisattva, Avalokitheshvara and various deities. Due to the fascinating features of the Mahayana religion and the fact that sectarianism was not an issue, people may have turned to the Mahayana religion. According to information found in the Mahayana tradition, statues and sources, the Mahayana Buddhism has been spreading extensively in comparison to Theravada Buddhism.

Keywords: King Rajasinghe II, guns

A Sri Lankan University Context as a Site Which Simultaneously Encourages and Discourages Bilingualism: A Case Study of the Faculty of Arts, University of Peradeniya

07 Nov.
SSH73

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This study argues that bi/multilingualism is simultaneously encouraged/ discouraged in the Sri Lankan university context and focuses on the Faculty of Arts, University of Peradeniya. This particular context is read as a space where various dimensions of power relations operate multi-directionally. The study examines the socio-political, economic, cultural and ideological factors that contribute to the established argument. The members of the minority ethnic groups in this context are often forced to become bilingual, whereas the first language speakers of Sinhala are not encouraged to use/learn other languages. The L1 speakers of Sinhala, are often reluctant to adapt to the multi-cultural/ multi-lingual situation of their immediate context. Bilingualism is often perceived as a resource as well as a deviation from the norm. Many researches on bilingualism show that the *becoming* of a bilingual is not always spontaneous. In this case, the linguistic factors are less important than the extra-linguistic factors or "the (additional) value conferred on a specific language (and often on its users) as a result of the geopolitical and socio economic (hegemonic) power wielded by the language vis-à-vis other languages with which it comes into contact". Data has been collected through both formal interviews and casual conversations with the target groups alongside with several published work concerning the fields of bi/multilingualism and ESL learning/teaching. In conclusion, this study established the ways in which bi/multilingualism operate in this context and determined the nature of bi/multilingual (dis)advantage.

Keywords: Bi/multilingualism, extra linguistic factors, hegemony

07 Nov.
SSH75

The Evils of Middle East: The Political and Economic Motivations behind Global Terrorism

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Several states of the Middle Eastern region suffer from miserable conflicts throughout last decades. From Israel-Palestine conflict to Syrian conflict, wide range of internal and external conflicts gradually intensified without a sustainable solution that led to the emergence of terrorism. At present, act of terrorism has spread and become more prevalent throughout the whole world. The main objective of this research is to discuss the reasons to understand why global terrorism still cannot be eliminated despite the already taken peace efforts. The research analyses this question by using the Paul Collier and Anke Hoefler model of greed and grievances. This model is used to theoretically justify the analysis. Moreover, in this study while speeches made by the leaders, government policies and other primary documents are considered as primary data, journal articles, periodicals, books and online scholarly journals are referred as secondary data. The results showed that internal and regional instabilities of the Middle East are closely tied to terrorism and war economy. The world powers contribute to the war economy by preparing to declare war against global terrorism as a ground to fulfill their self-interests such as oil, gas and transportation routes.

Keywords: Greed, grievances, self-interests, conflict, war on terror, global terrorism

Identification of Avalokitevara in the Buddha Triad at Muhudu Maha Viharaya

07 Nov.
SSH76

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This study aims at identifying the life-size statues of lay attire found in Muhudu Maha Viharaya on the Pothuwil beach of the eastern coast of Sri Lanka as Boddhisattva Avalokitevara in the Buddha-Triad. We broadly understand the influence of Mahayana on the eastern coast of the island and thereby how Muhudu Maha Vihara was established as a Mahayana center and consequently how the statues were sculptured as Bodhisattvas. We studied the inscription of the sites, archeological remains in the light of the history of Sri Lankan Buddhism. In addition, the research shows how the legend of Vihāramahā Devī and Kāvantissa is important in identifying the historical ties between Muhudu Maha Vihara and Magul Maha Viharaya. The study also links to later Buddhist Art of India. Using the descriptions written for the general public provided in websites and articles, two life-size human statues facing a Buddha statue at the site are recognized as those of gods or kings. There is at least one scholar identifying the statues to be of Bodhisattva Avalokitevara in both ascetic and princely form. While I am unanimous with his proposition, I extend my study to link the thesis to art proposing the statues to signify the concept of the Buddha Triad of later Indian Buddhist Iconography. It can be concluded that the statues with lay garments of Muhudu Maha Viharaya escorting the Buddha are a form of representation of the Buddha in the Triad.

Keywords: Bodhisattva, Buddha-Triad, Avalokitevara, Muhudu Maha Viharaya

Understanding Household's Residential Location Choice in Colombo Pettah's Peri-Urban Settlements and the Implications for Sustainable Urban Growth

07 Nov.
SSH77

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This study was conducted against the backdrop of the rapid physical expansion of Pettah, Colombo and the concomitant growth of peri-urban settlements of mainly residential land use around the city's main built-up area. Adopting the case study approach and selecting Newham Square and Ginthupity as study areas, it sought to understand the factors that inform households' decisions to live in Colombo Pettah's peri-urban settlements. Based on households' likelihood of change of residence in the future and their stated residential location preferences, the implications for sustainable urban growth were examined. Also, this research was conducted through observations, photographic surveys, questionnaires and interviews with those who live in the selected case study areas. The study found that family relations, relatively low land price, and house rents, as well as work-place proximity, were the most significant reasons underpinning households' choice of the urban periphery. In view of the aggregate cost- reducing advantages associated with the urban periphery therefore, the study concludes that rapid expansion of the city into peripheral areas due mainly to residential development will continue to occur. Therefore, suggests that urban development policies that aim at securing livable conditions and promoting mixed-use development in the dominantly commercial central areas of the city will be crucial to managing growth and averting unsustainable urban expansion.

Keywords: Location choice, peri-urban, sustainable urban growth, urban planning

Strengths and Opportunities for Implementing Sustainable Development (SD) Programmes in Secondary Schools in Sri Lanka

07 Nov.
SSH78

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Sustainable Development (SD) is related to economic, social and environmental development. According to United Nations 2030 agenda for Sustainable Development, there are seventeen SD goals to be achieved by both developed and developing countries such as Quality education, No Poverty, Gender equity, Zero hunger, Climate action etc. Therefore, the aim of the study was to identify strengths and opportunities for implementing SD programs in secondary schools in Kandy District. The study was based on survey research design with stratified sampling method for data collection. Thirty two secondary school principals were selected from Kandy district. Questionnaires and interviews were used to collect quantitative and qualitative data. According to principals responses in relation to strengths; human and physical resources were identified by 75% principals, community support and positive attitudes by 70% principals, school plans and participation of teachers and students by 65%. With reference to opportunities identified by principals; school syllabuses 75%, various programs in school and community relationship 70%, location of school, teacher attitudes and co-curricular activities 65%, meetings, special activities and school culture 50%. In conclusion, it could be identified that strengths and opportunities for implementing SD programs in secondary schools mainly related to human and physical resources, community support, positive attitudes, school syllabuses and co-curricular activities. Further, it could be suggested to implement a model action plan in secondary schools to enhance the effectiveness of SD programs to achieve the all factors related to SD goals in education.

Keywords: Development, Sustainable Development, SD Programs

06 Nov.
ET03

Energy Management in homes using Internet of Things

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Electrical energy usage pattern is having a major effect in the generation of electrical energy. Since the Tariff system used in Sri Lanka allows to pay only for the energy used. The generation utility is facing losses financially, because of the lack of knowledge of costs involved in power generation, the lack of communication between the generation utility and consumers causes the uneconomic energy usage pattern. In this research we used the internet of things to enhance the usage pattern of electrical power in residential areas. Since the Time of Use tariff method has been suggested for domestic consumers who are charged according to the cost of energy at that instant, Price of electricity decided by the utility according to the cost for producing it has to be sent to the consumers instantaneously to reduce electrical energy usage in the time where cost is high. To achieve this, a prototype was developed which consists of sensors to measure voltage, current, power factor, power usage, energy usage, temperature, humidity and can receive the pricing information of electricity from the utility. User interface was developed to display the energy price and the power consumption of the home instantly in order to educate the consumer about the electrical energy price variation with the energy consumption of his home. Smart devices such as smart phones, personal computers and laptops connected to the home Wi-Fi network with internet can be used to display the sensed data instantly providing information about the power usage and price of electricity for the home.

Keywords: Time of Use (TOU), Internet of Things (IOT), Wi-Fi

A Novel Data Mining Approach to Detect Thalassemia Patients Without Conducting HPLC Test

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The healthcare industry has a huge amount of medical data and information. But it is still not properly analyzed to discover useful information to predict future patterns. Hence the main objective of this study was to introduce a new model to predict whether a person has a risk of having the Thalassemia disease or not. The data were collected from more than 7000 patients, who are currently participating in the HPLC test in the National Thalassemia Center at Kurunegala. The collected data were trained and tested using three different algorithms. The performance of the algorithms was evaluated using the confusion matrix. Supervised Learning Algorithms such as Decision tree (DT), Logistic Regression, Naïve Bayes were used to predict the model and Python colab online editor and Jupiter notebook were used to generate and compile the pseudo-codes. While the Decision Tree method generated 91.34% accuracy, Naive Bayes generated 68.58% accuracy for the data. In addition, Logistic Regression showed 84.39% of accuracy. Comparing these three algorithms showed that Decision Tree (DT) algorithm was the most accurate model to detect Thalassemia. According to year 2019 statistical reports of the Ministry of Health, the population of Thalassemia patients in Sri Lanka has slightly increased. Hence it can be concluded that the proposed methodology will be helpful to both doctors and patients in making proper decisions based on their health conditions.

Keywords: Decision tree (DT), logistic regression, Naïve Bayes, confusion matrix

06 Nov.
ET12

Development of a Wearable Sensor for Monitoring Temperature of Uterus Based on Zero Heat Flux Principle

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Monitoring temperature of uterus over a menstrual cycle provides information on ovulation which is useful in diagnosing complexities of female reproductive system. The continuous temperature monitoring over menstrual cycle is important to identify deviations of the temperature variation patterns. On the other hand, accurate temperature capturing is difficult with fat layer and irregular body shapes. A wearable device with a sensor array was tested for continuous temperature monitoring. The sensors were developed based on Zero Heat Flux (ZHF) thermometry principle. The calibrated five sensors were fixed to an undergarment. The sensor placement was done as one sensor directly in line with navel and two sensors at a distance of 4 cm from navel, another two, 5cm below the navel and 10 cm apart from each. Three healthy subjects were used and the temperature of the uterus was measured continuously for 15 minutes per day at one minute intervals between 6 am to 8 am, during their one complete menstrual cycle. The core body temperature also collected as reference temperature measurement. The collected data was analyzed using simple statistics. Though the identification of ovulation was difficult due to less number of subjects and shorter date collection duration, the temperature variation pattern has identified in certain regions of uterus during the menstrual cycle.

Keywords: Continuous monitoring, uterus temperature, zero heat flux principle

A Music Database for Emotion Research and an Interactive Platform for Music-Emotion Annotation through Systematic Review

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Music emotion analysis has increasingly attracted the attention among Music Information Retrieval (MIR) community over the years. Since music-emotion describes a specific emotional meaning of a music clip, it has become a useful tool for listeners to arrange their personal music collections. Collection of such subjective data is important for further research in the fields of MIR and music data mining. To identify the current status of research in the above fields, a systematic literature review (SLR) was carried out considering 117 studies from six electronic databases where 12 studies were selected for detailed analysis. SLR resulted in several key findings: Majority of studies on emotion metadata have focused on the western world, whereas other cultural-specific music such as Sri Lankan folk music are left behind regardless of their richness in emotion expression; discrete and dimensional emotion models have been commonly used; in collecting human annotations higher attention is required on demographics as individual differences matter in music emotion perception. Based on the findings and opening new avenues for researchers worldwide to computationally explore the least explored melodies, we present a music database of a set of 76 music stimuli based on Sri Lankan folk melodies. A platform was developed to collect emotion annotations enabling both categorical and dimensional emotional ratings. Annotator profile considers a number of demographic factors. The study will facilitate intelligent, large-scale music analysis through introducing a novel dataset and an emotion annotation platform. Moreover, this effort will contribute in preserving and promoting Sri Lankan folk melodies.

Keywords: Emotion Analysis, Music, Database

06 Nov.
ET19

IoT based Smart Home Mobile Assistant for Optimizing the Energy Consumption

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Increment of energy consumption and population growth create a grave need to conserve energy in all possible way. As a result, home automation is becoming popular due to numerous benefits. Home automation refers to control the home appliances and domestic features by local networking or remote control. The current commercial home automation systems are general and does not consist of a specific design for the Sri Lankan context. Therefore, we designed a smart home automation system by keeping the Sri Lankan electricity tariff and practices in mind. This project involved the design and construction of an individual control home appliance using Raspberry pi 3, Arduino and Windows 10 IoT core. This system can perform the basic home automation functions by using numerous sensors, particularly the project offers Windows application for operating several devices from single device remotely where users can control lights, temperature of heaters, speed of fan, and switches from one place. In case of lights, system will turn on the lights if motion sensor is active and natural light is below the required density. Similarly, fan speed is automatically controlled on the basis of room temperature. It gives suggestions and how the electricity tariff system works for the users and how the user can optimize their power consumption. The system mainly consists of the control of the home appliances, reduce energy consumption and provide awareness. Using the system, the public can obtain piece of knowledge regarding Sri Lankan tariff system.

Keywords: Raspberry Pi, Arduino, smart home automation, power measurement, IoT

An Artificial Intelligence Approach for Reducing Drug Trafficking in Sri Lanka

06 Nov.
ET20

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Stopping drug trafficking plays a significant role in the government of any country. In that case, gateways should be adequately inspected and protected. In Sri Lanka, The Sri Lankan customs is the leading government authority that is directly interfering with these factors and personnel. Customs administrations are increasingly adopting risk management techniques to determine where the highest areas of exposure to risk exist and how to allocate scarce resources to manage these risks effectively. To achieve these goals, customs should be moving away from traditional control methods and adopting new approaches to their tasks. The purpose of this research is to introduce an artificial neural network model for identifying suspected personnel and carriers. The dataset used is obtained from the Narcotics Control Unit, Sri Lanka Customs and it contains details of 430 passengers, which is checked by Sri Lankan Customs. The proposed model contains two hidden layers with ten neurons in the first layer and eight neurons in the second layer. The model was trained by changing the number of hidden layers and the number of neurons. The accuracy of identifying suspected personnel in the training process while training the model using a training dataset and the accuracy of identifying suspected personnel in the testing process while testing the model using testing dataset is 98% and 71% respectively. The mean absolute error of the model for the testing dataset is 0.20. This model will be helpful for customs operations to minimize the manual inspection of goods and maximize the number of frauds detected.

Keywords: Artificial neural network, risk management, mean absolute error

06 Nov.
ET24

An Application to Prioritize Emails Based on Predefined Factors and Sentimentality

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Over the last few decades emails have evolved into one of the widely used communication methods around the globe for business communication. This has paved the way for companies to deal with large number of emails in customer-based roles such as customer inquiries, complains, feedbacks, service failures, and etc. Some emails might carry urgent matters which need immediate attention while some might just be customer feedbacks. The process of going through emails is time consuming, painstaking and expensive. Thus, the company is at risk in failing to attend urgent emails which require immediate attention. Hence, an important concern is raised on how to prioritize massive number of emails received by a company in an effective way. In this study, an email sorting mechanism is proposed based on content significance, gravity and sentimental values. Each email is analyzed and classified using natural language processing algorithms of an accuracy of 89% and sentiment analyzers. A scoring mechanism was generated indicating a numerical score for each email. Emails are added to a prioritized queue based on its score. Prioritizing emails based on its content value without actually going through them provides a greater advantage for companies. It increases coherence, productivity as well as efficiency. Content significance, gravity and sentimental value can be used to prioritize a bulk of emails which may lead to increase the productivity of business communication process.

Keywords: Natural language processing, sentiment analysis, machine learning, email sorting, text processing

Electro Boxing Pad

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Boxing has become one of the most popular sports in every part of the world. The important factors of boxing include the force and power of the punch with no proper mechanism to measure them. Currently, these factors are estimated by the experience of the coach. Due to lack of a proper mechanism to measure these factors, it has become difficult for the players to measure their progress and to have an idea about their development. "Electro boxing pad" is a device, which enables to measure the force of the punch. Lord cells in the Electro boxing pad are used to measure the force and the indicators display it on a digital screen in kilograms. Arduino technology is used to process the readings. In addition to that, it provides the strike rate, i.e. the number of strikes per minute, which is also displayed on the digital screen. The "Electro boxing pad" helps the players to evaluate their development gained during the practice sessions. This device can measure the punch force up to 50 kg and can indicate within 1 second. It is targeted to develop this device to measure up to 200 kg of punch force in future. This device is portable, small and low cost.

Keywords: Boxing pad, Boxing, punch force, Strike ratio

06 Nov.
ET30

Multi-Objective Optimization with NSGA II Algorithm for Water Distribution Management System

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Water distribution systems are water resources that provide consumers with water from the source. The water distribution system includes elements, such as valves, pipes, pumps, tanks and reservoirs and is important in urban development. Today the water distribution systems are very complex. Moreover, massive investments are needed to implement and maintain them. Mitigation of these problems requires the development of a system that reduces its cost and complexity. This research is focused on the observation of the water usage distributed through the water board. The main objectives of this research are to develop an optimized water distribution system design using multi-objective optimization concept and to find a smart solution for the management of the water distribution system. The implementation for this problem would be formulated through Non-Dominated Sorting Genetic Algorithm (NSGA)-II. The proposed NSGA-II, in most problems, is able to find much better spread of solutions and better convergence near the true Pareto-optimal front compared to Pareto-archived evolution strategy. This system imitates the network and evaluate the tank pressure, piece and power under the proposed schedule. The outcome of this system is elaborated as the interpretation of the optimal pressure level, tank volume, fragmentation and energy level for the given instances. In future we plan to implement NSGA II and compare with another multi-objective algorithm.

Keywords: NSGA II, multi-objective optimization, water distribution systems

Introduction of a Novel IoT Based and Automated Solution for Rainwater Harvesting in Dry Zone

06 Nov.
ET31

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A novel model is introduced to harvest rainwater, particularly for dry zone households with the intention to achieving multiple goals such as detecting rainwater quality at home, saving time, manpower, reducing water wastage and providing solutions to water scarcity. Under the current way of life, it is very significant to have an automated process for rainwater harvesting. The recently introduced automated rainwater harvesting system includes two tanks and two filters. The novelty of the proposed model is that it only contains one tank and a filter and it is a step forward and an upgrade of the existing system. First flush system exists to prevent the first raindrops from entering the system. The rainwater that drops into the water catchment system is captured by gutters. Rainwater passes through the conduits via an advance filter into storage tanks after removing debris by a coarse mesh. An IoT device capable of tracking water level and quality is connected to the top of the tank. It contains six sensors such as pH, Conductivity, Dissolved Oxygen, Turbidity, Temperature, and Ultra-Sonic sensor. Using GSM / GPRS and Wi-Fi modules, the sensor data in the Arduino Uno is sent to a server and displayed on a web dashboard. According to historical rainfall data (of past 15 years) analysed in the Kurunegala district, the dry zone receives a decent amount of sunlight throughout the year and the use of solar panels for power supply is suggested. The best economically and technically suited filter should be identified in the future.

Keywords: Automated rainwater harvesting, quality of rainwater, water quality sensors, Internet of Things

06 Nov.
ET34

A Model to Reduce Unnecessary Waiting Times in the Outpatient Department

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Most public healthcare centers face the issue of handling patient queues in outpatient departments (OPDs) and this leads to overcrowding of patients. Waiting in queues unnecessarily increases the suffering of patients with their disease but also waste of precious time. Increasing the number of staff members may not always be a good solution to solve this problem because the increasing number of staff can cost more than patients' total waiting costs. This research used queuing theory analysis to discover present mean waiting time for patients and predict waiting times by increasing servers in OPD. Finally, a new system was suggested to decrease mean waiting times in OPD. The two fundamental parameters of queuing theory analysis are arrival rate (λ) and service rate (μ). The arrival times and service times of each patient were gathered directly for each service point (registration, consultation and pharmacy) over a week. During the calculation of service rates, tea breaks and lunchtime were excluded. The present queue system adapts the ideas of the Tandem queue system and the queue discipline which has been used was first come first serve discipline. A new OPD system is suggested after queuing analysis and then the mean waiting time in the system can be reduced to rate of 65.69% - 74.90%. Furthermore, this rate was achieved through a theoretical study and a simulated system has been proposed to be implemented to decrease waiting times in OPD queues at hospital for patient management.

Keywords: Queuing theory, Patients management system, Tandem queues

Effect of Ayurveda Treatments in the Management of Chronic Wound: A Single Case Study

06 Nov.
MHS07

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Chronic wounds present a substantial economic burden on the healthcare system. It is also a leading cause of amputation worldwide. *Susruta Samhita* mentions 60 different types of therapeutic measures for wound care. Among them, internal medicine, local wound care, and non-surgical methods were used mainly for this study. Applying medicinal leeches is the most effective non-surgical method of bloodletting mentioned in Authentic Ayurveda books. This case study reported here was conducted to identify the effect of Ayurveda treatments in the management of a chronic wound. An 80-year-old female patient suffering from a chronic wound for two years was successfully managed through the selected Ayurveda treatments. She came to the clinic after many failures of different treatment methods and at that time she was advised for amputation. Along with the internal medicine and local wound care, the patient was recommended applying 3 medicinal leeches (*Hirudo medicinalis*) once a week for a two-month period. The hematological investigation was carried out prior to the leech therapy (FBC, BT, CT). Pain, exudates, odor, swelling, burning sensation, itching and size of the wound was assessed using a grading system before and after the treatment once a week. At the end of the treatment period, pain, exudates, odor, burning sensation, and itching were reduced completely while swelling and wound size reduced to a remarkable stage. Further evaluation is required to be done by taking a large sample size to prove the clinical significance of Ayurveda treatments in chronic wounds.

Keywords: Chronic wound, Ayurveda treatments, leech therapy

Effectiveness of Commonly Used Disinfectants on Bacteria Responsible for Hospital Acquired Infections at Sri Jayewardenepura General Hospital, Sri Lanka

06 Nov.
MHS08

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Hospital-acquired infections (HAIs) increase the morbidity and mortality of hospitalized patients. Nosocomial pathogens can be transmitted through contaminated instruments and surfaces. Disinfectants play a crucial role in preventing HAIs. Determination of the effectiveness of commonly used disinfectants on bacteria that cause HAIs is important for appropriate selection of disinfectants. This experimental study was carried out according to the quantitative carrier test referring to the European Standard EN 14561:2006 to assess the effectiveness of two high level disinfectants. Two types of disinfectants named as 'disinfectant-I' (peracetic acid) and 'disinfectant-II' (Didecyldimethylammonium Chloride) were tested at three different concentrations on glass, stainless steel and rexine surfaces against three most common bacteria (*coliform, Acinetobacter* species and *Staphylococcus aureus*) responsible for HAIs in Sri Jayewardenepura General Hospital, Sri Lanka. Both of the tested disinfectants achieved 'Microbicidal Effect value' of 5 at manufacturer's recommended dilutions and passed the test. Microbicidal Effect value of disinfectant-II was significantly higher ($P \neq 0.05$) than that of disinfectant-I. On rexine surfaces, both disinfectants showed poor activity (ME=5.13) on all three tested bacteria. The effect of the selected disinfectants is not significant ($P > 0.05$) as a high level disinfectant on different organisms on different surfaces.

Keywords: Hospital-acquired infections, surfaces, disinfection, microbicidal effect

Antibacterial Effect of Rukkattana (Alstonia scholaris) (Bark) Against Staphylococcus aureus

06 Nov.
MHS10

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Alstonia scholaris (F.) is an evergreen tree native to the Indian subcontinent and parts of Indonesia, Malaysia as well as Australia. The bark of the *Alstonia scholaris* is used in Ayurveda medicine to treat fever, malaria, and troubles in digestion, tumors, ulcers, asthma, and sore throat. Therefore, this study examined the Antibacterial activity of bark decoction of *Alstonia scholaris* against *Staphylococcus aureus*. Three decoctions of 60 g bark of *Alstonia scholaris* were prepared as C1 (480 ml reduced to 60 ml), C2 (960 ml reduced to 120 ml), C3 (1920 ml reduced to 240 ml). The reference drug amoxicillin (500 mg) were used in the evaluation of Antibacterial activity. The procedure followed the Antibacterial sensitivity test (ABST) (Kirby Bauer method). The effect of different decoctions on the bacterial strains were assayed by agar well diffusion method. According to the comparative data analyses, the significant antibacterial activity of *Alstonia scholaris* decoctions were compared with standard antibiotic, Amoxicillin. The results showed a significant difference in the ($P \leq 0.05$) in C2 (28.50 ± 0.34 mm) and C3 (32.16 ± 0.47 mm). C1 was not active against *Staphylococcus aureus*. It is concluded that *Alstonia scholaris* decoction possessed strong activity of healing capacity and inflammatory properties.

Keywords: *Rukkattana, Alstonia scholaris, Staphylococcus aureus*

06 Nov.
MHS17

Review on Rasa Yogas in the Management of Krimi Roga According to Bhaisajya Rathnavali (Renown Ayurveda Text)

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Worm infestation (Krimi Roga) is a disease caused due to the presence of worms in the body particularly in intestines. World Health Organization revealed soil transmitted helminth infections are among the most common infections worldwide. Rasa Shastra is one of the special branches in Ayurveda which use various metals, minerals and other substances, including purified mercury combined with herbs to treat illnesses. However low attention is paid to use Rasa Yogas in management of Krimi Roga. Therefore, this review is carried out to identify rasa yoga in Bhaisajya Rathnavali to examine rasa ingredients in Rasa Yogas. The main objective of the study was to analyze the pharmacological properties of Rasa ingredients. Analysis was conducted using Microsoft Excel. According to findings, 19 Rasa Yogas can be used for Krimi Roga. Kitari Rasa, Kitamarda Rasa, Krimivinasana Rasa, Krimihara Rasa and Krimighno Rasa were identified as the drugs that can be used for all types of Krimi Roga. Analysis revealed that 16 rasa ingredients were included in rasa yogas. As prominent rasa ingredients, yogas contained shuddha parada and gandhaka in 21.82% of the yogas. Other considerable rasa ingredients were rock salt, lauha basma and manoshila. Rasa ingredients include guna karma to cure Krimi Roga. Kapha is prominent dosha in Krimi Roga. Katu and tikta rasa were the most prominent rasa in selected rasa ingredients in rasa yogas. Katu, thiktha rasa and ushna virya decrease kapha dosha to cure Krimi Roga. Therefore further studies should be carried out to ensure the effect and efficacy of rasa yogas.

Keywords: Rasa Yoga, Krimi Roga, Rasa Shastra

The Comparative Study of Effectiveness of Aba-Murungadi Oinment in the Management of Ama-Vatha Sandhi Shotha (Rheumatoid Arthritis)

06 Nov.
MHS18

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Ama-vatha is a disease caused due to the vitiation or aggravation of *vayu* associated with *Ama*. *Ama-vatha* can be correlate with Rheumatoid arthritis and also Reactive arthritis. Rheumatism is an autoimmune disorder, with symmetrical joint involvement and effects many other systems too. The prevalence of *Ama-vatha* is considered to be around 1% with the symptoms of stiffness, swelling, and tenderness in small and big joints, crippling deformity of joints, pain and reduced functional capacity. According to Sharangadhara samhitha, there is a specific preparation called *Aba-murungadi* lepaya (*Doshagna lepaya*) which has been used for *Ama-Vatha* as an external application, *in traditional practice*. The objective of this study was to see the local effect of *Aba-murungadi* ointment in the management of the *Ama-vatha* with comparison of *Aba Murungadi thawilla*. For clinical study, the patients were selected from the Out-patient Department (OPD) at Gampaha Wickramarachchi Ayurveda hospital, Yakkala randomly irrespective of their sex, religion, occupation, ect. A detailed research proforma was prepared incorporating all the points from Ayurveda and modern aspects to study the patient as well as disease. Previously diagnosed Ama-vatha patients between 30 and 60 years of age with classical symptoms and whose knee joints are affected were included. Patients who had systemic diseases like diabetic mellitus, hypertension and respiratory diseases were excluded. 15 patients were selected as the treatment group and other 15 patients as control group. *Aba murungadi thewilla* was administrated to the control group (Group B) for two times per day in the period of three weeks continuously in contrast to the treatment group (Group A), which was given *Aba-murungadi* ointment at two times per day for three weeks. The study showed that both Abamurungadi ointment and thewilla were statistically significant ($p < 0.05$) for diagnostic criteria of joint pain, swelling, tenderness and stiffness.

Keywords: *Ama- vatha*, Rheumatoid Arthritis, *Aba murungadi thewilla*

06 Nov.
MHS23

Review on therapeutic usage of Gandhaka (Sulphur) Contained Rasa Aushadha for Svithra (Vitiligo) in Ayurveda Texts

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Among the countless diseases, *Svithra* (vitiligo) is uncompromising mental disturbance disease in present. It is an auto immune skin disorder characterized by white and depigmented patches enlarging and becoming more numerous. This is caused due to the disappearance of functioning melanocytes and loss of melanin in the epidermis. Ayurveda has different types of treatments for vitiligo. Rasa aushadha are most prominent than others. But people have little knowledge about it and thus used less widely. Sulphur contains Rasa aushadha and thus has acquired a great place in Rasa shasthra. Sulphur is effective because of its kerotolytic, antibacterial and antifungal properties. Main objective of this research is to raise awareness on the role of Sulphur containing Rasa aushadha in Vitiligo through Ayurvedic approach. Twelve Sulphur containing Rasa aushadha were collected and the data were analyzed using Microsoft Excel. 58.33% of aushadha were included in Rasa Rathna Samuchchaya and 16.66% were included in Bhaisajjya Rathnavali. In addition, 75% of these aushadha are used to treat for external indications and 25% of aushadha are for internal indications. Considering about other ingredients with Sulphur, Mercury is the prominent ingredient in 75% of Rasa aushadha. All three Doshas were prominent in Vitiligo. Sulphur has madhura thiktha rasa, Laghu snigdha guna, Ushna veerya, Katu vipaaka and kaphavaatha Shaamaka karma. It also has kushtagna, rakthashodhaka, vishagna and yogavaahi guna. Mercury has shad rasa, Snidgha, sara, guru guna. Ushna veerya, Madhura vipaka, Yogavaahi prabhava and thridoshahara karma. Thus, Sulphur combined with mercury can be used to pacify three Doshas.

Keywords: *Svithra*, Rasa shasthra, Sulphur

Effective Interventions for reducing Body weight in Overweight women over 30 years using Health Promotion

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Non communicable diseases (NCDs) are estimated to be responsible for 75% of total deaths in Sri Lanka. In Sri Lanka NCDs causes more than three quarters of all deaths and nearly one in five people die prematurely from NCDs. This collaborative quantitative study employs discussions and questionnaires received from women over 30 years age in Karuwalagashinna semi-urban village in MOH area in Sri Lanka. We created two groups of mothers (with 31 mothers) in the village based on their preference and easy to gather together. We conducted questionnaire based surveys and conducted discussions to collect baseline data and their current knowledge on the health issues. They identified being overweight as a major health issue among them. Then they made determinants web to unravel the factors, which increase the body weight. They prioritized the main determinants which affect being overweight and planned interventions to address those identified determinants. We used video clips and evidences of successful stories in other communities to empower them within two years. In the baseline result, there were 9.67% underweight, 19.3% normal weight and 70.96% overweight women. This was obtained by measuring their BMI (Body Mass Index). They started to reduce the salt, sugar and oil consumption from the "oil meter, daily sugar cup and salt cup" respectively. Through those activities, they measured and marked healthy level in separate ways for daily consumption. They also made BMI CARD to measure and mark their own BMI level monthly. Through this they can get an idea about their weight gain or decrease and what are the causes for excess weight. Furthermore, they played volley ball in the evening and engaged in home gardening to reduce their weight by addressing the physical inactivity. Through the above interventions their weight reduced from 70.96% (21 mothers) to 54.8% (17 mothers). Five mothers reduced their weights from overweight to normal weight. In addition, other over weighted women (17) reduced their BMI value compared to previous values. Improving knowledge, awareness and planning interventions are helpful to overcome problems faced by rural communities due to NCDs. Forming mothers groups in communities is a suitable method to deliver this process. It can be concluded that health promotion process is a good method for community based field work and it empowers people to take control over their health by themselves.

Keywords: Non communicable diseases, Body Mass Index, overweight, normal weight

06 Nov.
MHS28

'In-vitro' Antifungal susceptibility of Decoction of Tripala & Decoction of Atteriya Leaves against Candida Albicans

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Candida albicans is a common type of fungus. It is a common cause of Candidiasis. Tripala and Atteriya (*Murraya paniculata*) are two herbs which are used as local treatments for the Candidiasis as a *Yoni prakshalana* by Ayurveda physicians. Therefore, this research study was aimed to evaluate the antifungal susceptibility of decoctions of Tripala & Atteriya leaves against the laboratory specimens of *Candida albicans*. Three samples of Tripala and Atteriya leaves decoction were used for the evaluation. Fluconazole (2.5 mg/ml) was used as the Positive control. Reference organisms of *Candida albicans* was used. The drugs were authenticated by the department of Dravyaguna Vignana of Gampaha Wickramarachchi Ayurveda Institute. Decoctions were prepared according to Kwatha paribhasha mentioned in Ayurveda pharmacopeia. The antifungal activity of decoctions were determined by agar well diffusion method. Four wells were prepared and 50 μl of the each plant decoctions, Positive control & Negative control were added. The plates were incubated at 37 ^{0}C for 24 hours. The antifungal activity was assessed by measuring the diameter of the inhibition zone. Data analysis was done using Microsoft Excel & SPSS. In the present study all samples of Tripala decoction showed an inhibition zone of 19 mm, 19.5 mm & 18.5 mm around the well. Mean of inhibitory zone diameter was 19 mm. There was not considerable inhibition zone from Atteriya leaves decoction while the positive control showed mean inhibitor zone of 26 mm. Hence the study can be concluded that decoction of Tripala is effective as a *Yoni prakshalana* in the management of Candidiasis.

Keywords: Tripala, *Murraya paniculata, Candida albicans*

Effect of the herbal formula in Rajaushadhanidhiya on Pityriasis Versicolor

06 Nov.
MHS29

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Skin diseases are common in society. Pityriasis versicolor is such skin disease that produces well demarcated round or oval macules on the trunk, neck, and upper arms where the density of sebaceous glands is high, appear as hyper-pigmented patches on lighter skin types and hypo-pigmented patches on darker or tanned skin and can vary in colour. There are many treatments in Ayurveda, to relieve Pityriasis versicolor. The formula used for the present study is an external application, mentioned in Rajaushadhanidhiya, however, the effects are not scientifically proven. The present study was aimed at finding the efficacy of this herbal formula composed of *Ipomoea obscura, Curcuma longa, Cassia fistula*, *Phyllanthus emblica*. This treatment is practiced in Ayurveda as a safe and effective external mode of therapy. Thirty patients were recruited for the study and were advised to consume the test formula for one month without using any other treatment for Pityriasis versicolor. The size, colour, clinical form, itching of affected areas were graded by the all researchers before and after the treatment. Data were analyzed using Statistical Package for the Social Sciences (SPSS) and Microsoft Excel. A significant (P value ≤ 0.05) reduction in size, itching, colour and clinical form of affected areas was observed after the treatment. It can be concluded that the tested herbal formula has a marked effect on reducing the symptoms of Pityriasis versicolor.

Keywords: Pityriasis versicolor, macules, herbal formula

06 Nov.
MHS32

Physico Chemical Study of The Shelf Life of Selected Churnas (Powders)

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Churnas are the powdered form of drug preparations, used among Ayurveda and indigenous medical practitioners. According to *sharangadhara samhitha* the shelf life (*Saviryata avadhi*) for the *Churna* is two months. However, the drug manufacturing company mention different shelf life for the *Churnas* irrespective of the *sharangadhara samhitha*. The chemical and physical changes of *churnas* directly influence on the potency of drug and directly influence the recovery progress of patient. Therefore, the objective of the study was to find out chemical, physical and microbial changes of selected *churnas* within nine months. Three powders were selected and stored under normal room temperature and humidity in airtight glass containers and the above mentioned qualities were observed in initial stage and after two, three, six, and nine months. Data were analyzed using Statistical Package for the Social Sciences. No significant changes were observed in mean values of colour, odour, taste, consistency and touch against the time duration. Analyzed data revealed that significant different between initial month and after third month and no significant different between initial month and second month when considering pH and ash values. Loss of drying values revealed the significant difference among initial month and every other month. Total bacterial count was significantly elevated after two months and total viable count was significantly reduced after two months. Considering significant variances of parameters, it can be concluded that the *churna* are best to use within two months of production and *churnas* gradually lose their physical and chemical qualities when exceeding their shelf life.

Keywords: *Churnas*, Physic-chemical Parameters, *Saviryata avadhi*, *Sharangadhara samhitha*

Literature Review on pharmacodynamic properties of Traditional Formula Used on Sandhigatavata

06 Nov.
MHS34

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Ayurveda is a science of life, which deal with suffering of normal beings. *Sandhigatavata* means a condition in which morbid vata is located in the joints and destroys the joints. The main symptoms of *sandhigatavata* are pain and crepitation. According to Allopathic Medicine System, it is called Osteoarthritis. In western countries, radiographic evidence of this disease is present in the majority of persons by 65 years of age and in about 80%, of persons more than 75 years of age. In here, non-steroidal anti- inflammatory drugs and joint replacement are prescribed for this purpose which have lot of side effects. But the Ayurveda medicine can be used to treat this disease successfully. According to Ayurveda concept, the mode of action on any drugs are based on their pharmacodynamic properties. Therefore, this study was carried out to evaluate the pharmacodynamic properties of the formula, which is effective in managing the *sandhigatavata* through a review of Ola leaf manuscripts. On the basics of pharmacodynamic properties of drugs, it is obvious that most (60%) of the ingredients are *ushna veerya*. Due to ushna veerya, the drug counteracts with other predominant properties of vata, which create symptoms of *Sandhigatavata*. Thus, the cure the vitiated *vata dosha* is helpful to manage the *Sandhigatavata*. The application is mentioned not to possess *Ushna* property, but is *Madhura rasa* 60%. *Guru, Snigdha guna* 60% and *Madhura vipaka* 60% by which enhance the *Kapha dosha* and reduced the *vata*. According to the study, pharmacodynamic properties of the formula is effective on managing the *sandhigatavata*. Therefore, this study should be carried out as a clinical trial.

Keywords: *sandhigatavata*, pharmacodynamics properties, allopathic medicine

06 Nov.
MHS38

Literature Review on Therapeutic Value of Basna According to Sri Lankan Text Deshiya Chikitsa Samgrahaya

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Sri Lanka has its own indigenous scheme of traditional medicine which is called 'deshiya chikitsa'. 'Basna' is a group of formulae unique to deshiya chikitsa. They acquire their effectiveness as a 'medicine' after going through specific processing techniques such as fermentation, boiling with water or any other specific decoction, mixing with special herbal preparation etc. The main objective of the present review was to summarize the knowledge available in the traditional literature related to technological details and the medical applications of Basna in a scientific way. The common indications were *grahani roga* (improper digestion), *pandu* (anemia), *kamala* (jaundice), *udara roga* (abdominal disorders), *arochaka* (anorexia) and *unmada* (mental disorders) etc. Based on the indication, different techniques are used for the preparation of Basna which transforms the relevant therapeutic properties of the active ingredients in to a soluble form which make them more bioavailable. The data revealed that 15% of basna is used for *grahani roga* and 80% for *pandu* and *kamala*. For *grahani roga*, deepana (appetizer) and pachana (digestant) dravyas (ingredients) are mixed with ghee (without heat or fermentation) and small dose is continued for 14 days in early mornings (small dose - long time period). For *Pandu roga*, mainly deepana, pachana dravyas along with yabora, juice of citrus fruits and honey are fermented with buried clay pot near the heat places and used as large doses 3 times per day for 3 days (large dose - short time period). It can be concluded that 'Basna' have been used by the traditional medical practitioners for a long time by preparing them through unique processing techniques based on the indication, to treat a diverse group of ailments.

Keywords: *Deshiya chikitsa, Basna, Pandu, Grahani roga*

A Review of Sri Lankan Indigenous Medical Texts on the Management of "Yawwana Pilika" (Acne)

06 Nov.
MHS41

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Acne is a common skin disease affecting up to 80% of world population especially in adolescents and young adults without gender difference. Significant psychosocial effects such as depression and poor personality development have been linked with acne. Various causative factors as well as physical and psychological factors have been contributed toward acne. In Indigenous Medicine of Sri Lanka, acne resemble as "*Yawwana pilika*" which is just like a throne of "Imbul" tree (*Bombax ceiba L.*) arise due to vitiation of *Pitta* and *Kapha Dosas* and also called as "*Kurule*", "*Yuwana Pidaka*", "*Yawwana pidaka*" and "*Mukha dusika*" comes under *Kshudra Roga*. This study was designed to find out the management of "*Yawwana pilika*"mentioned in Sri Lankan indigenous medical texts. Data was collected from *Sinhala Yogarnawaya, Warayogasagaraya, Lakdiva Raktha Roga Samgrahaya, Peeyusharnawaya, Sarartha Samgrahaya, Sinhala Yogarathnakaraya, Sankshiptha Gedivana Chikitsa Samgrhaya, Bhaisajja Manjusa Sannaya* and *Thalpathe Piliyam* book Series. *Vamana* (therapeutic emesis), *Nasya* and *pralepa* (poultice) with their formulations were mentioned above texts as treatments according to stages of disease condition. Herbal, animal, herbo- mineral, herbo- animal, minero- herbal, minero -animal, herbo-minero- animal formulations which were mainly as fresh juice, powder, paste, oil and ash mentioned in Sri Lankan indigenous medical texts.

Keywords: *Yawwana pilika*, acne, Indigenous Medicine

06 Nov.
MHS48

Comparison of Conjugated Linoleic Acid (CLA) Contents in Raw Cow Milk and UHT Treated Cow Milk in Sri Lanka

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Conjugated linoleic acid (CLA) is a heterogeneous group of isomers of linoleic acid (18:2, cis-9, trans-11 & trans-10, cis-12) and found to be health beneficial in various diseases, such as cancer, diabetes, obesity, and atherosclerosis. Biological synthesis of CLA arises through the microbial isomerization of dietary linoleic acid in digestive tracts of ruminants. Therefore, food items originated from ruminants are rich with CLA. However, the distribution of CLA in cow milk available in Sri Lanka is poorly understood. Therefore, this study aimed to assess the content of CLA in raw cow milk and UHT treated cow milk in Sri Lanka. Three samples of UHT treated fresh milk and three samples of raw cow milk were analyzed for CLA content using standard procedures. Freshly drawn raw cow milk samples were collected from three local cows (n = 3) and three UHT treated milk samples (n = 3) were taken from the market. Milk fat separation was carried out by the double centrifugation method and CLA-1(cis-9, trans-11) and CLA-2 (trans-10, cis-12) levels of each milk sample were determined by gas chromatography. The mean value of CLA-1 in UHT treated milk (0.67±0.06 g/100g of milk fat) was significantly higher than raw milk (0.50±00 g/100g of milk fat). However, CLA-2 was not detected in milk samples. In conclusion, this study shows that the consumption of fresh milk provides a CLA level that is beneficial for human health. Moreover, it indicates that there is a possibility that UHT processing and feeding practices for cows may have affected the CLA content in milk. The better feeding for cows from which UHT milk samples were originated by organized farmers may have caused an increase in CLA content in UHT milk. However, further studies are highly warranted to confirm these findings.

Keywords: Conjugated Linoleic Acid (CLA), Cow-milk, Fatty acids, Sri Lanka, UHT

Efficient Tributyltin Extraction Method from Marine Sediment

06 Nov.
NSM04

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Tributyltin (TBT) is one of the most toxic xenobiotic compound in the aquatic environment. It has been widely used as a biocide in antifouling paints to control the growth of marine organisms on submerging surfaces in water. Studies have demonstrated a wide range of negative impacts of TBT on non-target organisms such as shell deformation, developmental retardation and imposex. TBT is quickly removed from the water and adheres to bed sediments due to its high specific gravity. We developed a method to quantify TBT in sediment was developed using Solid Phase Micro Extraction (SPME) technique followed by Gas Chromatography-Mass Spectrometry (GCMS) analysis. Sediment samples were collected from Kirinda, Hikkaduwa, Trincomalee and Mirissa fishing harbors, where boat activities were high. Three samples were collected from each location and were freeze dried and spiked with internal standard of TBT chloride (50 ppb). Distilled water was used as the dissolving solvent and mixture was sonicated for 2 hours prior to being centrifuged. Hybridization process was followed by absorption of TBT hydride into SPME fiber. The samples were analyzed using GCMS in parts per trillion levels. The highest concentration of TBT was recorded in Kirinda harbor (98±3.7 ng/Kg) and following Tincomalee, Hikkaduwa and Mirissa were 63±2.5 ng/Kg, 52±2.8 ng/Kg and 44±2.1 ng/Kg respectively. This is a newly optimized HS/SPME- GCMS method is sensitive and simple; it requires less reagents, reduce waste and is less time consuming. It also gives high precise with excellent recovery value 78±1.7%. Due to the increase in the use of industrial chemicals, it is an important to develop novel techniques to assess their presence in the environment.

Keywords: Tributyltin, sediment, Solid Phase Micro Extraction (SPME), Gas Chromatography Mass Spectrometry (GCMS), Imposex

06 Nov.
NSM06

Development of Sugar Free Cinnamon Biscuits and Evaluation of Its Quality Characteristics

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Biscuits are one of the popular snack food consumed in Sri Lanka. Sugar free biscuits with natural sweetening substances have become popular nowadays due to the health concern of high sugar foods. Cinnamon (*Cinnamomum zeylanicum*) contains a natural sweetening substance named as mannitol in addition to its main active ingredient cinnamaldehyde. This study was carried out to develop sugar free cinnamon biscuits and evaluate its quality characteristics and keeping qualities. Biscuits were formulated by partially replacing wheat flour with rice flour (100:0, 75:25, 50:50, 25:75, 0:100) and fully replacing sugar with cinnamon powder (5 g, 10 g, 15 g) and baking in an oven at 180^0C for 10 minutes. The biscuits were subjected to physical, nutritional and sensory analysis to evaluate the suitability for consumption. Based on the results of this analysis, bulk density, thickness, fiber and ash content significantly increased with the increasing level of rice flour while, spread factor and crude protein content decreased with addition of rice flour. Bulk density and spread factor increased while, diameter and thickness decreased with the increasing level of cinnamon powder. Formulation of wheat flour and rice flour (25:75) with cinnamon powder (15 g) was found as the most preferred formulation. The nutritional content of this formulation is carbohydrate 56.02%, protein 5.76%, total fat 25.46%, ash 4.02% and fiber 5.07%. Results of the sensory analysis revealed that there was no significant difference between wheat flour sugar free cinnamon biscuit and developed composite sugar free cinnamon biscuit. Aerobic plate count was zero during three months of storage period. Zip lock bags were selected as primary packaging due to its durability and paper board was selected as secondary packaging material due to eco-friendly attributes. In conclusion, cinnamon can be a potential source to replace sugar with longer shelf life and favorable edible qualities.

Keywords: Biscuits, sugar free, cinnamon

Investigation of Anti-bacterial Activity of Moringa oleifera and Assessing as a Potential Ingredient, to Increase the Shelf Life of Minimally Processed Alternanthera sessilis (textitMukunuwenna)

06 Nov.
NSM09

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The objectives of the study were to evaluate antibacterial properties of solvent extracts of (Dimethyl Sulfoxide (DMSO), ethanolic and hot water) of three varieties of *Moringa oleifera* (*Weerawila Miti, Mahailuppallama Miti, Mahailuppallama Jaffna*), cultivated in Sri Lanka against foodborne pathogens including *Escherichia coli, Staphylococcus aureus, Salmonella enteritica, Enterococcus faecalis,* and *Bacillus cereus* and to investigate its ability to enhance the shelf life of minimally processed leafy vegetables. Leaves, flowers, pods, and bark from each variety were evaluated for their antibacterial activity. The activity was analyzed using agar well diffusion method at five different concentrations. The study revealed that *S. enteritica* was highly resistant to all extracts but *S. aureus* was sensitive to *M. oleifera* extracts. Maximum antibacterial activity against *E. coli, S. aureus, E. faecalis* and *B. cereus* was observed for the ethanolic extract, while minimum activity was with DMSO extracts. The mean growth inhibition zone diameters were ranged from 9.72±0.21 to 36.82±0.13 mm against all tested bacteria. The activity decreased with decrease in concentration of the extract. The best activity was shown by *Weerawila Miti* variety. *S. aureus* counts were reduced in minimally processed *Alternanthera sessilis* (*Mukunuwenna*) by applying *M. oleifera* extracts. In six out of seven samples of *Mukunuwenna*, *S. aureus* counts were reduced by over 50% *in vitro*. It can be concluded that *M. oleifera* hot water extracts can be used as a natural antibacterial agent.

Keywords: Dimethyl Sulfoxide, *Moringa oleifera*, foodborne pathogens, natural antibacterial agent

06 Nov.
NSM12

Effect of Deep Fat Frying of Nile Thilapiya (Oreochromis niloticus) in Coconut and Palm Oils

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Nile Thilapiya is the most frequently consumed inland food fish in Sri Lanka. Deep fat frying is the process of immersing food in hot oil and is the most common cooking technique used to prepare Nile Thilapiya. The present study was aimed to assess the proximate composition (moisture, ash and fat) and quality in terms of free fatty acids (FFA) and peroxide value (PV) in Nile Thilapiya deep fat fried in two different frying media (coconut and palm oils). This experiment was arranged in completely randomized design in three treatments (fish fillets deep fat fried in coconut and palm oils compared to the raw/untreated form) with four replicates. Fish fillets weighing 50 g each and 7.5 cm×2 cm×1.5 cm in size were obtained from the muscle portion. These were deep fat fried at 180±2 ^{0}C for 4 minutes. Moisture and crude fat contents were significantly different between the raw (80.03% and 1.69% respectively) and deep fat fried fillets in palm oil (44.08% and 17.25% respectively) and coconut oil (49.05% and 13.51% respectively) ($p<0.05$). Ash content of deep fat fried fillets in coconut oil (1.58%) and palm oil (1.69%) was significantly higher than that of raw fish (1.09%). The results highlighted that the absorption of oil during the process was significantly lower in coconut oil than palm oil. However, FFA and PV were not affected by the oil type but fatty acid profile varied with the oil type. Further studies are needed to compare the secondary oxidation products.

Keywords: Free fatty acids, proximate composition, peroxide value, oil type, secondary oxidation

Evaluation of Functional and Nutritional Properties of Nymphaea pubescens Seeds

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The seends of *Nymphaea pubescens* (Hairy water lily), which is abundant in dry zone of Sri Lanka was studied for a range of nutritional and functional properties. Proximate composition and total dietary fiber content (TDF) were determined using standard procedures. Boiled seeds were used to determine *in-vitro* starch digestibility rate. Antioxidant activity was studied for its free radical scavenging property on *in-vitro* models, 1,1-diphenyl-2-picrylhydrazine (DPPH) and 2-azino-bis(3-ethylbenzothiazoline-6-sulfonic acid) (ABTS) by using methanolic extracts, and total polyphenolic (TPC) and flavonoid content (TFC) were estimated. Oil extracts from seed was studied for the fatty acid profile using gas chromatography (GC). Mineral content and heavy metal content was studied using ICP-MS and ICP-OES methods respectively. Moisture, fat, protein and ash were 7.28±0.09, 0.45±0.05, 7.66±0.53 and 0.66±0.02 respectively. According to the TDF content (9.09±0.61), seeds are a rich source of dietary fibers. TPC and TFC were 338.67±0.01 mg/g GAE and 40.29±0.01 mg/g QE respectively. *In-vitro* antioxidant activities of seed extract against DPPH and ABTS was concentration dependent with IC_{50} value 23.03±0.03 and 17.03±0.19 μg/ml respectively. *In-vitro* starch hydrolysis rate was 87.82±0.60, thus can be categorized as a high glycemic index food. Experimental data showed that palmetic acid, stearic acid, oleic acid and linoleic acid were the major fatty acids. Seeds are rich source of manganese, magnesium and iron but there is no evidence for heavy metal contamination. *Nymphaea pubescens* seed showed promising in terms of fatty acids, dietary fiber, minerals and antioxidant activity.

Keywords: *Nymphaea pubescens*, antioxidant activity, *in-vitro* starch digestibility rate, dietary fiber

06 Nov.
NSM19

Effects of Locally Available Natural Substances on Some Plant Seeds Germination

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Successful seed germination is a crucial step in the life cycle of a plant. While seed priming has been carried out using both natural and synthetic chemical substances, natural substances are considered to have fewer negative environmental impacts and are cost effective. Therefore, the present study focused on the effects of natural substances such as red rice (T_1) and white rice washed water (T_2), orange coconut (T_3), green coconut (T_4) and mature coconut water (T_5) on seed germination of black gram, pumpkin, rice and maize. 25 healthy sterilized seeds (85% germination rate) of the above plants were presoaked in 30 ml of natural suspension for 24 hours separately at room temperature and repeated twice. Then seeds were transferred to the sterilized petri dish with moistened filer paper and mean values of length of germ tube was measured. Data were subjected to analysis of one-way analysis of variance (ANOVA) followed by Tukey test. Except for pumpkin and maize seeds treated with T_1 and T_2, there were no effects of natural substances on germination rate of the tested seeds. But more interestingly after 48 hours, germ tube formation of most tested seeds were highly accelerated by T_1 and T_2, excepts black gram treated with T_2. Hence, T_3, T_4 and T_5 showed inhibitory effect in most tested seeds except maize at 48 hours. On the other hand, among the selected natural substances T_1 and T_2 revealed better effects on seed germination and hence, could be used as an environmentally friendly method to stimulate the seed germination.

Keywords: Germination rate, Rice water, Coconut water

Echolocation Call Characteristics of Hipposiderid Bats in Sri Lanka

06 Nov.
NSM21

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Sri Lanka is known to support 31 species of bats representing 8 families. The family *Hipposideridae* includes five species in Sri Lanka, currently identified as *Hipposideros speoris, Hipposideros ater, Hipposideros fulvus, Hipposideros galeritus*, and *Hipposideros lankadiva*. Detailed descriptions of echolocation calls of most bat species in Sri Lanka are not known. Our study generated the first detailed accounts and comparisons of time-expanded echolocation calls of four hipposiderid bats in Sri Lanka. Echolocation calls from hand held bats were recorded using Pettersson M500 microphone and BatSound Touch software. Recorded sound files were analysed to measure the frequency of maximum energy (FME) and call duration (CD) using BatSound Pro software. Unambiguous echolocation calls with high signal-to-noise ratio, emitted by *H. speoris* (132 calls from 16 bats), *H. ater* (88 calls from 13 bats), *H. galeritus* (37 calls from four bats), and *H. fulvus* (11 calls from one bat) were selected for further analyses. Descriptive statistics were calculated and separate boxplots were generated for each variable using Minitab 17 software. FME values (mean±SD) were 127.70±3.2 kHz in *H. speoris*, 154.64±3.0 kHz in *H. ater*, 159.02±0.7 kHz in *H. fulvus*, and 97.66±0.7 kHz in *H. galeritus*. The combination of FME and CD values do not overlap between species, indicating these parameters permit the accurate identification of these hipposiderid species in the field. Interestingly, except for *H. ater* (no published data to compare), call frequencies of the other three species vary to some degree across their biogeographic ranges. Therefore, detailed molecular and morphometric studies combined with acoustic information on Sri Lankan species are warranted to assess the taxonomic status of Sri Lanka bat species with respect to their relatives in mainland Asia.

Keywords: Ecolocation, Pettersson M500 microphone, BatSound Touch software, maximum energy, acoustic, biogeographic, Asia

Development of an Optimized DNA Extraction Protocol for High Quality DNA from Human Blood Using a Commercial DNA Extraction Kit

06 Nov.
NSM22

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DNA extraction is often the preliminary step in molecular based life sciences research. The objective of this study was to develop an optimized protocol for extraction of DNA from human blood having sufficient quantity and optimum purity that could be used in further downstream applications. DNA was extracted from blood using FlexiGene® DNA extraction kit by QIAGEN®. Although the original protocol provided with the kit was practiced without making any modification, spectrophotometric absorbency results revealed that DNA extracted did not have sufficient purity as it especially indicated organic compound contamination. A_{260}/A_{230} ratio for DNA, which needs to lie between 1.8-2.0 was detected to be between 1.3-1.4. Eventually, 70% ethanol washing to remove previously added isopropanol to pellet out DNA was repeated by doubling the volume of ethanol from 50 μL mentioned in original protocol to 100μL and air-dry time to remove all ethanol used for washing impurities was increased by nearly six times to that mentioned in original protocol, from 5 minutes up to 30 minutes. As a result, A_{260}/A_{230} ratio improved drastically from 1.4 to 2.2. However, protein digestion to remove all protein associates were optimum through the original protocol, which was validated by the A_{260}/A_{230} ratio 1.73, very close to the ideal value for DNA, 1.8. Concentration of DNA also increased from 20.8n g/μL to 234.5 ng/μL by increasing the volume of 100% isopropanol from 100 μL to 150 μL to effectively pellet out DNA. The optimized protocol for extraction of DNA was developed accordingly by modifying the original protocol.

Keywords: Concentration, downstream, DNA extraction, purity, quality

Molecular Dynamics Simulation and Binding Studies of Ajmalicinine With CDK4

06 Nov.
NSM23

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Cyclin-dependent kinase 4 (CDK4) is an enzyme responsible for the G1 to S phase transition in the cell cycle. CDK4 inhibitor of CDK4 (INK4)-retinoblastoma (Rb) pathway controls cell progression and dysregulation of this pathway lead for initiation and progression of many cancers. Thus, CDK4 inhibitors have the potential to be used as anti-cancer treatments. Ajmalicinine is an alkaloid compound which present in *Petchia ceylanica* (Kukul kaduru), a plant endemic to Sri Lanka. We carried out an *in-silico* study to investigate whether Ajmalicinine can bind to CDK4 and, if so, its mode of interaction. Molecular docking procedure was employed to predict binding affinity and pose of hypothetical alkaloid compound based on fascaplysin (one of the best inhibitors for CDK4); Carbofascaplysin (as a reference ligand) and Ajmalicinine to CDK4 receptor. Our study revealed that Ajmalicinine successfully docked on to the binding site and with more compatible binding affinity similar to Carbofascaplysin. Molecular dynamic (MD) simulations were performed to investigate the stability of the two complexes in an aqueous medium. The results indicated greater stability and similar behavior in the Ajmalicinine-CDK4 complex in the aqueous medium. The integrity of the complexes was conserved by strong hydrogen bonds formed between the amino acid residues of the proteins and ligands. The findings revealed that Ajmalicinine is a feasible agonist to CDK4 and warrants further investigation of the pharmaceutical potential of Ajmalicinine *in-vitro* and *in-vivo*.

Keywords: CDK4, Ajmalicinine, molecular dynamics

Influence of Major Triglyceride Constituents of Madhuca logifolia seed fat and Engkabang fat on their Crystallization Behaviour: A Comparative Study

06 Nov.
NSM25

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Studies on the role of constituent triglycerides (TG) of plant fats on their crystallization behavior are important for many reasons. The purpose of this study was to evaluate the impact of major triglyceride constituents of seed fats of *Madhuca longifolia* and *Engkabang* on their crystallization behaviors. Fats were initially obtained from their respective seeds using soxhlet extractor. They were subjected to analysis by high performance liquid chromatography and differential scanning calorimetry to determine their constituent triglycerides and crystallization thermograms, respectively. *Engkabang* fat was found to possess overwhelming amount of monounsaturated triglyceride (96.8%) molecules and lesser amount of both di-unsaturted (2.06%) and trisaturated (0.61%) triglyceride types. In contrast, *Madhuca longifolia* fat was found to possess around 44% monounsaturated TG molecules, 12.85% triunsaturated triglyceride molecules and 43.15% diunsaturated triglyceride molecules. The abundance of monounsaturated triglyceride over other triglyceride could have caused *Engkabang* fat to display single narrow thermal peak in the DSC cooling curve. On the other hand, a balanced distribution of differing triglyceride subclasses in *Madhuca longifolia* fat could have resulted in high-melting -and a low melting and middle-melting thermal peaks in its cooling curve. This particular crystallization feature of *Madhuca longifolia* fat would be beneficial to recover different fat components during fractional crystallization.

Keywords: *Madhuca longifolia*, soxhlet extractor, cooling curve, Engkabang fat

A Longitudinal Analysis of Rainfall of Watawala: Watershed of the Mahaweli River Basin

06 Nov.
NSM26

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Watawala is located on the western slope of the Central Highland and receives the highest annual rainfall in Sri Lanka. It is part of the watershed of the Mahaweli River Basin, which is the river basin on the largest river in Sri Lanka. The main objective of this study was to compare Watawala rainfall during the years 1958-1987 and 1988-2017 and to examine the trend of rainfall from 1911 to 2017. The rainfall trends were estimated using a linear regression model. The Mann-Kendall statistical test was applied to identify significant or non-significant monotonic trends. The results revealed that the total annual rainfall has decreased at the rate of 11.5 mm/per year from 1911 to 2017. Out of total annual rainfall, 65% rainfall is received from the South West Monsoon (SWM), which shows a statistically significant decreasing trend (9.3 mm/per year) during this period ($P<0.05$). Annual average rainfall has decreased by 337 mm (6.7%), and SWM rainfall has decreased by 219 mm (6.9%) during the 1988-2017 period compared to 1958-1987. If the decreasing trend of annual and SWM rainfall continues, there could be negative consequences for Mahaweli irrigation water supply and hydropower generation.

Keywords: Rainfall, comparison, trends, decreasing, South West monsoon

06 Nov.
NSM28

Effects of Pre-soaking Treatment on Seedling Emergence and Harvesting Time of Eight Selected Microgreens

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Microgreens are immature edible seedlings of vegetables and herbs that are rich in bioactive compounds. Seedling emergence being low and slow in microgreen cultivation leads to economic losses. The study was conducted to evaluate the ability of pre-soaking treatments to enhance seedling emergence and reduce the harvesting time of eight selected microgreen species. Four replicates with 100 seeds from each species were imbibed in distilled water for 0,3,6,9,12 h at 25^0C under ambient conditions. Pre-soaked seeds were dispersed in plastic trays filled with coir dust and compost (50:50) and kept in a plant house at 27 C under ambient conditions. Time for 50% seedling emergence (E_{50}) and time taken to reach harvesting height was recorded. One-way ANOVA using Fisher's LSD test was used to analyze the data. The following best pre-soaking treatments for each species were selected considering both E_{50} value and seedling emergence percentage; beet (6 h), carrot (9 h), fenugreek (3 h), green pea (12 h), green gram (6 h), radish (9 h), lettuce (6 h) and mustard (9 h). Those selected treatments significantly improved seedling emergence of beet (30%), carrot (45%), green pea (19%), radish (17%), lettuce (34%) and mustard (17%) ($P < 0.05$). Except for carrot, other species showed a significant reduction in their harvesting time period by one to two days. Therefore, pre-soaking can be used to improve seedling emergence percentage and rate and hence, reduce the time taken to harvest in the tested species.

Keywords: Microgreens, pre-soaking, harvesting period

Effect of Glyphosate on Removal of Alfalfa and Growth and Yield Parameters of Subsequent Rhodes Cultivation

06 Nov.
NSM30

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Increasing prices of agrochemicals and environmental pollution due to their intensive usage are major issues in agriculture. The objective of this study was to carry out a preliminary cost-benefit analysis of the application of glyphosate on removal of alfalfa for subsequent establishment of Rhodes grass. Two plots of alfalfa, 35 ha each, were selected. The tight side (RS) plot was sprayed with glyphosate [6 l of glyphosate/ha + surfactant (100 ml/ha of Captain) +1 kg/ha of urea] before 3 days of the final harvest, while the left side plot (LS) remained untreated. Following the final harvest of alfalfa, primary and secondary land preparation for subsequent establishment of Rhodes grass were practiced. Cost of agrochemicals prior to the establishment of grass was 0 $/ha and 183.2 $/ha for LS and RS, respectively. Additional cost for chemicals (MCPA, 2/4D and Captain) for the removal of post emerge weed or alfalfa were 132.75 $/ha for LS and 103.5 $/ha for RS. Total costs of land preparation (machinery + labour) were 80 /*hainLSand*42.5 /ha in RS. Total costs of cultivation were 212.75 /ha and 328.95 /ha for LS and RS respectively. Average number of seedlings /m^2 (sample size 1 m^2 with 20 plots per side) at 5 leaves stage (21 days old) were 128 in LS and (range 98-142) and 130 in RS (range 91-139). Average numbers of tillers per plant were 5 in LS and 4.5 in RS at 9 leaf stage. Yields of Rhodes in first year (total in 3 consecutive cuts) were 21.6 t/ha/yr in LS and 21 t/ha/yr in RS. The percentage of crude protein (CP) was 12.03% and 12.31% in LS and RS, respectively whereas acid detergent fibre (ADF) was 39.62% and 39.61% in LS RS, respectively. Despite the significantly higher cost incurred for the application of glyphosate to the RS, no significant differences were observed in growth and yield parameters and in chemical compositions of Rhodes between RS and LS. While the application of glyphosate resulted in increasing the total cost of establishing grass in plot RS, preliminary results indicate that there were no differences in the germination, tillering and hay quality of Rhodes grass in the absence of glyphosate.

Keywords: Glyphosate, Alfalfa, Rhodes grass, non-glyphosate cultivation

06 Nov.
NSM31

Antimicrobial Properties of Organic vs. Conventional Teas of Sri Lanka

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Tea has recently received the attention of pharmaceutical and scientific communities due to its beneficial effects on human health. Aforesaid benefits are attributed to the major chemical constituent, polyphenols with potent antimicrobial properties. The concentration and activity of polyphenols are highly dependent on environmental conditions as well as crop management systems. In Sri Lanka, tea is grown in six agro ecological regions either as conventional or organic management. The objective of this was to determine the effects of tea production system and the growing region on polyphenol content and antimicrobial properties of tea. Fresh leaf samples collected from randomly selected tea estates each for organically certified and conventional from five major tea growing regions in Sri Lanka were manufactured into CTC black tea using a miniature system. Polyphenol content was assessed by ISO 14502: PART1:2005E standard method, while the anti-bacterial and anti-fungal properties were evaluated using disk diffusion technique against *Escherichia coli* ATCC 25922 and clinical pathogen of *Aspergillus niger*. Polyphenol content, anti-bacterial and anti-fungal properties were significantly different ($p<0.05$) between the tea production systems and among the growing regions, where organic tea had higher polyphenol content, anti-bacterial and anti-fungal properties than conventional teas. Southern region tea had greater anti-bacterial and anti-fungal properties probably due to the high polyphenol content. In conclusion, this study provides some initial evidences of organically managed teas having better pharmaceutical properties over the conventionally grown teas.

Keywords: Polyphenol, anti-bacterial, anti-fungal, conventional tea, organic tea

The Effect of Three Aspergillus Species on Seed Germination and Seedling Growth of Ten Vegetable Crop Varieties

06 Nov.
NSM33

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Seed-borne pathogens are known to reduce seed germination and seedling development of crops, resulting in heavy economic losses. This study was conducted to determine the effect of seed-borne fungi *Aspergillus flavus, Aspergillus fumigatus* and *Aspergillus niger* on seed germination and early seedling growth of ten vegetable crop varieties, bitter gourd(*MC-43*), brinjal(*SM-164*), capsicum(*CA-8*), cucumber(*Kalpitiya white*), okra(*Haritha*), pumpkin(*Meemini*), radish(*Beeralu*), snake gourd(*TA-2*), spinach(*Yoda*), and tomato(*Rajitha*). Four replicates of 100 surface sterilized seeds each were germinated at 25 ^{0}C under 12/12 hour light/dark cycles for 14 days in sterilized clear plastic boxes filled with autoclaved silica sand, inoculated with 5 mL of fungal spore suspension (10^5 CFU/mL). Sterilized distilled water was used as the control and all the experiments were duplicated. Time to reach 50% seed germination (G_{50}), final germination percentage and shoot and root lengths of seedlings were measured after 14 days. *A. flavus, A. fumigatus* and *A. niger* (a) significantly reduced seed germination percentages by 28-46% in eight crops other than okra and tomato ($P<0.05$), (b) significantly increased G_50 by 3-14 days in eight crops except in bitter gourd and tomato ($P<0.05$), and (c) significantly reduced root lengths by 2-20 cm and shoot lengths by 4-20 cm in all ten crop varieties ($P<0.05$). The ungerminated seeds and affected seedlings were rotten and infested by fungi. The level of impact by the fungi varied between the crop varieties. Thus, the three *Aspergillus* species tested exert negative impacts on seed germination and seedling growth of all the ten crop species tested.

Keywords: *Aspergillus* spp., germination percentage, seed-borne, seed pathogens

06 Nov.
NSM34

Investigation of Biochemical Properties of Oncosperma fasciculatum and Areca concinna Seeds

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Present study was carried out to investigate the biochemical properties of two palm trees, *Areca concinna* and *Oncosperma fasciculatu*, endemic to Sri Lanka. Seeds extractions of the two trees were extracted in methanol. Soxhlet method was used to extract the fat content, and fatty acids were converted to fatty acid methyl esters to be analysed using Gas Chromatography. Analyses revealed that the seeds of both palm trees *Areca concinna* and *Oncosperma fasciculatum* possess oleic acid (mono unsaturated fatty acid), linoleic acid (poly unsaturated fatty acid) and stearic acid, palmitic acid, myristic acid, lauric acid, capric acid and caprylic acid (saturated fatty acids). Further, these species contain saponins, tannins and flavonoids as phytochemicals, which are believed to support the immune system against pathogens. Antioxidant activity of these species were tested using 2, 2-diphenyl-1-picrylhydrazy (DPPH) method. *Oncosperma fasciculatum* species and *Areca concinna* species showed 86.86% and 87.72% inhibition percentages, respectively. Antimicrobial activity was studied using the disc diffusion method and both species have shown considerable antibacterial activity against *Staphylococcus aureus*. Moreover, *Oncosperma fasciculatum* showed antifungal activity against *Candida* sp. Overall this study suggests that the two endemic palm trees *Areca concinna* and *Oncosperma fasciculatum* seeds exhibit antioxidant activity and antimicrobial activity which may be useful for nutritional and medicinal applications and potential antibacterial and antifungal applications. Hence, these species may be useful in future drug development.

Keywords: *Areca concinna, Oncosperma fasciculatum*, antioxidant activity, phytochemicals, antimicrobial activity

Control of Fungal Contamination in Plant Tissue Culture Using Synthetic and Natural Antifungal Agents

06 Nov.
NSM35

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Microbial contamination remains a serious issue in the plant tissue culture industry. This study was conducted to evaluate effective synthetic and natural antifungal agents to control the fungal contaminations in plant tissue culture. Different natural antifungal agents (cinnamon oil, clove oil, and ethanol garlic extraction), synthetic antifungal agents (carbendazim, mancozeb, chlorothalonil, and thiram) were screened using agar disk diffusion method against the common contaminants of tissue culture media, namely, *Penicillium* sp., *Cladosporium* sp., and *Pythium* sp. The effective antifungal agents were tested in tissue culture by calculating contamination percentage against control. Different concentrations (in the range of 50, 75, 150, 300, 600, 1200 mg/L for carbendazim, mancozeb, chlorothalonil, thiram; 100, 200, 400, 800 mg/L for cinnamon oil, clove oil and 250, 500, 1000, 2000, 4000 mg/L garlic extraction) of effective antifungal agents were used as treatments in a Complete Block Design with twelve replicates. Sterilized explants were cultured in MS medium incorporated with three natural antifungal agents and four synthetic antifungal agents with above concentrations as treatments to control fungal contamination in plant tissue culture. The highest effectiveness in controlling of contaminants were observed in 300 mg/L of carbendazim, 600 mg/L of mancozeb, 2000 mg/L ethanol garlic extraction (based on the fresh weight) for *Penicillium* sp., 300 mg/L of carbendazim, 300 mg/L of mancozeb for *Cladosporium* sp. and 300 mg/L of chlorothalonil, 600 mg/L of thiram and 4000 mg/L ethanol garlic extraction for *Pythium* sp. by incorporating to culture media, respectively. The level of plant growth and shoot production with media incorporated with antifungal agents is needs to be explored.

Keywords: Cinnamon oil, clove oil, garlic extraction

06 Nov.
NSM38

Constructing a Composite Vegetable Price Index Using Modified Factor Analysis

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This study introduces a modified factor analysis approach to develop a composite vegetable price index. The new method uses scaling by dividing the original variables with its mean, a specific weight for each individual indicator variable and the index assigns a specific numerical value to prices of vegetables for a given month. Monthly wholesale prices of nineteen vegetables were considered. As some vegetable prices were highly correlated, ten representative variables for highly correlated variables were retained based on variable-cluster analysis and correlation analysis. The grouping pattern in the data was identified through a Preliminary Factor Analysis. This resulted in a single factor explaining a substantial amount of the total variance. The original variables were divided by their means to scale the variables. The weight corresponding to a particular indicator variable was defined by squaring the Eigenvector coefficient of the given variable of the first Principle Component. Then the scaled variables were weighted and used in the final Factor Analysis. A single factor explaining 69.8% variance was selected as the composite index. First, the Vegetable Price Index was defined as a linear function of the composite index. Then it was converted into a function of original indicator variables by summarizing constant terms to make it easy to update. Cronbach's alpha was used to verify the internal consistency of the indicator variables. This method is not sensitive to variables having comparatively higher variances because of their means. Scaling in mean and weighting improved explaining variance and internal consistency of the variables.

Keywords: Composite Index, vegetable price Index, modified factor analysis

Characterization of Antibiotic Resistance Bacteria in Livestock Farms in the Kandy District

06 Nov.
NSM39

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Emergence of antibiotic resistant bacteria (ARB) is an intractable global health hazard. Antibiotics have been used extensively in livestock to treat diseases as well as to promote animal growth. In this context, surveillance of antimicrobial resistance is necessary of early detection of resistant strains of veterinary and public health importance. In this study cow dung samples were collected from 15 farms representing five zones in the Kandy district. The five zones represent Kundasale, Theldeniya, Galaha, Gampola, and Gangawatakorale. Samples were collected from small-scale farms and screened for the presence of ARB using a high-throughput assay including *E. coli.* strain ATCC 25922 as the susceptibility tester. Pure cultures of the ARB were obtained through pour plate method for further characterization. Out of the five antibiotics tested, 86% showed resistance to amoxicillin and all samples showed resistance to chloramphenicol. While there was no effect of the zone on the prevalence of antibiotic resistance, there was a clear effect of the farm. Morphological observations along with the following assays: gram stain, motility, spore formation, catalase, EMBA, lactase fermentation, methyl red, indole, citrate test were performed on the isolated colonies. Preliminary data suggest that *Citrobacter* sp. and *Proteus* sp. show amoxicillin and chloramphenicol resistance respectively. Further investigation is necessary to characterize ARB and identify the mechanism of antibiotic resistance.

Keywords: Antibiotic resistance, Amoxicillin, Chloramphenicol, cow dung

06 Nov.
NSM40

Mining for Polymorphic Sites in Rice Salinity Tolerance Gene HKT1;5 for Molecular Marker Development

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With a 389 Mbp genome, rice (*Oryza sativa* L.) has a well curated genome assembly. Genome assemblies have enabled pre-breeders to design and develop intragenic molecular markers targeting specific genes. The High-Affinity Cation Transporter (*HKT1;5, Os01g0307500*) is a gene mapped to the Saltol region in rice chromosome 1, and it is known to convey tolerance to salinity through its involvement in Na^+ or/and K^+transport. To identify genomic variations in the coding sequence (CDS) of *HKT1;5*, and to define genomic haplotypes, a 1,668bp CDS from 2,406 rice accessions were retrieved from 3000 Rice Genomes Project sequence repository at the Rice SNP-Seek Database.The retrieved sequences were aligned using Clustal Omega v1.2.0 using UGENE v1.28.1 with manual editing. In the alignment, eight single nucleotide polymorphisms (SNP) with more than 5% occurrence among the panel of accessions were identified. Based on seven SNPs at the exon 1 and one SNP at exon 2, 22 genomic haplotypes (nine confirmed haplotypes (representing at least 1% of the accessions) and 13 putative haplotypes (representing less than 1% of the accessions)) were defined using DnaSP v6. These eight SNP sites in the *HKT1;5* CDS are potential sites to develop intragenic molecular markers to evaluate their suitability for diagnostic detection of salinity tolerance in rice.

Keywords: *HKT 1;5*, marker-assisted selection, Na^+ transporter, salinity tolerance, *Saltol*

Strategic Reintroduction Profile of Alphonsea hortensis (Annonaceae), a Plant Species Extinct in the Wild

06 Nov.
NSM41

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One effective way of conserving plants is through reintroduction. The main objective of this study was to reintroduce *Alphonsea hortensis*, a tree species extinct in the wild, to its original locations. Nineteen bioclimatic variables were analysed using MaxEnt software to predict the sites before starting the reintroduction. This study was designed as four phases. The first was to find its past locations using herbarium specimens. Then develop a map with suitable locations using MaxEnt. Pre-plantation trials were done to determine the growth rate in different microhabitats (open, shade, partial shade). Finally, top and deep soil sample from forest reserves within the selected areas were checked for nutrients. These values were compared to Royal Botanical Gardens,Peradeniya soil by using One Way ANOVA pair wise comparison of Dunnett model at significant level $\alpha = 0.05$. Among the predicted soil properties were much similar in Molkawa and the location at RBG. Both striata soil pH and P, conductivity, Na, K in surface soil, were not significantly different between these two localities. In all locations, percentage of Ca and deep soil percentage of K were significantly different ($p < 0.05$). The growth rate was highest in partial shade, medium in open and lower in shady environments. This suggests that reintroducing *A.hortensis* has to be done in partially shady localities and Molkawa in the southwestern region of Sri Lanka could be recommended as a site for reintroduction. This criteria used for the reintroduction could be used in the future conservation of other plants enhancing benefits of ex-situ conservation.

Keywords: Extinction, conservation, reintroduction, wild-extinct

06 Nov.
NSM44

Effect of Root wash of Panicum maximum on the Growth & Development of Selected Crop Plants

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Plant growth promoting rhizobacteria (PGPR) are the soil bacteria that promote plant growth and development by various mechanisms. These naturally occurring plant beneficial rhizobacteria may have the potential to be developed as a bio-fertilizer. In this study, the effect of the rhizosphere microorganisms in the root wash of *Panicum maximum* on the growth and productivity of the selected crop plants were investigated. Root wash was used as it is highly likely to includes all rhizosphere organisms. Firstly sample of root wash was taken from the young weedy plant *P. maximum*. To observe the effect on plant growth, plant pot experiments and the field experiments were done using selected three crops of *Capsicum annuum* var. MI, *Capsicum annuum* var. Bull nose and *Solanum melongena* with the five different treatments; A bio-fertilizer formulation previously developed, cow-dung, root wash, root wash with cow dung and control treatments. Growth parameters, plant height, no of branches, flowers, fruits per plant and root length were measured. The study showed that the treatments had variable effects on growth and development of crops; highest significant effect observed from the root wash according to statistical analysis of one-way ANOVA at the 0.05% probability level ($P<0.05$). As such, these bio-inoculums may be developed as a bio-fertilizer which enhances the plant growth and development. Further studies, however, should be carried out to evaluate the efficacy of developed bio-inoculums as a bio-fertilizer.

Keywords: PGPR, *Capsicum annuum, Solanum melongena*, Bio-fertilizer, Soil

Preparation of Nam-Nam (Cynometra Cauliflora) Wine and Evaluation of Its Biochemical Properties

06 Nov.
NSM45

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Cynometra cauliflora ("Nam-Nam") is a fruit associated with well-known pharmacological effects and possesses folk medicinal values in treating several diseases. However, this seasonal fruit has short shelf-life under tropical conditions. The production of functional beverage (wine) from this fruit can preserve its nutraceuticals and health boosting properties and reduce post-harvest losses. Hence, the main aim of the present study was to prepare wine using *C. cauliflora* fruit and to conduct sensory evaluation and phytochemical analysis of the wine. Nam-Nam wine was prepared by fermentation of ameliorated must of *C. cauliflora* using *Saccharomyces cerevisiae*. In this study, by changing sugar percentage, three different wine samples were initially formulated as 0%, 10% and 50%. To identify if consumers prefer wine samples, sensory evaluation test was conducted based on five-point hedonic scale (appearance, color, aroma, texture and taste) using 30 panelists. Then consumer preferred wine sample was screened for preliminary phytochemicals using standard methods. Further, physicochemical parameters (titratable acidity and pH) of the wine was measured. In sensory analysis, 50% sugar added Nam-Nam wine sample was selected as the most preferred wine sample. Formulated Nam-Nam wine was rich with alkaloids, terpenoids, flavonoids phytochemicals. The sugar content of the initial formulation remarkably decreased after fermentation and pH of the wine sample increased from pH 3.8 to 4.4. The titratable acidity of final product was 0.9%TA. In conclusion, an acceptable fruit wine can be produced from Nam-Nam fruit, which can help to reduce postharvest losses. Moreover, producing a functional wine from Nam-Nam could be more effective than conventional methods of preserving nutrients present in the original fruit juice. Further research needs to be conduct to test alcohol content, anti-mitotic activity and anti-diabetic effect of the Nam-Nam wine.

Keywords: *Cynometra cauliflora*, Nam-Nam, phytochemicals, wine

06 Nov.
NSM47

Survey on Socio-economic Status of Orchid Farmers at Nattandiya DS Division, Puttalum District, Sri Lanka

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Orchids are a frequently grown ornamental plant consisting of many varieties with high price value in the local and international market. Experiment was done to analyze socio-economic status of small-medium scale orchid farmers at Nattandiya DS Division, Puttalam District, North Western Province, Sri Lanka using Simple random sampling technique. Data collected from personal interviews with 100 farmers during the period from September to November, 2017 were analyzed using SPSS software. Growers were categorized into small scale farmers (<100 plants), medium scale farmers (100 to 1000 plants) and large scale farmers (>1000 plants). Respondents gender, marital status, age and monthly revenue represent the status of farmers. Result showed that all of the sampled orchid farmers (100%) were married and majority were female (65%). The majority (80%) of respondents age was between 30 to 50 years. Majority of respondents (70%) revenue per year was Rs. 10,001 - Rs 30,000. All the sampled small scale farmers (100%) were engaged in cultivation of *Dendrobium* as potted plants. *Dendrobium* sp. has high demand in the local market. The medium scale farmers cultivated all four popular varieties of orchid [*Dendrobium* sp. (100%), *Phalaenopsis* sp. (100%), *Vanda* sp. (40%) and *Cattleya* sp. (20%)] as potted plants (40%) and cut flowers (60%). The involvement of farmers in cut flower production is higher than potted plant production. Result indicated that cultivation is mainly done by the married women aged between 30-50 years and has the potential to be a profitable occupation.

Keywords: Cut flower, *Dendrobium* sp., farmers, income, orchid, potted plant

Investigation of Throat Colour Polymorphism in Relation to Sex and Body Size of the Litter Skink, Lankascincus fallax

06 Nov.
NSM48

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Colour polymorphism is a pervasive phenomenon in both animal and plant kingdoms. Understanding the evolution and maintenance of polymorphism is of interest to evolutionary biologists. Among the lizards of Sri Lanka, the skink *Lankaskincus fallax* shows throat colour polymorphism where its relationship to sex and body size is unknown. Hence, this study was carried out to examine the relationship of throat colour-morphs to sex and body size in this species. Live skinks were sampled from two locations in Sri Lanka for a period of four months. Sex and the throat colour were determined visually and the snout-vent length (SVL) was measured in the field. Tail tips of selected individuals from the two locations were taken and a fragment of the 12S rRNA gene was sequenced in representative individuals having the different throat colours. Pairwise genetic distance of the three colour-morphs ranged between 0.4-0.5%, confirming that the three colour-morphs were the same species. Three colour-morphs (red, black and white) were observed in males in both locations, while only the white morph was observed in females, suggesting that the colour polymorphism was confined to males. There was a significant association between throat colours and sex and a significant difference between mean SVL of colour (red, black) throated (39.35 mm) and non-coloured throated males (30.31 mm). Thus, our study suggests that the throat colour in these skinks is highly associated with sex and the body size (SVL) in males. Future studies are necessary to understand the underlying drivers for the presence and maintenance of these different throat colours.

Keywords: Sexual dimorphism, DNA-barcoding, scincidae, endemic species, conservation

06 Nov.
NSM49

Diversity of Chiropteran Fauna in the Southeastern Semi-Arid Zone of Sri Lanka

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Sri Lanka is home to 31 species of bats and however, the diversity of bats in semi-arid habitats of the country is not known. Therefore, a survey of chiropterans was carried out in the south-eastern semi-arid zone. Sand dunes, thorny scrub forests, occupied and unoccupied buildings in and around Jetwing Yala hotel premises ($6^0$15'01.18"N, $081^0$23'50.66"E) were surveyed during a six day rapid survey. The study area is located in the eastern edge of Hambantota district around 4 km away from the Yala National Park. The area receives <500 mm annual rainfall and the average temperature is >29^0C. Visual encounter survey (day time to record bat roosts), capture survey and bioacoustics survey (06.30pm to 6.00am) techniques were employed. Triple high mist net system with 7.5×12 m capture area was used to capture bats. Echo Meter Touch 2 Pro and Pettersson M500 microphone were used to record bat sounds. Recorded bat sounds were analyzed using Kaleidoscope Pro 5 software. Total survey effort recorded six species of bats belong to four families representing five genera. Of the total, two species are frugivorous including *Pteropus giganteus* and *Cynopterus sphinx* and four are insectivorous including *Hipposideros speoris, Hipposideros ater, Pipistrellus coramandra* and *Taphozous longimanus. Hipposideros speoris* and *P. coramandra* day roosts were observed in buildings of the hotel. *Taphozous longimanus* colony was observed on a tree trunk of a *Borassus flabellifer* tree. A colony of *Cynopterus sphinx* was observed under lateral sides of a *Borassus flabellifer* leaves. *Hipposideros ater* was only recorded by capture methods. This study recorded 06 species of bats belonging to 05 genera that represent 19% species and 26% genera in order Chiroptera in Sri Lanka.

Keywords: Chiropteran, Species, Semiarid, Sri Lanka

A Generalized-Value Approach on Performing Inferences for the Generalized Inverted Exponential Distribution Reliability Function

06 Nov.
NSM51

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Life-testing and reliability studies are very important in providing warranties on lifetime of products. The exponential distribution is very popular statistical model extensively applied in many fields. This study considers a novel approach based on a generalize variable method for the inference about the reliability function of generalized inverted exponential distribution (GIED) with progressive type II censoring with fix removals. Based on these assumptions, obtain both the generalized and classical lower boundaries and p-values for the reliability function used for hypothesis testing. An example with the scheme of progressive type-II data and Monte Carlo simulation applied to illustrate the proposed method. An application to deep groove ball bearings data, even though both lower boundaries gives similar results, classical p-values are larger than the generalized p-values which show that the proposed method works better under any conditions, but the classical method does not for some cases.

Keywords: Generalized p-value, generalized confidence interval, progressively type II censored sample, fixed removals, generalized inverted exponential distribution

Removal of Residual Aluminium in Electrochemically Treated Water

06 Nov.
NSM52

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Electrocoagulation (EC) is a proven green technology for the removal of fluoride, hardness and hazardous heavy metals from water. However, residual aluminium in treated water is a major issue in EC. Electrocoagulation process was carried out in batch mode at different pH values with aluminium electrodes. A constant DC current of 1.0A was applied and the resulted precipitate of aluminium hydroxide and aqueous solution were analyzed for Al by Inductively Coupled Plasma Optical Emission Spectrometry as a function of electrolysis time. The removal of residual Al in aqueous phase was accomplished by two different methods. In method one, activated carbon was subjected to 24 h $Ca(OH)_2$ treatment followed by CH_3COOH treatment and finally oven dried. In method two, aniline was chemically polymerized by ammonium persulfate on the surface of purified graphite powder dispersed in 0.1 mol dm^{-3} HCl. Green colored polyaniline embedded graphite powder was separated, washed with distilled water and oven dried at 60 ^{0}C for 6 hours. Both base treated activated charcoal and polyaniline embedded graphite were characterized by UV-visible and Fourier Transform Infrared spectroscopic techniques and used for subsequent experiments. Aqueous phase of electrocoagulated system at different pH was passed through a column prepared by two adsorbents. It was found that highest removal percentage of 80% showed by polyaniline embedded graphite at pH 10 compared to that of 60% removal efficiency by base treated activated carbon at the same pH. Therefore, polyaniline embedded graphite system could be a promising material for the removal of excess Al in treated water by EC.

Keywords: Electro Coagulation, aluminium, activated Carbon, polyaniline embedded graphite Removal efficiency

Action of Porphyrin Derivatives Against Skin Fungi, Candida albicans and Malassezia furfur

06 Nov.
NSM53

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Porphyrins are deeply coloured highly fluorescent compounds of natural or synthetic origin with a broad spectrum of applications such as medicine, dye-sensitized solar cells and electrocatalysis. In oxygenated media, in the presence of light, porphyrins generate Reactive Oxygen Species (ROSs), singlet oxygen and superoxide radicals which can be toxic to microbes. Certain pathogenic fungi show resistance against available antifungal products and some are toxic and irritant to humans. In the present study, the effect of sodium salt of meso-tetra (4-carboxyphenyl) porphyrin and Zn (II) meso-tetra (4-carboxyphenyl) porphyrin (ZnTCP) were tested against fungi *Candida albicans* and *Malassezia furfur* by using standard agar disc diffusion method. Sabouraud Dextrose agar (SDA) as the fungal culture medium and a 10 ppm clotrimazole solution (antifungal cream) as the positive control was used. Inhibition zones (11 mm) were observed in *M. furfur* treated with 10 ppm sodium salt of meso-tetra(4-carboxyphenyl) porphyrin. *Malassezia furfur* treated with ZnTCP showed 12 mm averaged inhibition zone diameter and both were compared with the inhibition zones of positive control using one-way ANOVA followed by Tukey's Pairwise comparisons. There was no significant difference compared with positive control and porphyrin salts. However, for *C. albicans* there was no observed antifungal effect of porphyrins. Therefore, above results proved that both porphyrins have antifungal effects on fungi *M. furfur*, and no antifungal effect against *C. albicans*.

Keywords: Porphyrin, photodynamic action, antifungal, *candida albicans*, *Malassezia furfur*

06 Nov.
NSM57

Surface Modification of Montmorillonite Clay by Benzenediazonium Cation: Ammonia Gas Sensor

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Ammonia is produced in various chemical industries and intensive livestock farming. Exposure to high levels of ammonia brings health issues in humans, and therefore, development of sensitive platforms for sensing ammonia at room temperature has received significant attention. In this study, a sensitive and highly selective benzene diazoniumchloride intercalated montmorillonite clay (BDC-MMT) based sensor was developed. Intercalation of benzene diazoniumchloride was accomplished by allowing aniline to get adsorbed onto clay and dropwise addition of 0.1 mol dm^{-3} $NaNO_2$ for a period of one hour at 5^0C. Formation of benzene diazonium cation was confirmed by the Fourier-transform infrared spectroscopy characteristic peaks at around 1513 cm^{-1} and 1456^{-1} for the presence of NO group and -N=N- group respectively. UV-Vis spectral analysis of BDC-MMT thin film showed a characteristic absorption band at 492 nm due to conjugated structure formed by azo bond. Exposure of BDC-MMT to dry ammonia gas changed the original reddish-brown colour to yellow colour. Experiments continued with sulphur dioxide, hydrogen sulphide, and formaldehyde vapour showed no detectable change in colour or UV-visible spectral data. This suggests the applicability of BDC-MMT sensor for detection of ammonia gas.

Keywords: Montmorillonite, diazoniumchloride, ammonia, sensor, selectivity

Optoelectronic Property Evaluation of Synthesized Organic dyes using DFT/TDDFT Computational Strategies

06 Nov.
NSM60

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Computational calculations play an important role in designing new sensitizers, which provide an insightful understanding of the correlation between optical properties and the chemical structures of the dyes. In this study, series of synthesized organic compounds: Anthracene-9-ylethylanthracene-9-carboxylate, Pyrene-1-ylmethyl-4-bromobenzoate, Pyren-1-ylmethyl-4-(9-hexyl-6-4-[(pyren-1-ylmethoxy) carbonyl] phenyl-9H carbazole-3-yl), 3, 6-di (anthracene-9-yl)-9-hexyl-9H-carbazole,9-10-di(pyren-1-yl)anthracene,2,5-bis(anthracene-9-yl)-3-hexylthophene,and 3,6-bis(phenanthren-9-yl)-9-phenyl-9H-carbazol were studied by both density functional theory (DFT) and time dependent density functional theory (TDDFT) calculations using Gaussian 09 software. The solvation effect of acetonitrile solution is included in the calculations of molecular structural properties, electron bands and optical excitation spectra properties. Results reveal that 3,6-bis(phenanthren-9-yl)-9-phenyl-9H-carbazol is a more promising candidate for efficient dye-sensitized nanostructured solar cells (DSSCs), with relatively smaller energy gap and satisfied levels of series of optoelectronic properties. The results of this study is a good starting point for molecular level science of low-cost metal-free organic sensitizers based on organic dyes.

Keywords: Optoelectronic devices, organic dyes, DFT, TDDFT, Gaussian09

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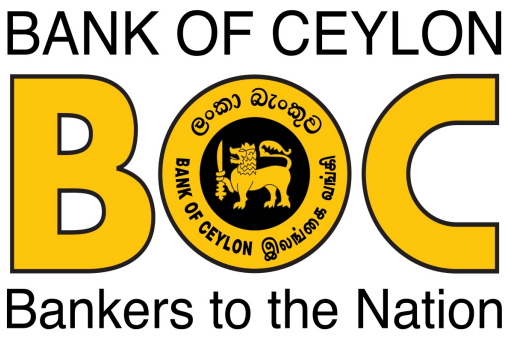
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