OURS 2022

International Open University Research Sessions 2022

"Contemplations towards Next Normal for a Smart Future – Directions and Dimensions"

10th and 11th November 2022

THE OPEN UNIVERSITY

OF SRI LANKA

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MESSAGE FROM THE VICE-CHANCELLOR

I am indeed happy to contribute this message to the International Open University Research Sessions 2022 (iOURS 2022), which is one of the significant annual events in the university calendar. Research has a clear potential to make significant contributions to the quality of higher education. Therefore, universities have an obligation to make the research-teaching nexus as strong as possible. The annual OURS provides an opportunity for sharing of knowledge created through research across disciplines.

The Annual Research Sessions publishes the results of multidisciplinary research in the areas of Open and Distance Learning (ODL), Education, English Language Teaching, Natural Science, Engineering Technology, Health Sciences, Humanities and Social Science, and Management Studies. It is open for the publication of research articles, reviews, and research communications in all disciplines. The iOURS provides a forum for OUSL academics as well as researchers at other state universities and Non-State Sector Higher Educational Institutions (NSHEIs) to publish high-quality research from a broad area of disciplines.

Today, the economies of developed countries are mainly based on scientific creativity and innovation. The economic targets of a country can be largely achieved through a dynamic and progressive education system that is geared towards creating policy makers, as well as scientists. A developing country like Sri Lanka needs approaches that facilitate the generation, application, and diffusion of knowledge at the local level. Rather than unquestioningly adopting solutions developed elsewhere, an emphasis on strengthening local capacity to generate, apply, and disseminate knowledge can help put in place an ongoing process of action and reflection. Subsequently, it encourages respect for the existing knowledge base of a community; raises the community's confidence in its ability to devise, implement, and assess solutions; and helps to systematize and expand local knowledge. I strongly believe that iOURS 2022 undoubtably stimulates this platform.

Developing and enhancing human skills and capabilities through education, research, learning, and meaningful work are the key drivers of economic success for individual well-being and societal cohesion. The global shift to a future of work is defined by an ever-expanding cohort of new technologies, new sectors and markets, global economic systems that are more interconnected than in any other time in history, and information that travels quickly and spreads widely. Despite the current high degree of uncertainty, this research forum uses a unique combination of qualitative and quantitative research approaches to expand the knowledge base to overcome those challenges. I strongly believe that the iOURS 2022 will provide insights into the latest research and best practices of delivering high quality Open Flexible and Distance Learning (OFDL) and will also be a stepping stone for the further development of OUSL's national and international advocacy campaigns.

While congratulating the presenters and thanking the organizing committee, I wish the Annual Research Sessions of the OUSL 2022 all success.

Prof. P.M.C. Thilkarathne
Vice-Chancellor

PREFACE

The iOURS 2022 is held from 10th -11th November 2022 on a fully online platform under the theme "*Contemplations towards Next Normal for a Smart Future – Directions and Dimensions*". It commences with its inauguration on Thursday, 10th November, followed by academic sessions in twelve sub-themes, and continues on 11th November 2022. The invited speeches and all presentations are to be presented online.

This year, we received 202 abstracts and extended abstracts for review and 140 abstracts were selected for presentation following a rigorous and blind peer review process. The abstracts we received covered a wide range of sub themes which include ODL, Education, English Language Teaching (ELT), Engineering and Technology, Health Sciences, Biological Sciences, Environmental Sciences, Agriculture, Physical Sciences, Humanities and Social Sciences, Management, and Law. This volume contains the abstracts accepted for presentation and publication in the conference proceedings.

The Chief Guest at the inauguration of iOURS 2022 is Prof. Ebba Ossiannilsson who is a Professor at the Victoria University of Wellington, New Zealand, a SPARC European Open Education Champion, and the Chair of the ICDC OER Advocacy Committee. The keynote addresses are to be delivered by Prof. Arjuna Parakrama, Professor of English and the Director of the Centre for the Study of Human Rights, University of Peradeniya, Sri Lanka, and Prof. Charlotte Nirmalani Gunawardena, Distinguished Professor, Online Education and Instructional Technology Organization, Information and Learning Sciences Program, College of University Libraries and Learning Sciences, University of New Mexico, USA. We are very grateful to all of them for taking time off from their busy schedules to be with us at the sessions.

A special feature of the iOURS 2022 this year is the six panel discussions organized by the faculties of Education, Engineering and Technology, Health Sciences, Humanities and Social Sciences, Management Studies, and Natural Sciences of OUSL. Another highlight of this series of events are the Pre-Conference lectures and workshops to be conducted on 8th and 9th November 2022 by the Research Unit of OUSL in collaboration with the six faculties of OUSL.

Organizing an event of this nature and magnitude required the collaborative and dedicated effort of all the members of the organizing committee of iOURS 2022. From formulating the Call for Abstracts to compiling a volume of proceedings and planning the research sessions, everyone worked hard in a true spirit of leadership and teamwork. Therefore, on behalf of the Senate Sub-committee for iOURS 2022, I thank all the authors who submitted abstracts and extended abstracts to the conference, all reviewers for their intellectual input that helped shape and uplift the quality and rigour of the research to be presented at the sessions, and the language editors, theme conveners, and the Session Chairs of iOURS 2022.

We appreciate the services rendered by members of the Senate Sub-committees for the OUSL Research Awards, OUSL Best Educational Video Production, and Best Interactive Multimedia Awards for selecting the awardees. This year, a new category

of award - the Three-Minute Thesis (3MT) competition - was introduced. We appreciate the 3MT Organizing Committee for their hard work and the judging panel for selecting the winners.

We wish to record our thanks to the Vice-Chancellor, Professor P.M.C. Thilkarathne, for his ready support in carrying out our work to make this event a success. We also thank him for suggesting new events such as the 3MT Competition, as well as faculty-organized panel discussions for the dissemination of knowledge and thought-provoking research ideas.

We thank Prof. Gayathri Jayathilake and the staff of CETMe for designing the graphics and video coverage of iOURS 2022 inauguration session. My special appreciation is extended to Mr. Samith Daladawatta at CETMe and Mr. J. P. P. Tharanga at the Department of Computer Science, OUSL, for maintaining and updating the iOURS 2022 web page. I specially thank Dr Ruwan Illeperuma for his hard work as the Chairperson of 3MT Organizing Committee.

I extend a very special appreciation for the excellent team effort of "iOURS 2022 Online Working Group" for their efficiency and willingness to make the iOURS 2022 online conference a reality. The untiring efforts of Dr. Uthpala Premarathne, Dr. Dushantha Alwis, Dr. Lahiru Wijeynayake, Prof. Gayathri Jayathilake, Mr. Lal Medawattegedara, Ms. Mayanthi Jayakody, Dr. Chandani Ranasinghe, Ms. Nilakshi Wickramasuriya/AR-Fac. Education, Ms. Vindya Angammana/AD-CRC, Mr. J.P.P. Tharanga, Mr. Kanishka Tennakoon, Mr. Krisahantha Lokuge/Web Administrator, and Mr. Chameera Chandrarathna is greatly acknowledged. The secretarial assistance provided by Ms. Vajini Subodha and Mr. Chathuranga Liyanage is very much appreciated.

Finally, let me thank all the presenters whose research and ideas will be showcased here and, the participants.

I am sure that iOURS 2022 will bring you renewed motivation and enthusiasm to engage in more productive research.

I wish all of you two days of intellectually stimulating and successful engagement in the research sessions.

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Address of the Chief Guest

A New Social Contract for Education for Well-Being, Inclusion, Equity, and a Smart Future for Individuals and the Planet

Education is a basic human right. It has long held a special place in the hearts and minds of people around the world, and for good reason. Throughout history, it has been a source of personal dignity and empowerment and a driving force for the advancement of social, economic, political, and cultural development. But today, education is in crisis, plagued by inequalities, and struggling to adapt to the needs of the 21st century. The effects of this crisis only reveal themselves over time and often remain invisible. However, they are profound and will be felt for decades to come. According to the Transforming Education Summit (UN), the international community must give this crisis the attention it deserves in order to transform our world by 2030 in line with the Sustainable Development Goals. It is therefore necessary to respond with determination, conviction, imagination and solidarity to transform education. In my presentation, I will highlight some global initiatives for a paradigm shift and a new social contract for education that aims for social justice and inclusion, in which open, flexible learning and distance education are a strategy that enables economic, social, political and digital justice to enable personalized, collaborative lifelong learning across the lifespan that focuses on health, well-being, inclusion, equity and a smart future for individuals and the planet.

Professor Ebba Ossiannilsson
Professor, Victoria University of Wellington; NZ
SPARC European Open Education Champion
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Keynote Address 1

Resisting the After-Shock Dogma: Rejecting Neoliberal Economic Policy as the Engine of Change in Educational Principles and Practice

"Disasters and emergencies do not just throw light on the world as it is. They also rip open the fabric of normality. Through the hole that opens up, we glimpse possibilities of other worlds… For governments looking to monitor their citizens even more closely, and companies looking to get rich by doing the same, it would be hard to imagine a more perfect crisis than a global pandemic."

Naomi Klein famously claimed in 2008 that neoliberal "free market" policies have come to dominate the contemporary world because they are smuggled in to so-called third world economies when the people of these countries are disaster-shocked and, I would add, crisis-devastated, as in Sri Lanka today. The key understanding is that unpopular and even discriminatory political and economic policies are imposed when people are preoccupied with life- and livelihood-threatening crises. My contribution, articulated for the first time here, is to argue that there are two distinct phases to this process of imposing unacceptable decisions of far-reaching long-term consequences on the public. First, we experience the decisions made during the immediate crisis or shock situation as extensively described by Klein, and, second, we suffer through the longer-term after-shock period where the catastrophic consequences of the original crisis are combined with the ongoing repercussions of State-imposed neoliberal policies, deliberately misperceived as solutions.

It is during this second after-shock period that the fields of education and higher education are most adversely, even irrevocably affected. This debacle takes place in four distinct but inter-connected ways. First, governments and their propaganda machines convince both the public and the experts that the crisis does not allow any other alternatives at this point of time. Hence, the government proposes a set of responses to the crisis they have created, and thereafter makes this into a fait accompli which all responsible academics must espouse and develop, at the risk of appearing insensitive to palpable public need as well as being seen as selfish and grossly impractical. Specifically, we are coerced into the conviction that schools should be closed and university education should be conducted online, as if there's no other option. Yet, as I oppose the reduction of teaching to facts and information remotely dispensed linearly in lines of text online, I realise that even this formulation, privileging as it does conventional face-to-face teaching for all contexts, doesn't do justice to the nuanced ways in which online education — especially in relation to open and distance learning — can actually help to redress systemic inequalities as well.

Second, the Government identifies selected experts and other champions, as urgently required to step up to the plate during this hour of need, and to assist the nation in the recovery process. Those who raise principled and fundamental objections are ridiculed as irrelevant, or maligned as pawns in political games. The simple fact that online (higher) education further excludes rural poor students from the right to learn, since power cuts, signal failures and the lack of computers or smart phones have catastrophic consequences for them, as well as for many non-elite others, exacerbated by economic destitution, is thus ignored. Moreover, within a neoliberal framing of education as a financial investment, such sections of society are dispensable. How convenient that the pandemic and the crisis help to achieve this objective of eliminating what are seen as non-viable students, sans widespread public opposition due to the After-Shock Dogma!

Third, proposals are advanced and validated, all based on the premise that the solution to the crisis can only be found within the established framework of the neoliberal economic response proposed by the IMF-World Bank-Sri Lankan Government neoliberal nexus. We are manipulated into "forgetting our differences and uniting for the common good." We find, therefore, the best ways of providing an inadequate and fundamentally flawed educational experience. To quote myself misquoting Wittgenstein, "a crack is showing in the organic unity of university education and one tries to stuff it with straw, but to quieten one's conscience one uses only the best straw." If we are to remove the blinkers imposed by the After-Shock Dogma, this always-already failed attempt at teaching-learning in absentia, becomes both futile and frustrating. Our energy must be better spent to forge a new path out of this mess, which is rights-based, structurally excludes no one, is pragmatic, while retaining its idealist core.

Fourth, and coming back full cycle, a consensus has been built that the predicament and its solution are givens, which cannot be usefully contested, and on the basis of this scenario, the proposed changes, in education in this instance, must be implemented expeditiously and unquestioningly, if we are to collectively mitigate the crisis for present and future generations. We are, therefore, stuck between the metaphorical devil and deep blue sea, forced to choose among options that are all unacceptable. We shake our collective head and bemoan our fate as we passively participate in ways of teaching without contact, denying free higher education again and again. What neoliberal policies and World Bank directives could not hitherto accomplish due to public outrage, the "new normal" has done for us, against us. Hence, by this stage we have bought into the doctrine that expenditure for (higher) education needs to be drastically reduced, and we manage as best we can. Why?
I argue, therefore, that the terminology of the hour, such as "New/Next Normal" and "Smart Future" are part of the problem of the insidious predation of our values and beliefs through the After-Shock Dogma process, which is based on dubious

premises and privileges the status quo. Language is never neutral. The historical and contemporary provenance of words present a palimpsest of the social values they both reveal and cover over as we use them. For instance, the word "credit" followed a "semantic trajectory from (religious) belief and trust to trustworthiness in general, and then to quantifiable monetary worth [which] clearly reflects the overall shift in emphasis from the extra-economic to the economic coding of value, from use to exchange value. . . . [and led to] the transformation of the concept's primary meaning from value in general, with an emphasis on the ethical, to a specific technical evaluation of monetary worth. It would not be too much of a stretch to argue that the trajectory of the narrowing meaning of credit, together with semantically similar words such as worth, reflect the reductive economization of value itself." In our context too we see how urgent education "reform" is represented as servile alignment with a (neoliberal) market.

Analogously, as is well-known, discussion on new/next "normality" is predicated on the covid pandemic context, whereas in Sri Lanka the pandemic situation no longer takes centre stage, as we suffer the simultaneous explosion of a four-fold economic, political, social and ideological web of crises. Our challenge is to undo the western pandemic-oriented notions of "normality" without wearing neoliberal spectacles. To innovate appropriate pedagogical responses, radical alternatives such as those practiced by Paulo Freire, Sri Aurobindo and Jiddu Krishnamurti, to name only three among many, require our careful attention now.

All teaching always also involves the teaching of values, whether we choose to or not. Hence, the easy "normal" which excludes and instrumentalizes, which forgets that education is a right to be enjoyed by all, which thrives on an uneven playing field, which equates education with employment, which rationalizes inequality on the basis of the After-Shock Dogma, must be unequivocally rejected. In its stead we must re-conceptualize our transformative teaching role in this time of multiple crises that prepares us to learn to learn from our predicament as if we are seeing this for the first time, unburdened by the baggage of ideology and the bewitchment of the four phases of the after-shock. I have no formula to offer except the rejection of hand-me-down formulas from business-speak and IT discourse. Instead, I invite you to reinvent, reformulate and reconceptualize how best we can use this crisis to clear a new path, seeing afresh, as strangers in our own land, focusing on the most subaltern of our students, always and relentlessly.

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Keynote Address 2

Transforming Learning Environments in a Post-Pandemic Era: Connectedness, Collaboration, and Co-Construction

This session will explore the future of learning in a post-pandemic digital world and focus on a major trend that will shape higher education learning environments of the future; the connection and sense of community between learners, teachers, and mentors, collaboration among them, and co-construction of knowledge in order to solve real world problems. Networking technology, a key player in the learning environments of the future will drive a paradigm shift from the teacher in control to networked students in control, for whom acquiring knowledge will no longer be a sufficient learning outcome, as they must develop new skillsets such as negotiating learning within teams, creating new context-sensitive understandings, and producing novel solutions to real-world problems.

So, how do learners connect, develop a sense of community, collaborate, and co-construct? Social presence gets at the heart of connectedness. What is social presence? Why is it important? How is social presence related to communication and collaboration? Can social presence be cultured among participants? We will explore these questions and research studies that have shown the impact of social presence on learner satisfaction and the social construction of knowledge. Once connection and community are established, how do learners collaborate and co-construct? We take a look at the wisdom Communities (WisCom) design framework (2019) and how it can be applied to develop learning environments that support collaboration and co-construction of knowledge in ill-structured knowledge domains. Seven components (wisdom community, communication, technology, distributed co-mentoring, learner support, the collaborative inquiry cycle and transformative learning) guide the design, delivery, and assessment of learning. It starts with wisdom and community and ends with transformative learning.

The session will conclude by reflecting on the ways in which we must change the culture of assessment to evaluate the 4Cs (connectedness, community, collaboration, and co-construction) and help the learner become a more sophisticated assessor of one's own learning.

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PROCEEDINGS

OPEN AND DISTANCE LEARNING (ODL)

LIFE SCIENCES

I. AGRICULTURE

ENVIRONMENTAL SCIENCES

PANEL DISCUSSIONS

OPEN AND DISTANCE LEARNING (ODL)

VIRTUAL INTERVENTION ON CAREER READINESS OF UNDERGRADUATES DURING THE PANDEMIC LOCKDOWN: SIGNIFICANCE, CONSTRAINTS AND IMPLICATIONS FOR FUTURE

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This study attempted to investigate the effective implementation of a virtual career readiness intervention and its perceived impact on the career readiness of BSc undergraduates of the Open University of Sri Lanka (OUSL). The virtual career intervention was jointly organized by the student-staff societies of the departments of Zoology and Chemistry of the Faculty of Natural Sciences. The career readiness -intervention was intended to enhance the employability of BSc undergraduates of OUSL by facilitating them to comprehend the employers' expectations in terms of knowledge, skills and attitudes. The online sessions were conducted by invited resource personnel from leading government and private sector organizations, alumni of the Faculty of Natural Sciences and staff of the Departments of Zoology and Chemistry. A certificate of completion was awarded upon submitting a reflective learning log on personal experience and achievements of the workshop after completing all three sessions. Learners' perceived impact of the intervention on their career readiness was evaluated by a self-administered online questionnaire consisting of both closed and open-ended questions. A total of 47 participants submitted the reflective learning log and responded to the questionnaire. Survey data revealed that the majority of the respondents (87%) were unemployed at the time of the workshop, and 89.36% of them were females. The majority of the respondents belonged to the 25-29 age category. Further, 46 students (97.9%) commented that the workshop was well organized, and 93.6% of students agreed that it fulfilled their career readiness expectations. Further, 48.9%, 42.6%, and 27.7% of students stated that session 1, session 2, and session 3, respectively, were instrumental in developing their skills. 95.8% of students said it helped them to understand employer expectations, and 4.2% strongly disagreed. 97.8% of respondents reported that they were able to understand career options. Overall, participants were satisfied with the career readiness intervention, and they endorsed that the objectives of the workshop were fulfilled. The outcome of this study may have implications for increasing the employability of OUSL BSc undergraduates through the effective transition from university to the workplace. Further, a longitudinal study is required to determine the impact of this workshop on participants' employability and ensuing career success.

Keywords: Career readiness, career readiness intervention, employability, employer expectations, skills

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STUDENTS' DROP-OUT RATES IN HEALTH SCIENCES DEGREE PROGRAMMES AT THE OPEN UNIVERSITY OF SRI LANKA

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The Open University of Sri Lanka is the only university in the country that facilitates Open and Distance Learning (ODL) education at all academic levels. Students' drop-out from degree programmes has been a burning issue of the OUSL which results in low retention and graduation rates. Therefore, this research study aimed to investigate the students' drop-out rates and their causative factors, for three degree programmes offered by the Faculty of Health Sciences: Bachelor of Science Honours in Nursing, Bachelor of Medical Laboratory Sciences (MLS) Honours and Bachelor of Pharmacy Honours. Students' registration data were obtained from IT division for academic years 2011 – 2019 for Nursing and from 2013 – 2019 for MLS and Pharmacy degree programmes. Furthermore, a questionnaire was sent to students who had not registered for 5 consecutive years to find out the factors that had affected students to drop-outs from the programme. Collected data were analyzed degree programme-wise. Results revealed that 14% (187 new-registrant students out of 1349), 23% (44 new-registrant students out of 193) and 19% (33 new-registrant students out of 178) students had dropped the Nursing, MLS and Pharmacy degree programmes respectively. However, overall drop-out rates were decreased through the years for the considered three degree programmes. Moreover, drop-out rates were higher in Colombo Regional Centre and male students were more likely to drop the degree programmes. Results revealed that "friends dropping out from the programme", "large number of assessments" and "inability to take leave from work" had highly affected students to drop-out from the Nursing, MLS and Pharmacy degree programmes, respectively. Thus, the most common factors identified were lack of peer support, course-related and work-related factors. Based on these preliminary findings, the Faculty of Health Sciences expects to introduce certain measures via the Learner Support Cell of the Faculty to facilitate and motive undergraduates to continue their studies.

Keywords: Drop-out of students, Health Sciences degree programmes, Open Distance Learning

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THE CHALLENGES FACED BY LEARNERS IN THE CONTEXT OF OPEN DISTANCE LEARNING: WITH SPECIAL REFERENCE TO THE OPEN UNIVERSITY OF SRI LANKA

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Even though we are in the fourth industrial revolution with high technology and a fast-paced digital society, there are still hurdles to overcome in distance learning. The effect is felt not only by the learners but also by the guiders or instructors. This study investigates the challenges faced by learners at the Open University of Sri Lanka (OUSL). This study was a field study that collected data using questionnaires and the data from questionnaires were analyzed both quantitatively and qualitatively. In this study, for the selection of samples, a convenience sampling technique was adopted. The methods of primary data collection were adopted by using Google Forms focusing on learners in the OUSL. The sample size was 100 learners in the OUSL. IBM SPSS and MS Excel 2016 were used to process and analyze the data. Descriptive statistics covered all response variables as well as the demographic characteristics of the respondents. The challenges in ODL are mainly found at three levels: individual, emotional, and institutional. This study reveals that there are several challenges faced by OUSL students. The challenges were categorized as individual (learner), institutional, and emotional related challenges. Individual-related challenges were found to be conflicts between family /work and study schedule, Lack of support from family, employer, and friends. Institutional-related challenges were established as, delayed study periods/semesters or academic years at OUSL, drawbacks in communicating the course information, and not enough guidance. Emotional-related challenges were found as a lack of balance between job and studies and feeling like or thought of dropping out from the courses and from the university.

Keywords: Challenges, Learners, Open Distance Learning, OUSL

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REFLECTIONS ON EDUCATIONAL AUDIO PRODUCTION WORKSHOPS CONDUCTED BY THE OPEN UNIVERSITY OF SRI LANKA IN 2020 – 2021

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Audio plays a vital role in Open and Distance Learning (ODL). The Centre for Educational Technology and Media (CETMe) of the Open University of Sri Lanka acts as a service provider for all Faculties of the university in numerous ways, including conducting various training workshops. CETMe conducted two hands-on workshops on educational audio production in face-to-face mode for the OUSL academic staff in 2020 and 2021. The aim of this paper is to examine the participants' reflections on the educational audio production workshops conducted by the CETMe in the said years. Twenty-six (26) academic staff members participated in the workshops. The data were collected by interviewing a sample of the participants (n=20). This study employed a qualitative research design to collect data, then they were analysed thematically and quantified when the data were presented. The findings show that the audio production workshops should be continued in the future too and the measures should be taken to enhance the effectiveness of the workshops. The participants were instructed to produce any educational audio production that can be integrated with the courses conducted by them, as an output of the workshops but it was revealed that only 15% have adhered to the instructions. Eighty-eight percent of the participants stated that they used the knowledge gained at the workshops when they conduct day-schools though they could not produce educational audio programmes to integrate with their courses. The majority of those who had not produced audio productions stated that it was difficult for them to manage their time with the workload. However, every participant mentioned that integrating educational audio productions with their courses help to enhance the quality of the courses in an ODL context. Thirty percent of the participants mentioned that it was difficult to proceed with the audio productions due to lack of awareness of writing audio scripts. They stated that the time allocated to train on scriptwriting was inadequate at the workshops. The findings recommend expanding the duration of the workshops, maximising the training duration on audio scriptwriting, following up on the progress of audio productions in different stages, and motivating the academic staff to upgrade their courses by integrating educational audio productions. It was found that there is a shortage of research that examine the impact and reflections of the participants after conducting training workshops, but such research is essential for further development of the workshops. Therefore, the findings of this research will help to enhance the quality and output of the training workshops conducted by the OUSL in the future.

Keywords: Educational audio production, Open and Distance Learning, Workshops

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A STUDY ON THE USER-FRIENDLINESS OF LANGUAGE IN SELECTED OUSL COURSE MATERIAL

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The foremost service expected from an academic belonging to an Open and Distance Learning (ODL) system is to produce instructional material that would replace the conventional university teacher since attending day schools for the Open and Distance learner is not a must. As a result, this particular form of learning resource is expected to bridge the gap between the teacher and the learner to create a successful teaching-learning situation. In doing so, the relevant instructional material must be written in user-friendly language which seems to be lacking in some of the materials produced at the Open University of Sri Lanka (OUSL). Accordingly, this study investigated on the user-friendliness of language in selected OUSL course materials. A textual analysis was conducted on two hundred randomly selected sessions representing all six faculties of the university. A questionnaire was circulated among twenty academics who had written those selected sessions. The results were analysed using a mixed-method analysis. The results revealed that 40% of the sessions exhibited flaws that made them lack of user-friendly language and these mistakes were related to many aspects such as the 'choice of words', 'sentence structures', 'paragraph structure', 'spelling', 'capitalisation' and 'punctuation' which are elaborated in the manual *Bridging the Gap: Distance Writing (1995)*. The respondents forwarded reasons for the lack of user-friendly language in the selected sessions such as prioritising course content over usage of language, difficulty in shifting from academic writing to more informal language and lacking confidence in their language ability. The authors of well-written sessions vouched that being conversant with the guidelines for writing purposeful instructional material and being aware of their job profile as ODL teachers and how they differed from the conventional university teacher are vital in producing purposeful course material. Training on the usage of effective language too seems to be helpful while newly recruited academics should be made aware of what type of service is exactly expected as teachers belonging to the ODL system.

Keywords: Open and Distance Learning, OUSL Course material, User-friendly

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LIFE SCIENCES

I. AGRICULTURE

EFFECT OF CLIMATIC FACTORS ON FILLED GRAIN PERCENTAGE OF RICE VARIETIES FOR CULTIVATION DURING YALA SEASON IN THE LOW COUNTRY WET ZONE OF SRI LANKA

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The unstable yield of rice (*Oryza sativa* L.) recorded in the Low Country Wet Zone (LCWZ) is due to the unfavourable weather conditions that prevailed during the *Yala* season. The most vulnerable yield parameter was the grain filling percentage. Therefore, the spikelet fertility was the most sensitive for grain filling. An experiment was conducted at the Rice Research Station, Labuduwa, Galle, Sri Lanka, during the *Yala* season of the year 2021, to identify the most adaptable varieties of rice for LCWZ of Sri Lanka, due to changing climatic parameters during the southwest monsoon. Twenty-three varieties of rice were used according to the age groups of 2.5 months, 03 months and 3.5 months under various climatic factors. Two planting dates were used to synchronize the flowering period from 1st to 15th of July and 15th to 30th of July, owing to the high rainfall received in July during the *Yala* season in the low country wet zone. The maximum and minimum air temperature, amount of rainfall, wind speed and evaporation were recorded during the cropping period. Yield parameters such as filled grain percentage were evaluated. The influence of climatic parameters on spikelet fertility and finally the filling percentage was evaluated. Accordingly, the varieties Bg 252, At 313, Ld 371 showed the highest filled grain percentage in 2.5 months, 3 months, and 3.5 months respectively. However, At 353 of 3.5-month variety also showed a higher filled grain percentage which was not significantly different from Ld 371. Ld 253and Bg 310. At 362 showed the lowest filled grain percentage. Further, stepwise multiple regressions were performed between the grain filling percentage and the climatic parameters. (Rainfall, Relative Humidity, Temperature and Wind). Rainfall is the only significant parameter in the stepwise regression. The Ld 253varietiy for 2.5-month varieties showed sensitivity to rainfall. Among 3 months and 3.5-month varieties Bg314 and At 353 showed sensitivity to the rainfall respectively.

Keywords**:** Adaptable, Climatic factors, LCWZ, Rice variety, Yala

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RICE YIELD PREDICTION IN THE NORTHERN AND EASTERN PROVINCES OF SRI LANKA USING WEATHER DATA

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Sri Lanka is a country that entirely depends on rice as a primary food source and the production of rice mainly relies on the changes of weather. Due to its rising demand, prediction of paddy yield in the future years is necessary and important. This research aims to investigate the trend of the yield of rice in Sri Lanka, by analyzing the regional climatic data. In addition, this study focuses on identifying weather elements which affect the paddy growth in Sri Lanka. This study was conducted in the Jaffna, Vavuniya, Mannar, Batticaloa and Trincomalee districts, based on the collected yield data during the *Yala* and *Maha* seasons. As the initial step, the weather and paddy yield data of the past 11 years were collected from the Department of Meteorology, Sri Lanka and the Department of Census and Statistics respectively. Then the collected regional weather raw data were pre-processed, and null values were filled with the corresponding mean values. In addition, a feature scaling technique was used to normalize the weather and yield data. The prediction was done using linear regression and the performance of the model was measured using Root Mean Squared Error (RMSE). In the evaluation of the proposed study, 74 data samples were used to train the prediction model and 24 samples were used for testing. The testing results showed that the proposed study closely resembles the yield prediction, with the least (0.86) RMSE. In addition, the results showed the correlation between paddy growth and weather elements: rainfall, relative humidity, and temperature, which are +0.46, +0.35, and -0.25, respectively. On this basis, rainfall positively influences the paddy yield while temperature influences it negatively. This prediction study could be beneficial for farmers, as it predicts the future demand of rice - based on the weather changes and identifies the correlation between paddy growth and weather elements in the local regions of Sri Lanka.

Keywords: Data mining, Dry Zone agriculture, Linear regression, Yield prediction

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EXPERTS' OPINIONS ON THE IMPACT OF CLIMATE CHANGE ON TEA CULTIVATION IN SRI LANKA

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Whilst the necessary effort has been taken by the stakeholders to increase the tea production and productivity, Sri Lankan tea production shows a declining pattern over the last decade. The study assumes that the above issue would have been affected by the disparity among the expert perception on the impact of climate change on tea cultivation. The expert group consisted of academics, corporate executives and estate managers who prepare policies and are responsible for ground level implementation. The purpose is to understand whether there is any significant difference between the expert perceptions on impacts of climatic and suitability factors on tea cultivation since their perception drives the policies and actions. Purposive sampling method was used consisting of well experienced people (n=41) in the tea sector representing 25 tea estate managers, 10 corporate executives and 6 tea related academia. Primary data were collected through key informant interviews using a semi structured questionnaire and analysed using multivariate regression analysis in conjunction with an Analytical Hierarchical Process. Soil type, soil pH, soil depth, gravel content, rockiness, sunshine duration and solar radiation, wind, rainfall, temperature and relative humidity were the ten climatic and suitability factors which were considered in the study. Academics prioritized soil pH, soil depth, gravel content, sunshine duration, and solar radiation over executives and estate managers. When the rockiness and soil type were considered, executives were ranked with higher degree of importance than others. Estate managers have ranked rainfall, temperature, relative humidity, and wind with higher degree of importance compared to other two groups. Experts highlighted the concerns in lack of replanting, and the lack of resistant cultivars for adverse climatic conditions. It can be concluded that there is a clear disparity among the perception of three expert groups on the impact of climate and suitability factors on tea cultivation. It is recommended to develop a corporate strategy based on a common agreement among three expert groups to sustainably mitigate the impacts of climatic change on the tea sector by providing useful insights to these policymakers

Keywords: Analytical hierarchical process, Climate change, Perception, Tea cultivation

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STUDY ON SUITABILITY OF COCO-PEAT PELLETS AS NURSERY POTS FOR CINNAMON (*Cinnamomum zeylanicum* BLUME)

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Availability of quality planting material is one of the prime requirements in the commercial cultivation of cinnamon. Currently recommended nursery media (topsoil, sand, cow-dung and coir dust) being limited resources, there is a requirement for readily available nursery media. This study was conducted at National Cinnamon Research and Training Center, Palolpitiya, Sri Lanka, to study coco-peat pellets as possible nursery media for cinnamon. In the first step, two sizes of coco-peat pellets 50x60mm (A_2) and 60x120mm (A_3), as well as 200x125mm polythene bags filled with topsoil, sand, cow-dung and coir dust in 1:1:1:1 ratio (A_1), were used with Albert solution as a foliar applicant in 0, 37.5 and 75 g/l concentrations in factorial Completely Randomized Design. Number of leaves shoot length (cm), root volume (cm^3), shoot dry weight (g), root dry weight (g), leaf area (cm^2) and leaf color of cinnamon plants were recorded. All effects and interactions were tested using ANOVA procedure of SAS software. In the second step cinnamon seedlings grown in 60x120mm coco-peat pellets were treated with 0, 0.5, 1, 2, 3, 4, 5, 6 g/L Albert solution levels and A_1 was the control. Completely Randomized Design was followed, and data collection and analysis were the same as the previous. In the first step, there was no significant interaction ($P<0.05$) between the two treatments of media and fertilizer level. At the age of six months, the highest root volume, shoot and root dry weights were recorded in A_3, while all the parameters were lowest in A_2 ($P<0.05$). There was no significant effect of fertilizer level on plant growth parameters, except on the number of leaves. At the second step, in all the treatments growth performances of plants were significantly similar ($P<0.05$). From treatments with significantly similar shoot lengths to the control, 4g/l was the highest. According to leaf color recorded using Munsel Color Charts for Plant Tissues, 4, 5 and 6 g/l fertilizer had resulted in Moderate Olive-Green color similar to the control. The above results suggested that 60x120mm coco-peat pellets can be used as nursery substrates for cinnamon seedlings, with application of 4g/l Albert solution.

Keywords: Cinnamon, Coco-peat pellets, Growth parameters, Nursery media

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ASSESSING THE CONSTRAINTS FACED BY STAKEHOLDERS ALONG THE SUPPLY CHAIN TO PROMOTE ECO-FRIENDLY FERTILIZER USE IN PADDY FARMING IN SRI LANKA

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Excessive use of synthetic Chemical Fertilizers (CF) in paddy farming has led to numerous socio-economic and environmental issues. The development of eco-friendly plant nutrients has been a response to this problem. This process includes 'Bio Fertilizer' with microbial inoculants and 'Slow-Release Urea Fertilizer' (i.e. rice husk-based biochar integrated with urea prills and pelletized). This paper presents the constraints faced by key stakeholders along the fertilizer supply chain in Sri Lanka. An in-depth structured interview was carried out using both online and face-to-face modes of communication with a set of stakeholders (n=80). This process was supported by a survey instrument containing 25 likely constraints categorized under 07 criteria and linked with a 10-point 'likert-scale'. Confirmatory Factor Analysis techniques were applied to analyze data, where the responses provided were used to derive an index (namely Relative Importance Index) for each constraint deliberated and a Mean Attribute Score (MAS) showing the gravity of constraints combined. The results signify that the stakeholders perceived that all these determinants were critically important in promoting the eco-friendly fertilizers developed ['Market' (38.0); 'Production' (32.1); 'Finance' (26.6); 'Information' (26.0); 'Health and Environment' (25.3); 'Institution' (20.6) and 'Government' (21.3)]. Further, almost all individual constraints specified under the 'Market' and 'Finance' categories have been ranked over and above those of the other determinants. This emphasizes the importance of fostering those privately oriented market-friendly regulatory mechanisms aligned with appropriate financial incentives and the right institutional and informational frameworks to produce and promote green agricultural practices in opposition to synthetic chemical fertilizers with seemingly detrimental effects.

Keywords: Constraints, Eco-friendly technologies, Fertilizer, Paddy farming, Stakeholder perceptions

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PUSH & PULL FACTORS BOOSTING THE DEMAND AND SUPPLY ASPECTS OF A MARKET FOR ECO-FRIENDLY PLANT NUTRIENTS, IN OPPOSITION TO SYNTHETIC CHEMICAL FERTILIZERS

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Massive applications of synthetic Chemical Fertilizers (CF) in agriculture have resulted in numerous negative consequences on the quality of life and physical environment. With a view of minimizing those repercussions, certain Eco-Friendly Fertilizers (EFF) were developed through a multi-phased program of research, including the 'Slow-Release Urea Fertilizer' (SRUF) and 'Biofertilizer' (BF). This paper presents the outcome of an analysis based on those "Push" and "Pull" factors that can influence on uplifting the state of the developed EFF by strengthening the 'demand' and 'supply' sides of the markets which is an alternative to CF. The Push and Pull factors identified were then conscripted as statements, 15 and 12 respectively. These were taken up with the direct stakeholders attached to fertilizer value chains (n=90), including experts, producers, traders, farmers, extension officers and media personnel, to obtain their responses during February/March 2022, interviews – both online and face-to-face. Exploratory Factor Analysis and Canonical Correlation Analysis techniques were applied to sort out the potential associations between those Push-Pull factors, which conveyed that four Push factors, namely: 'Product quality with technology adoption'; 'Environmental considerations'; 'Promotional tools', and 'Intention towards a product' and four Pull factors, namely: 'Market potential'; 'Legal aspects'; 'Promotional events', and 'Intention of a consumer' possess a significant positive influence on strengthening the EFF market against the CF. The estimates derived using Aggregated Mean Attribute Score (MAS) suggest that the Push-Pull factors in concern can further be categorized as "Extrinsic" [e.g., 'Product quality with technology adoption' (41), 'Market potential' (24.1)] and "Intrinsic" [e.g., 'Intention of a consumer' (24.7), 'Intention towards a product' (24.1)]. Overall, the outcome of analyses, infers that identification of prospective markets and legal perspectives is critical to promote those EFFs against the "how popular" synthetic fertilizers and for which satisfying of consumer intentions (mostly the farming communities) on 'quality attributes' and 'economics' is critically important.

Keywords: Eco-friendly fertilizer, Green agriculture, Market potential, Product quality, Push-pull factors

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IMPACT OF COVID-19 ON CONSUMER FOOD WASTE AND HOME-GROWN FOOD: A CASE STUDY IN KALUTARA DISTRICT, SRI LANKA

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COVID-19 has significantly affected the food supply chain in Sri Lanka. Fears of food shortages have caused panic buying which could give rise to food waste generation. Amid rising food security concerns, people are motivated to grow their own fresh fruits and vegetables. But there is a lack of academic attention paid to how the amount of food waste and home-food growing has increased during the pandemic situation. Therefore, a survey was conducted in the Kalutara district because it is one of the most Covid affected districts in the country. Data collected included demographic details, food waste before and during the pandemic, consumer behavior on food waste, and the extent of self-grown food by using a questionnaire. Data were gathered from 264 participants using simple random sampling. The data analysis was done using descriptive statistics, Chi-square tests, and Wilcoxon Signed Ranked test (IMB SPSS, version 16). A large majority (59.09%) of the participant declared that the amount of food waste reduced during the pandemic. The pandemic has led to a significant reduction in the amount of food waste compared to pre-Covid times ($p = 0.001$). The most wasted food category is vegetables both before and during the pandemic, while other food categories except milk and dairy products, pulses, and oil seeds and oil have also shown significant reductions in quantities wasted. Cooking in excess (31.3%) was the major reason for throwing food. The majority (87.3%) of the respondents employ some strategies to reuse their leftover food. 73.86% of respondents engaged in gardening; among them 33.8% started gardening after the pandemic. The majority of the gardeners (30.6%) engage in gardening to access fresh food. Interestingly 75.3% of the gardeners were hoping to continue gardening even after the pandemic. Our study contributes to a better understanding of how a crisis situation affects consumer food waste and home-grown food in the Kalutara district. It is recommended to expand this research by using large sample covering all districts to obtain a comprehensive understanding of the Sri Lankan scenario and to use quantitative data to gain further insight into food waste and the amount of harvest obtained from home gardens.

Keywords: Consumer behavior, Food category, Food security, Gardening

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USE OF *Salvinia molesta* AS A PHOSPHORUS SOURCE ON THE GROWTH PERFORMANCE OF RICE

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Salvinia molesta is an aquatic plant that can be used for the remediation of phosphorus from farm effluents. The aim of this study was to determine the growth performance of the rice variety BG 4/91(*Oryza sativa*) with *Salvinia molesta* as its phosphorus source. The pot experiments were conducted with four treatments: commercially used triple super phosphate (T1), Salvinia fertilizer (T2), control without adding any phosphorous fertilizer (T3), and blank without adding any treatment (T4). Phosphorus and other additives (Muriate of Potash (MOP) and urea) were applied according to the levels recommended by the Department of Agriculture in Sri Lanka. The plants were harvested after three months. During this three-month period, the height of the plant was recorded every two weeks and it gradually increased with time. The T4 plants showed a significantly lower growth rate compared to the other three treatments. Similar trends for the growth rates were observed on three treatments T1, T2 and T3. The yield of the plants grown in T3, treated with MOP and urea, was significantly higher than in the other two treatment, whereas there was no significant difference in the percentage yield of the *Oryza sativa* grown in TSP (29 ± 3 %) and Salvinia fertilizer (25 ± 2 %). Therefore, the findings present the possibility of utilizing farm effluent treated *Salvinia molesta* as an organic fertilizer. However, future studies need to be conducted to determine the combined effect of nitrogen and phosphorous in soils with different concentrations of phosphorus.

Keywords: Farm effluents, Organic fertilizer, *Oryza sativa*, Remediation

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WILLINGNESS TO IMPLEMENT A HYDROPONICS SYSTEM AMONG UP-COUNTRY VEGETABLE FARMERS IN SRI LANKA

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Over conventional farming, the hydroponic system offers numerous advantages - including improved nutrition management, increased quantity and production, shorter growing intervals for many plants, high propagation success rates, lower fertilizer costs, absence of pesticides and herbicides, and more efficient use of available space. Furthermore, this novel agricultural technique would be extremely beneficial in addressing the challenges Sri Lankans are currently facing due to inadequate fertilizers available for agriculture and the currency crisis. This study aims to investigate farmers' willingness to install and pay for hydroponic systems. To ascertain the scope of this study, a structured questionnaire survey was conducted in up-country vegetable growing regions (Badulla and Nuwaraeliya districts) using a random sample of 324 vegetable farmers. The farmers chosen represent homogeneity in terms of vegetable mix, climate, and geography but heterogeneity in terms of willingness and demographic factors. The pre-tested questionnaire was designed to obtain information about the participants' experiences with agricultural practices, extension services, and new technology. The survey was conducted between August 2021 and February 2022. The data analysis was performed using a multinomial logit model in Stata®/MP 16.0 for Windows (Revision 02 Jul 2019) software. Survey findings conveyed that 42% of the participants are willing to make the financial investment required to construct a hydroponics system on their farm if competent technical help is available. Out of 188 non-willing participants, 50% indicated an interest in implementing such a system on their farms if financial and technical assistance were provided. The results of the multinomial logit model indicate that age ($p=0.04$) and education ($p=0.02$) are highly significant when comparing participants who were willing to install hydroponics systems without financial assistance to participants who were unwilling to install hydroponics systems under any circumstances. In addition, the level of education appears to be very important for participants who were willing to install hydroponic systems with financial assistance against those who were hesitant to install hydroponic systems under any conditions ($p=0.04$). This study provides important insights into willingness data that may be used in future studies bringing hydroponics systems to up-country vegetable farmers.

Keywords: Economy, Hydroponic systems, Multinomial Logit Model, Post-Pandemic, Willingness to pay

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DEVELOPMENT OF FRUIT LEATHER USING UNDERUTILIZED FRUITS

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Fruit leathers are dehydrated sheets of fruit puree or a concentrated mixture of fruit juice consumed as a healthy snack. Underutilized or wasted fruits can also be used to make highly nutritious fruit leathers. In this study, Fruit leathers were produced using underutilized fruits - namely star fruit (*Averrhoa carambola*), lovi fruit (*Flacourita indica/Flacourita inermis*), bilin fruit (*Averrhoa bilimbi*) and a combination of the three fruits. Each fruit leather was produced using 95% fruit puree with 5% sugar. The puree obtained from fresh fruits was heated separately for 10 min with sugar, and dried 60℃ in an oven for 4-5 hours. The physicochemical properties and sensory properties of freshly prepared fruit leathers were assessed. Bilin had the lowest moisture content, acidity, and total soluble solid content, 82.83±3.01, 1.28±0.25, and 10.17 ±0.21, respectively, compared to other fruit purees. Based on the sensory evaluation, mixed fruit leather showed the highest median scores for color, aroma, mouthfeel, taste, and overall acceptability. The mixed fruit leather was selected as the best leather and a five-week storage study was conducted. The moisture content did not change significantly during the storage at room temperature. However, a significantly ($p<0.05$) low pH level of 2.10±0.08 was reported after 28 days of storage. There was no significant difference in total soluble solids compared to 7, 28, and 35 days of storage. During the storage, no microbial growth was observed in the tested mixed fruit leather, probably due to the low pH and the applied heat while processing fruit leather. Proximate analysis of the mixed fruit leather showed 2.06% of ash, 15.03% of fat, 2.41% of crude fiber, 0.55% of crude protein, and 45.43% of carbohydrates. The developed mixed fruit leather could be used as a healthy, energy-providing snack due to the presence of high content of crude fiber and carbohydrates.

Keywords: Bilin fruit, Fruit leather, Kamaranga, Lovi, Sensory evaluation

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EFFECT OF DIFFERENT STORAGE METHODS ON SHELF LIFE AND PHYSICOCHEMICAL PROPERTIES OF CASSAVA (*Manihot esculenta*) VARIETY MU51

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Cassava (*Manihot esculenta*) is one of the important root crops available in Sri Lanka and is considered a good source of energy. Being a drought tolerant plant, cassava crop can give a high yield even in water stress conditions. Even though cassava is an important crop in conserving food security in the country, it has a low market demand due to its short shelf life. The mechanical damage during harvesting and handling enhances the physiological deterioration, resulting in accelerated microbial spoilage. Identification of post-harvest technology to store the locally available cassava variety is a timely requirement to expand cassava cultivation. This study was undertaken to identify a suitable postharvest packaging material to store fresh cassava in ambient conditions and to evaluate changes in the physicochemical properties. Cassava variety MU 51 was used with five storage treatments; i.e. boxes with moist sawdust, polyethylene bags, wrapping with plastic wrap, waxing with paraffin wax and fresh cassava (control). Samples were analysed for moisture, ash, total soluble solids, pH value, fiber content and cooking time, with two-week intervals up to sixteen weeks. According to the results, cassava stored in moist sawdust, waxed with paraffin wax and wrapped with plastic wrap showed no significant difference ($p>0.05$) in moisture, ash, total soluble solids and cooking quality. However, fresh cassava showed significantly high moisture content (77.13±0.25) and significantly low cooking time 11.33±0.58 min after the 8th week compared to 2nd and 4th week. In contrast, Polythene packed samples showed significantly lowest ($p<0.05$) and highest total soluble solid content 7.53±0.97 and 14.77±0.63 at 2nd week and 6th week of storage respectively. This may be due to the increased soluble solids by starch hydrolysis resulting deterioration of fresh cassava. Similarly, polythene packed sample showed significantly lowest cooking time 8.33±0.58 min at 6th week reflecting quality deterioration. Cassava stored in moist sawdust, waxed with paraffin wax, and wrapped with plastic wrap can be stored for 16 weeks without compromising the quality characteristics. The findings will support to an increase in industrial uses and exportation of cassava while minimizing the postharvest losses using suitable packaging.

Keywords: Cassava, Packaging, Postharvest, Storage

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ANTI - BACTERIAL POTENTIAL OF HAND SANITIZER INCORPORATED WITH -*Alpinia malaccensis* - CRUDE EXTRACT

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Hand sanitization and hygiene have become vital practices among the general public to overcome cross-contamination of various microorganisms. The common commercial hand sanitizers are made from alcohol - which might not have residual antibacterial activity owing to the highly volatile nature of alcohols. Therefore, the utilization of active compounds from a plant that has antibacterial compounds with alcohols might exhibit synergistic antimicrobial activity. In this study, different concentrations (5 mg/ml and 10 mg/ml) of *Alpinia malaccensis* were compared with a 75% alcohol-based hand sanitizer having WHO formulation, and commercial hand sanitizers. Hand sanitizer efficacy was tested using in Disk diffusion assay against *Staphylococcus aureus* 113, *Escherichia coli*, *Listeria monocytogenes*, *Salmonella* Typhimurium. The finger imprint method was used as in vivo method and the effect was evaluated on resident microflora for 0, 2, 5, 10, and 15 minutes. The commercial sanitizer showed a significantly ($p<0.05$) smaller DIZ 14.33±0.58 for *S. aureus* 113 compared to other treatments - 5 mg/ml, 10 mg/ml, and the WHO formula. There was no significant difference between developed *A. malaccensis* sanitizer and the WHO formula. Therefore, there is a possibility to add *A. malaccensis* crude extract to enhance the efficacy of the available commercial sanitizers. Commercial hand sanitizers may not have used a standard formula or perhaps their antimicrobial properties have degenerated while in storage. However, no significant difference ($p>0.05$) in DIZ was observed in sanitizers against *E. coli*, *L. monocytogenes* V7, and *S.* Typhimurium. The finger imprint method showed no significant difference ($p>0.05$) in the reduction percentage between WHO and 10 mg/ml *A. malaccensis* hand sanitizer within the tested time. The pH of 10 mg/ml of *A. malaccensis* hand sanitizer did not change significantly for eight weeks. The pH was found in the range of 5.21-5.99 which is a mild acidic and neutral range. This alcohol-based herbal hand sanitizer is acceptable in appearance due to the natural fragrance and colour from the *A. malaccensis* crude extract. Therefore, the indicated alcohol-based hand sanitizer which has herbal phytochemical, could be used to enhance the efficacy of the available commercial sanitizers.

Keywords: *Alpinia. malaccensis*, Crude extract, DIZ, Hand sanitizer, Phytochemical

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INVESTIGATION OF FACTORS THAT AFFECT FRESH MILK CONSUMPTION OF CONSUMERS IN THE KALUTARA DISTRICT OF SRI LANKA

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Fresh milk is considered as one of the most popular beverages all over the world including Sri Lanka. The balance of carbohydrates, fats, proteins, vitamins and minerals in fresh milk plays an important role in reducing malnutrition among human beings. It improves the human health. Although, the nutritional and health benefits of fresh milk are higher than powdered milk, consumption of fresh milk is considerably low in Sri Lanka, including the Kalutara district. It is about 1% of the overall milk consumption of the country. Therefore, the present study is carried out to investigate the factors that affect fresh milk consumption in the Kalutara district in Sri Lanka. The findings of this study will help the policy makers to eliminate the obstacles which hinder the fresh milk consumption of the district and popularize fresh milk consumption. This will help to reduce the nutritional poverty among the people in the Kalutara district, improve the livelihood of farmers who produce milk in the district and save the foreign exchange spent annually for the importation of powdered milk. The data required were collected primarily through a pretested structured questionnaire distributed among randomly selected 286 consumers in the district. Chi-square test was performed to identify the relationship between the factors considered i.e. demographic, attitudinal and motivational and the degree of fresh milk consumption. The statistical package, SPSS 22 was used to find out the respective relationships. The results revealed that the educational level and income of the people in the study area, consumer attitudes on nutritive value, sensory properties and health issues associated with fresh milk and availability of quality milk with hygienic properties and the price of the milk have a significant ($p < 0.05$) effect on fresh milk consumption of the people in the district concerned.

Keywords: Demographic factors, Fresh milk, Kalutara

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THE EFFECT OF FERTILIZER PACKAGES ON THE GROWTH AND YIELD PERFORMANCES OF ICEBERG LETTUCE (*Lactuca sativa*) IN THE HORIZONTAL GROW-BAG SYSTEM

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Hydroponic Iceberg lettuce production necessitates an adequate level of nutrients to improve its performance. Therefore, a strategic combination of commercially available fertilizers is vital to produce a reliable and cost-effective fertilizer package for Iceberg. This study is conducted to evaluate the growth and yield performances of Iceberg lettuce (*Lactuca sativa*) in a hydroponic system and to assess the cost-effectiveness of the application of fertilizer packages. The experiment was conducted under controlled environmental conditions. Horizontal grow bags were filled with cocopeat and each grow bag had four planting holes with 25 cm spacing. Iceberg variety Tropical was used. Treatments were prepared using different combinations of N: P: K- 30:10:10 (A), N: P: K- 10:52:10 (B), Albert's solution (C), Calcium nitrate (D), K44 (E) and Calmax (F) fertilizers. Treatment combinations were treatment 1 (T1- A, B, C, D), treatment 2 (T2 - A, C, D), treatment 3 (T3 - C, F) and treatment 4 (T4 - A, C, E). T3 was used as the control. The experimental design was a completely randomized design with four replicates. Treatment application commenced after 21 days of the nursery period. The total fresh weight of the plant, the head weight, weight of shoots/plant and diameter of the head were measured at the harvest. Data were subjected to ANOVA. Duncan Multiple Range Test ($\alpha = 0.05$) was used to compare the treatment means. Significantly different mean values were obtained from the treatment application. The highest values for plant weight (484.81 g), head weight (374.16 g), mature shoot weight/plant (85.49 g/plant) and head diameter (11.94 cm) were given from T1. The lowest value was obtained from T2. The lowest cost was obtained from the application of T1 (Rs. 155.20 / 100 plants), while the application of T3 was given the highest cost (Rs. 359.18 / 100 plants). Based on the results of this study, it can be concluded that treatment 1 fertilizer package (N: P: K- 30:10:10, N: P: K- 10:52:10, Albert's solution and Calcium nitrate) can be used as a reliable and cost-effective fertilizer package to produce Iceberg lettuce in the hydroponic system.

Keywords: Cost analysis, Fertilization, Hydroponic system, Iceberg lettuce

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EVALUATING BEST SURFACE STERILIZATION METHOD AND HORMONE COMBINATION FOR SHOOTS INITIATION OF *Zingiber officinale*

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Ginger (*Zingiber officinale),* one of the most used traditional herbal medicines, is largely grown as an inter-crop with coconut and grown as a home garden crop in Sri Lanka. Ginger is clonally propagated via rhizomes. Due to continuous cultivation, it is susceptible to the accumulation and transmittance of pathogens from generation to generation. Therefore, the application of *in-vitro* propagation techniques is the most suitable propagation method for producing genetically stable plants over field propagation. The present study was conducted to evaluate the best combination of chemicals for surface sterilization and the best hormone combination for shoot induction of Ginger rhizomes. Early-stage ginger buds were used as explants and surface sterilized with a combination of ethanol and bleaching solutions; 70%, 75% and 80% ethanol solutions followed 10, 20, 30% (W/V) bleaching solutions and established in the MS media supplemented with different concentrations of 6 – Benzylaminopurine (BAP) and 1-Naphthalene acetic acid (NAA); 2, 3, 4, 5 mg/L BAP only, 0, 2, 3, 4, 5 mg/L BAP and 0.25 mg/L NAA and 0, 2, 3, 4, 5 mg/L BAP and 0.5 mg/L NAA. Both experiments were conducted Completely Randomized. In surface sterilization, the most efficient results were obtained from the sterilization process with 75% ethanol followed by 20%(w/v) bleaching solution. This result was used for the hormone combination procedure as a surface sterilization protocol. From among the 15 concentration combinations of BAP and NAA, 5 mg/L BAP added with 0.25 NAA mg/L showed the highest buds/explant formation 3 weeks after culturing. However, higher shoot elongation was observed in treatment number 13, added with 3 mg/L BAP + 0.5 mg/L NAA combination to the MS media. Statistically, significant leaf length was observed in treatment supplemented with 3mg/L BAP and 0.5 mg/L NAA having the highest mean leaf length of 1.2 cm. Treatments; 1, 5, 6, 9, 10, and 14 had not shown a measurable number of leaves per shoot.

Keywords: Hormonal combinations, *In vitro*, Sterilization methods, *Zingiber officinale*

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EVALUATE THE BEST STERILIZATION METHOD AND THE HORMONAL COMBINATION FOR *IN-VITRO* PROPAGATION OF *Curcuma longa* (TURMERIC)

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Curcuma longa is considered the Golden Spice of the world. *Curcuma longa* is valued worldwide as a spice, coloring agent, flavoring agent, and medicine. In the present study micropropagation of the Turmeric local variety was carried out by finding the most suitable sterilization method as well as the shoot initiation hormonal combination. Surface sterilizing was done with nineteen treatment combinations using Ethanol (70%, 75%, 80%) for 30 seconds and Clorox bleach solution (20%, 30%, 40%) or Hydrogen peroxide (2%, 4%, 6%) for 30 minutes. Further, the best hormonal combination was detected by supplementing the basal MS medium with fifteen treatments structuring a combination of hormones with BAP (0, 2, 3, 4, 5 mgl^{-1}) and NAA (0, 0.25, 0.5 mgl^{-1}) to evaluate the best hormonal combination for Turmeric. The completely Randomized Design (CRD) experimental design was applied for experiments one and two with five (05) replicates. The results revealed that 80% ethanol for 30 seconds and 4% hydrogen peroxide for 30 minutes combination has shown the highest performance by sterilizing the Turmeric rhizomes with shoot buds 2.2 activated shoot buds by achieving 80% success without contaminations. Murashige and Skoog (MS) medium supplemented with 2.0 mgL^{-1} Benzyl Amino Purine and 0.5 $mgL^{-1.}$ Naphthalene Acetic Acid has shown a significantly different maximum number of shoot buds of 3.6 per explant in *in-vitro* propagation of *Curcuma longa*.

Keywords: *Curcuma longa*, Micropropagation, Shoot multiplication, Sterilization method

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II. BIOLOGICAL SCIENCES

DETERMINATION OF THE ANTIBACTERIAL PROPERTIES OF ENDOPHYTIC FUNGAL CRUDE EXTRACTS ISOLATED FROM *Acrostichum aureum*

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Antibiotic resistance has become a critical problem among the human population as it is partly to blame for the increased mortality rates associated with infectious diseases. Hence, the development of more potent antimicrobial agents becomes a requirement. The current investigation assesses the antibacterial nature of the endophytic fungal crude extracts isolated from *Acrostichum aureum*, an associate mangrove fern. Roots, stems and leaves of the plant were collected from Negombo, Sri Lanka. Pure fungal colonies were isolated from each sample. The produced fungal colonies were identified as *Aspergillus fumigatus, Aspergillus ochraceus* and *Penicillium chrysogenum* based on their morphological and microscopic features. Crude extracts were prepared by solvent extraction technique using ethyl acetate and were dissolved in 1% Dimethyl Sulfoxide. The fungal crude extracts were tested against *Escherichia coli* and *Staphylococcus aureus* using Antibiotic Susceptibility Tests (ABSTs) such as well diffusion, Minimum Inhibitory Concentration (MIC) and Minimum Bactericidal Concentration (MBC) tests. An Analysis of variance test was performed on the Mean Zones of Inhibition (MZI) to compare the inhibitory action of each fungal extract. According to the results, all the fungal crude extracts were inhibitory and bactericidal. The concentration of the dilution, 10^{-3} was selected as the MIC of all the extracts due to complete inhibition of the test organism. *Aspergillus ochraceus* executed a more potent antibacterial activity (An MZI of 1 cm against *Staphylococcus aureus* and 1.01 cm against *Escherichia coli* and an MBC of 10^{-3} dilution against both the test organisms). The lowest antibacterial activity was exhibited by *Aspergillus fumigatus* with an MZI of 0.5 cm against *Escherichia coli* and MBC of 10^{-1} dilution against both test organisms. *Penicillium chrysogenum* exhibited a moderate antibacterial activity with an MZI of 1.55 cm and an MBC of 10^{-2} dilution against *Staphylococcus aureus* and an MZI of 1.15 cm and an MBC of 10^{-2} dilution against *Escherichia coli*. It was evident that *Staphylococcus aureus* was more susceptible to the generated crude extracts than *Escherichia coli*. In conclusion, the ethyl acetate extracts of endophytic fungi isolated from *Acrostichum aureum* have antibacterial properties which could be utilized to generate natural antibiotic agents.

Keywords: *Acrostchum aureum,* Antibacterial, Mangrove fungal endophytes

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MOLECULAR DOCKING STUDY REVEALS PINORESINOL AS A POTENTIAL INHIBITOR FOR NIPAH VIRUS GLYCOPROTEIN

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Nipah virus (NiV) infection caused by the biosafety level 4 zoonotic pathogen NiV, which belongs to the *Paramyxoviridae* family, was identified as a blueprint priority disease by the WHO in 2018. It was first reported in Malaysia in 1998 followed by sporadic outbreaks in Bangladesh and India. The natural reservoirs of the NiV are fruit bats belonging to the *Pteropus* genus, which are endemic to South and Southeast Asia. Primary zoonosis occurs through contaminated bat urine while interhuman transmission occurs via contaminated body fluids and aerosols. NiV infection provokes febrile encephalitis and respiratory diseases associated with a fatality rate of ~70%. Currently, there are no explicit drugs, therapies, or vaccines against this disease. In this study, protein-ligand docking was performed to identify therapeutic ligands against the NiV attachment glycoprotein (NiV-G) (PDB ID: 2VSM), which is a virulent factor mediating pathogenicity through host cell adhesion. The blind docking (BD) technique was utilised in AutoDock 4.2.6 (AD4). Phytochemicals endemic to South Asia were selected as novel therapeutics based on their endemicity to South Asia, general antiviral activity, and specific antiviral activity against the *Paramyxoviridae* family. Phytophenolic compounds, such as lignins and tannins derived from plants such as *Euphorbia hirta* that have depicted antiviral activity against the *Paramyxoviridae* family via clinical trials, were chosen apart from other phytochemicals employed in the study. ADME properties, such as physiochemistry, lipophilicity, water solubility, pharmacokinetics, druggability, and medicinal chemistry were analysed using SwissADME to identify the effectiveness of the phytochemicals. Binding free energy (BFE) and inhibitory constant (Ki) acquired from AD4 together with hydrogen interactions (HI) and hydrophobic interactions (HPI) acquired from BIOVIA Discovery Studio Visualiser 2021 were analysed as the primary parameters. The docking protocol was validated using redocking in AD4 while its common amino acid interactions (AAI) were analysed using LIGPLOT^{+} v 2.2. The docked orientations and conformations were validated via superimposing and generating an ≤2.00Å RMSD using PyMOL 2.5. The lignin Pinoresinol (BFE: -8.65 kcal/mol, Ki: 455.44 nM, HI: 6, HPI: 6) demonstrated the best docked result and satisfactory ADME properties becoming the best fitted phytochemical against 2VSM out of the sample set employed.

Keywords: AutoDock 4.2.6, NiV-G, Protein-ligand docking

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CHANGES IN FAST-FOOD CONSUMPTION AND MARKETING DURING THE COVID 19 PANDEMIC IN THE KEGALLE DISTRICT, SRI LANKA

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The COVID 19 pandemic and lockdown measures adopted to restrict virus transmission have rapidly reshaped food consumption and food marketing behavior across the globe. Limited studies were conducted to determine the effects of COVID 19 on the consumption of fast food and marketing behaviour in Sri Lanka. Therefore, the present study was conducted with the major objective of investigating the effect of the COVID 19 pandemic on the consumption of fast food and marketing in the Kegalle District. Data collection was done from November 8 to December 10, 2021. Two descriptive studies were performed through a self-administrated online questionnaire for consumers (n=201) and an interview-administrated questionnaire for fast food marketers (n=39). Results revealed that the consumption of fast food has reduced by 59.7% during the pandemic while online ordering and purchasing from mobile deliveries have increased by 14.9% and 35.8%, respectively. Further, 19.9% of the consumers reported an increase of fast food consumption due to changes in the general food consumption patterns (42%) and having the entire family at home during the lockdown period (25%) as the major reasons. Nearly 90% of the fast food marketers claimed that fast food marketing was reduced by 89.7%. Both studies show continuous lockdowns and health concerns as the main reasons for these reductions. In order to maintain consistent manufacturing and marketing in fast food outlets, 62.2% of the outlets developed new dishes while efficiently providing takeouts/deliveries (56.8%). Comparisons revealed that there was a significant decrease between pre and during the pandemic for "Consumption frequency" ($0.000, p<0.05$) and "Expenditure for fast food" ($0.000, p<0.05$), while a significant increase was indicated for "Online ordering" ($0.000, p<0.05$) and "Purchasing from mobile deliveries" ($0.000, p<0.05$) by consumers. The "Number of daily customers" ($0.000, p<0.05$) and "Daily revenue" ($0.000, p<0.05$) have shown a significant decrease in marketers, respectively. There were positive associations between the preferences for online ordering during the COVID 19 period with the "Occupation" ($0.000, p<0.05$) and "Monthly income" ($0.009, p<0.05$) of consumers. This study found that the consumption of fast food and marketing behaviour were significantly influenced during the COVID 19 pandemic with the lockdowns in the Kegalle District.

Keywords: Consumption frequency, COVID 19, Fast food consumption, Fast food marketing, Kegalle District, Lockdown

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PRIMARY MALARIA VECTOR *Anopheles culicifacies* (GILES): ABUNDANCE AND CLIMATIC CORRELATIONS IN A POST-MALARIA ELIMINATION SETTING

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Sri Lanka is experiencing 'anophelism without malaria' following the elimination of malaria since 2012. *Anopheles culicifacies* (Giles) is the primary malaria vector in Sri Lanka. Receptivity for malaria is due to the abundance of *Anopheles* vectors and the favourable climate for malaria transmission. Therefore, the abundance of *An. culicifacies* across three climatic zones and the correlations between their densities and climatic factors were explored from April 2015 to March 2016 using the Kruskal Wallis and Spearman's correlations tests. Study sites included the MOH areas of Horowpothana, Poonakaryand Buttala (dry zone), Nikaweratiya (intermediate zone) and Meerigama (wet zone). Entomological methods deployed for monthly collections were Cattle Baited Trap Collections (CBTC), Human Landing Catches (HLC), indoor Hand Collections (HC) and Larval Surveys (LS); monthly climatic data was also collected for the study sites. The highest number of *An. culicifacies* were collected from Nikaweratiya from CBTC (n=310, 74%), HLC (n=773, 53%), HC (n=110, 88%), and LS (n=5280, 63%). Their densities differed among the study sites from all collection methods (CBTC: H (4) =43.2, $p<0.001$, HLC: H (4) =45.2, $p<0.001$, HC: H (4) =24.4, $p<0.001$, LS: HC (4) =15.4, $p<0.01$). The highest mean densities of *An. culicifacies* were observed in Nikaweratiya (CBTC: 6.46 per trap, HC: 0.21 per man hour, HLC: 0.63 per man hour, LS: 29.54 larvae per 100 dips). The lowest densities of *An. culicifacies* from CBTC and LS were in Poonakary while it was absent in HLC and HC. Rainfall was negatively correlated with adult densities from HC (Lag0: $p<0.05$) and HLC (Lag0: $p<0.05$) in Meerigama. Larval densities of Meerigama (Lag0: $p<0.01$) and Nikaweratiya (Lag2, $p<0.05$) negatively correlated with rainfall. Temperature was negatively correlated with adult and larval densities in Horowpothana, Buttala and Nikaweratiya ($p<0.05$) and Meerigama ($p<0.05$). Relative humidity negatively correlated in Meerigama in HC and LS ($p<0.05$). These findings show the importance of considering the outcome of climatic correlations with vector abundance when determining the receptivity to malaria.

Keywords: Abundance, *An. culicifacies*, Climatic factors, Malaria receptivity

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MEDICINAL PROPERTIES OF BHANGRA (*Eclipta alba* (L.) HASSK.) FROM THE PERSPECTIVE OF UNANI MEDICINE: A REVIEW

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Eclipta alba (L.) Hassk. belongs to the family *Asteraceae,* known as *Bhangra* in the Unani system of Medicine. It is a weedy herb that possesses a wide range of medicinal properties. It is used alone or in combination with other herbs. Though the compendium of data and clinical studies on *E. alba* are minimal, it is still a valuable herb with numerous medicinal properties. This study sought to accumulate and systematically compile the information on *Bhangra.* Therefore, the objective of this study is to ascertain new study proposals on therapeutic uses and pharmacological actions of *E. alba* by collating the existing information. Thus, this study was done based on a systematic literature review of Unani classical literature and research publications. The Unani classical literature and research publications from 2012 to 2020 entitled on pharmacological effects and therapeutic effects of *E. alba* filtered by search engines such as PubMed, Google Scholar, Mendeley, and Science-direct were selected and scrutinized. Data was summarized and structured in the aspect of the Unani System. The whole plant of *E. alba* accommodates a variety of chemical constituents. Alkaloids, Ecliptine, and Nicotine are abundantly present. According to the temperamental theory mentioned in the Unani system of Medicine, it is considered to be a plant with a Hot and Dry temperament that is used as Musaffi e Khoon (Blood purifier), Muqawi e Bah (Aphrodisiac), and Muqawi e Jigar (Liver tonic). Modern pharmacological studies have been focused on its anti-cancer, neuroprotective, anti-bacterial, and anti-inflammatory actions. Further, it is available in compound formulations in Unani Medicine, such as *Majoon e Bhangra* and *Roghan e Bhangra*. Hence, it can be concluded that *Bhangra* is a potential and accessible medicinal herb with eminent medicinal properties in Unani Medicine and modern science, which requires elaboration in its classification and medicinal properties.

Keywords: *Bhangra, E. alba*, Therapeutic actions, Unani Medicine

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METHODS OF SINGLE STRANDED DNA SYNTHESIS AND ITS APPLICATIONS: A REVIEW

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Single stranded DNA (ssDNA) is a DNA molecule with only one strand. However, ssDNA is required for various uses in different research fields. This literature study aims to describe the background information on ssDNA synthesis and possible applications. Researchers have developed several ssDNA synthesis methods, including chemical, enzymatic, and bacterial-based methods, as well as modifications to improve affinity and sensitivity. Synthetic oligonucleotides for gene synthesis are often made using phosphoramidite chemical methods, either on traditional column-based synthesizers or on microarray-based synthesizers. Chemical synthesis can only produce oligonucleotides with a length of up to 200 bases. However, enzymatic methods can directly construct longer oligos from a double stranded DNA (dsDNA) template due to its exquisite specificity and mild conditions such as temperature and pH. Enzymatic synthesis method is a fast, low-cost, and stable way to synthesize ssDNA. Enzymatic synthesis via ligation or polymerization produces dsDNA, enabling complete gene synthesis, but it requires additional steps to generate ssDNA. Alternative enzymatic methods use isothermal amplification techniques for ssDNA synthesis, which rely on enzyme activity or designed primers to bypass the thermal denaturation of the dsDNA template. In recent decades, bacteria-based ssDNA synthesis has primarily been used for specific large-scale production of pure ssDNA. Sequencing, cloning, homology directed repair templating for gene editing, DNA-based digital information storage, aptamers, DNA robotics, and scaffolds DNA origami are just a few of the applications of kilobase-length ssDNA in biological imaging, bio nanotechnology, and synthetic biology. Single-stranded oligonucleotides have been used to develop treatments for previously incurable inherited diseases ranging from neurological to muscular to metabolic, as well as vaccinations. As research into DNA synthesis techniques continues, it can be expected technological advancements that are optimized for future uses, with the potential to lower synthesis time and cost. Efficient synthesis of ssDNA and use them in a variety of applications, providing more benefits to science and the humanity.

Keywords: Double stranded DNA (dsDNA), Single stranded DNA (ssDNA), ssDNA synthesis

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PREVALENCE AND BIONOMICS OF THE *Anopheles* MOSQUITOES IN SELECTED SITES IN THE HAMBANTOTA DISTRICT

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Malaria is a life-threatening disease caused by *Plasmodium* and it is transmitted to humans through infected female *Anopheles* mosquitoes. Although Sri Lanka was certified to be malaria free by the World Health Organization (WHO) in 2016, the country is highly receptive to malaria with the presence of malaria vectors in most areas. Hambantota is a vulnerable district in the country for malaria with the presence of a harbour, airport, and other tourist attractions. This study aimed at understanding the prevalence and bionomics of the *Anopheles* vectors in the District of Hambantota. The specific objectives were to assess the species richness, relative abundance, species diversity, breeding habitats, and biting behaviour of *Anopheles*, since an understanding of these aspects is imperative to take vector control decisions. Arabokka, Mirijjawila, and the harbour localities in the Hambantota Medical Officer of Health (MOH) area, and the Mattala locality in the Lunugamvehera MOH area were selected as study sites. Entomological surveys comprising Larval Surveys, Cattle-Baited Trap Collections, and Cattle-Baited Hut Collections were carried out monthly from October 2021 to March 2022. The secondary data of Human Landing Night Collections were obtained from the Anti-Malaria Campaign, Sri Lanka. A total of 7072 mosquitoes belonging to 11 *Anopheles* species, including the *An. culicifacies, An. subpictus, An. varuna, An. vagus, An. barbirostris, An. nigerrimus, An. pallidus, An. peditaneatus, An. jamesii, An. annularis,* and *An. tessellatus* were recorded. The highest larval species richness (9) and diversity (2), and the highest adult diversity (1.86) were recorded in Mattala. The highest adult species richness was recorded in Arabokka (11) and Mirijjawila (11). The *An. subpictus* was the most predominant species in all techniques, representing 35% (n=2482) of the total anopheline collection. The larval surveys identified 18 types of breeding habitats with the major breeding sites being tanks, canals, ground pools, and lagoons. The highest relative biting preference was shown by the *An. subpictus* (87%) in Hambantota and the *An. culicifacies* (69%) in the Lunugamvehera MOH areas. The biting peak times of the vectors were during the 1900 to 2100 hours. These findings on the prevalence and bionomics of *Anopheles* mosquitoes in Hambantota will be useful to design appropriate vector control measures to ensure the prevention of the reintroduction of malaria in the country.

Keywords: Abundance, *Anopheles*, Bionomics, Malaria, Receptivity, Vulnerability

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BIOMONITORING OF HEAVY METALS IN THE YELLOW-BILLED BABBLER IN SELECTED LANDSCAPES IN SRI LANKA FROM A CONSERVATION PERSPECTIVE

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Biomonitoring is an effective way to assess risk from toxic metal exposure as it indicates the total dose exposed by an organism. Biomonitoring also helps to determine the concentration of these metals at the target sites of an organism. The current study attempted to evaluate the toxic metal composition in feathers of the *Turdoides affinis* (Yellow billed babbler). Heavy metal (Pb, Cd and Hg) concentrations in feathers were analysed in samples from three sites that were selected based on the levels of urbanization (Urban, Sub Urban and Rural/ n =3 per), implications of heavy metal concentrations on the phenotypic traits (21 phenotypic traits), blood parameters, and the level of aggressive behavior of the bird. Data was statistically analyzed using IBM SPSS version 20. The results revealed that there was no significant variation of heavy metal concentrations between the habitats ($P>0.05$). We found that the highest reported levels of Pb (0.07 ± 0.001 ppm) and Hg (0.50 ± 0.02 ppm) were below the threshold level, while Cd level (0.31 ± 0.02 ppm) was above the threshold. The morphometrics remained unchanged while the plumage colours showed a difference between the three habitats (PCA values for PC1 =56.5%, PC2=24.6%). There was a positive correlation between Pb concentrations and the aggressive behavior of birds. The study concluded that heavy metals accumulated in all three habitats despite of urbanization, although bird behavior further indicated that urbanized environments could affect their wellbeing due to heavy metals. It is recommended that remedial action against the release of toxic metals needs to be taken for the conservation of birds.

Keywords: Aggressive behaviour, Biomonitoring, Toxic metals, Yellow billed babblers,

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THE GREEN SYNTHESIS OF IRON NANOPARTICLES FROM AN AQUEOUS EXTRACT OF NEEM LEAVES (*Azadirachta indica*)

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A green synthesis of iron nanoparticles was performed utilizing a plant extract. An extract of neem leaves (*Azadirachta indica*) was used as a reducing and stabilizing agent in the production of the iron nanoparticles (FeNPs). Neem leaves extract can be reduced Fe^{3+} into Iron nanoparticles (Fe^{0}) at room temperature. The green synthesized Iron nanoparticles were characterized by Scanning Electron Microscope (SEM) analysis, Energy Dispersive X-Ray (EDX) analysis, X-ray diffraction (XRD) analysis and UV-Visible Spectroscopy (UV-Vis) analysis. The SEM images showed that the particles were on the nanoscale while the morphology of particles showed spherical shapes with particle size ranging between 20-40 nm. EDX analysis showed the presence of elemental iron and indicated that the nanoparticles are essentially present in metal form. The XRD spectrum observed the crystal structure of the synthesized iron nanoparticles. The excitation of the FeNPs surface plasmon vibrations of the UV-Visible analysis identified absorption peaks in the 250–295 nm regions with the largest peak being found at 272 nm. The novelty of this research is the green synthesis of FeNPs and the successful execution of characterization processes. The FeNPs synthesized using the green synthesis method can be applied to a wide range of industrial applications.

Keywords: Green synthesis, Iron nanoparticles, Neem leaves, Reducing agent, Room temperature, Stabilizing agent

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EDUCATION

PRINCIPAL'S LEADERSHIP CAPACITIES AS PERCEIVED BY TEACHERS IN SECONDARY SCHOOLS IN GALLE DIVISION

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This study analyses principal's leadership capacities as perceived by teachers in secondary schools in the Galle educational division. One hundred teachers from 10 secondary schools in Galle were sampled, using random sampling techniques. The data was collected using a questionnaire which consisted of five main segments. There were four research questions addressed in the study. Standard deviation was used to analyse data using SPSS. The researcher used a quantitative approach and a descriptive survey design. The results of the study revealed that the majority of teachers perceived their principals positively (78%), with the highest positivity in the leadership capacity criteria namely shared vision for students' high achievement, instructional leadership, personal leadership, teachers' personal development etc. Principals were perceived least positively in the areas of promotion and use of technology in schools, being fully aware of learners' diverse needs, and also in the allocation and use of fiscal and material resources. . Male teachers perceived their principal's capacities significantly higher than female teachers; and older teachers (aged 41-50) perceived their principal's capacities significantly higher than younger ones. The study also found that female principals were perceived significantly higher than their male counterparts and principals who held higher educational qualifications were perceived significantly higher than those with lower educational qualifications.

Keywords: Educational leadership, Instructional leadership, Leadership capacity, Leadership, Teacher's perception

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PERCEPTIONS OF UNDERGRADUATES ON ONLINE TEACHING DURING THE COVID 19 PANDEMIC

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Due to the COVID-19 pandemic, a majority of universities in Sri Lanka was closed for in-person lectures and so, opted to teach online for nearly two years. The objective of this study was to identify the perceptions (uses, experiences, benefits, and barriers) of undergraduates on using online teaching to facilitate learning during this time. A self-administered questionnaire was instrumental in gathering the primary data from 64 undergraduates during the first quarter of 2022. Secondary data was gathered using published verified journal papers on online teaching and learning. According to the results, only 12.5% of students preferred online teaching while 62.5% prefer a combination of the online and in-person teaching methods. Students were familiar with online teaching platforms such as Zoom, Moodle, You-tube, Padlet, and Google docs. Only 29.7% of the group preferred online examinations. The benefits of online teaching, as perceived by the undergraduates, included being able to learn at their own pace, saving time and costs, having flexibility, and being comfortable raising questions. The main barriers that were indicated were poor internet connections, poor infrastructure, family distractions and related problems, a lack of motivation, and anxiety. To improve the efficiency of online teaching, this study suggests using a combination of online and in-person teaching so that students can learn theories at home while receiving hands-on experience at in-person sessions. Further, incorporating problem-based/ team-based/ flipped classrooms in online teaching will direct undergraduates to self-paced learning. Moreover, universities can accommodate students with poor signal connections at the hostels while other students learn from home. Relatedly, students can be called for in-person for examinations. This will relieve unnecessary stress and issues with online examinations. These suggestions will minimize the negative aspects of online teaching while maximizing the positives.

Keywords: Barriers, Benefits, COVID 19, Experiences, Online

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A PARADIGM SHIFT IN SCHOOL LEADERSHIP: PRINCIPALS' REFLECTIONS ABOUT THE PROGRAMME OF SCHOOL MANAGEMENT

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School leadership plays a significant role in school management, It helps to improve students' academic achievement and also increases teachers' professional development, ultimately improving the quality of education. According to Hansen (2010), school leaders must develop as professional leaders not only to build their own schools but also to consider the educational system as a whole to enact powerful systemic interventions at all levels of the educational system. School leadership has become the most important priority in education, and it plays a significant role in school outcomes. The Department of Educational Leadership and Management of the Faculty of Education, the Open University of Sri Lanka introduced a school management programme in 2022 for Principals to build and improve their managerial and leadership competencies for fostering their professional development to enhance the school's effectiveness. The present paper focuses on the extent the school management programme has developed and shaped its managerial and leadership competencies to cater for the school's effectiveness. Accordingly, four (4) research questions were formulated and investigated in this study. Principals' reflections on how the programme is influencing the knowledge, attitudes, and practices of school principals to enact pedagogical changes were investigated. The impacts of the school management programme on changing principals' pedagogical practices were evaluated using a variety of data-gathering strategies. The participants of this study were 75 school principals who followed the programme, representing all three mediums of instruction (Sinhala, Tamil, and English). Accordingly, the current study adopted a survey research design**.** The data collected using questionnaires and reflections of principals were analyzed both qualitatively and quantitatively. The findings reveal that the content knowledge of the programme, learner support, online courseware and motivational strategies adopted through the programme has supported participants to improve their managerial and leadership skills at the highest level. Also, limited resources in the school, time management issues to practice intended competencies due to administrative workload and some barriers in the school culture were identified as application difficulties faced by the principals in relation to applying the theory into practice. Accordingly, it is visualized that this initiative would provide sufficient insights to maximize the potential for pedagogical change of school principals to improve their school effectiveness.

Keywords: Pedagogical change, Professional competencies, Professional development, School effectiveness, School leadership, School management

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TRAINEE TEACHERS' PERSPECTIVES ON CO-CURRICULAR ACTIVITIES AT SCHOOL

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Co-curriculum, when conducted hand in hand with the core curriculum, can immensely contribute to the overall development of students. However, as the previous literature suggests, the implementation of the co-curriculum has been hampered by several factors and some of them are teacher related. Teachers are directly responsible for the effective implementation of the co-curriculum parallel to the academic programmes at school. Hence, it is essential to educate teachers in this regard. Co-curricular studies are usually included in teacher training programmes with the view of educating trainees about the importance of the co-curriculum, providing training and keeping novice teachers motivated. Against this backdrop, the present study investigated the attitudes, capacity and motivation of a set of trainee teachers who were offered "Co-curricular activities" as a core subject in a four-year (special) Bachelor of Education degree programme. A survey design was used and data was collected using a Google form that included closed and open-ended questions. Ninety-seven responses were returned and data were analysed and interpreted; qualitatively using thematic data analysis and quantitatively using percentages and charts. Data analyses found that a vast majority of novice teachers were optimistic about the implementation of the co-curriculum and confident in their capacity of supporting both physical and nonphysical co-curricular activities during their service. Participants were prepared to contribute, undertake specific training and spend extra time promoting the co-curriculum. However, the respondents were more skeptical about conducting co-curricular activities remotely during school closures. In addition to that, novice teachers pointed out several possible drawbacks that can obstruct conducting the co-curriculum such as lack of time allocated due to the examination-oriented education system, lack of facilities and little recognition given to co-curriculum in the present education system in Sri Lanka. The study suggests that to obtain the maximum contribution from the teachers for the successful implementation of the co-curriculum, more time and value should be added to the co-curriculum through educational reforms, regular teacher training programmes should be conducted and the infrastructure should be developed. Moreover, the observations suggest that providing more training opportunities related to the co-curriculum during the teacher training programmes can further empower the trainees to function in their teacher roles effectively.

Keywords*:* Co-curricular activities, Extracurricular activities, Teacher training programmes, Trainee teachers

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EMPOWERING MODERATELY HEARING- IMPAIRED YOUTH IN ICT LITERACY SKILLS

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By the year 2050, over 700 million - or one in every ten people, will have disabling hearing loss. Approximately 80% of them will live in low and middle- income countries. Low and middle-income countries have to spend a considerable annual cost to maintain the lives of their hearing-impaired citizens. Unaddressed hearing loss impacts on the schooling of children and a much higher unemployment ratio in adults. Though some of them are employed, they do lower-grade jobs. Some examples of research work conducted on the areas of primary, secondary and tertiary education of hearing- impaired learners include: Previous studies were conducted on the effectiveness of the state vocational training rehabilitation program for consumers with hearing impairments, the challenges faced by hearing impaired pupils in learning, Francois et al. (2015) studied on the topic of schooling of hearing-impaired children and the benefits of early diagnosis. Though vocational training is not popular among hearing impaired youth, facts reveal that hearing-impaired youth literate in ICT can find employment opportunities either as graphic designers or hardware technicians in the industry. At present, such kinds of training are mainly conducted in the physical mode as formal classroom teaching. The training institutions as well as the hearing-impaired learners realize that the necessary infrastructure, transportation, accommodation facilities and communication are barriers to their lives. The research addresses ICT-related vocational training of moderately hearing- impaired youth through the development of ICT literacy skills. The objective of the study was to design an interactive e-learning material to provide ICT literacy for moderately hearing-impaired youth. A mixed methodology is used in the study. Randomly selected thirty moderately hearing- impaired youth are allowed to interact with the designed interactive e-learning material to obtain ICT literacy. A simple quiz was used to measure the participant's understanding on the provided e-learning content. A questionnaire is used to get feedback about their e-learning experience. Interviews were conducted with a few participants to gather further clarification about their e-learning experience. A statistical package and a statistical tool were used to analyze data. Findings showed that e-learning could be incorporated to empower moderate hearing-impaired youth in acquiring ICT Literacy skills.

Keywords: E-learning, ICT literacy, Moderate hearing-impaired youth

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INTERNAL CONSISTENCY RELIABILITY OF RESPONSES OF STUDENTS ON FORMATIVE ASSESSMENT PRACTICES AND STUDENT-RELATED FACTORS

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Many data collection techniques are used by quantitative researchers to obtain data from respondents for various studies. A questionnaire is considered to be the most widely used technique to collect data for quantitative studies. Cohen et al. (2011) asserted that a significant contribution to successful research is measuring its validity and trustworthiness, which are essential for both quantitative and qualitative research. Many quantitative data reliability procedures are used in quantitative studies and internal consistency is the most frequent method used to measure the reliability of a scale. Internal consistency reliability is a measure of consistency between different items of the same construct. It is usually measured with Cronbach's alpha. Therefore, this research aimed to assess the internal consistency reliability of the responses of students to the instrument prepared on formative assessment practices. The main purpose of formative assessment was to guide the student's learning process, focusing on the improvement of their learning progress. Formative assessment has the potential to guide both teaching and learning in the classroom. The objective of this study was to assess internal consistency reliability of the responses of students to the instrument prepared on formative assessment practices which were implemented by the teachers in the classrooms and student-related factors that affect formative assessment practices. Quantitative methodology was used to collect and analyze data obtained from the respondents using the IBM Statistical Package for the Social Sciences (SPSS version 20.0). Data was collected from 60 randomly selected students in grades 8 and 10 in 1C and Type 2 schools in the Kalutara district. The findings of this study show that the instrument is reliable. The instrument consists of 10 main constructs, 38 sub-Constructs, and 114 items that can be identified under the formative assessment practices and student-related factors that affect the effective implementation of formative assessment practices. The value of the Cronbach Alpha was found to be between 0.722 and 0.886, which is considered to be an acceptable instrument for the actual study.

Keywords: Cronbach alpha, Formative assessment practices, Instrument, Internal consistency reliability, Student-related factors

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THE USE OF SOCIAL MEDIA BY UNDERGRADUATE'S FOR ACADEMIC PURPOSES DURING THE COVID-19 PANDEMIC: WITH SPECIAL REFERENCE TO THE UNIVERSITY OF KELANIYA, SRI LANKA

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The evolution of social media in recent years has changed audience behaviour around the world. The use of Facebook as a prominent social media platform became critical along with its features, as the Covid-19 pandemic spread in Sri Lanka, impacting its limping the health, economy, education, and day-to-day activities, among others. Although the online learning platform were influential in the pre-Covid-19 period, to a certain extent, they have become an imperative part of the teaching and learning processes of the higher education sector during the Covid-19 pandemic. In Sri Lanka, along with online education platform and systems, social media platform has played a collaborative role. The objective of this study was to identify the undergraduates' perceptions social media platform and their use of Facebook for academic purposes. This study examines the academic purposes and benefits of Facebook based on the responses of 150 undergraduates of the University of Kelaniya, Sri Lanka. Data was collected using Google forms while a Descriptive Analysis and a Multiple Regression Analysis was conducted using IBM SPSS Statistics package. Entertainment owns a major fraction in predicting the benefits from use of Facebook which indicate that undergraduates more prefer to spend their time for entertainment by using Facebook. But in contradiction, Avila & Cabrera (2020) revealed that the use of the Facebook Group function in virtual classrooms have highly improved the academic performance of students compared to those that were taught using a modular approach during the Covid-19 period. Thus, allowing students to use Facebook to explore their creativity, experiment, and for entertainment may enrich the process of completing academic activities and attaining a better academic performance.

Keywords: Academic purposes, Covid-19, Online education, Social media

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IMPLEMENTATION OF RIGHT TO PARTICIPATION AT SENIOR SECONDARY SCHOOLS IN SRI LANKA

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The objective of the study was to assess whether the students' right to participation as specified in the United Nations Convention on the Rights of the Child (UNCRC) is implemented in the selected senior secondary school settings. The specific objectives were to determine how the Right to Participation was being implemented in the teaching and learning process and in co-curricular activities. A survey design was adopted, with stratified school samples selected from three districts: Colombo (Western), Anuradhapura (North-Central), and Nuwara-Eliya (Central). There were 692 students, 36 class teachers, and 18 principals in the sample. The qualitative data gained through structured interviews, classroom observations, and focus group discussions were triangulated with the quantitative data gathered through questionnaires. The quantitative and qualitative data were examined using descriptive statistical (SPSS Ver. 20) processes such as frequencies, and sampling adequacy. In the teaching-learning process of the selected schools, students, teachers, and principals acted without being aware of their participation rights; the majority of senior secondary students prioritise acquiring knowledge in order to pass the GCE O/L examination, which limited senior students' participation in societal work and their contribution to sports. The senior secondary students' involvement in school administration is still quite low. It can be stated that stakeholders in the selected schools acted without being aware of their participation rights during the teaching-learning process. Senior secondary students in this sample were given average opportunities by their schools to express their ideas and act on their decisions in co-curricular activities, which did not provide enough opportunities for students to make decisions and express their ideas in school administration. The study made several recommendations, including reducing the workload for Grades 10 and 11 subjects, restructuring the current curriculum, and educating stakeholders on the advantages of promoting and enabling students' participation in extracurricular activities.

Keywords: Implementation, Right to participation, Senior secondary school

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THE IMPACT OF STUDENTS' PERCEPTIONS OF ONLINE EXAMINATIONS (WITH SPECIAL REFERENCE TO THE LEVEL - 3 FINAL EXAMINATION OF THE BACHELOR OF EDUCATION (HONOURS) IN THE PRIMARY EDUCATION DEGREE PROGRAMME)

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The closure of universities and regulations to maintain social distancing as preventive measures against Covid-19 have changed the teaching-learning model from a conventional standard system to a virtual one. This study aimed to determine the impact of students' perceptions of online examinations during the Covid-19 pandemic. The research method uses a quantitative approach using the survey design. The primary data was collected using a structured questionnaire through a google form, which was administered via email and social media. The population (N=436) was the students who were following the Bachelor of Education (Honors) in Primary Education degree program at the Open University of Sri Lanka. The questionnaire was sent to the entire population and 205 responded. The respondents' data analyses were done through descriptive statistics, Pearson Correlation coefficient analysis, and Regression analysis. The structured questionnaire was designed with a five-point Likert scale to measure variables. Reliability was tested with Cronbach's alpha. Findings reveal positive and significant impacts on students' perceptions of online examinations while the majority appreciated the online examinations. This indicates that students' perceptions have a high impact on online examinations.

Keywords: Covid-19, Online examinations, Students' perceptions

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THE AUTHENTIC LEARNING APPROACH IN THE TEACHING-LEARNING PROCESS: AN OVERVIEW BASED ON A SYSTEMATIC REVIEW APPROACH

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The aims of this paper are to provide a brief outline and an overview on the authentic learning approach in the teaching- learning process. It explores the effects of the authentic learning approach on students' performances in the teaching-learning process and the challenges of implementing an authentic learning approach in the teaching- learning process. This study adopted a semi systematic review approach. The literature review mainly focused on research articles that investigated the authentic learning approach. Most of the reviewed literature was published in online journals. The selected articles were read, and the findings following the reviewed literature are presented based on the research questions that guided the study. The qualitative analysis method was used for analyzing the data. Therefore, it was helped to critically evaluate the different ideas and opinions elaborated by different scholars and researchers. When we focus on the effects of the authentic learning approach in the teaching- learning process, we found that it is moving towards modern teaching methods and that it is able to provide a more meaningful learning environment for students. This learning approach paves the way for building more intellectuals or critical citizens. Students will be able to participate in projects and activities that will require them to apply the knowledge they have learned to address real-world problems using an authentic learning approach. Some researchers highlighted that authentic learning gives opportunities for teachers to bring the outside world into the classroom. This will enable them to communicate their knowledge and skills learned in the classroom into their real-life situations, thus making the value of learning much more important to them. When considering the challenges of using the authentic learning approach in the teaching learning process, implementing authentic assignments in the classroom is more difficult. Some researchers point out that there is a need to equip teachers with ample knowledge on planning, designing, and implementing authentic assessment in the classroom. The findings of this study indicate that some teachers do not have enough knowledge about this learning approach and that teachers need pedagogical training to carry out the teaching of the curriculum along with the authentic learning activities.

Keywords: Authentic learning approach, Challenges, Students' performances, Teaching-learning process

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THE RELATIONSHIP BETWEEN CORONAVIRUS ANXIETY AND ACADEMIC ACHIEVEMENT OF STUDENTS IN ONLINE CLASSES

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The outbreak of the Coronavirus affects not only the physical health of a person, but it can have devastating psychological effects too. To treat and diagnose this problem, the impacts should be identified. This study investigates the mediating role of empathy in the relationship between self-compassion and psychological capital with corona anxiety. The research method was correlational with path analysis. The population of this study included all undergraduate students of Poldokhtar Higher Education Centre (450 students) who were studying in the academic year 2020-2021. The sample of the study consists of 210 male students who answered the Corona Disease Anxiety Scale (CDAS), Self-Compassion Scale (SCS), Psychological Capital Questionnaire (PCQ), and Interpersonal Reactivity Index (IRI) electronically. Casual modeling was used to analysis data. The results showed that the proposed model meets with the data of this study (RMSEA = 0.001, GFI = 1.00, AGFI = 0.98, CFI = 1.00). The results also showed that the psychological capital has a direct effect on corona anxiety ($\beta = -0.16$, $p<0.05$), but self-compassion does not have a positive effect on corona anxiety ($p>0.05$). Self-compassion has a positive effect on empathy ($\beta = 0.32$, $p<0/01$); but psychological capital does not affect empathy ($p>0/05$) directly. Also, empathy positively affects corona anxiety ($\beta = -0.29$, $p<0/01$). Indirect pathway results showed that only self-compassion mediated by empathy could reduce corona anxiety ($p<0/01$). According to the results, students with higher psychological capital and empathy experience less corona anxiety, and on the other hand, it was observed that the more self-compassion increases, the more empathy improves, the result is a decrease in corona anxiety. Therefore, through education and promotion of self-compassion, empathy can be increased and the severity of corona anxiety in students can be reduced.

Keywords: Corona anxiety, Empathy, Psychological capital, Self-compassion

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ASSESSING THE PUBLIC SPEAKING SKILLS OF VIRTUAL ESL LEARNERS USING ALTERNATIVE ASSESSMENT STRATEGIES

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The conventional methods of assessing public speaking skills of learners were disrupted with school closures due to the sudden breakout of the Covid 19 pandemic. This study was carried out as an action research in a grade 7 English language online class to look at how alternative assessment strategies can be implemented to assess public speaking skills of virtual English as Second language (ESL) learners. The objectives of the study were to identify the need of using alternative assessment strategies to assess public speaking skills in an online classroom, plan an alternative assessment, implement the planned alternative and assess the suitability of the implemented alternative assessment. This action research was conducted using a sample of purposively selected learners (n=15). A speaking test was conducted focusing on speech (product) as the pretest for identifying the performance level of the learners. After conducting three workshops to improve the public speaking skills of the learners, an alternative assessment was planned and implemented in the online classroom. The alternative assessment was planned based on the Assessment for Learning (AFL) approach that is focused on the process as well as the product. Self-reflections and peer evaluations were also motivated to create a learner friendly collaborative environment that facilitates the learners to achieve their target skills. The analyzed data revealed that the manipulated alternative assessments positively affected the assessing of the public speaking skills of the ESL learners while providing them an opportunity to reflect on the process, identify their strengths and weaknesses, and develop their public speaking skills. Speech anxiety also can be decreased by using alternative assessments in assessing public speaking skills.

Keywords: Alternative assessment strategies, Assessment for learning (AFL), English as a Second Language (ESL), Public speaking skills

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IDENTIFICATION OF GIFTED AND TALENTED STUDENTS THROUGH THE LITERATURE

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In Sri Lanka, the school system gives attention to children with Special Educational Needs (SEN). But unfortunately, the school system does not pay enough attention to gifted and talented students in the classroom who are also considered as special needs students. The specific objectives of this study are to identify the nature of gifted and talented students and to identify the theoretical models of giftedness. In this study document analysis was followed to find the theoretical background which is useful to adapt a screening tool to the Sri Lankan context. The first phase of the study mainly collected data from the literature review. The literature review consisted of theoretical literature and empirical literature review. Moreover, to identify the research findings of the empirical literature review national and international level e-resources were referred. The method of content analysis was utilised to analyse the collected data from the literature review. As a result, the definition, characteristics, identification and indentation strategies, common methods of identification of giftedness and talented such as tests, achievement tests, nomination, and rating scales, etc. were found. Further, it was found that there are three theoretical models in relation to the gifted and talented; Renzulli's Three-Ring Conception of Giftedness, Gardner's Theory of Multiple Intelligences, and Gagné's Differentiated Model of Giftedness and Talent. It could be concluded that the literature review is the primary strategy for the development of the indentation tools for gifted and talented students.

Keywords: Gifted, Talented, Theoretical models

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A COMPARATIVE STUDY OF THE IMPACT OF PRESCHOOL EDUCATION GOALS ON THE OVERALL DEVELOPMENT OF CHILDREN

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Early childhood education is the foundation of a holistic development that creates supportive and constructive learning for children of all ages. Especially in early childhood, they need exposure to early stimulation, and to learn life skills that will prepare them for school and day-to-day life. Therefore, it is needed to emphasize all aspects of development at the beginning of a person. This study provides a comparative analysis of the aims of preschool education in relation to child development in a selected few countries in the world. According to international studies, general principles of preschool education should aim to provide a safe and stimulating environment in which children can feel happy and secure, and encourage their emotional, social, physical, creative, and intellectual development. In addition, preschool education should encourage positive attitudes towards the self and others, develop confidence and self-esteem, and support children to explore and respect their environment. The main aim of this study was to investigate how far the aims/ objectives of preschool education have been considered in the holistic development of children. A documentary survey was used as the research design in this study. Four countries were selected as the sample of the study. The curricula of preschool education were selected from Sri Lanka, Singapore, Finland, and Sweden. The findings showed that the aims of the selected countries have been focused on the main aspects of child development. It is clear that each of these countries has sought to provide basic conceptual attitudes and skills for the learning experiences of preschool children. All four countries have pointed out the importance of the play method for young children Among other countries, Finland has paid more attention to provide the basic foundations needed to maintain the well-being of the individual and guidance on how to behave in the society, as well as to ensure the autonomy of a child. It also focuses on the systematic development of a child. Each country has focused on developing the basic skills necessary for a child's total development. Play is the main learning method in those countries. Providing opportunities for a child to learn freely and independently are key points that emerged from this study.

Keywords: Holistic development, Preschool education, Teaching-Learning strategies

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ENGINEERING AND TECHNOLOGY

DESIGN OF HYBRID POWER SYSTEM FOR RUBBER-TYRED GANTRY CRANES

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The Rubber Tyred Gantry (RTG) crane is hoisting equipment usually used in port terminals to move shipping containers from one location to another. RTG cranes are powered by diesel generators, so operation carries high fuel costs. These RTG cranes perform very poor operation efficiency due to several reasons. The equipment is operated at a constant speed during the vertical lift, no matter how the load or real vertical lift changes and while lowering the container, the regenerative braking energy is not recovered effectively and thus usually dissipated through a resistor bank. This research study proposed a Hybrid Energy Storage System (HESS) as the potential solution for absorbing regenerative energy based on the combined energy storage devices. This HESS is achieved through efficiently combining one fast-response energy storage device with a high-power density and a slow response device with a high energy density. In this research, a new combination of battery and supercapacitor is used as Hybrid Energy Storage (HES) with the Quasi Z-source inverter (QZSI) topology which replaces conventional voltage source inverter (VSI) in many applications such as the electrical motor drive system. Proposed HESS was applied for the RTG crane's induction motor (hoist motor) drive system. The method of interfacing the Supercapacitor via a bidirectional DC-DC converter is proposed with the implementation of supercapacitor current control to support the battery as the primary energy source. The system is designed and modelled together with the required voltage and current control and simulated at a 15kW power rating in MATLAB Software.

Keywords: Energy storage system, Operation efficiency, Quasi Z-source inverter, RTG cranes, Super-capacitor

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DESIGN A SOLAR-PIEZOELECTRIC HYBRID STREET LIGHTING SYSTEM

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Electricity demand for street lights increases with the development of road systems in Sri Lanka including expressways. This increased demand for street lights directly affects the peak time demand of the country which is mostly generated by high-cost thermal power plants. During grid power outages, the street light system is out of operation due to the absence of any backup power source. Therefore, the national grid supply for street lighting should be replaced with renewable energy sources to decrease power demand and increase the reliability of the street lighting system while reducing the cost incurred. The solar-powered street lighting system is one of the most common alternative renewable energy systems identified whereas hybrid street lighting is a new trend. This research study aims to design a hybrid street lighting system using both solar energy and wind energy. The relative wind energy generated by moving vehicles on the road is absorbed by the proposed setup which can be installed in the middle of the road where it replaces conventional side dividers. The proposed system consists of piezoelectric crystals and solar panels as the main components. A mechanism consisting of oscillators is used to convert the relative wind energy into vibration. Piezoelectric plates are used to generate power from this vibration. The hybrid street lighting system was built as a prototype and tested at different wind speeds. Results indicate that using piezoelectric elements the wind energy can be converted to electricity and can be stored in a battery. The prototype fabricated in this research generates low power output from a piezoelectric generator compared to a solar panel. Therefore, by adding more piezoelectric plates and several piezoelectric wind turbines the output power can be increased.

Keywords: Hybrid street lighting, Peak time demand, Piezoelectric crystals, Relative wind energy, Vibration

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DESIGNING MICROCONTROLLER BASED ACCIDENTAL FIRE PROTECTION SYSTEM FOR SUGAR CANE PLANTATIONS

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Accidental fires in Sugarcane plantations are the main cause for pre-harvest loss in the Sugar industry. In the dry seasons, accidental fires are a plentiful phenomenon in Sugarcane plantations. The proposed system uses Smoke detectors, Infrared detectors, Carbon dioxide and Carbon monoxide detectors to detect fire and Arduino with GSM Module is used to notify fire alert and GPS location to Fire Alarm control panel which is installed in a remote place. The proposed system contains two separate systems which are the Field system and Fire Control Unit's system. The Field system is installed in the Sugarcane field and it includes Fire detection protocol and Fire prevention protocol. The Fire Control Unit's system is installed in the fire brigade office. These two systems communicate wirelessly via GSM Network. When fire is detected the Microcontroller sends a fire alert to the fire brigade and turns on water pumps to control Fire until fire brigade reaches the field to completely control the Fire. The Fire Control Unit's system turns on the fire alarm and displays the GPS coordinate of the burning field to reach the field and Drones can follow these GPS coordinate and get live video feedback about the current situation. Arduino Mega and Arduino Leonardo Microcontroller platforms are used in this system. To program microcontrollers, C++ programming language in the Visual Studio Code and Arduino Integrated Development Environment are used. The prototype can identify Fire and notify the fire brigade and turn on water pumps in less than 20s.

Keywords: Arduino, Fire-Detection, GSM, Microcontroller, Sugarcane

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DEVELOPMENT OF HUMIDITY SENSING MATERIAL USING ZnO DOPED DERIVED CHARCOAL FROM THE WASTE PVC

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Humidity sensors are one of the most commonly used sensing devices in various fields, such as industrial and medical, etc. Therefore, the development of novel low-cost sensing materials is important to satisfy the growing sensor market. Main objective of this study is to develop low-cost sensor material from waste polyvinyl chlodide (PVC) and investigate sensing parameters and performances like resistance, hysteresis, recovery and response times, and stability for relative humidity. The PVC has the potential to form conductive charcoal while removing bonded Cl molecules. Therefore, conductive carbon was prepared by pyrolyzation of PVC at 600°C, and ZnO was doped under hydrothermal treatment at 140 °C. The sensor was prepared by depositing ZnO doped pyrolyzed carbon composite on the gold-coated resistive type electrode. The prepared composite was characterized using scanning electron microscopy (SEM), X-ray diffraction spectroscopy (XRD), Thermal gravimetric analysis (TGA), and RAMAN spectroscopy. Also, sensing performance was investigated. The resistance of the sensor is changed between 569 and 630 Ohms with the relative humidity (RH) from 39% to 90%. Also, recovery time is observed as ~15 s. The humidity sensitivity of ZnO charcoal composite is 1.34 ohms per percentage RH attributed to the enlarged specific surface area induced by its unique nanostructure of charcoal. The results indicate that ZnO charcoal composite will be an ideal material for fabricating high-performance and low-cost humidity sensors.

Keywords: Hydrothermal reaction, Nanotechnology, Pyroliztion.

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PREPARATION OF FLEXIBLE ELECTRODE COMPOSITE MATERIAL WITH EXPANDED GRAPHITE AND PVAC

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Flexible electrodes are widely used in wearable electronics, energy storage devices and flexible capacitors. Therefore, developing novel low-cost biodegradable electrode materials is important to satisfy the growing market. The main aim of this study is to develop low-cost electrode material from biodegradable polymer composite materials and compare the electrochemical characteristics like resistance and conductivity against mechanical forces. Expanded graphite can form conductive paths after applying high compression force. Therefore, Expanded Graphite (EG) was prepared by chemically assisted thermal expansion of Kahatagaha graphite at 700°C, and polyvinyl acetate PVAc was used to prepare the composite mixture. Then the electrode was prepared by compressing EG mixed PVAc composite on the pneumatic press up to a 40-ton load. The prepared composite was characterized using scanning electron microscopy (SEM), X-ray diffraction spectroscopy (XRD), Thermal gravimetric analysis (TGA) and RAMAN spectroscopy. Also, current collecting performance was investigated under different graphite to PVAc ratios. The surface area has been increased from 2.84 m^2/g to 5.18 m^2/g after exfoliation and the best results obtained for EG to PVAc composition 1:2.5 (w/w). The lowest resistance obtained from the EG/PVAc system is 0.635 Ohms and the material ratio of EG to PVAc is 1:2.5, which was compressed at a 40-ton compressive force. The maximum strain shown in the study at the best conductivity is 0.059 %. That strain is attained at 0.043 MPa tensile stress. These results indicate that the EG-PVAc composite will be an ideal material system for fabricating high-performance, low-cost, and bio-degradable current collectors.

Keywords: Expanded graphite, Tensile stress, Thermal expansion

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PRODUCING A CEMENT BLOCK WITH SUSTAINABLE USE OF POLYESTER YARN WASTE AND DETERMINING OPTIMUM MIX PROPORTIONS

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The garment industry in Sri Lanka generates approximately 30000 to 40000 tons of textile waste. An attempt is made in this study to partially replace fine aggregate, which is one of the main ingredients in cement block making, with polyester yarn obtained from textile waste. A preliminary study done on variable cement: sand mixes indicated that a ratio of 1: 10 with water: cement ratio of 0.60 as the optimum combination to produce conventional cement blocks satisfying all the requirements specified in the SLS 855 applicable to cement block making. Based on a previous research study on producing concrete paver blocks it was decided to vary polyester yarn content from 0.1% to 0.5% replacing the fine aggregate. During the experimental phase, it was noted that increasing the yarn percentage further makes mixing mortar very difficult due to the tangling of wet yarn. Results of the compressive strength, moisture content, water absorption, and block density tests, recommended in SLS 855 for cement blocks, indicated that the addition of yarn improves the tested engineering properties. At a mix proportion of 0.4% fiber, it was possible to increase the compressive strength by 73%, or to 4.5 N/mm^2, when compared to conventional block strength of 2.6 N/mm^2. This makes it possible to use the block with 0.4% yarn even for load-bearing walls. This strength gain is due to the tensile capacity introduced by the polyester yarn to the otherwise purely compressive blocks made with cement sand mortar. This is further evidenced by the results of the split tensile strength test. A 100% increase in tensile strength is observed when 0.4% yarn is added compared to ordinary cement blocks.

Keywords: Blocks, Cement, SLS, Yarn

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A STUDY TO INVESTIGATE THE MOST SUITABLE SEAM-STITCH COMBINATION FOR SIDE SEAM OF SHIRTS IN RELATION TO SEAM STRENGTH AND SEAM DRAPABILITY

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The apparel industry is a fast-growing competitive industry. Nowadays many other alternative technologies such as molding, spot welding, adhesives etc. can be used to construct garments or to join fabric panels. Although, there are new technologies to construct garments or join fabric panels, still the most popular method is the sewing technique. When considering the construction of shirts, side seams can be constructed using various seam types, stitch types and stitch densities. These sewing construction parameters should be selected carefully in order to obtain high quality seam constructions. The main objective of this investigation is to find out the most appropriate seam types, stitch types and stitch densities for side seams of shirts in relation to seam strength and seam drapability, which influence both the physical and performance features of seams. Appropriate fabric type, sewing thread type along with two (02) ticket numbers, three (03) seam types, four (04) stitch types along with three (03) stitch densities and five (05) suitable seam-stitch combinations were selected for the experiments. The testing standards, machines and equipment for seam strength and seam drapability testing were also selected. A total of 150 samples were prepared as per the testing standards. Out of these 150 samples, 75 samples were prepared for the testing of seam strength. For each seam-stitch combination 15 samples were prepared, 5 samples each for 3 stitch densities. The same procedure was followed to prepare the other 75 samples for the testing of seam drapability. The samples were tested for seam strength and seam drapability to determine the most appropriate seam-stitch combination for side seam of shirts. As a result of this investigation, it was clearly found that the seam strength and seam drapability depend on the selected seam-stitch combinations and stitch densities. A large number of relationships can be developed from this study between seam-stitch combination and the seam strength as well as seam drapability. These findings will be very useful for fashion designers to select appropriate seam-stitch combinations and stitch densities for new designs. Further studies should be carried out to improve the findings of this study with increased number of material types, stitch densities, thread types etc.

Keywords: Seam, Seam drapability, Seam strength, Stitch, Stitch density

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A STUDY TO INVESTIGATE THE POSSIBILITY OF USING WASHED BLOODSTAINS IN SELECTED COTTON AND POLYESTER WOVEN FABRICS AS DIRECT FORENSIC EVIDENCE

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In forensic scenarios, it is very common to discover textile materials as evidence. As forensic textile science is still considered as a relatively new discipline, in a majority of criminal investigations textile evidence is considered only as circumstantial evidence. Bloodstain pattern analysis could contribute to more conclusive evidence than comparison of textile evidence, which could account for direct forensic evidence in criminal justice. Therefore, the main objective of this study is to investigate the possibility of using washed bloodstains in selected woven fabrics as direct forensic evidence to provide justice against criminal activities. The simulation experiments were conducted on 4 sets of fabric samples, 30 samples each from Cotton and Polyester. They were used to produce drip and spatter stains on samples and the results were photographed. All 60 samples were washed by using a domestic detergent after allowing 24 hours for stain fixation. Twenty samples, 5 from each set of samples, were taken out and dried under standard conditions. To balance the wash load, 20 fresh samples were added to the washing machine. The same procedure was repeated for two more washing cycles. After each washing cycle, the results were photographed. Dried fabric samples after each washing cycle, were treated with Luminol and the results were photographed. The photographs were superimposed by using Adobe Photoshop software to compare original blood-stained samples with Luminol treated blood-stained samples. The relationship between the original blood-stained samples and the Luminol treated blood-stained samples was analyzed by using ImageJ software for the average length and area of the stains. Qualitative analysis shows that the types of bloodstains formed can be identified with over 91% of accuracy by the use of Luminol on washed and dried samples. Quantitative analysis shows that there are different relationships for the average stain length and stain area of Polyester and Cotton samples. Statistical t-tests were carried out for all sample sets to determine the significance of the results on the selected two parameters. Further studies should be carried out to improve the outcome by using an increased number of samples on the selected fabric types.

Keywords: Bloodstain pattern analysis, Forensic textile science, Luminol, Washed bloodstains

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DETERMINING FACTORS LEADING TO SUCCESSFUL UTILIZATION OF BIOMASS FOR POWER GENERATION IN SRI LANKA

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During the past decade, many Sri Lankan energy-providing companies have invested in renewable energy projects to generate electricity. Solar, wind, and mini-hydro projects are the main focus of these investors. However, biomass energy generation, which is highly successful in many other Asian countries, has not received due attention in Sri Lanka. Even though there were a few bio-mass energy-generating projects commenced in Sri Lanka, most of them proved to be unsuccessful in a short period of time. This study looks into the reasons that lead to the failure of biomass energy generation in Sri Lanka by analyzing relevant information and also attempts to ascertain the factors that are favorable for the development of biomass power plants. Analysis of information collected through the literature survey and discussions carried out with the experts indicates that a multitude of reasons including policy, technical, legal, and administrative, have led to the failure of biomass-based electricity generation in Sri Lanka. The study finally makes recommendations that will eliminate the above obstacles, enhancing the successful utilization of biomass for power generation in Sri Lanka.

Keywords: Biomass, Energy Policy, Power Plant, Renewable Energy

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RESPIRATORY SYSTEM RELATED SEVERAL DISEASES DETECTION SYSTEM USING LUNG SOUND ANALYSIS

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COPD and Asthma are among the most common causes of severe illness and death worldwide among both children and elder people. Prevention, early diagnosis, and treatment are key factors to limit the spread of such diseases and their negative impact on the length and quality of life. An electronic device to diagnose COPD and Asthma based on Lung sound analysis is proposed. The proposed system detects sounds in the chest and analyses them to divide the condition of the lung status of the patient to COPD, Asthma or Healthy. When the stethoscope touches the chest, both blood pressure sounds, and lung sounds can be heard. Sounds of lungs with asthma and COPD have wheezing, Crackles, Rhonchi sounds than a healthier person. Sounds are analysed by MFCC and CNN. First, sound features are extracted by MFCC. Then lung sounds are classified for COPD, asthma and health by CNN. Deep CNN is used for training the model and training results which have 95.1% validation accuracy and 93.8% test data accuracy.

Keywords: Asthma, Auscultation, CNN, COPD, MFCC, Respiratory system

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INVESTIGATION ON THE SUITABILITY OF PAPER PULP IN THE PRODUCTION OF LIGHTWEIGHT, NON-LOAD-BEARING CEMENT BLOCKS

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The main ingredients used in the production of conventional cement blocks, widely used currently in the construction of walls, are Ordinary Portland Cement and fine aggregate in the form of M-sand (graded quarry dust). If these cement blocks can be made lighter while maintaining the required engineering properties, it would reduce the dead load applied to the structures, resulting in a reduction in the size of the structural components, which is cost-effective. Moreover, it can be concluded that savings are possible in energy costs due to the heat insulation property of added paper pulp. In this research study, an attempt was made to explore the feasibility of producing a lightweight cement block by partially replacing fine aggregate with paper pulp obtained from waste paper. Based on the outcome of a few preliminary studies it was concluded that the paper pulp replacement should be done within the range of 28% and 34% of fine aggregate, with an optimum cement: sand ratio of 1: 8 and water: cement ratio of 0.7. Compressive strength, moisture content, water absorption, and density tests, recommended in SLS 855: Part 1 for cement blocks, were carried out by varying the M-sand replacement percentage with paper pulp from 28 to 34 in two steps. Test results concluded that the optimum paper pulp replacement is 30% of fine aggregate, which gives a compressive strength of 1.23 N/mm^2 after 7 days of curing. This results in a 14% reduction in dry density compared to the control block. Moreover, it complies with all the standards specified in SLS 855 PART 1 for the production of lightweight, non-load-bearing cement blocks. This reduction in self-weight leads to substantial savings in the construction cost of structural elements.

Keywords: Cement blocks, Light weight, Paper pulp

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PHYSICAL AND MECHANICAL PROPERTIES OF *Sansevieria zeylanica* (CEYLON BOWSTRING HEMP) FIBER REINFORCED COMPOSITES

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Composites are heavily used today as an alternative to conventional materials in many industrial applications. In manufacturing the composites, there is a greater interest in using natural fibers with various polymer matrix materials. They are eco-friendly, light in weight with higher mechanical properties, bio degradable and economical. Sansevieria zeylanica (Ceylon Bowstring Hemp)-SZ- is one of the fiber-yielding plants grown in Sri Lanka. In this research, Sansevieria Zeylanica Fiber (SZF) was used as reinforced fiber with 20%, 30%, 40%, and 50% fiber weight percentages, while the composites were made using Epoxy and Unsaturated Polyester matrix polymers. Then, the physical and mechanical properties of mild alkali-treated and untreated fibers and composites were investigated. In the fiber state, the fiber bundle strength, single fiber strength, tensile strength, breaking elongation, and moisture absorbing properties of the treated and untreated fibers was tested as the first phase. In the second phase, the tensile strength, breaking elongation, hardness, flexural strength, impact strength, compressive strength, and moisture absorbing properties were tested for composites. In this work, manual extraction of SZF with water retting was used without damage to the fiber and dried under sunlight for 3-4 days to prepare them, some of them were alkali treated with 5% NaOH for one hour to remove impurities. After that, small bundles of SZ leaves were immersed in a water bath with a liquor ratio of 1:20 for 1 hour and allowed to dry for 3-4 days under sunlight. Alkali treated SZFs have shown higher tensile strength, bundle strength, and moisture absorbing properties than untreated fibers. However, the elongation at break was lower in alkali treated fibers than in untreated fibers. Further, the effective length of the SZF was measured as 30cm. In SZF reinforced composites, tensile strength, hardness, impact strength, and flexural strengths were 40% higher for fiber ratio than other fiber ratios. But the compressive strength exhibited good behavior in all tested samples. Further, Epoxy based reinforced composites have given much better physical and mechanical properties than Polyester-based composites. Therefore, it is recommended to use alkali treated SZF reinforced composites with a 40% fiber ratio and Epoxy matrix for industrial applications such as cladding boards, automobiles, aircrafts, home appliances, and aeronautical appliances.

Keywords: Fiber reinforcement, Mechanical and physical properties, Natural fiber composites, *Sansevieria zeylanica*

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EXPERIMENTAL INVESTIGATION OF MODIFIED CEMENT MORTAR CONTAINING RICE HUSK ASH AND POLYMER ADHESIVE

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One of the most extensively utilized finishing products in the building sector is cement mortar and cracking is one of the prevalent issues associated with the cement mortar plastering. The inability to tolerate external loads and a loss in movement flexibility are the two primary causes for fractures in cement mortar. Thermal expansion and drying shrinkage encourage the cracking of cement mortar. In this study, the properties of cement mortar are enhanced to prevent cracking. This experimental study was carried out using a 1:3 (cement: sand) cement mortar, made with Rice Husk Ash (RHA) and Polyvinyl Acetate (PVA) polymer adhesive. There were seven cement mortar mix designs considered in the study. The RHA was produced by incinerating the rice husk in a furnace at 650˚C for three hours. The RHA blending was done in percentages of 5% and 20% of the cement weight, while the PVA polymer blending percentages were 0.6%, 1%, and 3% of the cement weight. Compressive and flexural strength tests were conducted for all seven mix designs. The test results revealed that blending of 5% of RHA and 1% of PVA gives the optimum flexural and compressive strengths in cement mortar.

Keywords: Cement mortar, Flexural strength, Polymer adhesive, Polyvinyl acetate, Rice husk ash

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A HARMFUL WEB SITES DETECTION SYSTEM USING RANDOM FOREST MACHINE LEARNING ALGORITHM

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Detecting harmful websites is one of the highest priority issues for cyber security practitioners. Harmful websites are engaged in illegal and unethical activities such as spam, financial scams and malware agents and cause personal, financial and many other serious losses globally. The most commonly adapted approach to curb this issue is blacklisting and rule-based approach. Current approaches to dealing with this problem have many limitations in terms of effectiveness and efficiency. This research work proposes a lightweight approach for detection and categorization of harmful websites according to the type of attack or the harmfulness. The aim of the research is to design and develop a Harmful Website Detection System (HWDS) based on the lexical-based features of the addresses of the websites. A data set of about a hundred and twenty thousand (120,000) web addresses including the identified features were used in creating the models. The training data set included Malware, Phishing, Spamming, Defacement and Benign web addresses in addition to the normal web addresses. Three (03) Machine Learning Techniques, namely Random Forest, Decision Tree and K Nearest Neighbour were used to create a detection model. The highest accuracy of 99.8% was achieved by the random forest model to predict whether a particular website is harmful or not. Two models are designed in this system to identify the harmful status and harmful nature of any website. Hence, the model developed can be considered as an optimized, time-saving light weighted system with increased accuracy and provides a user-friendly solution for detection of harmful websites.

Keywords: Harmful Websites, Lexical Features, Machine Learning

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IoT-BASED COVID-19 PATIENT MONITORING SYSTEM

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Due to the high number of Covid-19 patients in the country, most quarantine centres and hospitals were fully occupied during 2020. As a solution to this problem, this research project designed a system using the IoT concept to monitor patients who are unable to contact physicians physically. A wearable device was designed and fabricated to measure a Covid-19 patient's body temperature, oxygen saturation, and pulse rate. The measured data is then uploaded to a cloud database. The system shows the real-time data to authorized persons over a web-based dashboard. In addition to real-time monitoring, the physician can retrieve the patient's previous measured data records and easily analyse his/her medical history with system-generated graphs. The wearable device is powered by the NodeMCU ESP 32 microcontroller. The device uses Wi-Fi to connect to the internet. An android application was developed to change the Wi-Fi connection of the wearable device as per user preferences. This Android application uses Bluetooth to communicate the Wi-Fi preferences to the wearable device. Google Firebase is used as the cloud database in the system. Each wearable device has a unique ID and the physician can add a new device to the system by inserting the details of a patient with this ID. An OLED display was included in the wearable device to allow the patients to monitor the measured values themselves. While vaccination has helped to control the spread of Covid-19 worldwide, there are still patients who need to be closely monitored. The system designed in this research project can be put to good use in this situation too. Moreover, the system can be used to monitor patients with fever and other respiratory diseases in addition to Covid-19 monitoring.

Keywords: Covid-19, Internet of Things, Remote monitoring, Smart healthcare

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DEVELOPMENT OF A LOW-COST CEILING BOARD PRODUCED FROM A COMPOSITE OF CEMENT, SAWDUST, RICE- HUSK ASH, AND WASTE POLYESTER YARN

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Ceiling boards provide thermal comfort while helping to reduce noise. However, due to the presence of hazardous materials, they pose a threat to the health of dwellers. Asbestos present in the most popular types of ceiling boards used in Sri Lanka is known to cause cancer. Using alternative materials instead of asbestos, especially problematic waste materials that cause environmental pollution due to uncontrolled dumping, solves this problem while helping to reduce the amount of waste. Three such problematic waste materials, rice husk ash, sawdust and polyester yarn, together with Ordinary Portland Cement (OPC) as the binder, were used to make an asbestos-free ceiling board in this research study. Ground rice husk ash was added due to its cementitious property to minimize the amount of the costly material, cement. A total of five different mix proportions were tested by varying the cement content from 40 to 60% in the study. Polyester yarn, added to increase flexural strength, was kept constant at 0.8% in all mixes. Equal percentages of ground rice husk ash and sawdust were used as the balance material. Samples were tested to determine density and water absorption, and flexural, compressive and split tensile strengths. Results of the compressive strength, flexural strength, and density tests of all mixes indicated that the resulting values far exceed the required criteria specified in the ASTM standard. Water absorption test results lie outside the range specified in the ASTM standard, but lie within the range of corresponding values of Masconite AC flat sheets, fiber cement flat sheets, and Trilite boards. Ceiling board type with a 40: 29.6: 29.6: 0.8 composite ratio of cement, ground rice husk ash, sawdust, and waste polyester yarn, respectively, was found to be the most economical mix. Moreover, the production cost, including labour for a 1200 x 1200mm ceiling board based on this optimal design, is Rs.445, well below the price of the most widely used types of ceiling boards.

Keywords: Ceiling board, Rice husk ash, Sawdust, Yarn

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CONDITION MONITORING SYSTEM FOR GAS TURBINE GENERATOR IN KERAWALAPITIYA POWER PLANT

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In the case of electrical power generation, the generator cooling mechanism is a crucial factor which decides the reliability. Most of the available generators consist of air-cooling systems and the condition of air is directly affected by the generator failures. Most of the time ambient air quality is not satisfied due to carbon particles, salty mist, and moisture content. That low-quality air can cause damage to the rotor and stator windings directly. Therefore, it is essential to check the air condition continuously to ensure the required air quality standards within the generator compartment. Not only the air quality but also there are other few parameters which are neglected by commonly available condition monitoring systems that are still affecting the generator reliability. Hence this research is based on developing a condition monitoring system for the gas turbine generator at Kerawalapitiya power plant which is suffering from frequent generator failures due to air quality issues of generator cooling systems. The proposed design consists of a condition monitoring system which can continuously measure moisture level, air pressure, air temperature, shaft ground brush AC-DC current and voltage inside the generator. By analyzing previous data collected during the normal operating conditions and turning gear conditions a membership function was implemented using fuzzy logic. Proposed design was simulated through MATLAB/Simulink software to validate the functionality. The inputs to the membership function were generator shaft ground DC voltage (mV), generator shaft ground AC voltage (mV), generator shaft ground DC current (mA), generator shaft ground AC current (mA), generator inside absolute pressure (mbar), generator inside moisture level (ppm) and generator inside air temperature (°C). The generator dry air condition, generator overall condition, shaft ground voltage & current condition, generator moisture level condition and inside temperature condition were the fuzzy logic system outputs. This system will generate warning alarms when the air condition is poor in both normal operating and turning gear conditions and it also has the ability to re-analyze the limits using the collected operational data. With the proposed model it is possible to analyze the air condition and that will avoid air quality related failures of the gas turbine generator while enhancing the overall system reliability. Hence the plant availability can be improved while maximizing the profits.

Keywords: Air cooled generator monitoring**,** Fuzzy logic, Generator condition monitoring, Rotor insulation failure

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NETWORK RECONFIGURATION ALGORITHM TO FIND A POSSIBLE SET OF NETWORK CONFIGURATIONS THROUGH SMART GRID TECHNOLOGY

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The term Smart Grid (SG) applies in communication and control technologies used in generation and transmission. Electrical utility industries are not focusing on SG technologies beginning at the distribution substation level due to complexity of the Low Voltage (LV) networks. However, distribution operators will have an opportunity to optimize the system operation and control due to the availability of data and remote-control facility in LV Smart Distribution System (SDS). Network reconfiguration is required when restoring the power during breakdowns, maintenance and load shedding in the LV Distribution Network (LVDN). If there is a set of possible network configuration/feeder arrangements, the operator shall find the best feeder configuration among them. This paper discusses an algorithm to find a set of possible network configurations, considering technical constraints and priorities. A comprehensive field survey was conducted to identify LVDN general arrangements in urban, semi urban and rural areas consisting of approximately 1600 distribution substations located in Western Province South II of Sri Lanka. The survey was focused on checking the possible ways of gathering input data, retrieval methods for the algorithm and sending the output of the algorithm to the SDS. A generalized smart selective secondary feeder topology model was developed incorporating the field survey and collected data. The proposed smart LVDN system has mainly two parts, the main control center and field devices. The developed algorithm was based on two separated data structures, namely Customer Cluster and Customer Switch Node. Using the output of the algorithm, the paper proposes how to minimize the number of operations of the switching devices to single operation when network reconfiguration takes place based on optimization multi-function objectives. The accuracy of the proposed algorithm was tested using a software-oriented database.

Keywords: Distribution network configuration algorithm, Network reconfiguration, Smart LV distribution systems

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DOMESTIC TYPE BIOMASS FUELED PADDY DRYER

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The objective of this study was to develop and implement an efficient and convenient domestic type biomass fuelled paddy dryer which could be used by small scale paddy farmers who cultivate about two acers of land. The proposed paddy dryer will ensure minimized wastage and improved productivity, which will result in enhancement of profitability with more efficient and optimized output. The paddy at harvest has high moisture content normally up to 24%(wb). It requires an optimum rapid drying process to reduce the moisture content to about 14 % (wb) for milling or storage. The most popular method of post-harvest paddy drying in Sri Lanka is sun drying in open yards or on roadsides. This method requires constant attention of farmers to avoid losses, assure uniformity of drying and preventing over drying by frequent agitating the grains. Also, farmers face with difficulties with sun drying due to clouds and unexpected rains. This has necessitated a paddy dryer that could be used day and night and minimises losses and improves the quality. As solution to this problem, in this study a prototype dryer was developed with a drying capacity of 7 kg and tested. The firewood or biomass is used as the heat source and water is used as heat transfer medium. The cost of the fabrication of the dryer is LKR 75,000. The dryer was found to be capable of drying 7 kg of paddy reducing moisture content from 24% (wb) to 13% (wb) over time span of 2 hours and 20 minutes, with the consumption of 1.5 kg of firewood.

Keywords: Biomass fueled paddy dryer, Biomass dryer, Domestic type dryer, Dryer, Paddy dryer

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GROUND FAULT IDENTIFICATION AND LOCATION DETECTION SYSTEM FOR SOLAR PV ARRAYS

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Amidst the global energy crisis, the renewable share in power generation has rapidly increased in the recent past. Solar energy is one of the prominent renewable-based generating methodologies. However, solar technologies are still improving and there are still some technical constraints in the solar industry that should be addressed. One of the major drawbacks in the existing solar systems is the difficulty in identifying solar Direct Current (DC) ground faults. These DC ground faults are frequently happening in solar photovoltaic systems due to various reasons such as insulation damage, aging, water leakage and corrosion. Due to these ground faults, a significant amount of energy is wasted, and fire risks are also associated with these faulty systems. Currently in the solar industry, no convenient devices are available to find the exact location of the ground fault in a solar PV array remotely and instantly. Therefore, the main aim of this research is to develop a ground fault identification and location detection device prototype for solar PV arrays. Initially, the proposed ground fault detection system was developed under the MATLAB/Simulink platform to check its functionality. Then the hardware prototype was implemented, and it was successfully able to identify a ground fault and its location by the implemented prototype. This project is based on voltage measurements and no involvement with the leakage current or insulation resistance. The main components used are the Arduino Mega2560 board, a voltage divider circuit and the SIM800L GSM module. The entire programming part was done based on Arduino IDE software. Generally, when a ground fault occurs, there must be a voltage between the positive or negative conductor with respect to the ground conductor. Normally these fault voltages fluctuate in between 0 to 1000 V depending on the panel arrangement. Here, the faulty voltages are taken as an input to the system and an algorithm was developed to identify ground fault location based on the faulty voltage. Finally, a text message alert with fault location data will be sent to a prescribed mobile number when a fault is detected by the system. Hence, with the proposed design, it is possible to detect faulty locations instantly while ensuring the solar system's safety.

Keywords: Direct Current, Global system for mobile, Photovoltaic

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EFFICIENCY OF VERTICAL UP-FLOW ROUGHING FILTER FOR TURBIDITY REMOVAL BY ADDING A COAGULANT CHEMICAL

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This research was conducted to improve the turbidity removal efficiency in the Roughing Filter (RF) as the pre-treatment method vital for treating the surface water by the vertical up-flow Slow Sand filter (SSF) of the Kilinochchi drinking Water Treatment Plant (WTP), which consists of intake, RF, aerator, SSF, and a clear water sump. The records show that the WTP stops its operation when raw water turbidity is high, especially during the rainy season. The research objective was to study the turbidity removal efficiency in RF when pre-adding Poly-Aluminium Chloride (PACl) as a coagulating chemical for treating surface water. In this study, 1% of PACl was prepared and dosed at the rate of 20 mg/L. The prepared solution was mixed with raw water into the water intake chamber before it reached the RF. In addition, the inlet structure of RF was modified to improve the mixing of PACl with raw water. The turbidity level of raw water and the treated water from RF were measured at six-hour intervals for one month during the rainy season. The turbidity is measured and analysed for 58 nos of trails. The raw water turbidity was above 80 Nephelometric Turbidity Unit (NTU) for 19 days during the testing period, varying in the range of 80.2 - 206 NTU, whereas turbidity of the filtered water from RF water was observed between 5- 41 NTU. The average turbidity removal efficiency of RF was 83.1%, while it was further observed that the turbidity removal efficiency increases when the raw water turbidity level increases. As per the operation manual of WTP, the turbidity level of treated water from RF should be less than 30 NTU before entering into SSF. The result illustrates that the turbidity of treated water from RF complied with the requirement in 95% of the trails, which enabled the proper functioning of WTP even during high raw water turbidity by complying with SLS 614-2013 when this methodology is adopted. It can be concluded that by adding PACl as a coagulant chemical, the turbidity removal efficiency of the vertical up-flow RF can be improved and thereby, improve the slow sand filter system to produce water to comply with SLS 614-2013.

Keywords: Drinking water, Poly-aluminium chloride, Roughing filter, Surface water treatment, Turbidity removal

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ENGLISH LANGUAGE TEACHING

TEACHER PERSPECTIVES ON THE FLIPPED CLASSROOM MODEL FOR ENGLISH LANGUAGE TEACHING IN SRI LANKA

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Teaching pedagogies are driven by complex networks of global changes. As such, teachers are likely to use a blend of technology in their classroom practices. With the advancement of technology, students also tend to embrace modern teaching techniques in place of the traditional methods of learning. Given this context, teachers are increasingly adopting the flipped classroom technique, which is one of the most recent developments in student-centered learning methodologies. However, the extent to which English as a Second Language (ESL) teachers in Sri Lanka are capable of flipping the teacher-centred classroom into a student-centred classroom is a question. Thus, a qualitative research was undertaken with ten ESL practitioners in the Colombo Educational Zone to examine the effectiveness of the Flipped Classroom Model for teaching ESL in Sri Lanka. This study used semi-structured interviews to gather data and Thematic Analysis (TA) for arranging data. Findings of the study demonstrate that although the flipped classroom method has been practised for years for teaching ESL in Sri Lanka, most teachers had no awareness of the terminology; Flipped Classroom Model. Even though teachers understand the implications of this practice for enriching their professional growth and students' performance they need the guidance and support to effectively implement this model. The study also uncovered that the alliance of technology and education in a flipped classroom can assure the authenticity and legitimacy of the learner outcomes. A broad investigation is recommended to understand students' requirements prior to implementing the inverted classroom model for teaching ESL. This may help overcome the issues that the students may confront when flipping the classroom. The study has implications for professional development providers, ESL practitioners and school management.

Keywords: English language, Flipped classroom, Learners, Technology, Teachers

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SHAPING THE NEXT NORMAL OF ENGLISH LANGUAGE TEACHING: INSIGHTS FROM A POST-PANDEMIC ONLINE TEACHING CONTEXT IN A SRI LANKAN STATE UNIVERSITY

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As the global pandemic COVID-19 unfolded, the normal operations of education were disrupted across the globe uncharacteristically. Students and teachers had to relocate traditional face-to-face classes to digital space and work remotely in order to meet the immediate demands. Similarly, the Sri Lankan higher education sector embraced online instruction as the new norm even though many undergraduates and teachers were unprepared and lessons unstructured to this attendant shift. Undoubtedly, there was a significant absence of proper strategies, and unexpected roadblocks for the implementation of fully online English Language Teaching (ELT) courses. This qualitative study investigated the first year English as Second Language (ESL) undergraduates' and teachers' attitudes towards online instruction after the pandemic to identify whether there was a change of the attitudes and if that was the case, the factors that shaped their thoughts. The study intended to determine a feasible instructional mode of tertiary English education as the next normal. First year ESL undergraduates and teachers of a Sri Lankan state university were the participants who were selected based on convenient sampling. Data were collected through five online focus group discussions with the students, three in-person interviews with English teachers, and reflective journals maintained by the same teachers. Qualitative data were analyzed based on Braun and Clarke's (2006) thematic analysis. The findings uncovered that there was a change in attitudes of both ESL undergraduates and teachers from positive to negative, as they had experienced many pitfalls. Those reasons were categorized under attitudes related to technological issues, emotional issues, socio-economic issues, and assessment issues. Accordingly, online English learning and teaching had been an unconducive experience in contrast to the initial expectation for an adjustable and extrinsically supported learning and teaching environment. Thus, the study suggested the possibility of adopting a blended learning approach where undergraduates and teachers could traverse the physical and virtual environments by successfully bridging their gap in order to master the language.

Keywords: Blended learning, ELT, Online education, Pre- and post-pandemic attitudes, Teachers, Undergraduates

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AN ACTION RESEARCH ON INCREASING STUDENTS' INTEREST IN ENGLISH GRAMMAR LESSONS

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It is an undeniable fact that the teaching of grammar in the second language classroom is one of the major concerns for the success of second language learning. The purpose of this action research is to explore the reasons for students' lack of interest in learning grammar and to find out ways to increase students' interest in learning grammar in an English as a Second Language classroom. Accordingly, this study seeks answers to two questions. They are; what are the underlying reasons for students' lack of interest in grammar lessons, and what can a teacher do to increase the students' interest in grammar lessons. For the current study, an action research design that is classroom-based and teacher-initiated, was undertaken. A sample of 30 students in Grade 10 in a government school located in Rathnapura was selected as the participants for the study. As both the conductor of the study and the teacher of the particular class, the researcher spent two hours a week with students to teach grammar. This study was carried out for over four weeks. It began with a questionnaire and ended with a semi-structured interview and focus group discussions. The questionnaire was employed to collect data on the students' perceptions of grammar lessons and aimed to find the underlying reasons for their lack of interest in grammar learning. Then an action plan was implemented to change students' mindsets about grammar lessons and increase their interest. Following this, semi-structured interviews with five students and focus group discussions were administered to get their perceptions of grammar lessons after the action plan. Based on the findings, students' perceptions and opinions about the grammar lessons before and after the implementation of the action plan were compared and analyzed. The results of the study indicate that the level of interest in learning grammar was increased by implementing interactive and student-centered activities.

Keywords: Grammar learning, Second language, Students' interest

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ANALYSIS OF COMPARATIVE MOVE ANALYSES OF LETTERS AND THEIR PEDAGOGICAL USE IN TEACHING ENGLISH FOR SPECIFIC PURPOSES (ESP)

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Many comparative genre analyses of letters provide implications for the letter writing pedagogy of English for Specific Purposes (ESP). However, it seems that there is a scarcity of literature that explored the diversity in the comparative genre analyses of letters. Therefore, this study analysed comparative move analyses of letters to identify different types of comparisons and their pedagogical usefulness. Qualitative thematic analysis was employed to identify the types of comparative move analyses of letters and their pedagogic use. The sample included six comparative move analyses of letters published online from 2007 to 2019. The results of this study include an analysis of three types of comparative studies which are popular among the move analysts of letters: 1) comparison of letters with other genres of the same domain, 2) letters written by writers of different nationalities, and 3) comparison of letters written by cultural groups (i.e., professionals and students). The growing body of comparative move analyses of letters has revealed evidence of diversities in relation to rhetorical patterns of the letters. This study is expected to contribute to an understanding of the rationale for the use of comparative approach to genre analysis that can be employed by future genre analysts who explore the impact of culture on genre production.

Keywords: English for specific purposes, Move analysis, Letters, Rhetorical structure, Contrastive rhetoric

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IDENTIFYING DIFFICULTIES ENCOUNTERED BY SRI LANKAN ESL STUDENTS AT THE FIRST CERTIFICATE IN ENGLISH (FCE) LISTENING TESTS

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Sri Lankan students who study English as a Second Language (ESL) confront diverse difficulties during internationally recognized listening tests. In particular, the present study is focused on identifying the listening comprehension problems encountered by the ESL students attempting the First Certificate in English (FCE) test conducted by the English for Speakers of Other Languages (ESOL) College International, Pannipitiya which is a Cambridge examinations preparation institute, and investigating their extent of exposure to listening in English. To achieve the objectives of the study, the mixed-method research design was employed while the data were collected from 30 students at the FCE level via questionnaires and semi-structured interviews. According to the results, the students' prior experience in acquiring listening skills before attempting the FCE test was not adequate to comprehend a complex listening text. Additionally, the significant listening difficulties encountered by the students were due to the speaker's accent, intonation, speed of speech and the listener's unfamiliarity with pronunciation. Furthermore, limited vocabulary and inadequate grammar knowledge appear as challenges in listening comprehension. Thus, it is recommended to encourage the students to develop their interest in English while familiarizing them with the authentic use of the English language to foster their listening comprehension. In conclusion, it is expected that the results of this study will contribute to overcoming the listening difficulties encountered by Sri Lankan ESL students in FCE listening tests.

Keywords: ELT, ESL learning, FCE, Listening skills, Listening tests

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EXAMINING ENGLISH AS A SECOND LANGUAGE LEARNERS' *(ESL)* PERCEPTIONS TOWARDS VIDEO FEEDBACK ON PARAGRAPH WRITING

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Writing and the provision of feedback are essential components in ESL learning environments. As the link between English teaching and learning processes and technology gets stronger, various techniques have been developed in the area of language teaching one of which is giving video feedback to ESL learners' writings. Even though studies have been carried out to investigate the effectiveness of diverse feedback methods for writing, considering the dearth of research in exploring the pedagogical and practical appropriateness of video feedback for ESL writings in Sri Lanka, the present study attempted to examine ESL learners' perceptions towards video feedback on paragraph writing. The study adopted an experimental research design. The empirical data for the study was gathered through a questionnaire administered for a sample of 10 first year undergraduates of the Department of Industrial Management at University of Kelaniya on a random sampling method. In accordance with the descriptive analyses, majority of the participants believe that video feedback helps to improve writing skills, to pay more attention to instructor's comments, to get a better understanding of how to revise the writing, to spend more time reviewing the individualized screencast feedback and to understand issues related to the content and language of the writing. Moreover, majority of the participants stated that video feedback is constructive, feels more conversational and interactive and is an accessible, user-friendly method and it allows to build a sense of closeness with the instructor. Despite the positive viewpoints, technical difficulties, initial anxiety and being a costly process were identified as the potential drawbacks of the approach. Overall, findings of the present study revealed that respondents have positive perceptions towards video feedback in terms of the engagement, revision, quality and quantity and participants' experience with video feedback despite the aforementioned pitfalls. Subsequently, the findings of this study revealed that an advanced and a novel form of technology integrated feedback is essential in every ESL learning environment as most learners are pragmatic with the practice of the video feedback as an eligible practice in ESL writing. Hence, further research is needed to determine the viability of video feedback for large learner cohorts.

Keywords: ESL learners, Feedback, Paragraph writing, Perceptions, Video feedback

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HEALTH SCIENCES

PREVALENCE AND EFFECTS OF SYMPTOMS ASSOCIATED WITH MENOPAUSE IN DAY-TO-DAY LIFE: A CROSS SECTIONAL STUDY AMONG WOMEN IN SRI LANKA

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Natural menopause is defined according to World Health Organization as "at least 12 consecutive months of amenorrhea (absence of menstruation) not due to surgery or other obvious cause, such as extreme weight loss". Most of the experiences and the symptoms around the menopause are self-limiting and not life-threatening, but sometimes disabling. This abstract presents results of one objective of a postgraduate study related to natural menopause in Sri Lankan women: effects of the symptoms associated with menopause in the day-to-day life of women in Sri Lanka. In this study data were collected from 914 naturally post-menopausal women through an interviewer administered questionnaire, by visiting a sample of homes covering all provinces and ethnic groups. Age at Natural Menopause (ANM), race, symptoms associated with natural menopause and their effects to day-to-day life were recorded. 74% are affected by backache, 53% insomnia, 67% joint-pain, 57% night-sweats, 45% hot-flashes, 41% mood changes-depression-irritability-tension, 39% gain in abdominal fat, 40% lack of energy, 33% difficulty in concentrating, 46% memory impairment, 33% fatigue and 20%-30% cold hands and feet, vaginal dryness and urinary problems. It was observed that 17% of Sri Lankan post-menopausal women are extremely affected by backache and joint pain, 12% by night-sweats, and 5%-10% by hot-flashes, insomnia, lack of energy and memory impairment. Using Chi square test of associations' prevalence of night-sweats, vaginal-dryness, backache, and lack of energy showed associations (p-value < 0.05) with categorised ANM (ANM ≤ 45, $45 < ANM1 \leq 49$, $49 < ANM \leq 51$, ANM > 51). Study indicated that prevalence of lack of energy, backache and vaginal dryness among the women whose ANM ≤ 45 was less than the women whose ANM > 45, and prevalence of night sweats among the women whose ANM ≥ 51 was less than the women whose ANM < 51.

Keywords: Associations, Effects, Natural menopause, Prevalence, Symptoms, Women

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KNOWLEDGE ABOUT URINARY TRACT INFECTIONS AMONG UNDERGRADUATES OF KAATSU INTERNATIONAL UNIVERSITY (KIU), SRI LANKA

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Urinary Tract Infections (UTIs) are one of the most common infections worldwide and a leading cause of morbidity and health care expenditures worldwide. Most UTIs are caused by bacterial species belonging to the family *Enterobacteriaceae*. This study aims to estimate the knowledge of UTIs among undergraduates to determine the association between a degree program and knowledge about UTIs. A descriptive cross-sectional study was conducted at KIU, among a group of undergraduates following study programs in Biomedical Science, Psychology, Nursing, and Management. Data were collected from an online questionnaire distributed through Google forms. The non-probability purposive sampling technique was used to select the sample of the study and the study sample was 302 undergraduates. Data were analyzed using SPSS v26 software. The relationship between knowledge of UTIs and degree programs was analyzed using frequencies and a chi-square test. Most of the selected sample were able to identify the common symptoms of UTIs including burning sensation when urinating (94.7%), frequent urge to urinate (77.0%), and lower abdominal pain (79.3%). A significant association (<0.005) was found between the variables of knowledge about UTIs with study streams proving that the faculty of health sciences and faculty of nursing have more knowledge when compared to faculty of management undergraduates. In conclusion, undergraduates from biomedical sciences and nursing streams are more knowledgeable about UTIs than students from other study streams.

Keywords: Knowledge, Undergraduates, Urinary tract infections,

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MALE AND FEMALE FACTORS CONTRIBUTING TO HIGH PREGNANCY RATE OF INTRAUTERINE INSEMINATION

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Infertility is a public health issue affecting one in seven couples worldwide. Seminal Fluid Analysis (SFA) is used to detect the fertility status of semen samples. Intrauterine Insemination (IUI) is a fertility treatment method used to inseminate processed sperms into the uterus at the time of ovulation. This study aimed to determine the effect of male (pre-processed and post-processed sperm parameters) and female factors on pregnancy rate of intrauterine insemination (PR-IUI). Data of selected female factors and selected sperm parameters (count, motility, morphology) from pre and post-processed (using density gradient method) SFA reports were extracted from the couples who were treated with IUI at the Fertility and Andrology clinic of the Professorial unit of Colombo South Teaching Hospital from 2017 January to 2021 August. Pregnancy statuses following IUI were also obtained from the clinic registries. Data were analyzed using SPSS version 22.0. A total of 140 SFA reports and corresponding IUI reports were selected for the study. An 18.57% (n=26) of IUI-PR was noted. Significantly high IUI-PR was noted with female partner's age <30 years compared >30 years (p=0.000,OR=1.87), with first two IUI cycles compared to >two IUI cycles (p=0.017,OR=0.271), pre-processed semen volume >3.0 milliliter compared to <3.0 milliliters (p=0.043,OR=2.55) and, percentage of progressive and non-progressive sperm motility >32% compared to <32% (p=0.034,OR=3.12) and <15% compared to >15% (p=0.003,OR=4.29) respectively. However, the number of days of abstinence from ejaculation (p=0.222), pre-processed total sperm count (p-value=0.093), percentage of pre- processed sperm morphology (p=0.082), percentage of sperm viability (p=0.093), post-processed sperm concentration (p=0.175) and percentage of post-processed progressive sperm motility (p=0.172) did not show any significant contribution on IUI-PR. Findings of this study shows that a significantly high IUI-PR can be obtained when the age of the female <30 years, with the first two IUI cycles, pre- processed semen volume >3.0 ml, pre-processed sperm motilities of progressive >32%, and non-progressive <15%.

Keywords: Density gradient method, Intrauterine insemination, Pregnancy rate, Seminal fluid analysis, Sperm parameters

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ENDOCANNABINOID SYSTEM MODULATION: SCREENING OF THE EFFECT OF PHYTOCANNABINOIDS IN NEURONAL MODELS

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Neurodegenerative diseases due to their complex molecular dynamics and subsequent lack of understanding of pathophysiological mechanisms, have been a major socioeconomic burden in the past several decades. Among the many therapeutic strategies, the Endocannabinoid System (ECS) modulation via the phytocannabinoids delta-9-tetrahydrocannabinol (THC) and cannabidiol (CBD) have been in demand due to their promising therapeutic potential. The current study aims to determine the effects of the THC and CBD in Alzheimer's (AD) and Parkinson's (PD) Diseases *in vitro*, in comparison to healthy neuronal models. The SH-SY5Y and M17 neuronal cells were cultured and differentiated with retinoic acid (Model AD) and MPP+ (Model PD). The disease neuronal models along with healthy neurons (Model H) were treated with THC and CBD, independently and as cannabinoid combinations over 4 weeks. The cell viability was measured with MTT assay. Compared to controls, cannabinoids treated models showed increased neuroprotection until 3 weeks with viability diminishing toward week 4. Interestingly, THC and CBD independently showed a better overall neuroprotective effect than cannabinoid combinations. In Model H of SH-SY5Y, overall significant neuroprotection was observed with both THC and CBD treated groups, independently as well as in THC: CBD, 1:1 and 1:2 combination. In Model H of M17, significant neuroprotection was observed only when treated with THC and CBD independently. However, surprisingly, in Model H of M17, both the combinatory treatments caused severe neuronal death. In the absence of any published literature to support the molecular mechanism of this altered phytocannabinoid response in healthy vs disease models, the authors hypothesise the involvement of potential differential dynamic behaviour in age-related disease mechanisms. Further studies focused on molecular biochemistry and genetics are recommended to explicate the observations of the study and to understand the molecular mechanism and pathways, prior to use of THC and CBD phytocannabinoids for medicinal purpose.

Keywords: Alzheimer's Disease, Cannabidiol, Endocannabinoid system, Parkinson's Disease, THC

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IMPORTANCE OF SIX ESSENTIAL FACTORS IN PREVENTING OBESITY FROM THE PERSPECTIVE OF THE UNANI SYSTEM OF MEDICINE-A SYSTEMATIC REVIEW

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Increase in fat cell size or fat cell number or in both can cause the adipose tissue an unusual growth which forms obesity. This is known as the state of imbalance between the consumed and utilized calories. Therefore, being overweight and obese is explained through BMI (Body Mass Index). WHO stipulates that a BMI of 25 is classified as overweight and a BMI of 30 or above as obese. This has been positioned to be a crucial health problem faced by the world today as it has injurious effects on almost all the systems of the human body. Especially cardiovascular defects, narrowing of blood vessels due to fat deposits causing dyslipidemia, hyperinsulinemia (Type II diabetes), degenerative joint disease, respiratory dysfunctions, stress incontinence, menstrual irregularities etc. According to the Unani system of medicine, Siman-e-Mufrit (obesity) is described under Balghami (phlegmatic) disease. Hence, Khilt-e-Balgham (excessive balgham) tends to accumulate in the tissues which disturbs the equilibrium of Akhlat (humours) causing qualitative and quantitative derangement resulting in Zof-e-Jigar (weakness of liver) which becomes the main cause of multiple disease conditions. This is also well explained in the Canon of Medicine by Avicenna as increased diet consumption and sedentary lifestyle are known to be the major factors causing Siman-e-Mufrit (Obesity). Therefore the aim of this study is life style modification through understanding the importance of Asbab-e-Sitta Zarooriyah (The six essential factors) in the prevention and control of various lifestyle disorders. For this various data were collected through classical texts, pharmacopoeias, journals, other texts and through the web. The results of this study revealed that pure air, food and drinks, physical activity and repose, mental activity and repose, sleep and wakefulness cause proper metabolic functions resulting in excretion and retention of waste materials to maintain the general health state of an individual with humors in equilibrium. Eliminating the cause is achieved through maintaining the principles and through treatment procedures.

Keywords: Equilibrium, Humors, Obesity, Overweight, Phlegmatic, Sitta Zarooriya, Unani medicine

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A REVIEW ON EFFECTIVE SINGLE DRUGS (*MUFRAD DAWA*) USED IN THE UNANI SYSTEM FOR THE MANAGEMENT OF POLYCYSTIC OVARIAN SYNDROME (*MARZ E AGHZIYA E KHUSSIYATUR REHAM*) SYNDROME: A REVIEW

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Polycystic Ovarian Syndrome (PCOS) is the most common endocrine disorder that affects up to 18% of the women of reproductive age and is the commonest cause of infertility due to anovulation. Between 2.2-26.7% of women in this age group have PCOS and many of them don't even know it. Conventionally, its diagnosis is based on presence of any two of the three criteria namely oligomenorrhoea and or anovulation, hyperandrogenism (clinical and or biochemical) and polycystic ovaries on Ultrasound scan (USS). In Unani system of medicine, it is described under the headings of *Qillat e tams* (Oligomenorrhoea), *Ihtebas e Tams* (Amenorrhoea), *Uqr* (infertility), obesity, phlegmatic disease, liver disorders and coined under *marz e aghziya e khussiyathur reham.* Eminent Unani physicians have prescribed very effective, tried and tested single and compound formulations for this disease. Most of these drugs have been studied on scientific parameters and shown significant activity in addressing the symptoms and complications of PCOS. The objective of this study is to explore the traditional wisdom of Unani medicine in treating menstrual irregularities coined under the medical term of polycystic ovarian disease and to critically evaluate the efficacy of single drugs of Unani medicine. Unani literature was reviewed extensively via various search engines for the herbs, shrubs used for the treatment of the PCOS. Ten drugs were selected for the present review. There is convincing evidence to suggest that the selected drugs have promising effects against PCOS and its complications. In addition, none of the studies has reported any adverse effects with the drugs. Further there's a great need to do more research on making medicine more effective. Besides, the review article is useful for treating patients effectively by advancing the research.

Keywords**:** Amenorrhoea, Androgenism, Herbs, Obesity, Oligomenorrhoea.

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UNANI PERSPECTIVE OF POLYCYSTIC OVARIAN SYNDROME *(MARZ-E-AKYAS-E-KHUSYATUR-REHM)*: A LITERATURE REVIEW

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Polycystic Ovarian Syndrome (PCOS), which is termed as *Marz-e-Akyas-e-Khusyatur-Rehm* in Unani, is a prevalent, complex endocrinopathy affecting 5% - 10% of women within the reproductive age. It is characterized by polycystic ovaries, hyperinsulinemia and hyperandrogenism which is implicated in the dysfunction of the hypothalamic pituitary-ovary axis, leading to anovulation and menstrual irregularity, obesity, hirsutism, acne and infertility. PCOS is caused by the imbalance of natural body humours. It arises due to predominance of *Balgham* in the body due to impaired temperament in liver (*Sue Mizaj Kabid*) and liver dysfunction, resulting in cyst formation in the ovaries, amenorrhea and obesity. According to current trends, PCOS will become a major cause of infertility, therefore the need for an effective treatment protocol is becoming increasingly urgent. This review aims in highlighting and understanding the concept of PCOS with special reference to *Marze Akyase Khusyatur Rehm* and its management in Unani system of medicine. Information was gathered by searching many review articles, published up to now, through electronic databases such as Google Scholar, PubMed, Research Gate, etc., and other authentic Unani classical texts, using the following key words: PCOS, *Marz Akyas Khusyatur Rehm*, Insulin resistance and obesity. Treatment mainly depends on the collection of symptoms. Obesity is observed in 35%–60% of women with PCOS. Hyperandrogenism causes central obesity. Also, obesity is associated with anovulation, miscarriage, or late pregnancy complications. Treatment is mainly focused on weight reduction by means of drug administration and lifestyle modification. Weight loss improves the endocrine profile (androgen and glucose levels), regularise the menstrual cycles and increases the chances of ovulation. Also, according to the Unani concept, PCOS is a disease of cold and moist nature and arises due to change in quantity and quality of balgham, as a result of impaired temperament of liver. Therefore, the management focuses mainly on improving the liver function along with weight loss. This review article is helpful to formulate a treatment package effectively by understanding the concept of PCOS.

Keywords: PCOS, *Marz Akyas Khusyatur Rehm*, Insulin resistance, Hormone imbalance, Obesity

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A COMPARATIVE STUDY OF THE IMPACT OF Cd(II) AND As(III) ON THE STRUCTURAL STABILITY OF THE HUMAN URACIL DNA GLYCOSYLASE ENZYME; AN *IN-SILICO* APPROACH

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There are on-going theoretical and experimental research studies to study the accumulation of toxic heavy metal ions on DNA repair enzymes. Human uracil DNA glycosylase (hUNG) that initiates the base excision repair pathway by recognizing and removing uracil from DNA is one such DNA repair enzyme that is being studied on heavy metal accumulation. The previous experimental and theoretical work performed on Cd(II) inhibition of the hUNG enzyme has reported that the inhibition of hUNG by Cd(II) takes place due to the replacement of catalytic water by binding with the active site aspartic145 and histidine148 residues. Further, computational analysis of structural stability based on 100 ns molecular dynamics (MD) simulation on the hUNG enzyme in the presence of Cd(II) has supported the proposed Cd(II) inhibition process on hUNG. Theoretical studies on As(III) accumulation on hUNG have reported that As(III) binding with the enzyme is feasible and reduction of enzyme activity takes place due to stable structural conformation obtained in the presence of As(III). However, in the present study, the main objective is to identify the toxic heavy metal ion among Cd(II) and As(III) that possess a high impact on structural stability and hence the activity of the hUNG enzyme. This study is a computational-based approach using 150 ns MD simulations for two enzyme systems; with Cd(II) and As(III). Using web server and trajectory analysis, it was shown that the enzyme in Cd(II) presence achieves a more stable conformation than the enzyme with As(III). Finally, with the support of previous work by Gokey et al, the present study concluded that the enzyme gets highly affected in increasing structural stability and decreasing activity in the Cd(II) presence compared to the As(III) presence. However, this negative change in the activity of hUNG by toxic metal ions might help in continuing DNA mutation.

Keywords: Human Uracil DNA Glycosylase, Molecular dynamics simulation, STRIDE web portal, Structural stability

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A REVIEW ON BIOFILM METHODS AND EMERGENT CONTROL OF BIOFILM PRODUCING BACTERIA FROM WATER PLUMBING SYSTEM

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The water plumbing system requires special attention due to the presence of biofilm pathogens on its surface. A biofilm is an accumulation of bacterial cells attached to various surfaces. In particular, biofilm consists of antibiotic-resistant bacteria, which have the ability to cause persistent infection. Water-borne infection related to biofilm complicates microbiological diagnosis and treatment, which consequently worsens the patient's health. Biofilms have major medical significance as they decrease the susceptibility to antimicrobial agents. The goal of this literature review is to focus on methods for detecting biofilm production and strategies for preventing biofilm formation in water plumbing systems, including drinking water and wastewater pipelines. The commonly used techniques such as Tissue Culture Plate, Tube, and Congo Red Agar methods are widely used by researchers for biofilm detection. However, advances in microscopic imaging techniques have led to gaining knowledge about biofilm formation. In particular, scanning electron microscopy is considered the gold standard method for the detection of biofilm formation as it is uniquely designed to capture compelling, high-resolution images of a sample's surfaces. Moreover, the identification of biofilm-associated bacterial species would aid in the development of treatment techniques to reduce biofilm formation in the water plumbing systems. Molecular techniques based on 16S rDNA sequencing are the most common housekeeping genetic marker to identify bacterial species together with the detection of biofilm genes. Moreover, research studies have proved that silver, silicon, and titanium nanoparticles control the formation of biofilms and kill the biofilm bacteria. Hence, these nanoparticles could be used for the prevention of biofilm formation. Similarly, there is ongoing research on pipeline materials with anti-adhesive properties to inhibit accumulation of biofilm bacteria on the surface. On the other hand, a probiotic approach is suggested in which they would introduce specific bacteria into the water plumbing system, to compete with biofilm bacteria. However, according to the literature published, nano coating of water pipelines would be a better solution to reduce the biofilm bacterial infection getting through water pipelines. The new invention of nano-coated biofilm free water pipeline with commercial application would fulfil the public's needs, leading to a reduction in infection and expenses.

Keywords: Antibiotic resistance, Biofilm producing bacteria, Water plumbing system

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THERAPEUTIC POTENTIAL OF *THABASIR* IN SRI LANKAN INDEGENOUS MEDICINE: A SCIENTIFIC REVIEW

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Thabasir (Bamboo salt) is a white silica exudation found in the internodes of stems of the female bamboo (*Bambusa arundinacea*). This concrete like crystalline is an opaque, white, irregular shaped, light, soft and brittle substance. It contains 90 % silica as a hydrate of silicic acid, peroxide of iron, potash, lime, aluminium and vegetable matter. Traditionally it has been used in various ailments such as hyperdipsia, diarrhoea, vomiting, heart diseases, cough, asthma, jaundice, fever, tuberculosis, bronchitis, leprosy, paralytic complaints, anaemia and as a general tonic in convalescents. Further, in recent years scientists have shown more interest in *Thabasir* due to its medicinal, nutritional and cosmetic values. However, up to now, no research studies have been carried out to prove its therapeutic effects scientifically, as mentioned in Unani medicine. Therefore, the information available in this review would help to do further research in this regard. Hence, this review aims to explore the information available in the literature regarding therapeutic potential of *Thabasir* in the field of indigenous medicine. All the available information on *Thabasir* was compiled from search engines of electronic databases such as Google scholar, PubMed, Medline, Scopus and classical texts. The literature search revealed that *Thabasir* possess pharmacological properties such as cardiac exhilarant, cardiac tonic, astringent, cooling, dessicant, febrifuge, general tonic, sexual tonic, tissue builder, aphrodisiac, spermopiotic, thirst quencher, hemostatic, expectorant, diuretic and general tonic. It can be concluded that *Thabasir* is a potential therapeutic agent in Sri Lankan indigenous medicine.

Keywords: *Bambusa arundinacea*, Bamboo salt, *Thabasir*, Therapeutic activity, Traditional medicine

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STRUCTURE-BASED VIRTUAL SCREENING AND MM-GBSA CALCULATION TO PREDICT POTENT INHIBITORS FROM NATURAL PRODUCTS FOR DNMT-ASSOCIATED CANCER

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Cancer remains a severe health concern representing one of the leading causes of worldwide deaths. The DNA methyltransferase (DNMT) enzyme is over-expressed in many cancer types, and its inhibition represents a potential area of research in developing novel anticancer compounds. This work is concerned with using various *in-silico* tools to identify natural product-based compounds that can inhibit the DNMT enzyme. MM-GBSA (Molecular Mechanics-Generalized Born Surface Area) assisted structure-based virtual screening was performed on DNMT enzyme with nearly twenty natural products imported from the Sri Lanka Flora database. The High-Throughput Virtual Screening (HTVS), Standard Precision (SP) docking, and Extra Precision (XP) docking are the tools used in the virtual screening process. The best three hits were checked for potency by considering reference inhibitor zebularine, the bound inhibitor in the crystal structure of the DNMT enzyme (PDB ID: 3SWR). As a result, from the twenty natural products, two molecules with the quinoline scaffold were identified as more potent in inhibiting the DNMT enzyme. The identified new compounds, oxobuxifoline, and lanuginosine, by these *in-silico* studies can be considered further *in-silico* analysis to ensure the inhibition efficacy against the DNMT enzyme. After the bioassay testing, these compounds can be recommended for clinical trials for various cancer types associated with DNMT.

Keywords: DNA methyltransferase, *In-silico* virtual screening, MM-GBSA, Sri Lanka Flora database,

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IN VITRO ANTIFUNGAL ACTIVITY OF SELECTED INDIGENOUS MEDICINAL PLANT EXTRACTS ON HUMAN SKIN FUNGAL INFECTIONS.

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Skin fungal infections are common in developing countries. Poor hygiene, limited availability of different types of antifungal drugs and the resistance of the organisms increased due to indiscriminate use of commercial antifungal drugs commonly used for the treatment of skin fungal infections can be cited as reasons for the increase in skin fungal infections. This research identifies the effective plant extracts from five selected plant species for inhibiting three common fungal species causing human skin infections and determine the minimal inhibition concentration of crude plant extracts. The five plant species were *Senna alata* (Aththora) leaves, *Caesalpinia bonducella* (Kumburu) leaves, *Trichosanthes cucumerina* (Dummala) whole plant, *Alpinia malaccensis* (Rankihiriya) rhizome, *Nerium oleander* (Kaneru) leaves were selected for antimicrobial susceptibility assay against selected fungi. Four solvents, which were Methyl alcohol, Hexane, Petroleum Ether and Isopropyl alcohol were used as extracting media. Three skin fungal species, which are *Trichophyton mentagrophytes*, *Epidermophyton floccosum* and *Candida albicans* ATCC10231, were selected for the test. The Disc Diffusion assay to determine the sensitivity of fungal strains against the plant crude extracts and the Minimum Inhibitory Concentrations (MICs) and Minimum Fungicidal Concentrations (MFCs) of plant crude extracts were determined against the test strains by the Broth Micro Dilution Method using 96 micros well plates as adapted by Khan and Ahamad (2011) with some modifications. Comparing the overall activity of the selected plant extracts, the *Alpinia malaccensis* (Rankihiriya) plant extracts showed higher antifungal activity for all the selected skin fungi. *Trichosanthes cucumerina* (Dummala) plant extract showed higher antifungal activity with fungus *Trichophyton mentagrophytes* and *Epidermophyton floccosum*. *Caesalpinia bonducella* (Kumburu) and *Senna alata* (Aththora) plant extracts showed lower antifungal activities than other plant extracts. The MIC value could not be obtained due to the selected concentration values were higher than the MIC value of the plant extracts tested.

Keywords: Disk diffusion assay, MIC, Skin fungus plant extracts

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SERUM FERRITIN AND C-REACTIVE PROTEIN AS POTENTIAL PREDICTIVE MARKERS FOR DISEASE SEVERITY IN ACUTE DENGUE

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Dengue infection can manifest a wide spectrum of clinical presentations ranging from self-limiting febrile illness to severe life-threatening complications. Early recognition of severe dengue cases is important for patient management and clinical triage. Inflammatory markers may be useful in the early recognition of patients at risk of severe dengue progression. The study investigated the significance of serum ferritin and C-reactive Protein (CRP) levels measured early in the febrile phase to predict the disease severity of dengue virus-infected patients. A cross-sectional study was performed on a total of 106 dengue patients (positive NS1 antigen and/IgM ELISA for dengue) who were admitted to the Colombo South Teaching Hospital, Sri Lanka from January 2020 to June 2021. Serum ferritin and CRP assays were performed on patients' samples collected within the first 03 days of the illness onset. All the patients were assigned into 03 severity groups; Dengue Fever (DF) without warning signs, DF with warning signs, and severe dengue as per the World Health Organization 2009 clinical classification. Mann-Whitney-u test was used to compare the continuous variables and binary logistic regression model was performed to find out significance of predictors of dengue. The p value <0.05 was considered statically significance. Of the 106 participants, 44 (42%) were diagnosed with warning signs and no cases progressed to severe dengue. The study consisted of dengue 72.65% males and 27.35% females, with a mean age 31 (±13.4) years. Serum ferritin (median: 753.73, Interquartile Range (IQR): 1658.6 ng/mL) and CRP (median: 10.8, IQR: 12.75 mg/L) levels in the first 03 days were higher than the expected reference range in all the dengue subjects. Serum ferritin values in DF with warning signs (median: 2055.6, IQR: 4634.8 ng/mL) were significantly higher than those without warning signs (median: 471.4, IQR: 615.5 ng/mL) (p<0.001). Ferritin level in the first 03 days of illness onset was associated with a higher risk of developing dengue warning signs (p=0.009, Adjusted Odds Ratio (AOR): 1.001). There was no significant variation in CRP levels between the DF without warning signs (8.9, IQR-13.9 mg/L) and with warning clinical groups (median: 11.7, IQR-10.9 mg/L) (p=0.116). In conclusion, serum ferritin measured in the first 03 days of illness onset can be a useful biomarker for the early prediction of patients who are at risk of developing warning signs of severe dengue.

Keywords: C-reactive protein, Dengue severity, Ferritin, Predictive markers

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THE IMPACT OF SMART PHONE ADDICTION AMONG ADOLESCENTS IN SELECTED SCHOOLS IN THE PILIYANDALA EDUCATIONAL ZONE IN SRI LANKA

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Addiction to the smartphone is explained as the inability to control smartphone use. Smartphone addiction is rising as a major health issue among adolescents since it imposes considerable physical, psychological, and behavioral problems on adolescents. Moreover, it is known to influence physical activities, academic performances, and interpersonal relationships. This was a descriptive cross-sectional study. School children (n=375) in age between 16-17 years were recruited from selected 10 schools using a simple random sampling method. Content validated, pre-tested, self-administered, Smartphone Addiction Scale Short Version (SAS SV) which comprised of 10 items was used to assess smartphone addiction and used cut-off values of ≥31 and ≥33 for male and female participants respectively to determine whether participants are addicted to smartphones or not). In addition, the physical, psychological, and social impacts of smartphone addiction and the socio-demographic characteristics of the participants were collected using a brief questionnaire. Data were analyzed using descriptive statistics on the SPSS 25th version. Ethical clearance was obtained from the National Institute of Health Sciences in Kalutara. According to the Addiction short version (SAS SV) tool, 92 (24.5%) school children were found to be addicted to smartphones, and 49 (53.3%) of them were males. As indicated in the findings, smartphone addiction causes physical (44.45%), psychological (38.04%), and social (26.84%) impacts on addicted adolescents. With regards to physical impact, experiencing light-headedness or blurred vision while using a smartphone was found to be relatively high (63.04%). Most smartphone-addicted students felt angry or anxious when their mobile phone broke down or got stuck. A higher proportion of students use smartphones even in happy moments, without being happy 41.30 %. Smartphone addiction shows physical, psychological, and social impact on adolescents. Therefore, it is essential to raise their awareness of the consequences of smartphone addiction and strategies that can be used to reduce it. Further studies are necessary.

Keywords: Adolescent, Adolescents, Physical impact, Psychological impact, Schools, Smartphone addiction scale, Smartphone addiction, Social impact, Sri Lanka

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HUMANITIES AND SOCIAL SCIENCES

NARRATING WAR AND VIOLENCE IN *WAR JOURNEY: A DIARY OF A TAMIL TIGER* BY MALARAVAN AND *TAMIL TIGRESS* BY NIROMI DE SOYZA

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This paper analyses how violence and gendered roles are represented in the memoirs *Tamil Tigress* by Niromi de Soyza (2011), and *War Journey: A Diary of a Tamil Tiger* by Malaravan (2013). Although both authors have joined the LTTE as child soldiers, their stories are different in many ways and this comparison brings to light the intersections of gender, class and nationalism. What do these aspects bring to light about the connection between gender and violence? *Tamil Tigress* is the autobiography of one of the first female cadres of the LTTE as well as the first narration of a Sri Lankan female guerrilla soldier to be published as a memoir in English. Malaravan's diary *Por Ula,* (1992) which is an account of the writer's experiences in battle as a Tamil Tiger was found and published posthumously, and then translated into English. This comparative analysis will focus on gendered representation, violence, love and marriage, family and autonomy, reflecting on the way in which violence is represented and how gender comes into play for the narrator and the reader in the two texts. Some of the questions that are addressed are: How do these two memoirs intersect in terms of gender, violence, political imagination and class? What are the differences in the way they put forward their reasons for joining an armed movement? How does the medium of the autobiography come into play in this retelling of personal histories? The complexities of treating an autobiography as fact will also be discussed with reference to these two texts in the light of objective writing in memoirs, and its contradictory nature.

Keywords: Gender, Memoirs, Representation, Violence, War

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A MORPHOLOGICAL ANALYSIS OF ENGLISH LANGUAGE NEOLOGISMS USED ON FACEBOOK, VIBER AND WHATSAPP

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The goal of this research is to study and analyse the use of English Language neologisms found on social media. With the introduction of digital technology, communication networks have advanced dramatically resulting in the emergence of a variety of communication methods. The key goal in choosing a communication technique is to find the simplest and fastest way to communicate. Although the language used on social media has not been the subject of many studies, social networking certainly has an impact on language, particularly the English language. Neologisms are words that have been coined but have not yet been adopted. Deviation/variation is the opposite of the norm, referring to a linguistic item chosen outside of the standard. A variety of neologisms have resulted from deviations in the conventional English language used on social media. This study uses qualitative research methods, specifically a descriptive research design. The researcher has used a non-probable purposive sample of 50 chosen respondents' posts. An interactive model is used in the data analysis. This study found that according to the formation process there are nine types of word-formation processes while six of them were found in the standard English Language. Besides the morphological processes of words in the Standard English language, a number of other methods are found in this research. The neologisms discovered in this study can be divided into nine categories described as clipping, coinage, use of existing terms with new meaning, usage of abbreviation and acronyms affixation, accent stylization, letter-number homophones, and onomatopoeia /reduplication. It was noted that these neologisms differ from respondent to respondent according to their age and gender.

Keywords: Linguistic analysis, Neologism, Social media, Word formation

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PROMINENCE OF UPCOUNTRY HOME GARDEN A STUDY BASED ON THE BOGAWANTALAWA SOUTH

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Home garden is the cultivation of a small portion of land which is around the household or within walking distance from the family home. It has been a long-standing practice among the rural, urban and urban households in Sri Lanka for centuries. The main objective of this paper is to analysis the prominence of upcountry home gardens in the study area. The data was obtained from the primary and secondary sources. The questionnaire survey was designed to collect primary data from thirty households according to simple random sampling techniques. Field observation was conducted to identifies the key prominence of upcountry home garden in the study area. Collected data have been analyzed through an excel spreadsheet and summarized using descriptive and quantitative analysis methods. As the key findings, prominence of upcountry home garden of the study area has been addressed. Conserving biodiversity and conservation of diverse plants, preventing the environment from chemicals, habitats for animals and other beneficial organisms, generation of employment opportunities and income, created a relaxing environment among the family members and food and nutrient security of families. In addition to this, the study finds the major challenges such as lack of fertilizer (26%), adverse weather conditions (22%), lack of water (17%), insect pests and diseases (13%), land fragmentation (12%) and decreased the traditional farming practices (10%). Moreover, the study gives some recommendations to the keep the sustainability among upcountry home garden, including, increasing awareness about importance of growing upcountry home garden. Continuous monitoring is needed for maintain the quality of the home garden.

Keywords: Beneficial organisms, Biodiversity, Home garden, Upcountry.

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THE FACTORS CONTRIBUTED FOR RAPID EXPANSION OF IT AND MANAGEMENT DEGREE AWARDING BY THE PRIVATE INSTITUTIONS (ESTABLISHED UNDER THE BUSINESS ACT) IN SRI LANKA

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The state university entrance for the students in Sri Lanka had fewer opportunities where the 17% of the students have the admissions. The competency for the higher education has been increasing with the enactment of the privatization policies of Sri Lanka. Number of private educational institutions was established in Sri Lanka under the business act. The rapid growth of the higher educational institutions can be seen over the last five years even in the Covid-19 pandemic through online learning. This study tried to identify the factors that impact for the rapid development of the higher educational institutions in Sri Lanka and the consequences of the privatization policies on state universities. The sample of the research includes the 360 participants from both the state and private universities approved and recognized under the University Grant Commission. The research used the close-ended questionnaire with online survey mode to collect the data and has been analyze using the SPSS and the excel 2016. The conceptual framework has been constructed using the existing literature papers and major four variables income, the medium of study, the availability of job opportunities and the number of years to complete the degree were taken. The conclusion of the results analysis demonstrates that the limited number of job opportunities available for the IT and management due to the slower economic growth of Sri Lanka and the comparative difference between the medium of study.

Key Words: Education, Higher education, Private, Privatization policies

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INFLUENCE OF SOCIAL MEDIA ADVERTISEMENTS ON FOOD PURCHASING BEHAVIOUR AMONG YOUNG ADULTS

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Food processing and distribution are deeply influenced by tradition; however intensive innovations lead to changes in the way individuals consume. One of these changes is the consistent growth of the habit of eating outside the home. Technology has made the purchase convenient for people. Advertisements are used to promote the goods and services that the market wishes to sell to the public. Advertising is one of the main modes of marketing. They entice customers to buy by using appealing images and sentences. These days a lot of advertising tools are being used to sell products. Social media plays a major role in advertisements, especially for marketing food items. Social media platforms become efficient sources to attract more customers. With the rapid growth of technology, young adults' access social media anytime anywhere. This study was aimed at exploring the influence of social media face book advertisements on the food purchasing behavior of young adults and how people react to social media advertisements. The respondents were young adults (21-30 years old) in the Jaffna district. A questionnaire was distributed to randomly selected participants including students, employees and unemployed persons from the district. Out of 234 respondents (111 male and 123 female) 83% purchased food because of social media advertisements. Attracted by the picture in the advertisement made up 61% of the purchasers. Participants consider reviews made by the consumers before purchasing (33%). When there are price reductions or coupons available in the advertisements, 57 % of the participants purchase food items. However, 38% of the purchasers felt that money was wasted on a particular order. With the wide use of the internet on smartphones, the advertisements can reach the consumers easily and the purchase of food items increases. During the Covid-19 Pandemic, people purchase food items online using advertisements due to lock down, travel restrictions and fear of exposure to illness in the outside world. Social media changes the traditional way of marketing by helping the consumers to purchase food from home easily. As young adults show poor healthy food purchasing behavior the study recommends that the social media advertisements should focus on marketing of healthier food.

Keywords: Advertisement, Food purchase, Social media, Young adult

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VEDDHA IN TRANSITION: A CRITICAL DISCOURSE ANALYSIS ON THE IDENTITY TRANSITION OF THE *RATHUGALA ADHIVASI* COMMUNITY

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Neoliberalism coupled with capitalism and neo-colonialism is a powerful force which has the power to intrude into individuals and communities. The intrusions made by the above forces have the power to change and reinvent, recreate and make individuals and communities perform identities. Within Sri Lanka, this effect of neoliberalism, neo-colonial and capitalistic forces can be aptly witnessed in one of the indigenous communities namely the *Rathugala Adhivasi* community. This community does not receive direct state or media attention and even to date is living within the marginalized hinterlands of Sri Lanka. Yet, despite living in the periphery, they have not been immune to the advances of neoliberalism and capitalism and have accordingly begun to leave their "traditional" lifestyles which have affected their language, cultural practices, food habits and means of sustenance. This research attempts to critically examine the possible transformations that have occurred in the identity formation of the *Veddha* community based in *Rathugala*, Sri Lanka in relation to the constant changes within the socio cultural, political and economic paradigms of the country. The data was mainly gathered through interviews conducted with a number of *Veddha* community members as well as individuals outside this community residing in the *Rathugala* area by the means of convenient sampling. This study was conducted in the form of an in-depth qualitative case study, and a critical discourse analysis was conducted using deconstruction as the basic means of analysis. The findings of this study portray how the intrusive nature of capitalism and neo-colonialism has reshaped the identity of this community while displacing and disempowering them within the hierarchy of the *adhivasi* communities in Sri Lanka.

Keywords: *Adhivasi*, Capitalism, Identity, Neocolonialsim, Neoliberalism, Periphery, Subaltern

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MAPPING THE SOCIO-CULTURAL DISCOURSE SURROUNDING THE BACKYARD POULTRY FARMING SYSTEMS IN SRI LANKA

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The poultry sector as a whole in Sri Lanka has been playing a major role in providing food and economic security for people. The poultry development networks are divided as broiler, layer and backyard out of which the backyard poultry sector has been providing employment, economic and food security for a multitude of vulnerable and disadvantaged groups within Sri Lanka. The backyard poultry sector has also gained popularity in Sri Lanka because, indigenous village chickens have been used for various ritualistic black magic practices, exorcist ceremonies and religious activities across Sri Lanka by all ethnicities. Despite being classified as a type of poultry rearing system that requires minimal input and scientific and technological intervention, with the western-oriented neoliberal and capitalistic forces gradually intruding into the Sri Lankan livestock sector, the backyard poultry rearing system has also been now transformed into a more structured, profit-oriented, capital intensive and productivity-based model. This research study, therefore, aims to explore and qualitatively analyze the complex socio-political, economic, cultural and biological dynamics operating within the backyard poultry farming sector and how the local rearing models and indigenous practices in the sector have been influenced, thus conditioned by the western-based knowledge on rearing structures. The data were collected by conducting semi-structured interviews with twenty people chosen using the convenience sampling method in selected areas in Sri Lanka. The data gathered were then tabulated, coded and themes were derived. The identified themes were analyzed using critical discourse analysis. The findings of the study indicated that the backyard poultry farming systems which have been in operation for ages in the absence of serious techno-scientific interventions, or administrative structuralizations are now gradually being altered into a more structured and market-oriented model with the advent of neo-liberalist and capitalist ideologies. The study finally implies that, in order to ensure the sustainability of the backyard poultry rearing sector in Sri Lanka, a sustainable model of governance should be introduced after looking at the local practices without solely relying on practices imported from the West.

Keywords: Backyard poultry production, Critical discourse analysis, Neo-liberalism, Socio-economic

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NEXUS BETWEEN PERSONAL FACTORS AND ENTREPRENEURIAL SKILLS: A STUDY OF UNDERGRADUATES IN SRI LANKAN UNIVERSITIES

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Sri Lankan Universities have introduced several entrepreneurial study programs to undergraduates and postgraduates. Universities strive to develop entrepreneurial competencies (skill and knowledge) and attitudes among the graduates via entrepreneurship education programs. Entrepreneurial skills can encompass an extensive range of both soft and hard skills. Because of the many business roles, entrepreneurs may take on, they may also develop various skill sets to accommodate the growth of their businesses and brands. The present study analyzes the nexus between the personal factors and entrepreneurial skills of Sri Lankan Undergraduates. The research question of this study is: what is the extent to which the personal factors of undergraduates are associated with their entrepreneurial skills. The main objective of this study is to examine the association between the personal factors of the undergraduates and factors influencing their entrepreneurial skills. Gender, course specialization, and year of study are the personal factors of the undergraduates considered independent variables. Innovativeness and risk-taking abilities influence entrepreneurial skills and are considered dependent variables of this study. Data were collected from 225 undergraduates who are studying a management degree program at the University of Vavuniya and Trincomalee Campus, Eastern University of Sri Lanka, and data were entered into the SPSS 22. The study's findings indicated that the gender of the undergraduate and the level of innovativeness are associated and hold well, there is no association between the course of specialization and the level of innovativeness, and the year of study and level of innovativeness is associated and hold good. There was no association observed among gender, specialization course, year of study, and risk-taking abilities. Finally, the researchers concluded that innovativeness skills have a close association with the gender of the undergraduates and the course of the specialization. The present study only considered two universities' undergraduates as a study sample as the same policy of admission criteria of these two universities has been followed by the UGC. Further, the study is significant to the undergraduates of the universities and other higher education institutes for developing entrepreneurial skills in the future.

Keywords: Inventiveness, Personal factors, Risk-Taking

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A COMPARATIVE STUDY ON PERSON DEIXIS: WITH SPECIAL REFERENCE TO THE CHALLENGE OF TRANSLATING SECOND PERSON DEIXIS IN SINHALA AND ENGLISH

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'Deixis is a term used to refer to a person, place or a time, and the meaning of them can be understood in relation to context. Moreover, it is meaningful only to the speaker and the hearer, therefore a third party is unable to understand the meaning conveyed through deixis. Deixis in relation to translation becomes more complex, as the translator must comprehend the deictic term by himself and convey it to target reader. This study focuses on identifying the person deixis (2nd person) in Sinhala and English languages and aims to find answers for the research question 'What are the challenges faced by a translator when translating second person deixis in Sinhala and English languages?'. A worksheet with sentences consists of second person deixis were distributed among 25 undergraduates of Translation Studies Hons. Degree programme in the University of Kelaniya, along with a structured interview to identify the challenges they faced in translating deixis. A comparative content analysis is conducted in relation to second person deixis in Sinhala and English languages with the aim of recognizing the challenges a translator faces. Findings revealed that there are a number of second person deixis in Sinhala language whereas there is only one in English, which is the second person deixis 'you'. It was clear that the use of second person deixis in Sinhala language is context bound. But when translating from Sinhala to English, the translator has only one option; 'you'. There, if it is an oral translation, the tone could be changed according to the context to convey meaning, but if it is a written translation, some additions to the text should be made or the other segments of the sentence can be translated in a way that it hints the meaning of the deixis. But if a translation is done from English to Sinhala, the translator has to study the context in conveying the meaning and thereby select a suitable second person deictic word for the English second person deixis 'you'.

Keywords: Context, Deixis, Second person deixis, Translation

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POVERTY REDUCTION THROUGH SOCIAL CAPITAL: A CASE STUDY OF A WOMEN FARMERS' ORGANIZATION IN THE WESTERN PROVINCE, SRI LANKA

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Women are potential stakeholders in the rural agricultural sector in the Sri Lankan economy. Under the Home Garden Cultivation and Development Programme of the Ministry of Agriculture, Sri Lanka, efforts are being made to develop 500,000 model home gardens island wide. One such initiative in 2016 was the establishment of 'Sithamu' (Let's think) women farmers' organization to boost rural development with female participation in agriculture. The aim of this programme is to encourage the production of home-grown food crops and motivate women's participation in the labour force. The current study was conducted as part of a larger study on the structure and functions of a women farmers' organization which comes under the purview of the Ministry of Agriculture, Sri Lanka. The main objective of the current study was to investigate the impact of membership in the women farmers' organizations in the development of the members' social capital and its impact on reducing their poverty based on Bourdieu's conceptualization of social capital (1986). In this case study, a women farmers' organization in the Western Province monitored by the local Agrarian Services Centre was selected as a convenience sample. Eight members of the organization were the informants of this study which involved data generation through a background profile questionnaire, a semi-structured interview schedule, observational field notes and document analysis. Thematic analysis of data revealed that membership in the women farmers' organization contributed to the development of their social connections with the other members in the women farmers' organization, the relevant government officials, resource persons, agricultural entrepreneurs in the locality and other government agencies related to agriculture. This paves the way for the development of members' social capital through the development of mutual trust, networks, sharing of information and collective decision making among the membership. It is apparent that the development of members' social capital has an impact on reducing their poverty through opportunities for self-employment and development of their entrepreneurial skills, improvement of their living standards, improvement of their capabilities (such as access to information, formal and informal credit, education, use of technology and common resources management) as well as collective action. It is recommended that more opportunities be made available for home markers from low-income families to benefit from these types of organizations.

Keywords: Agricultural sector, Poverty reduction, Social capital, Women farmers' organizations

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"NOTHING PREPARES YOU": LIMITS OF EXPERIENCE

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Employing a poststructuralist approach to language and culture as the methodology, the paper intends to explore the significance of literature to understand the idea of knowledge in which the Platonic tradition which barred literature from becoming knowledge is questioned. It seeks to discuss the limits of experience-based knowledge, focusing on the idea of singularity and repetition. The discussion, underpinned by extensive research on the idea of the subject, literature, and knowledge presented by Maurice Blanchot, Michel Foucault, and Jacques Derrida, unfolds concerning the poem "Nothing Prepares You for Pain" by Vivimarie Vander Pooten, as it informs the impossibility of creating a totality in both being and knowledge.

Keywords: Experience, Knowledge, Literature, Repetition, Singularity, Totality

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THE ROLE OF DIGITAL MEDIA IN DEMOCRACY: PERSPECTIVES FROM SRI LANKAN YOUTH

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Digital democracy is simply defined as democratic involvement through the use of ICT. As a result, promoting democracy through digital platforms has become prevalent in contemporary society. The youth's contribution towards promoting democracy through digital platforms has become a general in Sri Lanka. The purpose of this study is to identify the role of digital media in democracy: perspectives from Sri Lankan youth. This study adopts a quantitative research approach and collects primary data using an online questionnaire survey method. Secondary data was collected from several resources. The convenient sampling method was used to select the 500 youths in Sri Lanka, and the data was analyzed using SPSS. According to the analysis, in overall perception, 53.6% of Sinhala youths said Sri Lankan democracy is weak while minority community youths accept it at high percentages. The Indian Tamil community made up 54.9% of the population, Sri Lankan Tamil community 65.7%, and the Moor community 70.9%. 87.8% of them disagree with that. Digital platforms such as Facebook, WhatsApp, Twitter, and others affect democracy in a country. 65.6% of them revealed that access to the internet is not important to democratic citizens, while more than 50% of minority youths consider the internet important to democratic citizens. 31.1% of youths only use digital platforms to promote democracy, and those platforms are particularly popular among Sri Lankan and Indian Tamils (52.2% and 51%), respectively. 34.4% of them think digital freedom is important in a democratic country. Digital media increase the participation in pro-democracy activities of the younger generation, who are more absorbed in electronic media. Thus, by building a network of channels and confidence among young people regarding digital democracy, they may modernize and strengthen democratic aspects through digital media for democratic development.

Keywords: Citizens, Democracy, Digital media, youths, Sri Lanka

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THE DILEMMA OF MILITARY EXPENDITURE AND PEACEBUILDING IN POST WAR SRI LANKA (2009 – 2019)

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Military expenditure is a significant factor for almost every country in the world. For national security to be increased, the expenditure has to be increased. After the end of a war, in the post-war era, the country is more focused on the stability of the nation. Given that context, the peacebuilding process plays a major role. Once the war is ended, the costs for that should be reduced to some extent. After all, war costs are not as expensive as they were during the war. This research study examines the dilemma of military expenditure and peacebuilding in post-war Sri Lanka. The main objective of the study is to examine the relationship between military expenditure and peacebuilding in post-war Sri Lanka. The specific objectives of the study are to study the Sri Lankan government's contribution to peacebuilding, to study the allocation of military expenditure during the post-war era 2009 – 2019, and to give recommendations to promote peacebuilding. Moreover, it investigates whether peace can be built without spending on national security. A qualitative approach was selected as the research method for this study, through the use of semi-structured interviews and discussions. As primary data, the researcher used the purposive sampling method and interviewed four different types of groups; five military officials from three forces (Sri Lanka Army, Sri Lanka Air Force, and Sri Lanka Navy); five officials from Ministry of Defence; five project managers from National Peace Council (NPC); five peacebuilding activists. Secondary data is derived from reputed books, online journals, media reports, existing literature, academic research, journals, and websites. Despite having contradictory ideas on military expenditure and peacebuilding, the findings indicate both military expenditure and peacebuilding as significant. Furthermore, the research findings figured out a relationship between military expenditure and peacebuilding. To build peace in a country, national security must be strengthened by increasing military expenditure. Therefore, national security is a key factor in maintaining lasting peace in a country

Keywords: Military expenditure, Military officials, National security, Peacebuilding, Post war period

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FINDING HAPPINESS IN DIFFICULT TIMES: WOMEN'S SOCIAL MEDIA COMMUNITIES AND THEIR STRATEGIES IN THE BACKDROP OF THE ECONOMIC CRISIS IN SRI LANKA

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Social media groups devoted to women, mothering and domesticity are a relatively new phenomenon in Sri Lanka. It was intended to observe a few such Sri Lankan social media groups as repositories of advice and communal knowledge with Laurent Berlant's concept of "intimate publics" in mind. The objective in this study would be to question how women in Sri Lanka negotiate their identities as women and sometimes as mothers within these social media groups in a backdrop of global neoliberal and post-feminist trends. The study was focused on how these digital intimacies engage with the notion of frugality, positive thinking and individual effort and innovation in the face of economic challenges caused by the Covid-19 pandemic and the recent (and ongoing) economic crisis. A key question raised in this study was whether the issues and challenges related to women and domesticity are political and socially relevant or whether they are perceived as non- political and personal. What does it mean to "belong" to an "intimate public" which claims to "support" women in times of economic hardships? How do the members engage with the discourse of frugality, individual effort and positive thinking? To find answers, it was expected to engage with the theorizations of Akane Kanai and Amy Dobson in their works on affect, celebrity cultures and online women's communities globally, and hope to align my work with the contemplations of Laurent Berlant, Angela McRobbie and Rosalind Gill, paying attention to how the discourse of optimism and individualization intersects with the post- feminist insistence on individual effort and self-improvement. It is possible to claim that the tendency to see issues related to women as "personal" demonstrates a process of depoliticization and shift of focus from systemic inequalities and structural flaws.

Keywords: Digital intimacies, Post feminism, Social media, Sri Lankan economic crisis

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STUDYING THE IMPACT OF PERSON PERCEPTION CUES ON PERSONALITY TRAITS JUDGEMENTS AMONG UNIVERSITY UNDERGRADUATES

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Because light travels quicker than sound, humans are seen before they are heard. That is why even before a person utters a word their appearance tells much about them. Here, the person's clothing style plays a paramount role in making judgments in another's mind about her/his mood, personality, and overall confidence. Hence, it is very important to know how people make different judgments of personality traits of a person based on their dressing style, to understand the different expectations for how one should dress in different contexts and understand how clothes impact self-presentation. This quantitative study aims at exploring the impact of a person's clothing style on judgments of personality traits of that person, among university undergraduates. A total of 100 undergraduates (50 for each gender) were recruited from the University of Peradeniya through quota sampling. The undergraduates were selected as a sample because they represent a wide dispersion among districts in Sri Lanka. A questionnaire and photographs were used as research tools and the participants were required to answer the questionnaire based on the photograph. This research tested the effects of two dress conditions, traditional and modern conditions using 10 photographs. Data were analyzed using descriptive statistics and ANOVAs. The research hypothesized (H1) that the cues seen in clothes impacts judgment of personality characteristics: intelligent; conceited; friendly; sociable; kind; strong; competent; sensitive; independent; pleasant; innocent; attractive; polite; simple and erotic and, (H2) there is a difference between male and female when judging personality traits based on clothing. The results illustrated that there is a significant difference ($p \leq 0.00$) between ratings of traditional and modern conditions participants in eight personality traits: conceited, erotic, friendly, innocent, kind, polite, sensitive, and simple. The other seven personality traits; attractive, competent, independent, intelligent, pleasant, sociable, and strong did not show significant difference between two dress conditions. A chi-square test of independence was performed to examine the gender difference on the ratings of variables that measure personality traits and was proved not significant. In other words, both males and females had perceived personality traits in the same way. Results of the study indicate that university undergraduates (who are young adults) regardless of gender, tend to make judgments on their peers and community based on how they are dressed and are likely to combine traditional dress codes with more socially acceptable personality traits.

Keywords: Clothing style, Person perception, Personality traits, University undergraduates

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FACTORS INFLUENCING LABOUR TURNOVER IN THE TEA PLANTATION SECTOR IN BADULLA REGION IN SRI LANKA: A CASE STUDY ON CULLEN TEA ESTATE, BADULLA

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Tea plantation sector in Sri Lanka is a highly labor-intensive industry which requires a continuous supply of labour from plucking to manufacturing process. In such a scenario, the employee turnover or outgoing labour has become one of the biggest challenges that the tea plantation companies face in Sri Lanka today. Many studies have been conducted in academia focusing mainly on the economic factors as a key factor that influences labour turnover in the tea plantation sector. However, it was evident that, not only economic factors, but also social, psychological and political factors too highly contribute towards labour turnover in the tea plantation sector in Sri Lanka. This study is specially designed to find social, political and psychological factors that contribute towards the labour turnover in the tea plantation Sector which carries equal importance as economic factors. The study is conducted at the Cullen Tea Estate, Badulla using 50 respondents through random sampling. Primary data is collected by using a structured questionnaire specially designed on a Likert scale and the retention strategies were developed by using key informants. Therefore, this study revealed that the plantation companies should focus more on retention strategies of the employees not only focusing on economic factors, but also focusing more on social, psychological, and political factors that leads to outgoing labour in the tea industry. Otherwise, tea plantation sector in Sri Lanka will face more and more labour shortages in the near future, and it ultimately will negatively affect the export agriculture in Sri Lanka.

Keywords: Employee turnover, Economical factors, Social factors, Political factors, Psychological factors

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CULTURAL LOGIC OF JUVENILE UNDERWORLD: A STUDY ON DATA CONSUMERISM AND SELF COMMODIFICATION ON ADOLESCENT YOUTUBERS DURING COVID-19 LOCKDOWNS

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Sri Lanka responded to COVID-19 pandemic with nationwide lockdowns in early 2020. During the period of isolation, a group of adolescent users in their early teens and below, started posting videos on Social Media, threatening each other in a role-play as underworld operatives. Subsequently, when the mainstream news reported the incident, it caught the attention of the government authorities, and ended with police intervention. This paper is a theoretical and textual study of the said SM productions and interactions of Sri Lankan public with special emphasis on younger SM users, during a moment of crisis, when the local schools are trying to adopt an online delivery system for primary and secondary education. The research is looking at this crisis situation as a moment of change that represents the cultural formation of late modernity or the late capitalism as forwarded by thinkers in the light of Jameson and Baudrillard. Further, the research identifies this moment as an evolution and adaptation of Adornonian culture industry into the era of digital convergence and web 2.0 environments. The research also explores Marx's arguments of class, labour and commodity in the context of digital economy, SM platforms and data capitalism. The paper argues that the potential and possibility of becoming famous and financially successful on SM without any skills or expertise has appealed and motivated these juveniles to enslave themselves for SM platforms with their free labour. Further, the research identifies that the exploitation of its users by the SM platforms or digital labour of SM public, as the driving force of data capitalism that facilitates its exponential growth to become global monopolies. Moreover, the study exposes issues regarding utilization of SM as pedagogical instruments and the effect of these platforms on younger generation in shaping their attitudes and behavior patterns.

Keywords: COVID-19, Culture industry, Data capitalism, Digital labour, Social media

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"FOOLISHNESS OF THE TOM-TOM BEATERS": FOLKTALES OF THE CEYLONESE DRUMMER CASTE AND A MISPLACED (?) COLONIAL OPINION

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Ceylonese caste system caused a confused array of responses from the British colonials and Ceylon's first folktale collector Henry Parker was no exception. In his 1910 publication *Village Folk Tales of Ceylon*, Volume I, Parker arranged the folktales he collected according to the caste of the teller, and he offered an anecdotal introduction to the tales collected from the drummer caste— 'tom-tom beaters' in Parker's parlance—where he presents a case in point to locate the drummers as 'fools.' Parker seemingly justifies his comments by suggesting that such an opinion on the drummer caste was also in currency among the native population of the south of Ceylon. This study undertakes a folkloric reading of the tales Parker collected and featured after the afore-mentioned anecdotal introduction to understand the nature of the mind-sets of the tom-tom beaters. Folkloric speech acts, according to folklorists, are an intimate reflection of the creators/tellers/hearers of the tales. Thus, this study undertakes a folkloric reading of the drummer-caste tales for their unstated premises—which are identified as 'Folk Ideas' by the scholar Allan Dundes (1980)—to understand how the tom-tom beaters saw themselves against the backdrop of their world and how such thoughts might have formed their imagination. At the same time, these 'Folk Ideas' of the tales are analyzed to understand whether this caste lacked 'common sense' or 'forethought' as suggested by Parker in his introduction to the tales by this caste. The results suggest that the tom-tom beaters' imagination far exceeded Parker's opinions about their mind-sets.

Keywords: Caste, Folk ideas, Folkloric reading, Folktales, Speech acts

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"RIGHT, OKAY, IT'S AMAZING AH": CONSTRUCTION OF THE FEMALE SPEAKER IN SINHALA RADIO TALK SHOWS

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The role played by the media industry in the advancement of gender equality is considered to be significant. This is because media has been deemed to reflect as well as create patterns related to society and culture, and provide socio cultural norms, thus shaping public opinion. Although much research has been conducted in relation to television and gender representation, including television advertising, not many gender-related studies have been conducted with regard to radio, and none, if at all, have been conducted in relation to radio talk shows in Sri Lanka. Today, Sri Lanka has more than fifty radio stations operating in all three languages; Sinhala, Tamil, and English. The radio is still a popular medium even among socioeconomically disadvantaged communities. Therefore, this study takes as its focus, the Sinhala radio talk show in its manifestations as the very popular "morning drives" and "evening drives". The study takes the position that unlike an audiovisual medium like television, radio can only make use of voice and language in order to construct gender identity. Thus, this study investigates how the female speaker is constructed through the language use and interactional patterns of presenters, in three radio talk shows which are hosted by mixed sex presenters in Sri Lanka. Data were collected from three hours of talk from three different, popular Sinhala radio talk shows transmitted by three private radio networks. The talk was transcribed and the data were analysed by means of a qualitative content analysis framework utilizing the three variationist language and gender theories of deficiency, dominance and difference, put forward by prominent scholars in the field of Sociolinguistics. The study found the female presenter conforming to polarized and stereotyped constructions of the submissive and subordinate female as outlined by language and gender theories, particularly Lakoff's model of the female speaker as deficient and whose speech lacks semantic substance, and the difference model that posits that female speakers are socialized differently, and learn to be supportive and cooperative speakers. The interactions largely included information given by the male presenter and supportive feedback such as back channelling and minimal responses given by the female presenter. Further, the female performed the role of a helpless and often clueless 'damsel in distress', who possesses little knowledge of the world. However, it was found that the female presenter has an agentive role in relation to humour generation both as the object as well as the creator, and a serious role when presenting promotional content on the talk show. It is concluded that the speech behaviour of the female presenters on these radio talk shows enact a performance (Butler, 1990) of the stereotypical submissive female that is constructed through talk and interaction. It is concluded that this may be a marketable version of femininity performed on popular radio talk-shows which are by nature expected to entertain. However, the researchers caution that this is unacceptable and may reinforce ideas of misogyny and gender discrimination

Keywords: Gendered language, Radio, Talk-shows, Language and gender.

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ASSESSMENT OF SOFA AGREEMENT: COMPARISON OF U.S-JAPAN SOFA AND U.S-SRI LANKA DRAFT SOFA

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This research paper examines the reasons behind countries entering into the Status of Forces Agreements and evaluates the positive and negative impacts of the Status of Forces Agreement with special reference to Japan and Sri Lanka. The basic objectives of this research paper are to discuss the reasons behind countries entering into Status of Forces Agreements and to evaluate the positive and negative impacts of the Status of Forces Agreement by comparing Japan and Sri Lanka Status of Forces Agreements. Positivism and Realism have been adopted to examine the Status of Forces Agreement from the perspectives of these theories. Further, the concepts of sovereignty, jurisdiction, and international law as well as Article 98 of the Rome Statute have been used as lenses through which the applicability to the Status of Forces Agreement can be viewed. The Status of Forces Agreement is the legal framework that defines the rights and obligations of a foreign visiting force in a receiving state's territory and addresses how the domestic laws of the foreign jurisdiction apply to U.S personnel. This is often set out what the parties hope to achieve from the deployment. International legal sovereignty under Status of Forces Agreements undermines the Westphalian notion of sovereignty which is precisely the violation of Westphalian sovereignty that makes U.S bases and troops powerful symbols of opposition to foreign military presence. A receiving state may invite foreign troops to conduct peace operations to provide peace support within the framework of peace operations. The methodology of the research is qualitative and follows descriptive writing using documented data which can further be classified as secondary sources. Along, with Japan and Sri Lanka Status of Forces Agreements, books, journal articles, Hansard Report of the Parliament of Sri Lanka, newspaper articles, and web blogs. Documented data was collected following the thematic analysis of the research by referring to books for the research introduction part as well as journal articles, newspaper articles, and web blogs for the results, discussion, and conclusion part. Here, the author has limited the scope of the study by using the United States-Sri Lanka Draft Status of Forces Agreement of 2018 as well as restricted the comparison part only to the jurisdiction of the two agreements. Further, these two agreements have been viewed from a political perspective, not from an economic one. The paper concludes by evaluating the positive and negative impacts of the United States-Japan Status of Forces Agreement and the United States-Sri Lanka Draft Status of Forces Agreement as well as proposing modifications to the United States-Japan Status of Forces Agreement and the United States -Sri Lanka Draft Status of Forces Agreement to be balanced.

Keywords: Foreign jurisdiction, Foreign visiting forces, Receiving state, Rights and obligations, Status of Forces Agreement, United States personnel

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NATURE AND CHARACTERISTICS OF YOUTH INFORMAL EMPLOYMENT IN SRI LANKA

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Although there are different arguments about entry to informal employment, any employment should be able to improve the living standard by fulfilling the basic needs, including social protection for youth and coming out from the vicious cycle of poverty. The objective of this study is to examine the nature and characteristics of youth informal employment among youth aged 15 to 29 years in Sri Lankan employability. This study utilized the secondary micro level labour force survey data -2019 and analyzed using descriptive statistical methods. In this study, the conceptual framework used to analyses informal employment is based on the conceptual framework devised by the 15th ICLS as opposed to informal sector employment measured by DCS. This research reveals that the informal sector was the main contributor (60.4%) to employment generation in Sri Lanka in 2019. Meanwhile, 63.2 per cent was informal employment, and 46.3 per cent of informal employment was in the informal sector. The individual informality is determined positively by being male, being age groups;25-29, years and negatively by being educated in senior secondary, collegiate and tertiary level; being English literate; referring to spatial variations of individuals, workers from the rural sector dominate informal employment corresponding to the most significant representation of rural sector in country's population. Likewise referring to the gender difference, more employed males (16 per cent) than employed females (5 percent) are informally employed. A significant proportion of youth informal workers are non-married. In terms of ethnicity, Sri Lankan Tamil Christian (two percent) and Indian Tamil Hindus are less likely to participate in informal employment. As age increases among the youth population, individuals' representation in informal employment increases to a peak at the 25 to 29 age category and then decreases. More education and literacy in at least two languages, including English reduce the likelihood of youth participation in informal employment. Considering occupation categories, professional, technical and associate professionals, clerks are less likely to participate in informal employment whereas the service sector, skilled agricultural and fishery workers, machine operators, and those involved in elementary occupations are more likely to be informally employed. Similarly, youth informal workers are also more likely to be employed in the manufacturing and service sectors relative to agriculture in the informal sector. In conclusion, this study emphasizes the importance of identifying informal employment in the formal sector in national statistics. Moreover, proactive policies on education, literacy, and–particularly youth employment skills programs aimed at improving employment conditions of youth should be regularly conducted for the betterment of youth in employment.

Keywords**:** Formal employment, Informal employment, Labour force, Youth

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UNDERSTANDING GLOBAL PRACTICES ON DIGITAL DEVELOPMENT AND THE EMERGENCE OF THE GENDER DIGITAL DIVIDE WITH SPECIAL REFERENCE TO GENDER-SENSITIVE DESIGN OF TECHNOLOGY

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In a digitalized world, equitable participation of every person in the field of technology is quite an inquisitive prospect for research since it offers immense opportunities for the socio-economic and political development of the communities. The gender digital divide usually focuses on access to digital resources and the nature of skills possessed by a particular gender group. This study especially focuses on the gender-sensitive design of technology and its influence on the identified phenomenon of the gender digital divide. Considering the digital policies of global intergovernmental and non-governmental organizations, it assesses how far it can contribute to the existing gender digital divide. As a mixed-method study, while examining the concepts of gender and the relevant global policies regarding digital technology, the issue of the gender-sensitive design of technology is evaluated through a mini empirical case study. So, this study derives the practical aspect of implementing technology on behalf of the gender divide while analyzing the global practices and related policies in the field.

Keywords: Digital technology, Gender, Gender digital divide, Gender-sensitive design, Global policy

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AN ANALYSIS OF REPRESENTATIONS OF VIOLENCE IN TOXIC MASCULINITIES IN THE TV SERIES *YOU* AND *13 REASONS WHY*

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The study of toxic masculinities can be considered a more recent area of scholarly interest within the dynamic and interdisciplinary field of masculinity studies. Toxic masculinities is a topic of strong contemporary relevance due to the fact that it is recognized as the most common and the most damaging form of behaviour embodied by men at present. Furthermore, representations of toxic masculinities have highlighted the importance of recognizing the detrimental ways in which men undergo processes of socialization in which the use and display of violence are perceived as normative behavioural patterns. The study of toxic masculinities is also an area of pedagogical significance as scholarship points towards the urgent need to address the rising levels of verbal, physical and sexual abuse, in light of the contribution of visual media in portraying such behaviour. Representations of gender and sexualities in visual media, specifically in films and TV series become a critically important area of study with the more recent popularity of the streaming service Netflix. The study utilizes a theoretical framework based primarily on gender studies and visual media with the central aim of exploring representations of toxic masculinities in the selected Netflix TV series *You* (2018) and *13 Reasons Why* (2017). Accordingly, the construction of toxic masculinities is examined through representations of physical and emotional forms of violence displayed in the behavioural patterns of male protagonists in the selected television series. Drawing attention to the digital media through which these complex patterns of behaviour are demonstrated in the selected television series, the study focuses on issues pertaining to cyberstalking, voyeurism, surveillance and therein the normalisation and romanticisation of violence. The study also probes into the portrayals of alternative forms of masculinities that contribute to interrogating forms of toxic masculinities that are often represented through white, heterosexual, able-bodied male protagonists. The portrayal of male characters in these two texts is analysed through a textual and visual analysis. This research will contribute to the understandings of toxic masculinities within the field of masculinity studies.

Keywords: Representations of violence, Toxic masculinities, Violence, Visual media

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LAW

THE IMPACT OF COVID-19 IN THE COURT PROCEEDINGS IN SRI LANKA: A CRITICAL ANALYSIS ON THE SCOPE FOR ADOPTING THE MODERN METHODS USED DURING THE COVID-19 PANDEMIC

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Due to the Coronavirus pandemic, a large component of the legal structure has shifted to an online approach during the last two years. As a result of the digitalization of the legal system, multiple new trends have too emerged. As part of the gradual digitalization reform of the country, the Court system also required a rapid reform. It is recognized by the research that examining courts systems in other jurisdictions, that to deliver justice in an efficient manner they have to improve both their approaches and host systems. Further it is observed that to modernize their systems and approaches they must digitalize them. The purpose of this study is to understand and analyze the modes by which these technological advancements could transform the existing Court system in Sri Lanka into a modernized court system. The research will analyze the benefits and challenges of digitalization of courts in Sri Lanka by adopting a doctrinal legal research method. Moreover, research will discuss the newest technological advancements that can be adopted by the Sri Lankan Courts which are already adopted by other jurisdictions around the world. It is observed that one difficulty of digitalization is that courts often lack the budget to introduce those technological advancements. However, Courts can improve their systems by using open sources and widely used software. Thereby Courts could promote sustainability by providing external services, open sources and clouds while addressing other legal and organizational barriers such as e-filling and e-services submission process. Nonetheless, in comparison to the advances made by other court systems, the Sri Lankan legal system must consider a number of different aspects in its journey toward digital transformation.

Keywords: Justice, Technology, Pandemic

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DOES THE 'PULSE' OF AN UNBORN CREATE NINE MONTHS OF SLAVERY? A LEGAL PERSPECTIVE IN THE LIGHT OF THE TEXAS HEARTBEAT ACT

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Developments in the field of fetal medicine denote that, the modern world has recognized fetus as an entity possessed with different capacities. Twenty first century is considered as the era of fetal rights. The recognition of fetal rights is objected by the legal scholars by considering the freedoms of women. The recent controversial legislation related to the recognition of fetal rights in the world is the *Texas Heartbeat Act 2021*. The *Act* imposes taboos on the termination of pregnancy after the detection of fetal heartbeat and steps forward from the fetal viability to fetal heartbeat. The fetal viability depicts an instance where the fetus becomes independent to exist outside the womb of the mother with the mechanical support. Conversely, fetal heartbeat is not considered as a constant phenomenon as it dealt with different medical uncertainties. Prioritizing of fetal rights is labelled as a contravention of the rights of women including the autonomy. The *Act* is criticized on the medical basis. The author in this research analyses the Texas Heartbeat Act and legal aspects related to the fetal rights. Simultaneously, the author examines the legal aspects in relation to the freedoms and reproductive autonomy of women. The methodology used in the research is qualitative in nature and the author has analyzed both primary and secondary sources of law. The doctrinal methodology is prioritized in the research as it is basically involved with an analysis of legislation with the international legal instruments pertaining to the human rights. The author concludes the research with the stance that, the recognition of fetal heartbeat has a negative influence on the freedoms and interests of women. The conclusion of the research signifies the international law concept as 'involuntary servitude'.

Keywords: Fetal viability, Fetus, Texas heartbeat act, Reproductive autonomy

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POSITIVE PROTECTION AS THE ONLY SAVIOUR TO PROTECT TRADITIONAL KNOWLEDGE: A COMPARATIVE ANALYSIS

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The purpose of this research was to identify and evaluate the most effective and appropriate method of safeguarding Traditional Knowledge (TK). Traditional knowledge is a dynamic body of knowledge that is always evolving. It is created, fostered, preserved, and passed down through generations within a social group. For many cultures, TK is an integral component of their comprehensive perspective, and it is inextricably linked to their traditional influences, faith, and traditional legal frameworks. This implies that it is critical to preserve not only knowledge but also the social and personal context in which it has been embedded. It could be asserted that conventional intellectual property tools are ineffective in the present context to safeguard TK. The goal of defensive protection is to stop unauthorized third parties from acquiring intellectual property rights. Positive protection enables holders of TK to maintain and promote their knowledge by establishing positive rights, which aim to safeguard TK. This study primarily focuses on the positive protection strategies that third-world countries could develop to protect and maintain their TK through the use of the prescriptive approach, supporting the establishment of *sui generis* Laws. The research problem of this research can be elucidated as "What is the most effective method of protecting TK?" The objective of this research is to observe the most effective method of protecting TK. This research, which utilized qualitative data, falls under the category of doctrinal legal research. Furthermore, this research utilized the comparative legal analysis method to compare different jurisdictions and combine various international legal perspectives in the field of protecting TK. Ultimately, it can be recommended that Sri Lanka and other developing nations should implement a system for protecting TK by passing *sui generis* laws in addition to offering legal clarity to both factions that hold TK as well as other parties seeking to exploit TK.

Keywords: Defensive protection, Positive protection, Sui generis laws, Third-world countries, Traditional knowledge

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SRI LANKA'S POST WAR IMPLICATIONS ON ONLINE FALSEHOODS AND MANIPULATIONS; INTANGIBLE NATIONAL SECURITY MENACES

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The new war and threat landscape have drastically changed in the digital world. In the past, where war was fought with arms, weapons, bullets and barricades, currently, war happens online. A sensitive and critical piece of information can cause irrevocable damage if fallen into corrupt hands. Online falsehoods, as well as manipulations, are widely committed by terrorists, extremists and profit-driven individuals. At present, Sri Lanka is falsely accused of committing genocide, gross human rights violations and international humanitarian law violations during the war against the Liberation Tigers of Tamil Eelam (LTTE). LTTE and its international networks are using social media to promote falsehoods and manipulate the public by painting fictitious claims against Sri Lanka, which incur national security threats to the country. Unlike Singapore, Sri Lanka does not have a separate Act to criminalize falsehoods and manipulations committed online. Therefore, it is timely that Sri Lanka must criminalize, denigrate and prevent online falsehoods and manipulations. In this context, the research problem is the need to criminalize online falsehoods and manipulations that are threats to Sri Lanka's national security, in the post-war context. The research has attempted to identify online falsehoods and manipulations, and threats incurred by them to Sri Lanka's national security. In addition, research has provided recommendations to denigrate and prevent the threats posed by online falsehoods and manipulations. The nature of the research is qualitative. Research has utilized both primary and secondary sources. In the end, research has concluded, that online falsehoods and manipulations carried out by the LTTE and its international networks are threats to the national security of Sri Lanka and the imminent need to introduce an Act to criminalize online falsehoods and manipulations.

Keywords: Manipulations, National security, Online falsehoods, Post-war, Singapore, Sri Lanka

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A CRITICAL ANALYSIS OF THE LEGISLATIVE FRAMEWORK ON THE PROTECTON OF GEOGRAPHICAL INDICATIONS IN SRI LANKA

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Marking the monumental and historic episode in the Intellectual Property Law chapter in Sri Lanka, the European Union granted the Geographical Indication (GI) Certificate for the first time to Ceylon Cinnamon .Prior to the Intellectual Property (Amendment) Act No 8 of 2022, there was no criteria for registering the Ceylon products which came under the scope of GI. With this new Amendment Act, it provides a platform for indications which are having unique qualities attributed to their geographical origin, to be registered as GI and thereby to combat against the counterfeit products all over the world. Despite the fact that Agreement on Trade Related Aspects of Intellectual Property (TRIPS) does not mandate the member countries as to the criteria by which protection to GI should be monitored. National legislative framework dealing with regard to GI, confers two fold protection to Geographical Indications i.e. positive and preventive, where positive protection is conferred through certification and collective marks which are related to trade mark law and under sui generis protection. Preventive protection is accorded via the unfair competition laws and consumer protection laws. Registration of GI falls under the scope of sui generis protection which falls under positive protection. This paper aims to analyze the provisions of the Intellectual Property (Amendment) Act No 8 of 2022 that accords the registration mechanisms for the GIs and thereby to determine to which extent the registration of GI could be protected against counterfeits .In this backdrop the paper employs the qualitative methodology where the provisions of Intellectual Property Act and the Amendment Act are discussed .Paper also engages in the comparative analysis of the International Conventions which are designed for the protection of GI. The Paper finally concludes that the provisions of the Amendment Act confers a conducive environment for the protection of GIs via registration than what was conferred by the main Act and therefore the best is yet to come.

Keywords: Geographical indications, Intellectual property act, Intellectual property rights, Legislative framework, Registration

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COMMUNITY MEDIATION AND JUSTICE: A DISCONNECT?

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Dispute resolution through community mediation exists as a quasi-judicial practice in many societies around the world including in Sri Lanka. The primary function of community mediation is to resolve minor disputes with the use of third-party mediation techniques by voluntary mediators from the local community. These mediation sessions are based on the idea that minor disputes are better resolved within the local community rather than the formal courts of law so that the disputing parties are able to settle their issues in a non-adversarial and non-adjudicatory manner. Theoretically, community mediation is recognized as a form of Alternative Dispute Resolution (ADR) and is founded on the principles of popular justice that are often seen in contrast to the formal state law in both structure and function. The objective of this preliminary study of community mediation in Sri Lanka is to explore the ideas of mediation and justice in the context of a Mediation Board which is a statutory community mediation forum found in all parts of Sri Lanka. Using a grounded theory methodology and interpreting the information gathered from the questionnaire survey, this study revealed three emerging ideas among the disputants; firstly, mediation is seen as a useful mechanism of dispute resolution with qualities such as the ability to discuss and negotiate, cost-effectiveness and able to resolve issues. Secondly, mediation is seen as an alternative to courts which is the intention of the ADR movement and accepted by disputants. Thirdly, ideas about mediation and justice are not necessarily seen as congruent since mediation is understood more from a utilitarian perspective than a way to obtain justice. Although limitations exist in this study since it was based on a questionnaire survey, findings suggest that a further in-depth analysis of community mediation and justice would provide valuable insights for policy planners in formulating reforms to dispute resolution processes.

Keywords: Alternative dispute resolution, Community mediation, Justice

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RIGHT TO LIFE AS A FUNDAMENTAL RIGHT; A LEGAL ANALYSIS ON SRI LANKAN CONSTITUTION

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The fundamental rights chapter of Sri Lanka's 1978 Constitution ensures the protection of fundamental human rights. However, the Sri Lankan Constitution makes no mention of the right to life. Sri Lanka retains its position of implicitly and indirectly protecting the right to livelihood under Article 11 and Article 13(4) of the constitution. Furthermore, by a broad interpretation of the *locus standi,* Article 17 read with 126 provides a remedy for the infringement of basic rights. The truth is that the right to life is more important to humanity than democracy or suffrage. The researcher concludes that the right to life is more important than the other rights since it is impossible to enjoy the other rights without having access to the right to live. This right includes a responsibility to take actions to protect people's lives. Some basic rights that can be specified are access to nutritious or safe food, access to clean water, a healthy environment, access to health care, and so on. These are also important indicators of a developed society that is sustainable. This is a desk research project. In developing the research, main sources included constitutional provisions, legislative enactments, and case law, while secondary sources included scholar publications and critiques. Many governments throughout the world have made the right to life absolute. As a result, in the Asian region, countries such as India, Pakistan, and Bangladesh have adopted it. However, Sri Lanka is trailing behind in appreciating the importance of defending the right to life by virtue of the Constitution itself. However, Sri Lanka can view the right to life as a basic right only by judicial activism. As a result, it is high time for Sri Lanka's Fundamental Rights chapter to focus on a human being's most basic right by ensuring it through a right.

Keywords: Constitutions, Fundamental right, Judicial activism, Right to life

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MANAGEMENT

IMPACT OF CORPORATE GOVERNANCE ON FINANCING DECISIONS AND PROFITABILITY

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The paper aims to examine the impact of corporate governance mechanisms on financing decisions and profitability of listed companies in Sri Lanka during the period of 2016 to 2020 where the data are collected from secondary data sources. Panel regression analysis is used to examine a sample of 100 listed companies representing Capital Goods, Food, Beverage & Tobacco, Consumer Services and Materials sectors in Sri Lanka. This research looked at six aspects of corporate governance: Board Size (BS), Board Gender Diversity (BGD), Board Composition (BC), CEO duality (CEO), Audit Committee (AC), and Board Meetings (BM). Financing decisions have been measured through the Long-term Debt to Total Asset ratio (LDTA). Return on Equity (ROE) and Return on Assets (ROA) are used to measure profitability. Firm Size (FS) is taken as the control variable in this study. The results of the study indicate that audit committee has a significant positive impact on financing decisions. Likewise, board composition has a significant positive impact on ROE and board gender diversity and board size have a significant negative impact on ROE. Further, audit committee has a significant negative impact on ROA.

Keywords: Board gender diversity, Corporate governance, Financing decision, Profitability

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FACTORS AFFECTING JOB SATISFACTION –A SURVEY AMONG AYURVEDA MEDICAL OFFICERS IN CENTRAL PROVINCE, SRI LANKA

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Ayurveda is a system of medicine practice under health care system in Sri Lanka and job satisfaction of Ayurveda physicians plays a vital role for successful service to the patients. This study is based on a survey carried out through questionnaires given to 30 Ayurveda doctors conducted by Prof. Kenadi D. Gunawardhana in a training program held in National Institute of Traditional Medicine, Navinna in 2012 to determine the relationship between environmental factors, demographic variables, and perceived job satisfaction of the Ayurveda medical officers. Corresponding author was one among 30 participants. In this study, data were collected through a questionnaire to identify the impact of environmental factors and demographic factors on satisfaction of Ayurveda medical officers in central province via face to face interviews and interview via phone calls. 92 medical officers responded. Among them, 64.5% were female and 35.5% were male. Maximum number responded (37.8%) were in between the age group 36-45 years. It was observed that, there is no impact of payment and other benefits, promotion opportunities, relationship with subordinate on job satisfaction. There is weak positive impact of administration policies and performance appraisal on job satisfaction. Experience level above 25 years doctors are most satisfied (mean 4.6667). Most of participants are satisfied on their nature of work. Less than 5% are not satisfied. Mean of total satisfaction is 3.8593± .54275. So, overall satisfaction levels are between 3.3 to 4.4 ranges which declare that Ayurveda medical officers are in satisfied level. Above variables are key points which affects the job satisfaction among Ayurveda medical officers and findings can be shared with legislators and policymakers to improve the quality of work of Ayurveda physicians aiming to improve job satisfaction hence overall service of the Ayurveda field.

Keywords: Ayurveda doctors, Central province, Job satisfaction

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THE IMPACT OF THE BEHAVIOURAL INTENTION ON THE USE BEHAVIOUR OF INFORMATION SYSTEMS WITH SPECIAL REFERENCE TO THE MODERATING ROLE OF COMPUTER SELF-EFFICACY OF HUMAN RESOURCE MANAGEMENT PROFESSIONALS

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Information System failure due to lack of usage of the information systems remains as a crucial universal problem in both developed and developing countries. When it comes to the contemporary Human Resource Management phenomenon, the use of Information Systems in facilitation of the discipline is a trend. Nevertheless, in the Sri Lankan context, it was revealed that companies lag in technology readiness. As per the technology acceptance literature, it is theorized that usage of an information system depends on a system user's intention to use the system and the role of behavioural intention has been well-established as a predictor of actual use in management information systems. Nevertheless, this study suggests that the transition from the behavioural intention towards the actual behaviour, may need reinforcement with the information system user's or the Human Resource Management Professional's computer self-efficacy. Thus, the research objective was to identify whether computer self-efficacy moderates the impact of Behavioural Intention to Use Information System on Information System Use Behaviour of the Human Resource Management professionals. This study used the quantitative techniques due to the positivism philosophy and adopts the deductive approach and quantitative method was used. It is cross sectional and the population of this study was the IS users, and the unit of analysis was at the individual level. A simple random sample of two hundred was drawn from the Sri Lankan Human Resource Management Professionals who use information systems. The primary data was collected using a pre validated structured questionnaire. Using SPSS and AMOS, the absolute, incremental and the parsimonious fit indices established a good model fit. The interaction method was used to test the moderation effect and the findings concluded that the Human Resource Management Professional's Computer Self Efficacy moderates the positive relationship between the Behavioural Intention to Use Information System and Information System Use Behaviour. It can be recommended that the intention–behaviour gap can be influenced with the User's Computer Self-Efficacy. Therefore, it is further recommended to employ users or the Human Resource Management Professionals who use information systems who have Computer Self- Efficacy to improve the Information System Use.

Keywords: Behavioural intention to Use IS, Computer self-efficacy, IS usage, IS use behaviour

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IMPACT OF EMOTIONAL INTELLIGENCE ON PSYCHOLOGICAL WELL-BEING OF MANAGEMENT UNDERGRADUATES: DURING COVID-19 OUTBREAK

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Psychological well-being is critical for undergraduates. Currently, with the COVID -19 Outbreak e-learning has become a requirement for all universities. Accordingly, the psychological well-being of the undergraduates has been affected to a greater extent as they are experiencing a higher level of stress, and burnout which has ultimately resulted in their academic progress. Thus, promoting the psychological well-being of undergraduates is crucial. Emotional Intelligence (EI) is a notion that has piqued the interest of researchers and experts in the field of mental health. In the meantime, EI has been used as a method to improve the psychological well-being of university undergraduates during the COVID-19 Outbreak. The purpose of this study was to investigate the impact of Emotional Intelligence EI on the psychological well-being of Management undergraduates during the COVID-19 Outbreak. The quantitative methodology has been adopted to achieve the aim of the study and data was collected through a survey which was conducted within a sample of 248 Management undergraduates from one of the state universities in Sri Lanka. The researcher conducted a regression analysis to determine the impact. The findings of the study revealed that there is a significant positive impact of EI on the psychological well-being of Management undergraduates during the COVID- 19 Outbreak. Thus, sub-variables such as self-management, social awareness, and relationship management have proven a significant positive impact, while self-awareness showed a negative impact on the psychological well-being of the Management undergraduates during the COVID-19 Outbreak. The study solely considered EI to address the research problem and it's a limitation where it ignored the alternatives available for enhancing the psychological well-being of undergraduates. The study provides insight especially for undergraduates to be aware of the contribution of EI to the enhancement of psychological well-being.

Keywords: Emotional intelligence, Psychological well-being, Relationship management, Self-awareness, Self-management, Social awareness

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EFFECT OF SOCIALLY-RESPONSIBLE HUMAN RESOURCE PRACTICES ON JOB SATISFACTION AND EMPLOYEES' INTENTION TO QUIT WITH SPECIAL REFERENCE TO SELECTED HOTELS IN PASIKUDAH, SRI LANKA

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Social responsibility is one of the most dynamic and demanding activity areas for modern corporations which indicates the balanced approach to the economic, social and environmental impacts of organizations. The current study aims to investigate the relationship between independent and dependent variables, while the study highlights the effect of socially responsible Human Resources (HR) practices on job satisfaction and employees' intention to quit among the selected employees in the hotels in Pasikudah. The research philosophy of this study was positivism and quantitative data uses a deductive study approach. The study utilized a descriptive survey methodology, with 200 respondents. The collected data were analyzed by using descriptive statistics, correlation, regression and mediating analyses. The study concluded that socially responsible HR practices and job satisfaction are at a high level and employees' intention to quit is at a low level among the respondents. Further, the analyses revealed that high socially responsible HR practices have a positive relationship with job satisfaction while socially responsible HR practices reduce the intention to quit the current job. Also, socially responsible HR practices have a significant effect on job satisfaction and employees' intention to quit in the selected hotel industry Thus, employees' participation as a contributor through HRM in corporate social responsibility activities, will undoubtedly help the organization in rising ethically and sustainably.

Keywords: Employees' intention to quit, Job satisfaction, Socially responsible HR practices

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IMPACT OF MONETARY POLICY ON ECONOMIC GROWTH: EVIDENCE FROM SRI LANKA

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The aim of the study is to identify a relationship between monetary policy and economic growth rate in Sri Lanka. The quantitative research approach was applied to the study and secondary data was collected through the Central Bank of Sri Lanka and Department of Census and Statistics in Sri Lanka. Data has been collected on a monthly basis for 70 observations from January 2015 to October 2020. The chosen variables for the analysis were interest rate, inflation rate and money supply (M2B) and GDP growth rate. Auto Regressive Distributed Lag (ARDL) Bound Test has explored the integrating relationship between monetary policy variables and GDP growth rate. The result indicated that there is a relationship between monetary policy and the economic growth rate in Sri Lanka for the long run. There is a positive and statistically significant relationship between money supply and economic growth rate in the short run. Statistically, there is no sufficient information to confirm the relationship between inflation rate and interest rate towards economic growth in Sri Lanka for a short run. Further results illustrated that Error Correction Model is negative and statistically significant at 5% level. It indicated that when GDP growth change from the equilibrium value, the adjustment rate of the GDP is 147% on a monthly basis. The empirical reviews evidenced that the Monetary policy significantly affects in the economic development of a country. It is required to introduce a proper policy mechanism for monetary policy. Controlling different monetary policy instruments through government policy implications can adjust monetary policy favourable economic growth of Sri Lanka.

Keywords: ARDL bound test, GDP growth rate, Inflation rate, Interest rate, Monetary policy, Money supply

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THE IMPACT OF HUMAN RESOURCE MANAGEMENT PRACTICES ON TURNOVER INTENTION WITH SPECIAL REFERENCE TO STAR GARMENTS PVT LTD, GALLE

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Organizations consider human resources as an important resource for gaining competitive advantage. Thus, retaining skillful employees within the organization is a major concern because as shown by researchers, currently there is a higher turnover rate among organizations. Employee turnover has become a severe problem for the Sri Lankan apparel industry. But the real causes of turnover still have become a puzzle to organizations. Many Sri Lankan apparel organizations are continuously faced with higher turnover. There is no doubt that the problem has become significant for researchers. Among the various factors that effect on turnover intention, human resource management practices are highly significant. Most of the researchers already have found that Human Resource Management practices are a major cause of employee turnover. Thus, this study focuses on HRM practices namely, training, performance appraisal, working conditions and compensation, and it examines the impact of HRM practices on employee turnover intention. The study is based on 'Star Garments Pvt Ltd', Galle. A sample of hundred sewing machine operators were selected for the study. Simple random sampling was employed. This is a quantitative study. A self-administered questionnaire was distributed for gathering primary data. (SPSS) software was used for data analysis. As per the correlational analysis results, there is a negative relationship between the HRM practices and turnover intention. Across the four independent variables (Compensation; Performance Appraisals; Training and working conditions) and the dependent variable, which is turnover intention, researcher found that HRM practices have a significant impact on turnover intention. Among the HRM practices, the highest impact has been recorded from compensation which is 80.5% effect on turnover intention. Future researches can be conducted on different respondent categories from diverse industries by expanding the research model.

Keywords: Compensation, Performance appraisals, Training, Turnover intention, Working conditions

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PHYSICAL SCIENCES

ENHANCING THE PHOTOCURRENT BY TiO_2 NANOFIBERS IN PbS QUANTUM DOT – SENSITIZED SOLAR CELLS

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Semiconductor quantum dots have attracted extensive attention over the past decades with different applications including Light Emitting Diodes (LEDs), photodetectors, transistors, spectrometers, medical imaging, quantum computing and solar cells due to their unique size dependent optoelectronic properties. Quantum dot-sensitized solar cells have gained more attention in the area of solar energy conversion systems due to their low production cost and the excellent properties such as the ability of multiple exciton generation and high molar extinction coefficients. TiO_2 nanofiber-based photoanodes were grown with an optimized quantity and size of PbS quantum dots prepared by Successive Ionic Layer Adsorption and Reaction (SILAR) technique to absorb the photons from the visible to near-infrared region of the solar spectrum. Nanofibers and photoanodes were optically and morphologically characterized. Solar cells were fabricated using PbS quantum dot sensitized normal TiO_2 P25 photoanodes and also PbS quantum dot sensitized TiO_2 nanofiber photoanodes, maintaining equal thicknesses for both types of photoanodes. These solar cells were characterized under the simulated light of 100 mW cm^{-2} with AM 1.5 spectral filter. Overall power conversion efficiency and short-circuit current density of the solar cells are enhanced by around 33% and 26% respectively due to the use of TiO_2 nanofibers. These can be attributed to the enhanced light absorption caused by multiple scattering and effective electron injection caused by the nanofibers and also due to the high amount of quantum dot formation due to the large surface area of the TiO_2 nanofiber photoanode.

Keywords: Molar extinction coefficient, Multiple exciton generation, Multiple light scattering, Quantum dots

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EFFECT OF Au PLASMONIC NANOPARTICLES ON SHORT-CIRCUIT CURRENT DENSITY OF PbS QUANTUM DOT SENSITIZED SOLAR CELLS

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Quantum Dot-Sensitized Solar Cells (QDSSCs) have gained more attention recently in the area of solar power conversion systems due to their low production cost and the excellent properties of quantum dots such as ability of Multiple Exciton Generation (MEG), tunable energy gap due to the quantum confinement effect and high molar extinction coefficients. The working principle and structure of QDSSC is similar to the dye-sensitized solar cell. Only difference between these solar cells is the sensitizer. In dye-sensitized solar cells, organic or metal organic dyes are used as sensitizers. In the present study, TiO_2 based PbS quantum dot – sensitized solar cells were fabricated using the Successive Ionic Layer Adsorption and Reaction (SILAR) technique. In order to study the effect of Au plasmonic nanoparticles, different amounts of colloidal Au nanoparticles were incorporated into the photoanode and the amount of Au corresponding to the highest efficiency was optimized. PbS Quantum dot sensitized Au plasmonic nanoparticle incorporated solar cells show a significantly higher efficiency of 4.24% compared to the control device without Au nanoparticles. This is an efficiency enhancement of about 37.2%. Current density also shows about 35% enhancement. This is evidently due to the enhanced photocurrent caused by the Localized Surface Plasmon Resonance (LSPR) effect.

Keywords: Localized surface plasmon resonance, Plasmonic nanoparticles, Quantum dots, Tunable energy gap

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A MATHEMATICAL MODEL FOR THE HARD TIME WINDOWS VEHICLE ROUTING PROBLEM WITH MOVING SHIPMENTS AT THE CROSS DOCK CENTER

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Cross-Docking (CD) technique was initiated in the 1930s to make supply chain cost effective. However, from the 1980s, after the successful application of this technique to the Walmart food chain industry, it became popular among manufacturing and retailing companies. Vehicle routing problem (VRP) is one of the widely discussed optimization problems. The research on integration of VRP with CD (VRPCD) was initiated at the beginning of 2000s. Moving shipments (MS) from receiving doors to shipping doors is an activity inside a Cross-Dock Centre (CDC). This study mainly considers MS as an additional aspect in the literature of VRPCD. In this study, not only loading or unloading shipments at all the nodes including CDC and homogenous fleets of vehicles within pickup or delivery process but also, heterogeneous fleets of vehicles between pickup and delivery processes aspects are taken into account. Furthermore, Time Windows (TW) characteristics are also considered here. A mixed integer nonlinear programming model is developed to obtain the optimal solutions to hard time windows vehicle routing problem with moving shipments at the cross-dock centre (TW-VRPCD-MS). In the proposed model, the factors considered for the total cost are transportation between nodes, service at nodes including CDC, moving shipments inside CDC and vehicle operation. The compatibility of the proposed model is tested using sixteen randomly generated small-scale instances. The required number of vehicles and the average computational time to reach the optimal solution are estimated using LINGO optimization software. Since the average computational time is reasonably less for the tested instances, it can be concluded that this proposed model can be used for last time planning for similar small-scale problems with nodes up to 20. Further analysis revealed that the convergence rate to reach the optimal solution rises exponentially with the magnitude of the problem. Therefore, this study recommends applying heuristic or metaheuristic techniques to solve large scale instances, nodes more than 50, of TW-VRPCD-MS to obtain a near optimal solution in a less computational time. Moreover, it is recommended for further studies to revise the proposed model according to the availability of vehicles for transportation, temporary storage capacity at CDC and budget allocated for transportation.

Keywords: Cross- docking, Moving shipments, Time windows, Vehicle routing

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ELECTROCHEMICAL REMOVAL OF SALT IONS VIA CAPACITIVE DEIONIZATION USING ELECTRODES FABRICATED FROM LOCALLY ACTIVATED CARBON

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In the present era, access to safe water sources has become a great challenge. Thus, sea water desalination has been recognized as a solution to overcome this issue by following several methods for the ion removal from salt water, including ion exchange, electric dialysis and reverse osmosis, though higher maintenance cost, high energy consumption, complex pre-treatment methods remain as major drawbacks, where alternatives electrosorption method, Capacitive Deionization (CDI) emerged as a low cost, energy efficient and environmental-friendly technology for desalination.

This process of electro-sorption occurs at two electrodes when removing ions from the feed solution. Applying an electrical potential difference across porous carbon electrodes charges them positively and negatively. Cations and anions that move to the polarized electrodes create Electrical Double Layers (EDLs), while removing ions from the feed solution. The adsorption capacity and electric conductivity of electrodes highly depend on the electrode material. Hence, to enhance the electrochemical performance of electrodes by using locally fabricated activated carbon, carbon black, was used as the conductive additive and polybond was used as the binder. Being able to form a homogeneous slurry, surfactant span-20 was added to the active material. Electrodes were casted using doctor blading method via a thin film applicator. Electrochemical performance was evaluated for various types of current collectors and stainless-steel metal plate was determined as the best. Surface area of mesoporous activated carbon was improved by HNO_3 acid treating method from 1286 m^2/g to 1562 m^2/g, implies specific capacity for electrode 73.5 F/g, at scan rate 10mV/s and NaCl ion removal capacity is 9.6 mg/g. Thus, it suggests that locally available activated carbon can be used for the fabrication of electrodes in electro-sorption techniques including capacitive deionization.

Keywords: Capacitive deionization, Electric-double layer, Electro sorption, Ion removal

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FABRICATION OF A HUMIDITY SENSOR USING CARBONIZED NITRILE BUTADIENE RUBBER (NBR) WASTES

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Humidity is a critical parameter in different practical applications such as industrial processes, researches, medical applications and other fields. A wide range of materials such as ceramics, composites and polymers have been used as humidity sensing materials. In this study, a simple, cost-effective, high-performance, resistive humidity sensor was developed using conductive carbon/ZnO, prepared under controlled heat treatment of NBR polymer wastes with zinc hydroxide. The prepared nanocomposite was analyzed by various analytical techniques such as X-Ray Diffraction (XRD), Thermo Gravimetric Analysis (TGA), Scanning Electron Microscope (SEM), Fourier Transform Infrared Spectroscopy (FTIR) and Raman spectroscopy. Humidity sensing properties of the fabricated sensor were investigated at room temperature (25 °C) within the 14-85% relative humidity range. Initial resistances of the humidity sensor were measured by varying the carbonization temperature. The sensor designed at 700 °C has 6.8 kΩ initial resistance and shows fast response and recovery times at room temperature, which can be effectively used as a humidity sensor. Resistance of the sensor increases from 6.52 kΩ to 7.06 kΩ with the reduction of relative humidity from 85% to 14%. Response and recovery times are found as 13 s and 12 s, respectively, when switching between 35 RH% and 65 RH%. In addition, the sensor shows good stability and repeatability. The experimental results show the potential of effectively utilizing NBR wastes to obtain valuable carbon materials. Such conductive carbon/ZnO systems can be recognized as an ideal material for developing low-cost, high-performance humidity sensors.

Keywords:Carbonization, Nitrile butadiene rubber, Relative humidity, Resistance

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5-CHLOROMETHYL-8-HYDROXYQUINOLINE; A NOVEL COLOURIMETRIC SENSOR TO DETECT Fe(II) IONS

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Iron is an essential metal in biological systems, and it is responsible for the various biochemical processes in organisms. However, the imbalanced iron concentration in the human body causes diseases like cancer, anemia, Parkinson's, etc. Water contaminated with Fe(II) ions is mainly responsible for the imbalance of iron content in biological organisms. Therefore, developing rapid and user-friendly techniques to detect Fe(II) ion contamination in the environment is one of the current research interests globally. Though several conventional detection methods involve Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES) and Flame Atomic Absorption Spectroscopy (FAAS), those techniques are expensive and require multiple sample preparation steps. Therefore, colorimetric methods attract research interest due to their rapid detection. In this study, a novel 8- hydroxyquinoline (8-HQ) derivative 5-chloro-8-hydroxyquinoline (5Cl8HQ) was synthesized as a colorimetric sensor for the detection of Fe(II). In the presence of the Fe(II) ions, the sensor solution exhibited a rapid color change from yellow to green. This novel sensor detects Fe(II) ions with a LOD of 0.04 ± 0.10 ppm with $R^2 = 0.9949$. Compared to the other sensors, 5Cl8HQ is completely soluble in water and can be used to detect metal contamination in aqueous solutions directly.

Keywords: 5Cl8HQ, 8-HQ, Chemosensor, Colorimetric method, Water-soluble

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FERROUS CHELATION ACTIVITY OF *Annona muricata* PLANT EXTRACTS

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Heavy metals play a major role in the function of living organisms. As an important heavy metal, Fe can be found in cytochrome, hemoglobin myoglobin and in many enzymes. However, high concentrations of Fe in the human body could be toxic and can have adverse effects. Metal chelation therapy is a widely used clinical treatment to reduce the heavy metal content in affected people. Desferrioxamine B is the current drug used to treat Fe toxicity. There is enough evidence to prove the importance of plants as a natural source of medicinal compounds compared to most synthetic chemical agents, which have numerous limitations like microbial resistance and cytotoxicity. This work explored the Ferrous chelating activity of *Annona muricata,* which is a member of the Annonaceae family, distributed in tropical and subtropical regions of the world. All parts of the *Annona muricata* tree are extensively used in traditional medicines against an array of human ailments and diseases. However, activities of phytochemicals are partly dependent on plant material type and extraction method. In this research, methanol extracts of bark (**BE**), seeds (**SE**) and leaves (**LE**) of *Annona muricata* obtained using Soxhlet, sonicator and bottle-shaker extraction methods were examined for the Ferrous chelation activity. The Ferrous chelation activity is reported as percentage inhibition of 1,10 – Phenanthroline – Fe^{2+} complex. EDTA was used as the positive control. **BE** was found to have a promising chelating capacity (91% at 1 mg/mL, shaker method) while EDTA only showed 85% activity at 1 mg/mL. **LE** (sonicator method) and **SE** (soxhlet method) showed 53% and 39% at 1 mg/mL respectively. Results of this study revealed that *Annona muricata* bark has significant ferrous chelating potential compared to **LE** and **SE**.

Keywords: Chelating capacity, Extractions methods, Iron

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I_P-SEPARATION AXIOMS IN IDEAL TOPOLOGICAL SPACES

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The study explains separation axioms in ideal topological spaces. We propose a new type of separation axiom using *Ip*-open sets in ideal topological spaces called *Ip*-separationaxioms. We consider *Ip*-T_0space, *Ip*-T_1 space, and *Ip*-T_2 space (*Ip*-Hausdorff space) within this concept of *Ip*-separation axioms**.** The implications of these axioms are examined, individually and in connection to other axioms. In this way, we consider some significant properties of each separation axiom in ideal topological spaces. One of the properties was established in the *Ip*-T_0 space, *Ip*-T_1 space, and *Ip*-T_2 space by the combination of the *Ip*-irresolute bijective map, the *Ip*-irresolute injective map, and the *Ip*-continuous injective map in ideal topological spaces, respectively.

Keywords: Ideal, *Ip*-open sets

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PVA/(2-PROPANOL) BASED BEE-HONEY(CORE) AND POVIDONE-IODINE (SHEATH) COAXIAL ELECTROSPUN BEADS ON STRING NANOFIBROUS SCAFFOLD FOR CONTROLLED DRUG RELEASE

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On one hand bee Honey is a potent natural wound healing biomaterial. On the other hand, povidone iodine is a readily available synthetic drug frequently used for wound healing. Preliminary studies were carried out to seek the possibility of incorporating them separately into coaxial electrospun polyvinyl alcohol polymer nanofiber films. Electrospinning was done by using PVA+bee honey as core solution and PVA+povidone iodine as the sheath solution. Fabrications of nano fibers were carried out under different electrospinning and experimental conditions to counter the transition phase from coaxial electrospray to coaxial electrospin. Three series of samples of fiber mats were prepared through coaxial electrospinning by changing only the weight percentage of the sheath solutions as (7.5, 10, 12.5) w/w% respectively while keeping the ratio between PVA to Povidone Iodine (PVI) as 4:1. Electrospinning was done by changing the flow rates where the core and sheath solutions had the same flow rate in a single electrospin. By SEM images, beads on string nanofibers under best conditions were seen in the third sample with the highest weight percentage of sheath solution of 12.5 w/w% where a higher percentage of beaded fibers in the interval of 80-90 nm were successfully fabricated. The rate of release of bee honey and PoI, in saline, was examined using UV–VIS spectroscopy. All three samples resulted in initial release after a short time of immersion in saline and there was no burst release as in common smooth nanofiber related drug-releasing applications. In vitro release profile of bee honey in the series of samples were similar while in povidone iodine release profile with increasing weight percentage of sheath solution drug release rate has been decreased. Sample 3 of best-beaded fibers had the slowest drug release rate. FTIR spectral analysis further verified that there is no significant bond formation in bee honey and PoI after they are released. This study exemplifies the potential of bee honey as a wound cushioning agent while the incorporated PoI executes its wound healing dynamics without burst release; giving ample time for the wound to heal.

Keywords: Beaded nanofibers, Coaxial electrospinning, Controlled release

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EVALUATION OF A ZINC(II) PHENANTHROLINE COMPLEX AS A POTENTIAL INORGANIC PHOSPHATE SENSOR

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Even though inorganic phosphates are readily used in the profitable production of food to support the growing population of the world, the excess of inorganic phosphate ions is linked to eutrophication, which causes aquatic dead zones. In this study, as an effort to rescue the aesthetic appearance and health of aqua nature, a metal-based colorimetric sensor potentially applicable in rapid testing of inorganic phosphates in water reservoirs is reported. We prepared a novel EBT-based Zinc(II) phenanthroline complex, $[Zn(phen)_2(EBT)_2]^{2+}_{(aq)}$, to monitor inorganic phosphates in environmental water bodies with high sensitivity and selectivity over a variety of other anions (EBT = Eriochrome Black-T). The starting material, $Zn(phen)_2(NO_3)_2{\cdot}2H_2O$, is synthesised and its purity is confirmed via ^{1}H-NMR, FTIR and UV/Vis spectroscopy. Aqueous solutions of the complex and EBT (stoichiometric ratio=1:2, pH=10) were mixed to prepare the probe complex, $[Zn(phen)_2(EBT)_2]^{2+}_{(aq)}$. UV/Vis spectrophotometric experiments were carried out to confirm that $[Zn(phen)_2(EBT)_2]^{2+}_{(aq)}$ readily probe inorganic phosphate via indicator displacement assay: the EBT indicator molecules bound to the zinc complex are replaced by the phosphate ions: The association constants determined via Benesi-Hildebrand method shows that the binding affinity of phosphate ions to $[Zn(phen)_2]^{2+}_{(aq)}$ (1.6×10^4 mM^{-1}) is one order higher than the affinity of EBT to $[Zn(phen)_2]^{2+}_{(aq)}$ (2.7×10^3 mM^{-1}). Upon EBT displacement, the probe solution produces a distinguishable colorimetric response; the red colour probe solution turns to blue indicating the presence of free EBT. The calculated limit of detection of the proposed sensor is 0.087 mM. Further, the interference studies confirm that other common anions such as SO_4^{2-}, Br^-, Cl^-, HCO_3^-, F^-, NO_3^- and CH_3COO^-, specially the oxy anions, are incapable of performing such EBT displacement reactions with the proposed sensor.

Keywords: $[Zn(phen)_2]^{2+}$ complexes, Binding affinity, Colorimetric sensor, Eriochrome Black-T, Indicator displacement assay, Inorganic phosphates

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ENVIRONMENTAL SCIENCES

IMPACT OF SHRIMP FARMING ON DEGRADATION OF DIVERSITY, SOIL AND WATER QUALITY OF MANGROVE ECOSYSTEM IN ANAWILUNDAWA RAMSAR WETLAND SANCTUARY

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Mangroves are the most productive ecosystems in the world and that provide different goods and services for the marine environment and peoples. Mangroves are estimated in Sri Lanka to cover only 160km2 which amounts to around 0.24 % of total land area. The national red list completed by biodiversity secretariat 22 species of true mangroves. Mangroves are salt tolerant diverse plants communities growing in the inter-tidal estuarine zones of sheltered coastal environments in the tropical and sub-tropical areas. Shrimp farming systems were affected in their management. Shrimp farms are many causes for mangrove loss. This study attempted to document the true mangrove species available and the impact of shrimp farming on degradation of diversity, soil and water quality of mangrove ecosystem in Anawilundawa Ramsar Wetland Sanctuary. The major issues of shrimp farming include the loss of soil and water quality of the mangrove ecosystem, change in soil and water pH, soil and water temperature, soil and water salinity, soil and water total nitrogen and phosphorus percentages. According to the study, most of the water and soil parameters were significantly changed near to shrimp farm areas. Furthermore, in this research conducted a survey to find mangrove species in Anawilundawa Ramsar Wetland Sanctuary. According to the results, out of the 22 mangrove species in Sri Lanka, only 12 are found in this area. This may be due to the change and soil and water parameters near Shrimp farming affecting the growth and survival of mangrove species.

Keywords: Anawilundawa Ramsar wetland sanctuary, Mangroves, Shrimp farm

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EFFECT OF X-RAY IRRADIATION ON SEED GERMINATION AND SEEDLING GROWTH OF INDIAN GOOSEBERRY (*Phyllanthus emblica* L.)

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Phyllanthus emblica L. is an essential medicinal plant species with many nutrients. It is still categorized as an underutilized fruit due to the insufficient availability of quality planting materials. The seeds exhibit long-term dormancy hindering seed propagation potential. To upgrade the fruit from its underutilized state, there should be a low cost, easy access, and feasible method to overcome seed dormancy to create a viable plant population. Therefore, the study was conducted to examine the effect of low-dose X-radiation on seed germination, seedling growth, and dormancy breakup of *Phyllanthus emblica* L. as a low-cost and feasible method. A total of 960 quality seeds were sorted using a floating test. 16 X-radiation treatment doses ranging from 0-7.5 Gy with 0.5 Gy intervals were applied to each treatment plate. Randomized Complete Block Design was done with 6 replications for each dose level. The irradiated seed-containing plates were stored in a mini-greenhouse for germination. The seed-germination and plant growth parameters were measured weekly. One-way ANOVA was carried out to find out the significant difference between the findings. Microsoft Office Excel 2010 was used for descriptive statistical analysis. The percentage of seed germination, mean germination time, and vigour index were assessed to identify the outcome of the results. A significant enhancement in seed germination and seedling growth was observed in response to X-ray. The significant highest mean germination percentage (56.7%) was obtained in the 2.0 Gy exposed sample. A significant stimulation in seed germination and seedling growth parameters were obtained within the range of 0.5-4.0 Gy dose range expose samples. Seed germination and seedling growth inhibition started from 4.5 Gy and persisted until 7.5 Gy dose exposures. The highest vigour index and seedling growth parameters were observed in the 1.5 Gy dose exposed sample. Therefore, the application of X-radiation can be suggested as a feasible pre-treatment method to break up seed dormancy and obtain a quality plant population in *Phyllanthu emblica* L. This treatment can be applied in large-scale commercial propagation of Indian gooseberry.

Keywords: Dormancy, Germination, Indian gooseberry, Irradiation, pre-treatment, X-ray

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APPLICATION OF InVEST MODEL TO EVALUATE BLUE CARBON DYNAMICS IN THE CHILAW LAGON, SRI LANKA

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The Integrated Valuation of Ecosystem Services and Trade-offs (InVEST) model is an open-source modelling tool developed by the Natural Capital Project. The InVEST model can be used to evaluate the impacts of different management practices of ecosystems on the flow of benefits from these ecosystems to people. In the present study, the Coastal Blue Carbon tool of the InVEST model was used to evaluate the dynamics of blue carbon within the Chilaw lagoon, under two different Sea-Level Rise (SLR) scenarios published by the IPCC in 2021 for the years 2100 and 2150. SLR in each year relating to SSP 1-1.9 (best possible pathway; scenario 1) and SSP 5 – 8.5 (worst possible pathway; scenario 4) were considered for this study. Each SLR scenario was considered to be an alternative management plan and it was assumed that inundation would result in a low-level (30%) disturbance to the biomass carbon pool present in the mangrove forest. Carbon accumulation, carbon stocks, carbon sequestration, carbon valuation, and carbon emissions were taken into consideration regarding blue carbon dynamics. Carbon accumulation (282,083.85 MgC and 273,219.6 MgC for scenarios 1 and 4 respectively), carbon stocks, carbon sequestration between 2021 and 2150 (7282 GgC under scenario 1 and 7114 GgC under scenario 4), and monetary carbon values were found to be distinctly lower under in scenario 2 compared to scenario 1. In contrast, emissions were found to increase sharply with 528.10 MgC and 8391.57 MgC emitted in scenario 1 and 2 respectively in the period between 2100 – 2150. This indicates that SLR will have a negative impact on the capacity of blue carbon mangrove ecosystems to mitigate climate change. The model represents a tool ideal for preliminary studies into predicting the impacts of alternative management plans in Sri Lanka. However, the lack of available national databases makes the application of the model difficult.

Keywords: Blue carbon, Climate change, InVEST, Sea level rise, Sri Lanka

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FLORISTIC DIVERSITY AND DISTRIBUTION OF BIOMASS CARBON OF SELECTED AREAS IN THE CHILAW LAGOON, SRI LANKA

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The Chilaw lagoon is considered to be the most species divergent mangrove forest on the island with high species diversity. However, studies on the species composition of mangrove forests of the lagoon complex are limited and varied. The following study was undertaken to provide an updated list of the species present. Along with this, studies on the distribution of biomass carbon (i.e., above-ground biomass carbon and below-ground biomass carbon present in living mangrove trees) among present species were also evaluated. Four transects were laid down on the mangrove islands identified in the northern portion of the Chilaw lagoon and an account of species as well as measurements of Diameter at Breast Height (DBH) was taken. Species were identified with descriptive literature and taxonomic keys. Measured DBH values were applied to allometric equations associated with the calculation of biomass in mangrove plants. The calculated biomass was then used to obtain the values for biomass carbon in the select area. We identified twelve species of mangroves belonging to four families. The most abundant species identified from the survey sites was *Bruguriea cylindrica* followed by *Avicennia marina* and *Avicennia officinalis*. *Xylocarpus granatum* and *Bruguiera sexangular* were the least abundant species that were identified. The Shannon index of diversity and species evenness was calculated to be 1.90 and 0.76 respectively. In addition, the presence of many threatened mangrove species such as *Bruguiera cylinndrica* and *Xylocarpus granatum* from the study site is a noteworthy observation. Biomass carbon was calculated from 357 plant stems that were measured to determine biomass distribution. The above-ground biomass carbon and below-ground biomass carbon were 12.80 MgC and 2.6 MgC respectively, and thus total biomass and biomass carbon content of the study sites in Chilaw lagoon were calculated to be 183 $Mgha^{-1}$ and 102.8 MgC ha^{-1} respectively. The largest contribution to biomass carbon was from *Bruguriea cylindrica*. However, *Avicennia marina* contributed a comparatively high biomass carbon to *Bruguriea cylindrica*, despite the fewer number of species encountered.

Keywords: Carbon stocks, Chilaw lagoon, Mangroves, Plant diversity

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EFFICACY OF COMPOST MADE OF FOOD WASTES WITH ORGANIC AMENDMENTS FOR ENVIRONMENT FRIENDLY AGRICULTURE

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Agricultural systems can be sustained by the use of organic fertilizers, and the use of compost as nutrient sources have been considered the best option. Although there are benefits of composts, one of the major concerns is the high emission of carbon dioxide when it is applied to the field. Carbon dioxide acts as a greenhouse gas causing global warming. Suitable organic amendments to be used for compost are being studied as a solution to this issue. The objective of this research is to develop a compost type made with organic/mineral amendments for eco-friendly agriculture. This preliminary study reports the quality of the compost made with different organic/mineral amendments, the performance of different compost types with and without amendments, the potential of organic amendments in reducing greenhouse gas emissions for an environmentally friendly agriculture and the best type of co-compost. Food waste was co-composted with banana peels, eggshells, onion peels and papaya peels individually with a 1:1 ratio; and the quality of the mature compost was measured using the physicochemical parameters. Six seedlings of *Capsicum annuum* were planted in potting mixtures with a 1:1:1 ratio of co-compost, topsoil and sand. The positive control experiment was done with food waste compost and the negative control was with no compost. The performance of the six treatments were evaluated by measuring the plant height, the number of leaves in a plant, number of buds, number of pods and the average weight of pods. Carbon dioxide emission of the six treatments were measured by absorbing it to calcium hydroxide. The results showed that the co-compost made with banana peels was the best amendment, with better physicochemical characteristics and performance in growth. None of the treatments gave a significant reduction on the emission of carbon dioxide.

Keywords: Amendments, Compost, Greenhouse gas, Physicochemical properties

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PRODUCTION AND INVESTIGATION OF STARCH BASED BIO PLASTIC REINFORCED WITH COCONUT FIBRE COMPOSITES

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Environmental pollution due to plastic waste and prolonged time to degrade has become a global issue. The single use plastic items have especially become a great threat to the environment. When comparing the usability and degradation life time, it is surprising because the usage of the plastic item/ lasts for a very short period of time compared to the degradation time. One potential approach to overcome this problem is to encourage the use of bio-based and biodegradable plastics. Accordingly, the objectives of this study were to produce coir fibre reinforced plant based bioplastics and to compare the tensile strength of bioplastics. In this study bioplastics were formed and developed from sweet potato, manioc and potato starch reinforced with and without coir fibre. According to the results, manioc showed the highest starch percentage. Manioc-based bioplastic is the most profitable production compared to the sweet potato and potato-based bioplastic productions under a cleaner production process. The transparency of the bioplastic sheet was reduced with the increasing addition of coir fibre. Manioc based bioplastics have the highest tensile strength compared to the sweet potato and potato-based bioplastics of three different fibre concentration levels. The tensile strength of the three bioplastics gradually increased with the addition of fibre and it indicates that high fibre concentration leads to high tensile strength. Hence, there was an increase on the tensile strength on three yams-based bioplastics with the addition of fibre.

Keywords: Bioplastic, Cleaner production potential, Tensile strength

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SUITABILITY OF GRANULAR AND POWDERED ACTIVATED CARBON AS AN ADSORBENT FOR DESALINATION

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Drinking water scarcity is a major problem faced by one third of the world population. Approximately 90% of the earth crust is covered with oceanic water. In Sri Lanka most of the dry zone areas are facing drought and water scarcity annually. Therefore, as an island surrounded by the sea, one of the best solutions for water scarcity is desalination of sea water. Among water purification methods, the available techniques for sea water desalination are expensive. Thus, the objective of this study is to introduce a low cost highly effective and environmentally friendly method to desalinate sea water, using membrane filtration and adsorption isotherm techniques. Naturally available household and industrial wastes such as coconut shell, saw dust, bamboo and watermelon peel were used as the activated carbon sources for this study. First, granular and powdered activated carbon was prepared. Batch experiments and column experiments were done to natural sea water samples and synthetically prepared Sodium Chloride aqueous solution. The Freundlich Isotherm model was used in adsorption studies. Finally, data were analyzed statistically. According to the characteristics of activated Carbon, the highest Carbon concentration and pore spaces occurred in saw dust. According to Freundlich Isotherm, constants were high in saw dust. Batch experiments were done to different granular and powdered activated carbon varying the parameters of angular velocity, initial weight, volume, and time of the rotating shaker. According to obtained results, salt removal capacity (72.39%) was high in saw dust. Statistical analysis of both granular (72.39%) and powdered (69.67%) activated carbon showed that the highest salt adsorption occurred in the saw dust. According to the column studies with *Hydrlla verticillata* in the column led to the effective salt removing capacity rather than the normal column studies. Thus, according to both with (83.00%) and without (72.00%) using *Hydrlla verticillata* in column studies, saw dust shows the highest salt removing efficiency (83.00%). Salt removal capacity can be increased using *Hydrilla verticillata* as a layer in the filter. Following the treatment processes salt ion concentrations were significantly reduced. Well-developed and organized rotating membrane filters are highly recommended as a further development of this study. This study shows that effective desalination of sea water could be accomplished by using Granular Activated Carbon of Saw Dust.

Keywords: Adsorption, Desalination, Freundlich isotherm, Granular & powdered activated carbon, Membrane filtration

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HUMANITIES AND SOCIAL SCIENCES

UNDERSTANDING FILM AS AN EXPERIENTIAL CONSUMER GOOD

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Most of the time, we assume that film is an art form to entertain or educate people. But in fact, it is an art form that has created a glamorous and profitable industry worldwide. Even though the world's lucrative film industries have identified and given priority to the business aspect (the industrial aspect) of the film, there is a considerable understatement in the Sri Lankan film industry. It's noticeable that the number of people going to the cinema is going down day by day, leading to a drop in film sales. Since the theatrical run is still considered the primary revenue-generating mode for a film, there must be a proper audience for the betterment of the film industry. This is where the importance of understanding the nature and true potential of the film product emerges. The main objective of this research was to explore how Sri Lankan filmmakers have understood the nature of the film product and how they treat the film product. Since interpretivism serves the researcher's objectives, which are to explore, gain insight, and understand the context of the identified problem, this research philosophy was adopted for the study. In-depth interviews with a purposely selected sample were held to collect primary data aligned with the qualitative and inductive research approach. Since the high-relevancy primary data sources were limited and the researcher wanted to enhance the effectiveness of the study, purposive sample technique was used to select interviewees. Secondary data was collected by referring to books, research articles, newspapers, and web sites related to the research field. Thematic analysis was used to analyse collected primary data. The research revealed that the contemporary Sri Lankan film industry is predominantly a director-oriented film industry where the artistic aspect of the film is valued over the industrial aspect. The majority understand film as a masterpiece of art. Even though there is enough literature to prove that film is an experiential product where we need to take subjective experience more seriously, Sri Lankan filmmakers give priority to their artistic expression irrespective of the needs, wants, and desires of consumers. Further, the majority understand that the film-going experience needs to be differentiated and specialized from the home-viewing experience. However, no authority (both academic and professionals) has taken sufficient action to challenge the current scenario and overcome the problem.

Keywords: Consumer good, Experiential product, Film industry, Film product, Sri Lanka

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PANEL DISCUSSIONS

PANEL DISCUSSION 01

PUBLIC HEALTH IN CRISIS: STRATEGIES TO OVERCOME

"The public health system, if it is to overcome the current crisis, it must be focused on the following themes: Appropriate use and development of human resources, sustainable financing, appropriate use of health technologies, implementation of effective low-cost interventions, and digitalization. I will elaborate on these themes in the panel discussion".

Prof. Vajira H. W. Dissanayake
Department of Anatomy, Genetics and Biomedical Informatics, Faculty of Medicine, University of Colombo, Sri Lanka

"Working towards establishing a Centre on Communicable Diseases at the Ministry of Health as a pandemic-legacy. A conceptual framework will be proposed for proactive preparedness for future pandemics, retaining existing system strengths, reviewing, and learning from existing gaps in both the system and overall COVID-19 operations co-ordination."

Prof. Athula Sumathipala
School of Medicine, Faculty of Medicine & Health Sciences, Keele University, UK

When developing strategies to overcome the current Public Health Crisis in Sri Lanka, firstly, there is a need to identify what factors are contributing to the public health crisis. This evaluation needs continuing data and evidence. This is because the approach of Public Health is not about providing the most advanced, expensive treatments with uncertain outcomes. It is the science of protecting and improving the health of people and their communities. This work is achieved by promoting healthy lifestyles, researching disease and injury prevention, and detecting, preventing and responding to infectious diseases, including non-communicable diseases. Maintaining nutritional status also falls in that category, especially for the most vulnerable, such as infants and pregnant mothers. Home safety and road safety are also within its purview. What is necessary is to redirect the available resources to address the most critical factors contributing to the public health decline. It is also essential to understand that management requirements in different regions may differ. This fundamental caveat makes educational institutions like the Open University create diversity in their approach to resolving matters regionally. For example, clean water could be the central issue in the dry zone, whilst in Colombo, distributing available food to the needy without waste should take priority. This presentation will include a 'model' that area leaders may apply to install change regionally to achieve the goals identified primarily because the current financial crisis has led to many other deficits in Sri Lanka.

Preventive measures for public health decline should not include intermediaries who have often exploited the available funds with corrupt politicians. Thus, the most cost-effective way to progress is to educate staff at the grass root level and resource direction to apply evidence-based rectifying tools, including advice regionally. In other words, we need to use a dynamic strategy for the recovery where local officials are equipped with the necessary tools and education to change course swiftly to apply preventive measures before the advancement of a crisis. The recent COVID turmoil in Sri Lanka is a perfect learning example. These changes should be 'bottom-up,' i.e. evidence-based, dealt with people who have been in the business of public health and prevention regionally and not 'top down' by parachuted individuals dictating from the air-conditioned rooms.

Prof. Chulananda Goonasekera
Department of Anesthetics, Kings College Hospital NHS Foundation Trust, UK

PANEL DISCUSSION 02

PROTECTED AREAS AS NATURAL SOLUTION FOR CLIMATE CHANGE

It is paramount of important that Responses to climate change must now focus on reducing greenhouse gas emissions enough to avoid *runaway impacts* ("avoiding the unmanageable") and on addressing the impacts that are already with us ("managing the unavoidable"). Managing natural ecosystems as carbon sinks and resources for adaptation is increasingly recognized as a necessary, efficient, and relatively cost-effective strategy.

Thus, it essential that the governments develop policies for "climate sensitive natural resource protection, coastal protection and emergency preparedness".
Protected areas (PAs) are an essential part of the global response to climate change. They are helping address the cause of climate change **by reducing greenhouse gas emissions**. They are helping society cope with climate change impacts by maintaining essential services upon which people depend. Without them, the challenges would be even greater, and their strengthening will yield one of the most powerful natural solutions to the climate crisis. Protected areas can contribute to the two main responses to climate change through:

Mitigation

• Store: Prevent the loss of carbon that is already present in vegetation and soils
• Capture: Sequester further carbon dioxide from the atmosphere in natural ecosystems

Adaptation

• Protect: Maintain ecosystem integrity, buffer local climate, reduce risks and impacts from extreme events such as storms, droughts, and sea-level rise
• Provide: Maintain essential ecosystem services that help people cope with changes in water supplies, fisheries, disease, and agricultural productivity caused by climate change Protected area systems have the advantage that they are already established as efficient, successful, and cost-effective tools for ecosystem management, with associated laws and policies, management and governance institutions, knowledge, staff, and capacity. They contain the only remaining large natural habitats in many areas. Opportunities exist to increase their connectivity at landscape level and their effective management so as to enhance the resilience of ecosystems to climate change and safeguard vital ecosystem services.
The world's protected area network already helps mitigate and adapt to climate change. Protected areas store 15 per cent of terrestrial carbon and supply ecosystem services for disaster reduction, water supply, food, and public health, all of which enable community-based adaptation. Many natural and managed ecosystems can help reduce climate change impacts. But protected areas have advantages over other approaches to natural ecosystem management in terms of legal and governance clarity, capacity, and effectiveness. In many cases protection is the only way of keeping carbon locked in and ecosystem services running smoothly.

Without the investment made in protected areas systems worldwide, the situation would be even worse.

We need to plan protected areas through a partnership of governments, communities, indigenous peoples, non-governmental organizations, and the private sector would ensure greater protection of these essential services. But these co-benefits for climate, biodiversity and society are often missed or ignored. We need to highlight how protected areas contribute significantly to reducing impacts of climate change and what is needed for them to achieve even more.

As we enter an unprecedented scale of negotiations about climate and biodiversity it is important that these messages reach policy makers loud and clear and are translated into effective policies and funding mechanisms at all levels.

Opportunities to use protected areas in climate response strategies need to be prioritized by national and local governments. At the national level, National action plans (in line with the Convention on Biological Diversity's (CBD) strategies need to be developed to establish and use PAs as a major climate change mitigation and adaptation tool. The role of protected areas as part of national strategies for supporting climate change adaptation and mitigation should also be in cooperated into policies in line Convention on Climate Change.

Dr. U.K.G.K. Padmalal[1], Dr. Lakshman Peiris[2], Mr Gardi Dharmaratna[3]

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PANEL DISCUSSION 03

MASCULINITIES THROUGH MULTIDISCIPLINARY PERSPECTIVES

BUILDING AND PROMOTING GENDER INCLUSIVE SOCIAL SPACES AND WORK CULTURES: WITH SPECIAL FOCUS ON MASCULINITIES THROUGH MULTI-DISCIPLINARY PERSPECTIVES

Social Institutional set ups, social spaces and workplace cultures today seem shrouded with non-inclusive, non- gender aware, gender blind and gender-neutral practices and spaces that lack gender sensitivity and empathy towards socio-cultural realities of women and men. This situation is surprisingly true for higher education institutions' and everyday life; academic life behavioural dynamics and practices. Inclusivity broadly entails, the practice or policy of providing equal access to opportunities and resources for categories of people who might otherwise be excluded or marginalized based on numerous criteria based on age, locality, caste, or other practices, those having physical or mental disabilities or belonging to other minority groups such as class, gender, sexual orientation, or ethnicity/race. An informed and responsible process that improves the terms of participation in society, particularly for people who are disadvantaged, through inclusive work practices by enhancing opportunities, access to resources, voice, and respect for safeguarding the rights of the marginalised and the forgotten is a critical necessity within higher educational institutions as well as the society as a whole. Within this broad perspective, the following experiences of multiple masculinities are unravelled.

THE NEWLAND FAMILY, FROM ENGLAND TO AUSTRALIA AND AFRICA WITH LUCK AND WHITENESS

This paper examines the 'imperial dispositions' of the Newland family over three generations from pioneering and taking up Ngarrindjeri land in South Australia in the earliest days of the colony, to extending their land holdings on Barkandji land up the Darling river towards the Queensland border and then, with Victor Marra Newland in the third generation, extending into business activities by establishing an internationally renowned hunting and safari firm in East Africa. In the second generation, benefitting from racial capitalism. this family could consolidate its position as 'Old Gentry' (Van Dissell, 1986) and be poised to mobilise imperial masculinity, military prestige and connections to develop the notion of the 'Great White Hunter'. This endeavour would profit from transnational connections with figures such as ex-President Roosevelt through his East African expedition. The family's success was premised upon Indigenous dispossess*ion and the protection of white domination on a global scale.*

Prof. Margaret Allen

Professor Emerita, Gender Studies and Social Analysis, Faculty of Arts, University of Adelaide, Adelaide, South Australia 5005

LANKA'S DOMINANT MASCULINITIES: A REFECTION

Sri Lanka, like all other societies hosts a variety of masculinities. But the more dominant versions of these masculinities are based on a regressive understanding of 'being tough' which manifests in men's attitude towards life in general, and the way in which they treat perceived subordinates, from ethno-religious minorities to women and coworkers. In Sinhala society in particular, this is also manifest in the subversion of two conventional values linked to morality – *lajja* (shame) and *baya* (fear). That is, toxic masculine behavior becomes possible and culturally accepted when the fear of being publicly shamed is culturally and politically dismantled. These manifestations are clear in public-political behavior as well as the ways in which military heroism has been constructed in the context of the country's civil war. The presentation will offer an in initial reflection on these issues.

Prof. Sasnka Perera
South Asian University, New Delhi

MUNDANE EXPRESSIONS OF MASCULINITIES IN THE TRANSPORTATION INDUSTRY

Drawing on over 18 months of ethnographic research alongside rickshaw drivers in northern Sri Lanka, this talk focuses on mundane expressions of masculinities in the transportation industry. I use common and everyday occurrences in postwar Jaffna to highlight a linkage between masculinity and mobility that goes far beyond the peninsula. This is felt particularly pointedly by mobility workers from marginalized backgrounds, such as Jaffna's Panchamar and Muslim communities, and the small number of female rickshaw drivers for whom conforming to dominant masculine norms is an economic requirement but also a significant social risk.

Dr. Daniel Dillon
The University of Texas at Austin, USA

PANEL DISCUSSION 04

DIGITAL CITIZENSHIP AND THE CHANGING NATURE OF GRADUATE ATTRIBUTES

Digital citizenship is defined as "being able to find, access, use and create information effectively; engage with other users and with content in an active, critical, sensitive, and ethical manner; and navigate the online and ICT environment safely and responsibly, while being aware of one's own rights" (UNESCO, 2016, p.15). Thus, it comprises not only digital literacy, but also online behavior, safety and security, as well as values. Digital citizenship can be understood as norms of behaviour regarding the use of digital technologies. It involves competent and positive engagement with digital technology (access and skills), active and responsible participation (empowerment and etiquette), and lifelong learning in formal, non-formal and informal contexts (including risk management and resilience) (OECD, 2019). Given the proliferation of technology integration in education and in the workplaces, the digital competency development in individuals is imperative. The Education 2030 Agenda emphasizes the acquisition of ICT skills as an essential requirement for citizens to confidently thrive in the rapidly evolving knowledge-based and technology-driven society (UNESCO, 2016). Since ICT plays a key role in enabling citizens to effectively participate in and contribute to the knowledge society, students need to be equipped with the appropriate digital competencies, to engage in society actively, positively, and in a responsible manner. Higher educational institutions have the responsibility to address this need via the stipulated graduate attributes which are the qualities, attitudes, behaviours, values, and ethics built into the learning process that the learners are motivated and facilitated to develop through their learning process and demonstrated through their practices, which contribute to their professions (Spronken-Smith et al., 2015). This panel discussion focuses on the role of graduate attributes, higher education institutions and practitioners in the development of digital citizenship. It will explore how higher education institutions can support the development of digital citizenship to enhance students' learning achievement, graduate attributes, and employability.

Prof. Som Naidu[1], Dr. Sanjaya Mishra[2], Ms. Sukaina Walji[3], Ms. Renata Sguario[4]

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PANEL DISCUSSION 05

SMART CITIES: CHALLENGES FOR THE ENGINEERING SECTOR IN THE NEW NORMAL

A smart city is a municipality that uses information and communication technologies (ICT) to improve operational efficiencies, quality and effectiveness of operations and services while effectively managing data of such operations and services. As half of the world's population is currently living in the urban environments, effective and efficient management of limited resources to fulfill complex needs of urban population is the driving force behind the smart city concept. Hence, sustainability is one major aspect in this concept. The recent COVID 19 pandemic add a new dimension to the smart city concept with the implementations of social distancing. It has to address various sectors like construction, environment, power and energy, transportation, agriculture and food availability, water management, data and telecommunication, etc, to transform a city to a smart city. Usually, an integrated approach would have to be implemented in this regard. This panel discussion would be mainly focused on sustainable and environmental friendly built environment, power and energy development and management and agriculture and food supply chain management of smart cities in New normal. Always, development of built environment is an essential need in any city development. Incorporation of high-tech features enables the construction of smart building and infrastructure during last few decades. This ensures high operational efficiencies while enabling expected quality of service of users. However, now there is strong dialogue regarding the necessity of blending Love city concept with Smart city concept. Diverse, inclusive, climate-resilient, green and traffic-calmed, with short distances and a high quality of neighborhoods – that is what a "Love City" should be. Can the Smart City and Love City must be more closely bound together in the future? Planning, developing, and managing of power and energy in the context of smart city is always a challenging task. Nevertheless, modern ICT applications in power and energy sector has enable the development of smart power supply grid to power up smart cities with high quality reliable service and minimum losses. Further, it has enabled the collection, management, and processing of real time data of power and energy sector. The cities cannot live alone and cannot be smart alone despite it builds with all the smart infrastructure. Agricultural value chain and supply chain which goes hand in hand shall play important role in smart cities. Smart integrated supply and value chain will monitor every activity at each stage of the value and supply chain. These smart networks and chains carry information such as land extent, soil characteristics, water table, details of water resources, details of fertilizer, and other chemicals, details of machinery, storage facility, logistic details, details of value additions, detail of wholesale and retail networks, the pattern of consumers, behavior of the consumer and many more. Therefore, implementing a ICT based Agricultural value chain and supply chain shall be essential for a smart city.

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PANEL DISCUSSION 06

CREATIVE ECONOMY, ENTREPRENEURSHIP AND NEW NORMAL SRI LANKA

The concept of 'creative economy can be considered one of the most important concepts in the world but Sri Lanka has not utilized the potentials. It is worthwhile to understand the meaning and implications of creative economy (sometimes referred to as creative industry). According to John Howkins, the author of 'The Creative Economy: How People Make Money from Ideas,' creative industry refers to a range of economic activities which are concerned with the generation or exploitation of knowledge and information. Howkins divides the creative economy into fifteen sectors, which are: 1) Advertising; 2) Architecture; 3) Art; 4) Crafts; 5) Design; 6) Fashion; 7) Film; 8) Music; 9) Performing Arts; 10) Publishing; 11) Research and Development; 12) Software; 13) Toys and Games; 14) TV and Radio; 15) Video Games. According to Landry & Bianchini (1995), "The industries of the twenty-first century will depend increasingly on the generation of knowledge through creativity and innovation." Human capital can be considered important and KSA factors – namely, knowledge, skills and attitude – as prime factors that will govern the world economy at this moment. The Sri Lankan economy needs to have a paradigm shift that will pave the way for social, economic, and political recovery. In universities, there is a need to produce entrepreneurs, not employees. This should start from K12 education. The country needs change agents. Educational reform is a must in the long run and should have proper strategies in the economy as well. In Sri Lanka, we are still concentrating on traditional exports like tea, rubber, coconut and garments. Something out of the box is required to compete in the world market – even if it utilizes the resources fully. The concept of a "creative economy" can be used as a new strategy for the country in order to achieve sustainable economic development (Abeysekera, 2020).As Sri Lanka is in an economic crisis at the moment need to have separate discussions on the "new normal Sri Lanka" with different approaches by following best practices.

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