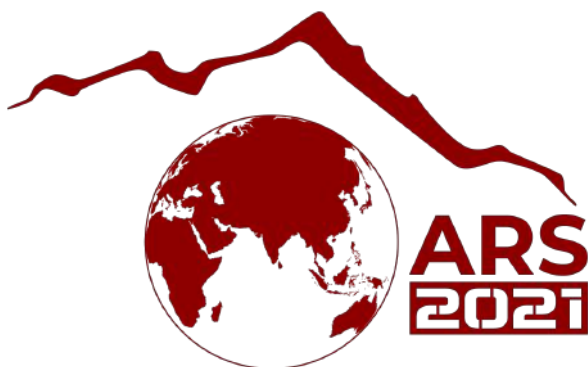




# 11<sup>TH</sup> ANNUAL RESEARCH SESSION

SABARAGAMUWA UNIVERSITY OF SRI  
LANKA



21<sup>ST</sup> DECEMBER 2021  
SABARAGAMUWA UNIVERSITY OF SRI LANKA, BELIHULOYA, SRI LANKA

**Abstracts of 11<sup>th</sup> Annual Research Session, Sabaragamuwa University of Sri Lanka  
(ARS2021)**

**Published by** Sabaragamuwa University of Sri Lanka

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**ISSN** ISSN 2756-9306

**Citation** Abstracts of the 11<sup>th</sup> Annual Research Session,  
Sabaragamuwa University of Sri Lanka.

**Available from** Sabaragamuwa University of Sri Lanka.  
P.O. Box 02, Belihuloya 70140, Sri Lanka.  
Tel: +94 (0)45 2280014  
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**11<sup>th</sup> Annual Research Session  
Sabaragamuwa University of Sri Lanka**

Organized by

**Centre for Research and Knowledge Dissemination  
Sabaragamuwa University of Sri Lanka**

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**Message from the Vice Chancellor  
Sabaragamuwa University of Sri Lanka**



I am rally happy to write this note for “11<sup>th</sup> Annual Research Session-2021” of the Sabaragamuwa University of Sri Lanka.

Undergraduate and postgraduate researchers are carries out collaboratively among Universities, Industries and Research Institutes. These collaborations are mutually beneficial and also have a clear potential to make significant contribution to the quality of higher education.

This session would provide a platform to present and publish research work carried out by final year undergraduates and postgraduate students under the guidance of academic staff and the outside subject experts. Most of the researchers conducted are applied research that address most issues directly related to the development of the country. It is evidence that the quality of research and proceedings have reached a commendable level showing the commitment of the academic staff and the students to develop the research culture in all faculties of the university.

Finally, I wish to thank the coordinator, secretary, members of the organizing committee, members of the academic staff who dedicated their valuable time and energy towards making this event successful and memorable one.

Prof RMUSK Rathnayake  
Vice Chancellor  
Sabaragamuwa University of Sri Lanka

## **Message from the Director, Center for Research and Knowledge Dissemination**



It is with great pleasure that we welcome you to the 11<sup>th</sup> Annual Research Session of the Sabaragamuwa University of Sri Lanka. In this remarkable year 2021, where the University is celebrating her 25<sup>th</sup> anniversary, the Center for Research and Knowledge Dissemination (CRKD) is organized ARS as an annual event to give a platform to all academics, postgraduate and undergraduate students to share their latest research findings with the multi-disciplinary scientific community of the SUSL and pave a pathway for their innovations and creativity.

We are very proud to feature the 11<sup>th</sup> ARS with the renowned keynote speaker, Prof. Dhammika Herath, Department of Sociology, University of Peradeniya, Sri Lanka, widely known in his field for the impact and innovative nature of his research contributions to peace and conflict, post-conflict reconciliation, religion and conflict, peace education, development, democracy and governance.

I appreciate and acknowledge the leadership and guidance of the Vice-Chancellor Prof. RMSUK Rathnayake and the support of the Registrar and Bursar in making this 11<sup>th</sup> ARS a success. This year, due to the measures that were taken for COVID-19, organizers had to face a new challenge in organizing a virtual session in parallel to the main event.

I would like to thank all the members of the organizing committee, Dr. HUS Pradeep (Chairmen / ARS), Dr. LD Lekamge (Co-Chair ARS) and Dr. WMAUKM Wijesekara (Secretary ARS), Faculty Coordinators and Ms. SMF Shafnaz (Research Assistant / CRKD) for their tremendous efforts, to make this event a success. I would like to thank the Dean of the Faculty of Graduate studies, Prof. HMS Priyanath, who has made significant contributions, by bearing all the responsibilities to organize the postgraduate's colloquium.

More importantly, my sincere thanks extend to the authors of manuscripts, the keynote speaker, the technical program committee members, technical session chairs, language editors, poster presenters and all other participants who assisted in this endeavour in numerous ways to make this event a reality.

Prof MLM Chandrika Dissanayake  
Director  
Center for Research and Knowledge Dissemination (CRKD)

## **Message from the Chairman of the 11<sup>th</sup> Annual Research Session 2021**



I'm very pleased and delighted to issue this message on behalf of the Organizing Committee of the 11<sup>th</sup> Annual Research Session (ARS) of Sabaragamuwa University of Sri Lanka (SUSL). This is the annual event of SUSL, and we hope that this year ARS provides a solid platform to disseminate innovative research findings of the academics, postgraduate students and undergraduate students who are attached to different faculties of the university. This will be a milestone in their research careers.

Apart from, this offers a very good opportunity to the participants to present their research findings to a wider community of academics of SUSL. And at the same time, they have been provided a room to discuss and get comments and suggestions from senior academics of the university in making further improvements in their research.

This year's ARS received abstracts mainly under three categories. Firstly, there are 7 from the academic staff members of the university who have completed their post-graduate studies in local and international universities. Secondly, 21 abstracts were received from postgraduate students attached to the Faculty of Graduate Studies, SUSL. Finally, 24 abstracts were received from the poster presentation session from the under-graduate students attached to SUSL. This session will broaden up the research ability of the under-graduates.

I would like to thank Prof. Dhammika Herath, Department of Sociology, University of Peradeniya, Sri Lanka, for his priceless service as the Keynote Speaker, and his presence at this event is an honour and a privilege for the entire academic community of SUSL.

I would like to extend my sincere thanks to Prof. RMUSK Rathnayake, the Vice-Chancellor, SUSL, for his immensurable support, encouragement and presence of this event. I also wish to express my deepest gratitude to Director, the CRKD and the staff for their invaluable support extended to make this event a success. Finally, I would like to thank Secretary, Co-chairman, Faculty Coordinators, and those who have worked extremely hard to organize this event. Thank you very much for your team work. I wish you all an enjoyable and inspiring Research Session.

Dr. HUS Pradeep  
Chairman of the Organizing Committee  
ARS 2021 – 11<sup>th</sup> Annual Research Session

**Message from the Dean  
Faculty of Graduate Studies  
Sabaragamuwa University of Sri Lanka**



It is indeed with a great pleasure that I issue this congratulatory message for the Annual Research Session (ARS) of the Sabaragamuwa University of Sri Lanka as it is a very significant event organized annually to provide scholars, postgraduate and undergraduate students with a platform to disseminate their research findings. This ARS organized by the Center for Research and Knowledge Dissemination (CRKD) of the Sabaragamuwa University of Sri Lanka is particularly significant for the Faculty of Graduate Studies (FGS) as FGS is fortunate enough to organize its Graduate Colloquium – 2021 with the collaboration of the CRKD as one of the main events in the ARS of the Sabaragamuwa University of Sri Lanka. FGS annually organizes the Graduate Colloquium to encourage postgraduate students to share their research findings and progress with a panel of experts which will help them improve their postgraduate studies. I am confident that the postgraduate students of the FGS will immensely be benefited from this event.

I take this opportunity to congratulate the organizing committee for taking the challenge of organizing the ARS in a very professional manner despite this difficult situation in the wake of COVID-19 pandemic. I have no doubt that the ARS–2021 will offer our university academia and postgraduate students to share their latest research findings and insights with their colleagues and experts in a multi-disciplinary forum.

On behalf of the FGS I extend my sincere thanks to the Director–CRKD and the organizing committee who shouldered the task of organizing the annual research session – 2021.

I wish all the participants an interesting, thought-provoking, and productive event.

Professor H.M.S. Priyanath  
Dean  
Faculty of Graduate Studies  
Sabaragamuwa University of Sri Lanka

## **Keynote Speech - How to Become a Successful Researcher?**

**By**

**Professor Dhammika Herath,  
Department of Sociology,  
University of Peradeniya**



Prof. R.M.U.S.K. Rathnayake  
Vice Chancellor, Sabaragamuwa University of Sri Lanka

Prof. H.M.S. Priyanath  
Dean, Faculty of graduate studies,

Prof. M.L.M. Chandrika Dissanayake  
Director, Center for Research and Knowledge Dissemination

Dr. H.U.S Pradeep, Chairperson, ARS-2021

Deans, Heads of Departments, Professors, Librarian, senior and young academics, members of administrative and non-academic staff and of course dear students. It is a great honour and a privilege to have been invited to the 11<sup>th</sup> Annual Research Session of the Sabaragamuwa University.

What is research in social sciences and how does research contribute to the production of high quality knowledge and its dissemination? These are very important questions at a time when, 'publication' has become a global profitable industry in which unfortunately supply and demand have become key determinants and the 'invisible' hand, originally proposed by economic philosopher Adam Smith in his "wealth of nations" appear to have greater control on knowledge production. In the academic world today, academics strive to publish as many publications as possible irrespective of the quality. Often, we try to publish as many publications as possible exploiting a single research study. Thus, academic publications can lose the aspect of originality and may not have any impact on society, which makes our employment possible through the payment of taxes. So, the question that I am addressing in this keynote address is how to become a successful researcher by being able to undertake meaningful studies which end up in meaningful publications generating new knowledge and fresh intellectual as well as pragmatic contributions to human life in our society. How do we cease to become unwitting agents of a rabid publication culture?

Often, postgraduate students and young researchers struggle to find a meaningful research topic or an area of study in their dissertations, which is nowadays mandatory to obtain a degree in social sciences and therefore, the search for topics has become a boring and routine exercise instead of a genuine quest for knowledge. Is there a more meaningful way to develop new research ideas? First of all, students and young researchers need to understand how and why we become interested in research. The critical element in the development of knowledge is the inherent human tendency for observation. As a social science student and a young researcher, throughout your university education, you have been exposed to a wide spectrum of concepts and theories, which help you understand the social reality you experience in everyday life. All of us have internalized these concepts and theories and have made them a part of our life even though you may not realize it. The theories and concepts you have studied influence the way you look at things, understand them and interpret them and react to them in practical ways. The application of knowledge takes place even in most mundane interactions within the family or community. This natural tendency for utilizing knowledge can be combined with natural human tendency for observation. When you interact with family and friends, when you travel, when you watch television, when you read a book, etc you observe, perhaps without knowing that you observe. In fact, your close and attentive observation may help you generate highly meaningful research ideas. For example, let me take two recent examples; the covid pandemic affected the entire globe, and we heard from many sources that domestic violence has increased in Sri Lanka during the past one-year or so. A curious social science student will grab this piece of information with great enthusiasm and use it to develop an interesting research quest on the linkage between the social dynamics of covid and domestic violence. To take a second example, one could not have failed to watch on television how farmers in Sri Lanka have taken to the streets, perhaps, for the first time in our political history after independence. Again a young researcher with good observation skills would not fail to ask as to why do farmers come out on to the street to protest? She would be interested in finding out the deeper sociological reasons, which motivate farmers to question a government policy on organic agriculture. A good observer will naturally develop these questions and she will then move on to develop more specific research ideas. There are of course other ways in which you develop new research ideas; reading existing literature, conversations with experienced academics in your faculty, new developments or radical changes in the society and important social issues etc are veritable sources of new research topics.

But does every social problem become a research problem? My answer is certainly in the negative. What is a research problem after all? You may have an interesting research topic in your hand but several months later in your academic semester your supervisor or senior colleague may tell you that there is no research problem and then you find yourself stranded in no-man's land. Many students rewrite their research topic in different words as the research problem or rewrite the objectives of the study as the research problem. None of these actually represent the research problem, which becomes illusive for many young academics. To put it simply, the research problem is a lacunae in knowledge; it is



the gap which you try to address (Bernard, 2006; Bryman, 2012). Hence, not every social problem becomes a research problem. For example, at the beginning of the covid pandemic, the relative increase of domestic violence became an important topic as this was a new experience and hence a knowledge gap; this was a new experience and most of us did not realize that domestic violence had actually increased and we could not understand why it had increased. So, it was not the prevalence of covid-related household violence that formed the research problem; it was precisely the gap in knowledge which created a research problem. Perhaps, by now, we may find important academic and policy studies which have undertaken in-depth studies into domestic violence under a pandemic situation and then, we may no longer have a research problem there when the gap in knowledge has already been filled. To take another example, poverty continues to persist in Sri Lanka to some extent in some parts of the country. Therefore, poverty is definitely a social problem but does it also become a research problem? It becomes a research problem only if you find an aspect related to poverty about which a knowledge gap can be demonstrated. How do you demonstrate that a knowledge gap exist? That can only be shown through an effective study of existing literature (Bryman, 2012).

Hence, a study of literature, often called technically the literature review, becomes a key component in the development of research proposals. I have observed that many postgraduate and undergraduate researchers try to develop a separate chapter in their dissertations on the existing literature. However, many of these dissertations lack a section outlining the research problem or it has not been effectively articulated. Often, students do not realize that it is through the study of existing literature that one can show there is inadequacy of knowledge about some research area. It is this aspect which then is chosen for a particular study. Usually the following structure may be used to present a research problem. After the usual introduction, you can launch your literature review and then you can start a new subtopic on the research problem where you offer a short summary of your literature review. This helps the reader to have a snapshot of your long literature review. In the summary you direct the attention of the reader to previous scholars who have generated insights into the topic of your study but point out that these existing studies have failed to give sufficient attention on the particular sub-aspect which you propose to study. This way you can demonstrate the knowledge gap. Then, you may also highlight the importance of filling this knowledge gap. Remember to comment on the academic value of filling this knowledge gap.

It does not need to be reiterated that the research problem is the heart of a research proposal and hence why examiners usually pay special attention to the research problem in evaluating a research proposal or an application for a research grant. The research problem is your guiding light to everything you do in your research study. It guides your advanced literature review, research objectives, research design, methodology and data collection instruments, analysis and finally the publication of a dissertation, any other publication. When you have developed a clear research problem, then, you develop some objectives for your study. There is a strong logical relationship between the problem and objectives in the following order; when you fulfill the objectives, automatically, the gap in knowledge

should be filled. This means, in order to fulfill your objectives, you gather data, which you must analyse and generate new knowledge.

### **Epistemology and ontology in research**

A particular difficult area where young academics and students struggle involves the application of epistemology and ontology in research proposals. While experienced researchers, at times, do not make an explicit statement about epistemology and ontology, they take care to give sufficient attention to these aspects in their research designs. Examiners of dissertations lay significant emphasis on highlighting these aspects in undergraduate and postgraduate research in order to make sure that students get the best training in social research. Simply, epistemology refers to study of knowledge or science of knowledge. It address the question of how we know things or how we gather knowledge (Uyangoda, 2015). Bryman (2012) in this famous textbook on research methods shows that epistemology is basically about four interrelated questions

Rationalism versus empiricism

Positivism versus interpretivism

Rationalism is the idea that we gather knowledge through the application of reason or our power of thinking. Ancient Greek philosophers primarily used their power of thinking to generate knowledge. One can argue that oriental philosophical traditions such as Buddhism, Hinduism, Jainism, Confucianism etc also used rationalism to a greater extent. Rationalists believed in 'a priori truths' and absolute truth, which supposedly exist in the universe. Human beings only have discover them using their power of thinking. Once discovered, the truth is absolute and can never be proven wrong. Empiricism is the idea that we generate knowledge through experience rather than reason. Human beings have five senses and we use them to gather external signals containing coded information, which is then processed in our brain and decoded. This process of using experience to generate knowledge is the empirical approach. The philosopher John Locke stated that human beings are born with a clean table and it is the experience which leads to knowledge. David Human further mentioned that sensory information leads to generalization, which then can be advanced to knowledge. For example, when human beings observed that when dark clouds gather in the sky, the rain follows. They then, generalize this experience and develops a theory that dark clouds causes rain. In contrast to rationalists Hume said that truth is incremental and there is no absolute truth but then truth is incremental. Our journey is one of incremental increase of knowledge and it is never a one way journey (Bryman, 2020; Comte, 1975; Silva, 2001; Uyangoda, 2015). Truth can of course be overturned; for example, human beings once believed in geocentrism; that the earth is the center of the universe. Later on, Nicolaus Copernicus presented a mathematical model to confirm Heliocentrism, which established the sun as the center of the universe. If we take a contemporary y example, at the beginning of the covid pandemic world health organization advised that face masks were not essential for ordinary people but then later it was

made mandatory. Thus, the idea that truth can be overturned is the foundation of modern science. Early social scientists believed that social sciences should espouse this method of generating knowledge. This relates to our earlier discussion on whether social science should rely on positivism or humanism/interpretivism.

Positivism is the idea that social science must use the scientific method used in natural sciences. Social scientists should undertake empirical data collection, develop hypotheses and proceed to tests those hypotheses like in natural sciences. Positivism was adopted by the modern father of sociology August Comte and founders of sociology such as Emily Durkheim too. However, some social scientists believed that the social sciences were fundamentally different from natural sciences and that social sciences cannot use the same methods as in natural sciences. Social science involves the study of human beings, their perceptions, feelings, emotions, behavior which is highly unpredictable and hence, we have to use a different approach. This is the basis of humanism where it was believed that we need to have an interpretative understanding of the social reality. Max Weber's concept of *verstehen* is important in this concept (Tucker, 1965).

Moving on the question of ontology in social science research, we need to address two questions; Objectivism versus Constructivism. Objectivism is connected to positivism in many ways and maintains that the social reality is something that is objective, which we can see, feel, and almost touch. The social reality is tangible and like in Durkheimian sociology, the reality stands over and above the individual. The reality has an existence separate from the researcher (Bernard, 2006). However, constructivism believes that in human world, the reality is not so concrete and most social phenomena we study are social constructs. The reality is not out there for us to see, feel or touch. The reality is something that we create in our mind, in particular historical periods in relation to social and political conditions which exist at the time and even the same phenomenon will have different meanings in different historical contexts. Therefore, we should see the social reality as something that is constantly under construction by individuals and society. For example, if you take the concept of nation, one can ask where it exists. Can one find the nation? Where is it located? What does it look like? The nation is in our mind and what is meant exactly by concepts such as nation, nationalism, ethnicity, religion, priest etc change over time and hence these are social constructs. Tambiah

It is important for young academics and students to properly outline in their dissertations where they stand in relation to these important questions raised under epistemology and ontology. When you have a proper understanding on these questions you are in a position to carry out a study which will result in meaningful publications and generate fresh intellectual contributions, which others will want to read.

### **Pragmatic planning in social science research.**

As in everything else we do, research requires extensive and careful planning which helps you minimize loss of time and save resources. In almost all cases, a research study starts

with some observations and a study of existing literature and of course your senior colleagues at the university will be a great source of ‘leads’ in research. This may not always happen in a formal setting but it could just be when you have a coffee with your colleagues or in other informal settings. For students, your supervisor will be your greatest source of new ideas. When you have some interesting ideas, which you may want to test, the next step is to read extensively and continuously communicate with your colleagues and/or supervisor. When you reach an advanced stage of having developed a full research proposal, then, you may also want to undertake some pragmatic planning. Research is expensive and needs funding. Most undergraduate and Master of Philosophy students self-fund their studies and this is doable as they usually limit data collection to a smaller sample but when it comes to a doctoral degree, you may want to explore sources of funds. The University Research Council at your university or the Faculty Research Committee may have information about funds from the institution. There are also various national foundations such as the national science foundation, national research council, and international sources. Often international sources requires joint application with experienced researchers and in most cases you will have to apply through an established research institution, which can be your university or research institutions such as the International Center for Ethic Studies, Center for Poverty Analysis, and similar organizations. If you succeed in securing funds from a national or international organization, you may rest assured that you have a good proposal in your hand. The ability to secure a grant outside of your university is an indication that you already are a good researcher or at least have the potential to become a good researcher. Securing funds from an international organization will require you to compete internationally among other researchers and hence your proposal must be original, systematically developed, comprehensive in literature review, has identified the gap in knowledge, has proposed a sound methodology, is feasible within a time frame and most importantly, has the potential to contribute to fresh intellectual insights to the field of study. Often, your caliber which means your existing record of publication, caliber of other members in your team, and alignment of your proposal with the goals of the funding organization will have a critical influence. Therefore, if you apply for international funding, make sure to read instructions and match your goals with the goals of the funder. Some universities have developed what is referred to as a ‘publication seminar’, which are held once in a month and where researchers can present their draft papers and proposals. These are genuine sources of help in order to improve your research proposal or grant application.

With or without funding, you need to concentrate on the pragmatic aspects of data collection. You must always keep in mind your epistemological and ontological approach to your study. There is a dominant tendency among social science researchers to heavily rely on qualitative methods of data collection. However, many excellent publications result from mixed methods research studies which combine qualitative and quantitative methods. A few of the most frequently used data collection methods are the interviews, observations, focus group discussions, case studies, and library or archival methods. These can very well be combined with a survey method if that is relevant for your study.

A particularly important aspect in data collection is ‘note taking’. Often, especially those

relying on qualitative methods must be adept in note taking. In some disciplines such as anthropology, extensive note taking encouraged. Some anthropologists take note of even facial expressions, sound of breathing or humming, other non-verbal expressions made by the informants. Typically these studies do not want to miss even one word. In contemporary research it is not so common to be that extensive but it is always good to be as extensive as possible. Often it is advisable not to postpone the development of a transcript. You tend to forget the interview and perhaps lose more than 50% in a matter of few hours unless you have extensive notes. Hence, it is always a good idea to develop the transcript perhaps on the same day. Usually, you should not conduct more than 4 interviews per day if they have been about one hour each as you tend to become physically tired and lose attention to subtle conversations. Some researchers voice record the interviews and later develop extensive notes. It is here that the ethics approval becomes important.

In the past, not many social science journals requested ethics approval from contributors. However, some journals have now begun to request ethics approval and it is likely that within the next five years or so, most social science journal might want you to submit your ethics approval before they accept your publication for review. No ethics review committee gives approval to past studies or studies which have already begun. Hence, make sure you obtain ethics approval from a recognized ethics review committee, most likely, from a university. Returning to the utility of voice-recording, there is no doubt that it is an excellent way of having extensive data but you must obtain informed consent from the participants before you can record an interview. However, there is a downside to this; it is likely that your informant will be affected by voice recording and will not be as free as when no such voice-recording takes place. The informant will be careful when she or he expresses emotions, criticism, and most likely will want to cater to your own values. Therefore, the use of voice recording requires careful thinking.

Data analysis is a central part of your research output. This also where there is a central issue with regard to young academics who usually tend to adopt a reporting style. Often, they make use of extensive quotations from the interviews, FGDs, Case studies and 'report' what the informants have stated. This is certainly not the intended goal of a qualitative study, which aims at generating in-depth insights. Often students and young academics report their findings even using percentages. We almost never use percentages in qualitative studies as our sample is usually small and our aim is to go in-depth rather than cover a large number of people. Therefore, in qualitative studies, usually your sample is more likely to be heterogeneous as you want to get information from diverse participants so that you capture a diverse range of ideas on a chosen topic. The fact that you have a heterogeneous sample means that it makes no sense to report your findings in percentages. In qualitative studies we delimit the relevance of findings to the sample. We do not extrapolate our findings like in a survey method, which by definition relies on a random sample. However, although you do not claim to represent a wider group beyond your sample, the readers of your publication may have the freedom to decide that, perhaps, the findings are relevant beyond the sample. Therefore, it is important that we pay significant attention on to the 'analysis' rather than reporting. The publication resulting from your study should

have a deeper analysis of your data, which is the interpretation of your findings. This is where you generate a micro theory out of your data. Often the conclusion in many dissertations and at times research papers consist of a summary of the findings. That would be a waste of resources. In fact the conclusion should be used to engage in a deep analysis of your findings and generate in-depth insights and to develop a micro theory.

There are a wealth of theories and methods available for data analysis in qualitative research. Most common method of data analysis used in qualitative research relates to thematic analysis which is in fact a component of the family of Grounded Theory (Glaser, 1992; Glaser and Strauss, 1967). The systematic application of grounded theory which also includes narrative analysis, thematic analysis, conversational analysis, can yield very rich outputs. Alan Bryman (2012) has an excellent coverage on grounded theory and there is a wealth of material on grounded theory available on social media such as youtube. Depending on the type of the research problem and the nature of study, you might explore the possibility of using other methods such discourse analysis, ethnographic method and also content analysis, which is connected with quantitative analysis. Discourse analysis has become popular in studies which examines popular narratives such as the role of religion, ethnicity, nation and nationalism, sexuality, democracy, power, etc. discourse analysis can be performed at various levels; some undertake extensive data analysis like in linguistics while some experienced researchers use their training in order to extract the discourses which are embedded in conversations.

### **Skills needed for research**

Research in social sciences can be extremely rewarding when you have gained some experience in the trade but it can be a daunting exercise at the beginning. Some young researchers give up their research career midway as they feel that research is not something that they want to do. However, if you persist, you become accustomed to undertaking research even under challenging circumstances. Research in social science require you to be a thinker and be reflective. It requires not only good communication skills but excellent listening skills. You must train your mind to read between the lines and see the hidden messages in conversations. Research can be physically strenuous at times as you may travel to different parts of the country and at times different parts of the world for some studies, especially, when you become an experienced researcher. However being a researcher enables you to experience the world and generate new knowledge and it can make you an international character. It does not need to be emphasized that your language skills are critical in research and publications. Good researchers find good data but good researchers with excellent language skills develop excellent publications.

Publishing can also be a rewarding experience but it is also a frustrating experience for all researchers. If you have published in international journals already, you may have experienced rejections of your submissions as many as 10 times. But this requires you to have courage. Each rejection also offers you comments for improvement and those can be used to fine-tune your publications. As young academics and students, your initial step

will be to publish in local journals and publishing houses. There has been a tendency by academics to ‘self-publish’ where you approach a printing-shop with your book, pay them to print your book. But this method is increasingly discouraged now as this does not involve any referee process and a publisher. In fact you become your own publisher. Therefore, a good starting point can be those journals published by Sri Lankan universities or national science foundation. Most university journals maintain a double-blind review process. This gives a very good training into the process followed by international journals, which belong to many different layers. Some of them belong to the most prestigious category and young academics will initially find it difficult to publish in such high ranked journals. But if you have already published in local university journals, then, you can aim at recognized international journals and reputed publishing houses. Whether local or international, if you publish a book or an edited volume, it is always better to approach a recognized publisher.

A final war of caution should be given regarding the ‘predatory’ publications’ which have become so common among academics. There is no standard definition for predatory publications and no hard and fast rules to categorise a journal as predatory. However, some guidelines can be used. In a very simple sense predatory publications are those which have a profit orientation and which publish articles or even books without a proper review process and without verifying the quality or originality. The sole purpose of these publications is to make profit and they will publish anything you submit. The first criteria may be whether you have to make a publication fee. If yes, you need to be careful. Usually predatory journal may charge somewhere between 100 to 300 US dollars and will publish your paper in a matter of weeks or a month. However, publication fee is not an adequate indicator as some of the highly ranked journals in some social sciences such as economics also charge a fee and they are reputed journals. Hence, you will need additional checks; usually predatory journals do not have an institutional affiliation to a university or a research institutions or an established publishing house. Some of them do not have an editorial board and even if they have one, the editors themselves do not have a publication record. Often the editors also do not have an institutional affiliation although they may have self-imposed titles such a professor or doctor. In some situations even the name of the journal can be a good indicator. Every morning when you open your email, you may be getting requests for articles from some journals. These might be predators which look for prey; hence the name predatory journals. Some of them (not all) have strange names such as “Australian Scientific Research Journal of Engineering, Medicine, and Sciences and religion” “Multidisciplinary journal of cybernetics, mathematics, and social sciences, or “Journal of contemporary, politics, Engineering, computing, and the Arts”. These are hypothetical names but if you get a call from journals having such strange names, you need to exercise caution. Often these may be predatory because no journal of quality can afford to have such a variety of disciplines accommodated in one journal. Often, good journals represent only a fraction of a discipline in some situations or are devoted to social sciences in general. The Beall’s list of predatory journals can also be used to identify such journals. Publication in predatory journals can discredit you in the academic world and even disqualify you from employment in the universities and scholarship programmes. In

fact, the University grant commission in Sri Lanka is developing a new promotion scheme where predatory journals have been specifically excluded from accepted publications.

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# **Session 01**

## **Professional Forum**

*Agricultural Sciences, Applied Sciences, Management Studies and  
Social Sciences and Languages*

## A Role of Reactive Oxygen Species in Organophosphate Induced Neuronal Cell Cytotoxicity

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Organophosphate (OP) pesticides are used in agriculture, veterinary and public settings worldwide to control pests. Oxidative stress induced by pesticide in neuronal cells is one of the underpin mechanism that induced neurotoxicity. Therefore, role of reactive oxygen species induced by oxon metabolites of commonly used organophosphate pesticides in human neuronal progenitor cortical neuronal cells (hNPCs) has been examined. Undifferentiated and differentiated human progenitor cortical neuronal cells were exposed to oxon metabolites of chlorpyrifos and azamethiphos for 24 hours over a concentration range of 0.3-200  $\mu$ M and cell viability measured using Thiazolyl Blue Tetrazolium Bromide (MTT) and lactate dehydrogenase (LDH) assays. Low and high inhibition concentrations of each pesticide interpolated from viability curves were further assessed by ATP assay to evaluate the impact of pesticides upon cellular bioenergetics. Cellular reactive oxygen species (ROS) generation was assessed using 2',7'-dichlorofluorescein diacetate (DCFDA) assays while cellular oxidative stress markers such as protein carbonylation, glutathione, and lipid peroxidation levels were also quantified. Specific targets of cytosolic oxidative damage were characterized by gel electrophoresis and oxyblots. Both cell phenotypes experienced pesticide-induced cell viability loss, ATP depletion and ROS generation that was pesticide concentration dependent. There was a concentration-dependent increase of protein carbonylation levels, and lipid peroxidation associated with the oxidative stress and GSH depletion. A protein of 50 kDa was a major target for oxidative stress damage after exposure to either pesticide and in both undifferentiated and differentiated hNPCs. This study concluded that cytotoxic responses are associated with ROS generation with concomitant increased of lipid peroxidation, antioxidant depletion and protein carbonylation.

**Keywords:** *hNPC, Organophosphates, Reactive Oxygen Species*

## Sustainable Mass Production of Valuable Plant Species Through Efficient Micropropagation

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Micropropagation is important for both multiplication and preservation of a wide range of crops, including many food crops. Even though the agricultural sector has been harnessing its advantages in achieving increased crop production, recent times have seen a need of innovative improvements since contemporary systems rely significantly on conventional methods. Furthermore, numerous plant species are being revealed to possess medicinal and other valuable properties, but difficult to culture using conventional methods. Therefore, methods that facilitate efficient mass propagation of economically important species have become vital. Our results represent new developments with regard to improved growth medium for *Solanum tuberosum* L. (potato) and effective surface sterilization methods for explants of difficult-to-propagate species. Enhanced mesos (CaCl<sub>2</sub>, MgSO<sub>4</sub>, KH<sub>2</sub>PO<sub>4</sub> in Murashige and Skoog (MS) medium improved the overall quality of *S. tuberosum*, as indicated by longer shoots and larger leaves with dark color, compared with MS medium only. The quantitative ion analysis revealed a significant role of the minerals; calcium, magnesium, potassium, phosphorus, and iron on improved overall quality of plantlets. We present new methods and developments for the micropropagation of Japanese medicinal plants including *Polygonatum macranthum* (Maxim.) Koidz. Seed germination of *P. macranthum* was achieved within nine weeks through the use of the new surface sterilization method, in contrast to 19 months taken under natural conditions. The results could facilitate the mass propagation of difficult-to-propagate species of economic importance.

**Keywords:** *Difficult-to-propagate species, Efficient Micropropagation, mesos, Solanum tuberosum* L

## Mask Plasma Patterning on *Polydimethylsiloxane* Surfaces Using Atmospheric Pressure Plasma Jet

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Cell culturing in laboratory conditions can be seen developing in recent years. These cell cultures were used with applications such as patient-specific drug screening and gene-modifications. These cell cultivations generally require culturing devices and one of such devices is polydimethylsiloxane (PDMS). Although these devices carried the properties of bio-compatible, it also shows hydrophobic property on its surfaces. Use of low-pressure plasma irradiation with masks, able to fabricate these surfaces to hydrophilic property which provide the adhesion of cells on these devices. Using this technique, patterning on PDMS surfaces only depends on mask size. So, as an alternative approach, this study considered to use atmospheric pressure plasma jet (APPJ) with mask on PDMS surfaces for fabrication. In addition, effect of irradiation time on mask plasma patterning using APPJ was also investigated. Double electrode APPJ configuration with Helium gas was used to fabricate the PDMS surfaces with mask. Different irradiation times were used to investigate its effect on fabricating areas. Culture and sub-culture on these fabricate surfaces were carried out using the mouse osteoblast cells (MC3T3-E1). After three days of cell culture, a green, fluorescent dye was introduced on living cells and fluorescent spectroscopy was carried out to estimate the success of cell culture and its area. Cell culture on APPJ fabricated PDMS surfaces with mask was observed to be successful in this study. Change in the irradiation time shows variances in fabricated area on mask patterning. Results also shows that longer irradiation time saturate the patterning area to mask size while lower irradiation times able to fabricate areas to lower than mask size. Debye shielding effect is expects to dominate in lower irradiation time for such variance in fabricated area while diffusion effect on longer irradiation time.

**Keywords:** *Mask Patterning, Atmospheric Pressure Plasma Jet, Polydimethylsiloxane, Cell Culturing, Irradiation Time*

## **The Impact of Green Intellectual Capital and Organizational Learning on Environmental Performance; Evidence from Sri Lankan Manufacturing Organizations**

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As manufacturing sector being the largest sub sector in Sri Lankan industries, society's attention on their activities and the impact to the environment has been increased. Though companies picture an ethical contribution through annual reports the evidence shows there's a huge practical issue. From intellectual capital and knowledge based theoretical perspective, this study aims to ascertain the mediating impact of organizational learning on the impact of green intellectual capital on environmental performances in Sri Lankan manufacturing plants. With a sample representation of BOI registered companies in Sri Lanka, an electronically generated structured questionnaire administered to collect data. Findings were derived testing the hypothesis through Partial Least Squares (PLS-SEM 3.0) Structural Equation Modelling. The findings reveal that, compared to the direct impact of green intellectual capital on environmental performance, the intensity of the relationship strengthens when the influence of organizational learning is exerted within the organization. The practitioners' role to integrate human, relational and structural capital is vital to convert the traditional organizational learning into environmental learning which enhances the environmental performances.

**Keywords:** *Green Intellectual Capital, Organizational Learning, Environmental Performance*

## **B6 Albino Mice Show Enhanced Diet Induced Nonalcoholic steatohepatitis Susceptibility**

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Nonalcoholic fatty liver disease (NAFLD) is an alarmingly rising metabolic disorder. Non-alcoholic steatohepatitis (NASH) is the progressive liver damage with inflammation, leading to fibrosis and carcinogenesis. Interestingly, enhanced susceptible for NASH was observed in B6 albino mice (albino) with high cholesterol diet (HCD), compared to wild type B6 black mice (black), a phenotype not reported before. This study was led to understand the underline mechanism of elevated NASH susceptibility of albino mice. B6 albino mice carry a point mutation in *tyrosinase* gene and this is the only genetic difference compared to B6 black mice. Albino and black mice were fed with HCD for 10 weeks. Normal diet fed mice used as controls. Body weights, blood indices and liver damage related serum parameters were monitored. Liver samples were histologically analyzed. Mice carrying only the G291T mutation were developed using CRISPR/Cas9 technology and employed to confirm that the observed phenotype is resulted from that specific mutation. Liver injury was observed in albino mice from post day 1 HCD feeding, with elevated serum liver injury markers. 2 weeks of HCD induced NASH in albino mice, but no symptom was observed in black mice even after 10 weeks of diet. Histological analysis of albino mice livers revealed significant inflammatory cells and lipid infiltration, and severe fibrosis. Distorted serum lipoprotein profile was observed in albino mice, resulted from altered cholesterol absorption in small intestines. Similar to B6 albino, CRISPR generated mice exhibited the same liver damage phenotype, confirming the contribution of G291T mutation. This work uncovered a novel genetical factor for NASH development and expanded the understanding on NASH pathophysiology.

**Keywords:** *Nonalcoholic Steatohepatitis, B6 Albino Mice, Enhanced Susceptibility*

## Indic Loanwords in Chinese and Sinhala: A Semantic Analysis

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Along with the revival of philosophy, literature and language in Tang Dynasty, a large number of Indic loanwords were introduced to Chinese language which became an integral part of Medieval as well as Modern Chinese lexicon. Indic loanwords in Chinese language have largely been borrowed from Sanskrit and other *Prakrit* languages in India such as Māgādhī, Gandhāri and Pāli. Since Sinhala also has borrowed a number of Indic loanwords from these languages, a phonological and semantic relationship has been established between Sinhala and Chinese through Indic loanwords. The present study aims to analyze Indic loanwords in Chinese and Sinhala from a semantic perspective. A list of 765 words have been selected as the sample of the study which are both available in Sinhala and Chinese. The words were first categorized into three types as transliterations (349), free translations (285) and phono-semantic matchings (131). The semantic relationship between the two languages has been analyzed using four variables, namely similarity in general meaning, usage in modern language, number of morphemes and change of meaning. Similarity level was evaluated using the criteria  $4.5 \geq$  = Very High,  $4-4.49$  = High,  $2.5-3.99$  = Average High,  $1.5-2.49$  = Low,  $0-1.49$  = Very Low. The study has found out that the similarity levels of free translations are relatively low compared to transliterations and phono-semantic matchings. Transliterations account for the highest similarity rates and phono-semantic matchings have recorded medium similarity levels. It was found out that the major reason behind the low similarity levels of free translations is their higher Sinicization level. Most transliterations, even ones which have penetrated into modern Chinese with highest Sinicization levels show higher similarity levels in Chinese and Sinhala. The study concludes that Sinicization of Indic loanwords and semantic similarity between Sinhala and Chinese are two dependent variables.

**Keywords:** *Indic Loanwords, Chinese, Sinhala, Semantic Similarity, Sinicization*

## **China-Sri Lanka Economic and Strategic Relations and India's Response: Testing Theory of Realism**

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In the new world order, China has become the second most influential nation in the world after the USA. In this context, China always tries to sustain its peaceful rise, and increase its influence around the world and South Asia is no different. As such, Sri Lanka too becomes a main economic and strategic interest country for China. Accordingly, China tries to develop the closer economic and strategic relations with Sri Lanka. India evaluated this situation has a huge challenge and threat for her to remaining as regional power in South Asia. Therefore, India tries to minimize the China-Sri Lanka economic and strategic relations, while influencing Sri Lanka as the big brother. On this basis, this study focuses to evaluate the growing China-Sri Lanka economic and strategic relations and India's response in general and particularly during the period from 2005 to 2020, while testing the theory of realism. With this broad objective, the following specific objectives have been pursued: to analysis why do China and Sri Lanka want to conduct economic and strategic relations with each other despite India's big role, to explore what foreign policy challenges does Sri Lanka face in conducting her economic and strategic relations with China in the context of growing Sino-India strategic rivalry in the Indian Ocean and to examine what are the policy options for India to avoid China's presence in Sri Lanka and protect her hegemony aspiration in south Asian region. The study was largely descriptive, and researcher used qualitative research methods for the subsequent analysis. Qualitative data were gathered by using primary and secondary sources. Primary data were gathered through semi-structured interviews, case studies, official documents, reports and GIS Mapping. The sample size was consisted of 100 respondents. The secondary data were gathered through published books, research papers, working papers, newspaper articles and internet. The study found that China has increased the economic and strategic relations with Sri Lanka over the years, providing a model of close relations between large and small countries. The following factors have been impacted to China's interest to build close economic and strategic relations with Sri Lanka; the importance of the Indian Ocean to China's rapid growth, strategic importance of Sri Lanka, balance India, survive as a hegemonic power in Asian region, and use Sri Lanka as an economic and trade hub. The study also found that Sri Lanka too has an interest to build closer economic and strategic relations with China with following reasons; survive through balance, economic benefits, no condition for borrowings and aids, and China non- interference in the internal affairs of Sri Lanka. The study further found that India's dominate behaviour towards Sri Lanka has become a realistic dynamic of closer economic and strategic relations between two countries. The study finally found that the China-Sri Lanka economic and strategic relations create a huge challenge to Indian hegemony aspiration in south Asian region, which India has dominated for many years.

**Keywords:** *China-Sri Lanka, Economic , Strategic Relations, Hegemony*



# **Session 02**

Graduate Colloquium

*Agricultural Sciences*

## Evaluating the Stock Health of Shrimps and Characterization of *P. monodon* (Fabricius) for Broodstock Development in Sri Lanka

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Wild collected broodstock served as the only source of post larvae for *Penaeus monodon* farming in Sri Lanka since the inception of farming from 1980s. These wild stocks also acted as a source of catastrophic viral infections frequently devastating the industry. However, systematic studies linking the stock health of these wild broodstocks collected in Sri Lankan waters were unavailable. Further, morphometric variations of these broodstocks, their genetic relatedness and resistance to diseases under Sri Lankan conditions were not studied. Hence, present study was aimed at investigating the stock health of wild collected brood shrimps, identifying the correlation with their morphometric variations, genetic relatedness, and their resistance to selected viral diseases. As the first baseline study, samples were collected from various sampling locations representing the whole farming and broodstock collecting areas. Samples also included farm collected shrimps and other crustaceans collected from different areas. Samples were tested for seven critical crustacean diseases using standard IQ 2000<sup>TM</sup> PCR test kits. Out of 2060 PCR tests conducted for the seven diseases, white spot disease and IHHNV were only recorded, where the later was the first ever confirmatory study in Sri Lanka. For the analysis of morphometric characters, genetic relatedness of broodstock clusters and their correlation with disease resistance, 609 samples were already collected from the projected 660 samples. Truss and morphometric variations were partly analysed, and results indicated the existence of separate clusters. Preliminary analysis of DNA barcoding for genetic relatedness revealed the existence of some genetic variation, but this needs to be confirmed by the complete number of samples collected from different areas. Further, pre-tested microsatellite markers will be used to determine the disease resistance of these broodstocks for selected disease and correlation between these parameters are still to be studied. Upon completion, this study will provide valuable insight of disease resistance of wild brood shrimps and their correlation with genetic relatedness and morphometric characters, providing much needed baseline information for country's broodstock development programs.

**Keywords:** Broodstock Development, Genetical Variation, *P. Monodon*, Shrimp Diseases, WSSV

## **Captive Breeding and Larval Rearing of *Labeo lankae*, *Systemus spilurus*; Critically Endangered and Endemic Freshwater Food Fish Species in Sri Lanka**

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Sri Lanka supports a rich freshwater fish assemblage that comprises 97 species including 61 endemics. Other than these indigenous species, 24 exotic species have been introduced to the island mainly to boost the inland fishery. Endemic and native fish stocks are heavily affected by heavy fishing pressure, habitat destruction, climatic factors and introduction of those exotics. Among the native and endemic species *Labeo lankae*, *Labeo heladiva*, *Tor kudree*, *Systemus spilurus*, *Walago attu*, *Ompock bimaculatus*, stocks are heavily affected and sufficient scientific data are unavailable for conservational efforts. Present study was aimed at re-establishing stocks of those fish species to control the population declining. One of the objectives of the study was to develop and optimize protocol for captive breeding and larval rearing of *L. lankae*, *L. heladiva*, *T. kudree*, *S. spilurus*, *W. attu* and *O. bimaculatus*. Broodstock fish collected from different locations were transported to Aquaculture development centers at Dambulla and Ginigathena. During acclimatization and growing, formulated fish feeds (42% crude protein) were provided but *carnivorous W. attu* was fed with trash fish. Matured *L. lankae* fish were selected and induced breeding was performed using sGnRH $\alpha$  + Domperidone at the rate of 0.5 ml per kg body weight for females and 0.2 ml per kg body weight for males. Then, they were kept in a hatchery jar for spawning. Similar procedure was used for *S. spilurus*, but in cement tanks. After a latency period of 10 hours, *L. lankae* spawned non-adhesive floating eggs, and after 30 h of embryonic development, hatching was completed. *S. spilurus* spawned adhesive sinking eggs after a latency period of 7 h and 45 min and hatching were completed after 16 h. Feeding commenced from 24 h and 60 h respectively for each species, first with egg yolk, then artemia followed by formulated feed. More than 70% of larval survival was reported under this feeding regime. In conclusion, we here report the first evidence of successful captive breeding and larval rearing of critically endangered and endemic freshwater fish spp. in Sri Lanka; *L. lankae* and *S. spiluru*.

**Keywords:** Captive Breeding, Endemic Fish, GnRH, *Labeo lankae*, *Systemus spilurus*

## Reproductive Ecology of Members of Family *Channidae* in Sri Lanka

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The reproductive ecology of members of the family *chanidae* was observed in their natural habitats from 2018 to 2021. The breeding ecology of the *Channa cf. ara* (n=02), *i kelaartii* (n=05), *C. marulius* (n=01), *C. punctata* (n=02), *C. orientalis* (n=04) and *C. striata* (n=07) were recorded in a total of 21 locations by using several environmental variables including the main ecosystem type, altitude, preferred micro-habitat, depth and width of the water body, comparative turbidity of water, shade, substrate, pH level, dissolve oxygen level, salinity, mean annual air temperature and number of individuals in the Cohort. Our results reveal breeding habitats of Sri Lankan Channids do not overlap with each other, showing significant differences in micro-habitat requirements from other members of the family. The *Channa cf. ara* and *C. marulius* breeds in pools in medium size lotic habitats and *C. striata* breeds in lentic habitats including marshes, canals and tanks. The breeding habitats of *Channa cf. ara* and *C. marulius* are geographically separated from each other though their natural habitats show similar characteristics. *C. punctata* breeds in shallow lentic habitats including marshes, canals and small tanks. Both *C. kelaartii* and *C. orientalis* breeds in slow flowing lotic habitats such as small streams. However, *C. orientalis* prefer comparatively shallow water (<15cm) with rocky and sandy substrate while *C. kelaartii* prefer comparatively deep water (<40cm) with muddy and sandy substrate. Occasionally, both the latter species breed in marshes and also in small pools associated with streams and rivers. Information on breeding ecology of Channids in Sri Lanka will help to develop captive breeding protocols for these species and also to preserve these important breeding habitats

**Keywords:** *Breeding, channidae, Ecology, Micro- habitat, Reproduction*

## ***Hermetia illucens* Larvae as A Feed Ingredient for Food Fish Culture**

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Sri Lankan food fish production has remarkably increased within the past few decades, and at present, aquaculture has emerged as one of the famous industries among Sri Lankans. However, similar to terrestrial livestock farming, feed was a major concern in aquaculture due to rising feed costs, particularly for the major protein source (fishmeal) included in the feeds. Therefore, fish nutritionists have paid their attention towards the investigation of alternative and more reliable protein sources for fishmeal. This study was an overview of such an attempt made under the Sri Lankan conditions to replace fishmeal with an alternative protein source. However, the overall objective was to evaluate the suitability of *H. illucens* larvae as an alternative for fishmeal in Sri Lankan food fish culture. Rohu (*Labeo rohita*) was selected as the food fish species and few feeding trials were carried out to find the best feed formulations for different life stages (post-larval and fry) of *L. rohita*. Feed formulations were developed by using *Hermetia illucens* larvae as the alternative protein source to replace different levels (0%, 25%, 50%, and 75%) of fishmeal in the feed. As per the results of the feeding trials, the formulation that gave the best growth performances i.e., weight gains, length gains, feed conversion ratios, was identified with the aid of the scientific analysis methods. The results implied that the 25% fishmeal replacement with *H. illucens* larva as the best rate for the *L. rohita* diets. Moreover, chitin was suspected as a possible anti-nutritive factor available in *H. illucens* larval diets that reduces the growth performances at higher fishmeal replacement rates. However, further research trials were planned to be carried out to investigate the microbiological aspects (histopathological, haematological and gut microbiota) of the use of *H. illucens* larvae as a feed ingredient for *L. rohita*.

**Keywords:** *Feed Ingredient, Fry, H. illucens, Labeo rohita*

## Suitability of Reanalyzed Precipitation Data as an Alternative Source for Missing Data: A Case Study in Dry Zone, Sri Lanka

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Owing to the availability over long spatial and temporal scales, reanalyzed data are widely used in climatological studies. However, the reliability of such datasets depends on location and time. Often it requires analyses of the fitness before the climatological application. Therefore, the objective of this study was to identify the most reliable reanalyzed precipitation data source to overcome the issue of missing data in the dry zone of Sri Lanka. The observed precipitation data from Anuradhapura, Puttalam, and Batticaloa for the period of 1985 to 2005 were regressed against the reanalyzed data of Asian Precipitation – Highly Resolved Observational Data Integration Towards Evaluation (APHRODITE), Multi-Source Weighted Ensemble Precipitation (MSWEP), and NASA Power Prediction of Worldwide Energy Resources (NASA POWER). Raw daily precipitation data, Annual total precipitation, and Number of rainy days per annum were the selected weather parameters. Root Mean Square Error (RMSE) and correlation coefficient were used to identify the most fitted reanalysis data source. The lowest estimated RMSE values for daily precipitation 5, 10, and 5 mm and highest correlation coefficient were observed as 0.9, 0.78, 0.83 in APHRODITE at Anuradhapura, Batticaloa, and Puttalam respectively. Similarly, Annual precipitation showed the lowest RMSE in Batticaloa and Puttalam as 378 and 177 mm and the highest correlation coefficient as 0.91 and 0.77 for APHRODITE. In contrast, the lowest RMSE and the highest correlation coefficient for the number of rainy days were observed in MSWEP data. Based on the result, APHRODITE data shows the higher potential of using as an alternative data source to fill the missing precipitation data in the Dry Zone of Sri Lanka.

**Keywords:** APHRODITE, MSWEP, NASA POWER, Reanalyzed Data

## Long-Term Behavior of Pb Immobilization in Three Natural Geo Sorbents

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Lead (Pb) is a toxic heavy metal which is linked with environmental and health issues across the world. Vehicle emissions and paint industry are two of the major sources of Pb pollution. After entering the soil, Pb may stay in the soil for a longer period depending on changes in the soil. Pb entered human body tends to accumulate in it. This study was intended to discover a cost-effective method to immobilize soil Pb in bio available from using a natural geo-sorbent – i.e. biochar. Biochar plays an important role in remediation of contaminated soils by adsorbing heavy metals into its adsorption sites. The efficacy of three natural geo sorbents in remediating contaminated soils in Horton Plains with Pb was assessed. The pattern of immobilization of Pb by three natural geo sorbents termed as Rubber Nutshell Biochar (BRS), Rice Husk Biochar (BHS) and naturally developed Biochar in Horton Plains (HPS) was tested. The highest fluctuation was exhibited in soils treated with HPS while the least was in the soil treated with y BHS. When BRS is taken into consideration, it showed a moderate capacity for immobilization of Pb and, HPS also showed a considerable capacity compared to the soil collected from Horton Plains. Furthermore, the study revealed that there is a fluctuation pattern in the immobilization of Pb by all three types of biochars including BHS and the BHS showed the most stable fluctuation behaviour of the immobilization of Pb.

**Keywords:** *Immobilization, Natural Geo Sorbents*

## Investigation of Phosphate Solubilization of Eppawala Apatite with Using the Isolated Soil Microorganisms

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Sri Lanka uses tonnes of phosphorus fertilizers per year due to it is an agricultural country. Apatite: phosphorus fertilizer that has low solubility which acts as the barrier for its commercial usage. Development of an economical and environmentally friendly process for successful soil P management through enhancing soluble phosphorus of Apatite is a major concern in crop production in Sri Lanka and Phosphate Solubilizing Microorganism (PSM) focused attention in this regard. This study was conducted to screening Phosphorus solubilizing microorganisms who enhance the solubilization of the Eppawala Apatite. The soil was collected from different ecosystems and Pikovskayas Agar media was used to isolate PSM. Apatite and topsoil mixtures were treated with eight isolated PSMs namely S1, N1, B1, B2, D1, D2, D3, G1. A randomized complete block design (RCBD) was used for the experiment with 3 replicates for each treatment and apatite + topsoil mixture was used as a controller. Commercial biofertilizer was used as one of the treatments to compare the effectiveness of isolated PSMs. Treated samples were tested for the available phosphorus percentage using the 2% citric acid method for 8 weeks within a week interval. Molecular Characterization of D1 fungus strain was done due to its significantly high ( $P < 0.05$ ) effectiveness on phosphorus solubilization of apatite. As a result, Isolated Microorganisms of Turpentine and Teak plantations were significantly more effective (3.79%- 3.47% of mean Available phosphorus content) than the controlled sample (2.19% of mean available phosphorus content) and other treated samples. D1 gives about 1.5 times increment of available phosphorus percentage to the apatite. Isolated D1 from the soil of the turpentine plantation is 100% genetically identical to *Penicillium abidjanum* CBS 246.67 fungus. Therefore, *Penicillium abidjanum*-D1 can be used to increase the amount of phosphorus present in Eppawala apatite with an economical and environmentally friendly process.

**Keywords:** Eppawala Apatite, *Penicillium abidjanum*, Phosphate Solubilization



# **Session 03**

## **Graduate Colloquium**

*Applied Sciences and Management Studies*

## Investigation and Identification of Anti-diabetic Activity of Selected Medicinal Plants that Used in Folk Medicine in Sri Lanka

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Diabetes Mellitus (DM) is one of the major non communicable disease encountered by the global community. Even though there are many medicines prescribed for DM, a permanent cure has not been discovered yet. Long term intake of such medicines may cause many side effects. Therefore, the patients are now more concerned of using herbal alternatives to control DM. There are number of medicinal plants that used to treat/control DM in Sri Lanka but most of them are underutilized. This piece of study was conducted to investigate the scientific background of utilizing some selected plants namely Kowakka (*Coccinia grandis*), Malla (*Olax zeylanica*), Bakmee (*Nauclea orientalis*), Thebu (*Costus speciosus*), Madan (*Syzygium cumini*) Udahalu (*Passiflora foetida*) and Masbedda (*Gymnema sylvestre*) to control/prevent DM in Sri Lankan folk medicine. Hot water extracts were prepared brewing 4g of dried leaf powder of each plant in 100 ml of hot water. Extracts were subjected to  $\alpha$ -glucosidase inhibition assay to evaluate their hypoglycemic potential. Antioxidant activity of extracts was measured using DPPH radical scavenging assay and TPC of each extract was determined by Folin & Ciocaitu's method. Extracts were further subjected to  $\beta$ -glucourinidase inhibitory assay to evaluate the alleviating potential of drug induced liver toxicity. Among the seven types of hot water extracts, the highest activity for  $\alpha$ -glucosidase inhibitory assay was detected in *Syzygium cumini*, *Nauclea orientalis*, and *Olax zeylanica* water extracts respectively. For the  $\beta$ -glucourinidase inhibitory assay highest activity observed in *Gymnema sylvestre* leaf extract. *Syzygium cumini* showed the highest total phenolic content and the highest DPPH free radical scavenging activity. In view of that *Syzygium cumini*, *Nauclea orientalis*, and *Olax zeylanica* leaves exhibit potential activity towards DM. However further investigations such as isolation of active compounds, *in-vivo* tests, and molecular modelling of active compounds, are planning to continue as further studies.

**Keywords:** Diabetes Mellitus, Water Extract, Anti-Diabetic Activity

## A Preliminary Study to Determine the Geographic Origin of Low-Gem Quality Corundum in Sri Lanka

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The value of a gemstone largely depends on its rarity, size, clarity, and durability. At present, the geographic origin of a gemstone is also an important factor that affects its value. In heat treatment, the geographic origin is highly important as the physical and chemical properties of gemstone could be varied among different gem-bearing localities. Therefore, the present study aimed to determine the origin of low-gem quality corundum in Sri Lanka based on spectrophotometric data and trace element concentrations. Thirty-five gem samples were directly purchased from mines located at Marapana and Horana. The physical properties of samples such as weight, refractive index, and fluorescence were measured. Inclusions were observed using the optical microscope. Spectrophotometric properties were determined using Raman spectrophotometer and Fourier-transform infrared spectrophotometer (FTIR). Initial observations made by magnification lenses suggested that most of the samples contained mineral inclusions, cracks and had a translucent appearance. The Raman spectroscopic observations revealed peaks at 417 cm<sup>-1</sup>, 644 cm<sup>-1</sup>, and 750 cm<sup>-1</sup> corresponding to corundum. The observed inclusions and FTIR results confirmed that the samples are natural and have not been subjected to any heat treatment. However, none of the FTIR spectra of samples revealed characteristic peaks that could be successfully used to distinguish the geographic origin of the samples. The X-ray fluorescence and laser ablation-inductively coupled plasma-mass spectrometry-based investigations should be performed in a wide range of gem samples from the two localities in order to compare the geographic origin.

**Keywords:** Gemstones, Gem localities, Inclusions, Trace Elements

## **Docker Container Compatibility as a Host Infrastructure for Software Application Deployments: A Review**

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Containerization is a novel computer technology that introduces an alternative computer infrastructure for traditional virtualization. Containers are executing on the container engine which was launched on the host computer infrastructure. Containers are dedicated to providing a very lightweight and isolated computer environment for software applications. Containers are a specific computerized package that includes all primary and fundamental software libraries, dependencies, and binaries to run software applications and services. Currently, computer practitioners are shifting to use containers to test, experiment and deploy software applications in the containerized environment. Among most container management technologies, Docker is a very famous and trending technology. This study was aimed to identify the Docker container compatibility for software application deployments. The objectives of the research study are to identify the Docker container trends, features, limitations, and direct integration with third-party technologies. For the study, thirty-five scholarly research articles, official Docker documentation and five online forum articles were used. By applying a thorough review process, the selected works of literature were summarized. Observations and investigations of the study bring the architectural view of Docker, Docker advantages, Docker limitations, Docker compatibility with third-party integrations and Docker features over other corresponding computer infrastructure technologies. As mentioned in the existing literature, Docker containerization is introducing a fabulous and marvellous market within the information technology domain especially of the cloud-based host infrastructures.

**Keywords:** *Compatibiliy, Containers, Docker, Infrastructure, Software Deployment*

## Photoluminescence Properties of Dicarbonyl Containing Organic Molecules

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Recently, organic electronic materials emitting room temperature phosphorescence (RTP) has been studied heavily. The bases of the field depend on the molecule synthesis and characterization of new and superior variants. Benzil and benzil alike dicarbonyl containing molecules (molecules with two carbonyl (C=O)) plays an exciting role in such studies. The current study provides both fundamental and extended emission properties of a set of novel benzil derivatives, consists of a fluorinated monobenzil variant, a bisbenzil variant, and a non-fluorinated bisbenzil variant. Photoluminescence character is studied by time-resolved and steady-state photoluminescence spectroscopies at both room temperature as well at 77 K (in liquid nitrogen) accordingly. It was revealed that the molecules in focus are capable of emitting RTP. The variant with the most extended lifetime as well the highest emission amplitude was the monobenzil variant. The RTP lifetimes were estimated using both the time-correlated single-photon counting (TCSPC) method and 12-bit oscilloscope coupled with the third harmonic excitation light pulses from Nd:YAG laser. The recorded lifetimes for phosphorescence were 16.9  $\mu$ s (by TCSPC)/17.5  $\mu$ s (by oscilloscope) for monobenzil variant, 5.2  $\mu$ s/5.2  $\mu$ s for bisbenzil variant, and 18.8  $\mu$ s/17.5  $\mu$ s for fluorinated bisbenzil variant. Thus, we conclude that all three variants can emit RTP while monobenzil has more prolonged and intense emission from the triplet state, Also the fluorination in bisbenzil doesn't affect the excited triplets. Hence for efficient RTP materials bulky substituents in benzil framework is recommended.

**Keywords:** Room Temperature Phosphorescence, Organic Electronics, Photoluminescence Spectroscopy

## Sentiment Analysis Using LSTM, CNN & GloVe for Exploration of social media

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Sentiment analysis is an automated method that makes use of computing energy to identify the polarity of a given context. In particular, because of the improvement of social media, there shall be a substantial demand for digging up significant statistics from the big data on the Internet via sentiment analysis. Inspired by the contribution of using the achievements of deep learning, the study was enthused by coping with the sentiment analysis task by using the deep learning models. In this paper, we propose a framework called Glove + deep learning. Initially, we utilized the Glove embedding to compute vector representations of words, which will be the input for the Neural net. Precisely, the GloVe word embedding model is followed right here with the intention of creating the best use of the worldwide and nearby records for the training corpus. Then we designed a simple neural network, Convolutional Neural network (CNN) and Recurrent based Long Short-Term Memory (LSTM) neural network architectures for the sentiment classification of well-known YouTube video review. In order to overcome the shortcomings of the traditional recurrent neural community which is the simplest capability to managing short-time period dependencies and the inability to examine the lengthy-time period records of textual content, a neural network model combining LSTM is proposed in the study. We used the Rectified Linear Unit (ReLU) Activation function, Adam Optimizer, and binary cross entropy as a loss function to improve the accuracy and generalizability of the model. The model appreciably generated higher effects and specifically, the LSTM model was appreciably sensitive to overfitting even without parameter tuning. Through the comparison test of the simple deep neural network model, CNN model, and LSTM model, evaluating the training accuracy (81%, 86%, 87%), testing accuracy (64%, 74%, 84%), and overfitting indicators (15, 12, 3), it was identified that the LSTM model with Glove word embedding demonstrated optimally. In this effort, the number of layers, neurons, hyperparameters, and activation functions were randomly selected. Future studies can change these parameters and test which works optimally for different embedding methods and within diversified datasets.

**Keywords:** CNN, Deep Learning, Glove Word Embedding, LSTM, Sentiment Analysis

## **Constructing Lean- Green Productivity Index to Quantify the Environmental Impact for the Leaner Apparel industries in Sri Lanka**

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Lean manufacturing is famous philosophy for waste reduction, and it generates significant benefits to achieve Sustainability. There is a less attention is drawn to measure the environment impact of Lean in practical scenario. This paper highlights constructing the metrics to measure the environmental savings from lean manufacturing in the apparel industry in Sri Lanka. The main objective of the study is “To quantify the impact of the lean manufacturing savings towards the environmental impact through the lean- environmental matrix based on Green productivity matrix?” the main objective is reached through four sub-objectives such as Objective 01 - “To Identify what variable has been the highest correlation among the variables of Lean manufacturing savings and Lean Manufacturing earnings with Product Life Cycle Cost in the operational activities in the apparel industry in SL?”. Objective 02- “To Identify how to develop the quantify coefficients for the environmental index in the apparel industry in Sri Lanka?” Objective 03- “To Identify what type of relationship prevails between Lean Productivity and the environmental index in the apparel industry in SL”. Objective 04- “To Identify what type of quantify relationship prevails between the Lean productivity index and the environmental index in the operational activities in the apparel industry in SL?” Secondary data from twenty-five apparel is considered for the sample of the study and Lean savings, Lean Manufacturing total earnings, Life Cycle cost, variables are considered as independent variables, and solid waste, toxic waste, Energy waste, water waste, and air pollution will be considered as dependent variables of the study. To reach the study objectives Multiple Regression analysis, regression analysis, and Correlation analysis, green productivity matrix is expected to use as analytical tools of the study. This study will draw the attention of the apparel industries to consider greener in their production system in order to achieve sustainability.

**Keywords:** *Lean Manufacturing, Green Productivity, Environmental Impacts*

## Determination of the Spectrophotometric Properties of Low-Quality Gems in Sri Lanka: A Case Study from Marapana

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Geuda, the most common low-quality gemstones found in Sri Lanka is frequently subjected to different treatments in order to enhance their color and transparency, thereby increasing their trade value. This study was conducted to investigate the applicability of Fourier-transform infrared spectroscopy (FTIR) and Raman spectroscopic techniques to distinguish different Geuda varieties. Low-quality gems were collected from a gem pit in Marapana, Sri Lanka. Based on the morphological and optical properties, the collected gems were identified in three families: corundum, spinal, and garnet. The corundum consisted of twelve gemstones belong to seven major groups including Pita ottu, kalu ottu, Silky, and Young Geuda. The FTIR results of Geuda (i.e., Pita ottu) showed OH stretching infrared absorption peak at  $3160\text{ cm}^{-1}$ , thereby suggesting their natural origin and presence of goethite in the inclusion. The Raman vibrations at  $242\text{ cm}^{-1}$  and  $547\text{ cm}^{-1}$  confirmed the presence of goethite. This study provides evidence for the application of FTIR and Raman spectrophotometry for the identification of functional groups and characterization of low-quality gemstones.

**Keywords:** *Corundum, FTIR, Geuda, Goethite, Raman spectroscopy*



# **Session 04**

## **Graduate Colloquium**

*Management Studies and Social Sciences and Languages*

## **An Analysis on the Relevance of Capital Structure Theories in Relation to Firm Specific Variables**

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The decision on capital structure relates to the combination of the company's debt and equity, which may have significant implications for the value of a firm and the cost of capital. This is a crucial decision because the wrong choice of capital structure can lead to financial distress and even to bankruptcy. Based on the theorems of Modigliani and Miller (1958) and empirical evidence of financing decisions, two competing capital structure theories have been developed and these two theories are Trade-Off Theory and Pecking Order Theory, which seek to explain the shift in leverage ratio by focusing on cost-benefit function and position of transaction costs of borrowing, mostly dependent on observable firm attributes. As a consequence, differences in capital structure theories emerge in their definitions of tax significance and changes in information, transaction and agency costs. The predictions of traditional capital structure models have been well established primarily in the context of developed economies. However, the applicability of theoretical principles to capital structure decisions by companies in emerging and developing countries persist minimal. Many of the research conducted on the analysis of Capital Structure Theories do not concentrate on the applicability of Capital Structure Theories considering firm unique variables. The purpose of this study is to theoretically assess the relevance of Trade-Off Theory and Pecking Order Theory in relation to firm-specific variables. The analysis included firm-specific elements such as profitability, size, liquidity, tangibility and growth in order to review the relationship with the above two theories and to validate the objective of the study. The study concludes that there is an interaction with capital structure, firm-specific variables, and relevance of Trade-Off Theory and Pecking Order Theory.

**Keywords:** *Capital structure, Firm-specific variables, Pecking Order Theory, Trade-Off Theory*

## **Impact of Sustainable Supply Chain Management Practices on Triple Bottom line Performance**

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Traditionally, manufacturing companies seek to maximize profit from their major business process and form other activities as well. These companies concentrate highly on cost reduction activities and use of short and easy unauthorized manufacturing processes. However, economic considerations are not enough to achieve sustainability. Many environmental and social problems are created by manufacturing companies due to poor attention on environmental and social pillars in the sustainable practices. Air pollution, water pollution, ground contamination and employee unrests are taken place due to this profit-oriented manufacturing systems. Therefore, manufacturers may have to implement environmental and social practices parallel to their economic practices to gain competitive advantages. Nowadays, many stakeholders continuously give their pressure to manufacturers to adopt and implement Sustainable Supply Chain Management (SSCM) practices. The purpose of this study is to investigate the impact of SSCM practices on Triple Bottom Line (TBL) performance and further examine the institutional pressure as the moderator on the relationship of SSCM practices and TBL (economic, environmental, and social) performance. Hence, this study is carried on as a survey research study. Data was gathered from 88 manufacturing companies in Sri Lanka. Selected data is analyzed using a structural equation modeling. Findings (from pilot study) pointed out environmental practices enable manufacturing managers to increase their TBL performance. Further, findings assist to identify what extent of SSCM practices have been implemented by manufacturers and to ascertain what extent of impact on economic, environmental, and social pillars by SSCM practices. Moreover, findings emphasize regulatory pressure mainly influences to implement environmental practices. Therefore, it will help to determine the moderating effects of institutional pressure on the relationship of SSCM practices and TBL optimization.

**Keywords:** *Institutional Pressure, SSCM, TBL*

## **Effect of Transaction Cost on Livelihoods of Smallholders: A Review of Empirical Literature**

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Smallholders can be identified as a crucial group who influenced with the negativities of transaction cost. If it able to identify the particular reasons behind transaction cost among smallholders, it can be able to address the problem more precisely. The objective of this study is to accomplish a review of empirical literature on the analysis of the influence of transaction cost on the livelihood success of smallholders. This study was based on the approach of reviewing past empirical literature on the impact of transaction cost on the livelihood success of smallholders. A research article was the unit of analysis in this study. A sample of 30 research articles published between 2005 and 2021 were selected for the reviewing purpose. Review those articles using content analysis. Results found that many have investigated how the transaction cost among smallholders influence their livelihood success. To measure the transaction cost, majority have used searching cost, negotiating cost, monitoring cost and only few has used enforcement cost. Inadequate information, reliability of available information, lack of infrastructure and presence of uncertainties have influenced on smallholders to generate a several modes of transaction costs. The livelihood success was measured in relation to the business success of smallholders. As per the findings of the reviewed empirical studies, a significant negative relationship between transaction cost and livelihood success can be clearly observed. Smallholders who are lagging behind education, market experience and technology are prone to higher levels of transaction costs. These findings may direct future research for the effective future interventions which should be improved to mitigate the higher levels of transaction costs among smallholders.

**Keywords:** *Livelihood Success, Smallholders, Transaction Cost*

## **Pre-Independence Patriotic Hindi and Sinhala Poems: A Comparative Study on Selected Poems of Maithili Sharan Gupt and S. Mahinda**

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This research compares prominent patriotic poetic works of the Indian poet Maithili Sharan Gupt and the Sri Lankan poet Sikkim Mahinda, bringing to light their ideologies on the freedom struggle and the criticisms and taunts they throw at the colonial rule and its followers. The research follows an exploratory, qualitative and inductive approach. The Socio-economic background of the two countries when these poetic works were written are questioned and analysed. The social and educational background of the two poets and the prominent literary works of the relevant age also are studied to get a clear picture of social context and the literary background of the age. The biographies of the two writers are studied to help the reader to understand how these writers honed their skills and to identify the factors which led them to use their literary works to rally nations against the powers of the west. Maithili in his prominent three volume literary work *Bharat Bharati* goes in detail into the philosophy, religion, art, science and natural wealth of the past and the present. He compares the prosperous past to the sobering realities of occupied India. Then he goes on to compare the future to the past and show the reader what they can accomplish with freedom. Mahinda in his writings uses simple lullaby format among a multitude of others to get the youth to join the fight for freedom. Though the core ideology of both these writers remains the same across the numerous patriotic poetic works they created, the techniques and the intensity of this message varies drastically. Mahinda writes in the form of a wrathful youth at his wits end while Maithili is much subtle and gentler in the use of the language.

**Keywords:** *Colonialism, Maithili Sharan Gupt, Patriotism, Poems, S. Mahinda*

## **A Narrative Synthesis on the Influence of Parenting Styles and Self-Efficacy on Self-Employment Intention of Youth: A Review of Empirical Literature**

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The empirical studies relating to the influence of parenting styles and self-efficacy on self-employment intention of youth has not previously been evaluated through a systematic literature review. Thus, this paper aims at reviewing empirical findings to identify the influence of parenting styles and self-efficacy on self-employment intention of youth. To bring coherence to the diffuse body of literature, this study is reviewing 141 scholarly papers. The search strategy of this multidisciplinary review includes prominent electronic databases, journals, published scholarly studies and both quantitative and qualitative research studies on the main variables of the study. Additionally, quality assessment, data extraction and analysis were completed on all included studies. Using content analysis, 141 included studies were grouped into three categories including parenting styles, self-efficacy and self-employment intention. The review revealed that parenting styles are positively associated with self-efficacy of children and the evidence was most robust in relation to the authoritative parenting style. Though self-efficacy is positively related to self-employment intention, research to date have not focused on the influence of parenting styles on self-employment intention. Nevertheless, currently, there are no evidence on the influence of parenting styles on self-employment intention and the mediation effect of self-efficacy. One of the main leverages to obtain new employment opportunities for youth is the social influence. Numerous research reports suggest policy development on self-employment by facilitating entrepreneurial learning, embedded curriculum with self-efficacy and parental positive encouragement. In conclusion, integrating parenting styles and self-efficacy with self-employment will expand the existing knowledge on self-employment intention. The results of this review evidence suggest policy development and future research propositions to uplift self-employment by enhancing self-efficacy level through parenting styles.

**Keywords:** *Narrative Synthesis, Parenting Styles, Self-efficacy, Self-employment Intention, Youth*

## **Factors Affecting the Going Public Decision of Private Companies in Sri Lanka: A Pilot Study**

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The empirical studies on the going public decision of companies are limited in literature due to the absence of a comprehensive database on accounting information and poor survey response rate in many countries. This study investigates the factors affecting going public decisions of companies in Sri Lanka. It collects primary data through online questionnaires from finance professionals and accountants working in listed companies and unlisted companies that qualified to list in the CSE. The questionnaire is designed based on the benefit-cost trade-off theory of going public decision. The questionnaire collects data about the characteristics of the respondents' company, their opinion about the motives/benefits and costs/constraints of the going public decisions, and their perception of stock market characteristics and behaviours toward going public decisions. This pilot study utilizes 36 responses as the final sample. The mean of the benefit and cost of response are sorted to find prime motives and constraints of going public. Consequently, binary logistic regression is performed to find significant factors affecting the decision. This pilot study reveals that lowering the cost of capital, publicity, and gaining additional finance for growth are the prime motives for going public. Disclosure of a lot of sensitive information, under-pricing, and fear of loss of control are the prime constraints of going public. The binary logistic regression is revealed that stock market and cost-related factors significantly impact the probability of going public than benefit-related factors. This pilot study has contributed to developing appropriate scales and measurements that enhance the questionnaire's content and face validity.

**Keywords:** *Benefit-Cost Tradeoff, CSE, Going Public, IPO, Listing Decision*

## **The Strength of Cognitive Aspect of Social Capital on Livelihood Success of SANASA Beneficiaries: With Special Reference to Badulla District**

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SANASA is one of the key Community-Based Organizations (CBOs) in Sri Lanka. It was founded based on a cooperative philosophy with the primary purpose of enhancing the living standard of its recipients. One of the means through which this purpose is attained is by guaranteeing the Livelihood Success (LS) of these beneficiaries. CBOs can use the strengthening of social capital (SC) as a means of achieving the LS of its members. However, even though CBOs have been in operation for a substantial period in Sri Lanka, their members have not achieved LS as expected; it is evident in the poverty that exists within the community. One of the causes of this could be the fact that cognitive aspect of SC (CSC) has not been examined in depth. Therefore, this study mainly focuses on how CSC influences the LS of SANASA beneficiaries. This study used a quantitative approach. Data was collected from 273 SANASA beneficiaries of Badulla District through structured questionnaires. Partial Least Square Structural Equation Modelling was used to analyze data with the help of smart PLS version 3. The study tested 5 hypotheses to explore the relationship between 5 sub-dimensions of CSC on LS. Only 4 out of the 5 hypotheses were accepted; revealing that Interpersonal Trust, Relational Norms, Group Identification and Shared Language have a significant impact on LS. However, the overall impact confirmed that CSC positively contributes to the LS of SANASA beneficiaries. These findings can bring productive outcomes for policymakers to take maximum advantage of SC that exist in the community when designing and implementing initiatives targeting SANASA beneficiaries. Similarly, further research can be conducted to study in-depth reasons behind the absence of an impact of Group Identification, Relational Norms and Shared Narratives on LS among SANASA beneficiaries.

**Keywords:** *Cognitive Social Capital, Livelihood Success, SANASA Beneficiaries*



# **Session 05**

Undergraduate Poster Presentations

*Agricultural Sciences*

## Effect of Storage Period from Harvesting to Subsequent Sowing on Sprouting Ability of Ginger (*Zingiber officinale* Rosc.) seed rhizomes in off-season with different storing materials

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Ginger (*Zingiber officinale* Rosc.) is a perennial spice crop consideration as short duration crop approximately need nine month to maturity. Ginger rhizomes need to storage for few months before seeding. Among storage materials, paddy husk showed best performances. However, information on optimum storage period of ginger seed rhizomes in off season under different storage materials is not properly investigated. Therefore, this study was conducted to identify the most effective storage time and storage medium for ginger seed rhizomes in off season. The experiment was conducted as two factor factorials by using Randomized Complete block Design (RCBD) with three replicates. Storage time (1 week, 3 weeks and 5 weeks after harvesting) and storage method (store with paddy husk, with sawdust and without storing medium) were considered as two factors. Sowing ginger seed rhizomes just after harvesting was considered as control treatment. According to the results, storing time and storage method were significantly affected on moisture content at sowing. Moisture drop rate was higher in without storing medium method compared to store with any medium. Early sprouting ( $21 \pm 0$  days) of seed rhizomes were observed ginger rhizomes stored for three weeks in paddy husk and highest days required to sprouting was observed in rhizomes stored for one week in paddy husk ( $35 \pm 10.5$  days). Maximum pseudo stem height was significant with storage time and storage method that was observed in three weeks in sawdust. Dry weight of rhizome was significant with storage time that was higher for three weeks in paddy husk. Other growth parameters (dry weight of leaves, leaf area per rhizome and length of roots) were not shown any significantly difference with both storage time and storage method for two months. Therefore, this study concludes that storage of ginger rhizomes up to three weeks after harvesting for early sprouting with Paddy husk.

**Keywords:** Feasibility, Ginger Seed Rhizome, Paddy Husk, Sawdust, Sprouting Ability

## **Productivity of Sudangrass (*Swayanjatha*) (*Sorghum sudanense*) and *Vigna marina* Under Milpa on Degraded Land**

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Soil degradation leading to the formation of non-arable land has become a major issue in the dairy sector for increasing milk production. Modern organic management with the introduction of soil rehabilitating plants that can tolerate this problematic soil condition is one of the sustainable ways to solve the problem. The plants used to rejuvenate the degraded soil are Sudangrass (*Sorghum sudanense*) and *Vigna marina*. Sudangrass is a special plant that can tolerate harsh environmental conditions with minimum support. *Vigna marina* is the creeping legume plant that can reverse soil degradation using a symbiosis association with Sudangrass (*Sorghum sudanense*) under “milpa” cropping system. The main aim of the study was to provide a sustainable solution for the fodder shortage in the dairy sector. This study assessed the growth and yield of the Sudangrass (*Sorghum sudanense*) and *Vigna marina* under infertile soil conditions. The experiment was done using four treatments 1. Biofertilizer (T1), 2. Biochar (T2), 3. Combination (T3), 4. Control (T4). Therefore, all the growth parameters such as above ground biomass, number of leaves, final length of the plants were recorded and the largest value, in general, all was in T3, followed by T1 and T2, the lowest recorded by in T4. The results indicate the fodder Sudangrass (*Sorghum sudanense*) and legume *Vigna marina* has potential to thrive in degraded land treated with *Gliricidia* biochar and the bio-fertilizer used. Therefore, the less demanding crops appear to be a sustainable solution to produce fodder in degraded lands

**Keywords:** *Biochar, Milpa, Sudangrass, Vigna marina*

## Effect of Organic Fertilizers and Chemical Fertilizers on Soil Biology: A short-term field trial

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Soil quality degradation is a major challenge in agriculture and common to short-term high demanding crops. Properly managed, live soil is crucial for agriculture. Soil microbial biomass and the organic matter content are essential components to maintain the soil biology, a major part of soil quality. Incorporation of chemical inputs severely affects soil biology. Therefore, to find solutions, a 100% environmentally friendly, low-cost organic fertilizer was tried as a short - term field trial. The focus was to increase soil biology in low fertile lands within a short period. The study was conducted for seven weeks using Cabbage (*Brassica oleracea*) as an indicator crop in a low fertile land. Randomized Complete Block Design was used, with five replicates and three treatments- (i) Super compost, bio-fertilizer, sterilized farm soil (T1), (ii) Chemical fertilizers recommended by the Department of Agriculture for *Brassica oleracea*, sterilized farm soil (T2), and (iii) Control–sterilized farm soil (T3). Parameters were analysed following standard laboratory procedures at the beginning and at the end of the experiment. In general, soil parameters were significantly different in T1 ( $p < 0.05$ ). It manifested the highest increment in organic carbon (2.12%) and microbial activity (14.84%) due to the addition of nutrient-rich organic fertilizer with beneficial microorganisms. At the same time, T2 showed the second highest increment - 0.585% in organic carbon and 7.36% in microbial activity. There was no significant difference between the increment values of T2 and T3 related to microbial activity. T3 showed the lowest increment as the soil was sterilized to eliminate the microorganisms. The results indicate, the application of organic fertilizers has the potential to upgrade soil biology in low fertile lands even within a short time. Therefore, this would be an ideal solution to conquer the challenges in agriculture related to low fertile abandoned lands.

**Keywords:** *Chemical fertilizers, Microorganisms, Organic Fertilizers, Organic Matter, Soil Biology*

## Performance of *Vigna marina* on Degraded Lands Under Organic Soil Management

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Sri Lanka is struggling to become self-sufficient in milk and the limited land available for fodder cultivation is one of the key barriers faced by the dairy industry in the country. Most of the available land for pasture and fodder in Sri Lanka are degraded lands and so the production of pasture and fodder in degraded lands through a cost-effective eco-friendly soil productivity improvement will be a practical solution. Cultivation of *Vigna marina* using bio-fertilizer and soil amendment was tried as a sustainable solution. To convert the less fertile soil to productive soil, and to produce nutritious feed required for the dairy industry were the focus of the study. This study assessed the growth performance of *Vigna marina* in less fertile soils under different organic soil management. The experiment was done under a Randomized Complete Block Design (RCBD), using four treatments. Farm soil + biofertilizer (T1), Farm soil + 20% Pine wood biochar (T2), Farm soil + Biofertilizer + 20% Pine wood biochar (T3), Farm soil as control (T4). Therefore, as growth parameter such as dry weight of above ground bio mass. The best performance for biomass has recorded in T1 (10.48 g) followed by T3 (9.79 g). The lowest was recorded in T4 (5.85 g) while T2 (7.53 g) recorded comparatively higher value than T4. Total Nitrogen content of the soil has been significantly increased in T1 (0.174%), T3 (0.166%), T2 (0.142%) respectively compared to T4 (0.057%). The results indicate that the *Vigna marina* has potential to thrive well in severely degraded land treated with biofertilizer and pine wood biochar. There for the *Vigna marina* under organic soil managements appears to be a highly effective and sustainable solution to produce productive soil and nutritious feed required dairy industry.

**Keywords:** Bio Chars, Bio Fertilizer, Degraded Lands, Soil Productivity, *Vigna marina*

## Effect of Light Spectrum from Light Emitting Diode (LED) on Post Harvest Fruit Quality of Tomato (*Solanum Lycopersicum* L.)

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Tomato (*Solanum lycopersicum* L.) is one of the importance commercial vegetable crops in the World. This study was to investigate the effect of different light wave lengths (light colours) from LED lighting on postharvest quality and microbial growth on harvested tomato fruits. During the experiment light intensity was maintained at 5555.5 - 8333.3 lux/m<sup>2</sup> and temperature range was 25<sup>0</sup>C-28<sup>0</sup>C, relative humidity was 80% - 90%. Under different colours of LED lighting fruit quality parameters were studied such as Fresh weight Loss, TSS, Lycopene, Total Carotene, Ascorbic acid and *in vitro* microbial growth. During the storage period Fresh weight loss% was significantly high in blue and red LED lighting and the lowest was recorded in control (Dark). On 25<sup>th</sup> day highest TSS was recorded (4.50 ± 0.52%) under the blue LED light treatment whereas, the lowest TSS was recorded under the white (3.5 ± 0.52%). The highest lycopene content was recorded under the red LED light in 21<sup>st</sup> (178.56 ± 3.59 mg/kg) and 25<sup>th</sup> (237.35 ± 22.8 mg/kg) days. The lowest Lycopene content recorded in Green LED light in 21<sup>st</sup> (65.373 ± 3.59 mg/kg) and 25<sup>th</sup> (90.53 ± 22.8 mg/kg) days. At 21<sup>st</sup> day highest carotene content was recorded under the red LED light (0.3461 ± 0.0047 mg/kg). Lowest carotene content was recorded in green light (0.1274 ± 0.047 mg/kg). 1<sup>st</sup> (0.177 ± 0.048cm) and 2<sup>nd</sup> (0.333 ± 0.074cm) days after inoculating the highest *in vitro* microbe colony growth was recorded in control and there was no *in vitro* microbes colony growth in LED light treatment in 1<sup>st</sup> and 2<sup>nd</sup> days. LED light colour mainly red, white, and blue considerably effect on postharvest fruit quality of tomato such as fresh weight loss%, Lycopene content, Total solid content (TSS), Total carotene. LED light spectrum effectively suppressed microbial growth on fruit surface which evident by delaying of microbial growth in *in vitro* microbial study.

**Keywords:** Fresh weight loss, *in vitro* microbial growth, Lycopene, Total carotene, Total Soluble Solid

## **Effect of Calcium Application on Growth, Yield and Quality in Tomato (*Solanum lycopersicum*)**

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Tomato (*Solanum lycopersicum*) is world's third most consumed vegetable. It has an increasing demand for locally and large export potential too. One of the biggest problems in tomato production is poor nutrient management where calcium plays an important role. Therefore, this study was conducted to determine the potential of calcium to enhance plant growth, yield and quality of tomato. This experiment was conducted at the poly-tunnel of the Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka to investigate the performance of tomato cv. Platinum F1 under foliar application of calcium. The experiment was conducted using Completely Randomized Design with two factors and four replicates. Calcium was applied with three different calcium sources namely, Calnit, Winner and Calmax in two level of time of application namely one week after transplanting and just before flowering and repeatedly apply with fifteen days interval. Those calcium sources were applied in 0.5% concentration until entire plant was wet. Earliness of flowering, flower clusters, flower count, days to the first fruiting, fruit count, fruit weight, fruit circumference, fruit hardness, pH, total soluble solid content, vitamin C, lycopene content, blossom end rot incidence, plant height and plant fresh weight were measured. The highest plant height ( $112.5 \pm 2.25$ cm), flower count ( $60 \pm 2.55$ ), fruit weight ( $30.6 \pm 1.63$ g) and vitamin C content ( $0.00319 \pm 0.00014$ mg/100g) were recorded with foliar application of calcium sources. However, time of application has no effect on the above parameters. Foliar application of calcium has no significant effect on days to first fruiting, flower clusters, fruit count, fruit hardness, pH, total soluble solid content, lycopene content, blossom end rot incidence and plant fresh weight. This indicates that the foliar application of calcium has a positive effect on growth, yield and yield quality parameters of tomato through there is no effect of the time of application.

**Keywords:** *Calnit, Calmax, Foliar application, Tomato, Winner*

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# **Session 06**

Undergraduate Poster Presentations

*Applied Sciences*

## **Gender Inequality Face by Female Athletes; With Special Reference to the Sabaragamuwa University of Sri Lanka**

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This particular study was accomplished to identify the gender inequality faced by female athletes; with special reference to the Sabaragamuwa University of Sri Lanka. Identify the gender inequality faced by female athletes in Sabaragamuwa University was the key objective and it examined about what kind of factors of gender inequality related to participation in sports and how gender inequality experienced in other areas of sports life. A survey method was applied to examine the gender inequality faced by female athletes in Sabaragamuwa University. The questionnaire was used as main data collection method for the study. 113 female athletes who were participated currently to the university sports were selected as sample using total sampling method. The questionnaire was consisted of thirteen categories with two subsections as gender inequality related to participation in sports and inequality experienced in other areas of sports life. The study has provided conclusions after wearing out detail scientific analyses of data using suitable statistical tools. Descriptive statistics and chi-square test were used to analyze the data gathered from the questionnaire. According to the results, six factors were accepted from the chi-square analyze: approach of teachers and coaches ( $P < 22.7476$ ), economical aspects ( $P < 29.2110$ ), Social and cultural acceptance ( $P < 21.1453$ ), religious factors ( $P < 31.5024$ ), inequality in job opportunities ( $P < 48.1320$ ) and scholarship awards and leadership ( $P < 39.0244$ ). There is a positive moderate correlation among all factors. The results which were identified under the sub sections inequality faced in other areas of sports life is highly affected for the females to participate sports. Results suggested that there is need to enhance gender equity among the University sport participants. The recommendations were suggested of this study can be able to use as a tailor advertising messages among the different stakeholders of the University sport sector.

**Keywords:** *Cultural, Economic, Gender Inequality, Female Athletes, University Sport Participation, Social*

## **Prediction of Sport Talents among Adolescent Female Netball Players in the Western Province of Sri Lanka**

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Netball is an exciting, fast and skillful game of fair contest. It has the power to change lives and inspire communities. Netball is one of the fastest growing participation games in Sri Lanka. This study was conducted to find out how the Physiological, Physical Fitness and Anthropometric characteristics were affecting the playing ability of the adolescent female Netball players in the Western province of Sri Lanka. To achieve this purpose, the study sample was twenty (n=20). Players were selected by using multistage sampling technique. The age of the players was ranged from years 13-19 ( $\pm 1$ ). The Netball playing ability was selected as the dependent variable and it was assessed by ratings of a judge panel. Physiological variables taken were VO<sub>2</sub> max, Resting Heart Rate, Breath Hold Time. Physical fitness variables were Cardiorespiratory Endurance, Muscular Strength, Muscular Endurance, Speed, Agility, Flexibility and Leg Explosive Power. The anthropometric measurements used were Height, Weight, circumference and length of limbs, Girth of Chest, Waist, and Hip. To examine the relationship between performance ability and selected independent variables, a cluster analysis and Pearson correlation was calculated with SPSS 25 software. The findings of the research are mentioned below. Significant correlations were obtained for resting heart rate and footwork playing ability, Muscular endurance and footwork playing ability, speed and passing playing ability. The research concluded that there are significant correlations with the anthropometric variables namely, height, weight, thigh girth and calves circumference with the passing playing ability. This study concludes that there are impacts of Physiological, Physical Fitness and Anthropometric measurements for playing ability of adolescent female Netball players in the Western province of Sri Lanka.

**Keywords:** *Anthropometric, Physiological, Physical Fitness, Playing Ability*

## **Why are we behind? Comparison of the Step Behavior of Elite 400 Meters Hurdles in Sri Lanka with Elite Asian athletes**

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The 400m hurdle event in Sri Lanka has won medals at Olympic Games and other international competitions. However, since the year 2000 Sri Lankan 400mH athletes were not able to win any international medal above the South Asian level. Therefore, this study aimed to identify and compare the stride pattern in 400mH event of the top 10 Sri Lankan and Asian level athletes referring to 2019 athlete rankings. Following the retrospective research design sample of 20 athletes of 400mH, distributing top 10 athletes from each level were selected under the selective sampling method. Each athlete's best race video in the year 2019 was analyzed. The stride patterns of selected subjects were analyzed by using Kinovea software version 0.8.26 and recorded in Microsoft Excel 2013. The statistical analyzes were done by using Minitab version 19. Oneway Analysis of Variance (ANOVA) and Tukey test were utilized to assess significant differences and Pearson's correlation test performed to identify linear relationship. Accordingly, a significant difference in stride patterns of athletes in each level was identified. Furthermore, according to the Tukey test from the start to the first hurdle and the 6<sup>th</sup> hurdles to the 10<sup>th</sup> hurdle significant differences identified in Sri Lankan athletes ( $p < 0.05$ ). From the 1<sup>st</sup> hurdle to the 6<sup>th</sup> hurdle all 2 levels were significantly different ( $p < 0.05$ ). From the 10<sup>th</sup> hurdle to the finish line there was no significantly different between 2 levels. The 400m flat time was significantly different in all 2 levels. The Pearson correlation revealed a significant strong positive correlation between 400m flat time and 400mH. ( $p < 0.05$ ,  $r = \pm 0.917$ ). In conclusion, to improve the level of performance among Sri Lankan 400mH athletes compared to the Asia level, time taken from the start to the first hurdle, the timing between hurdles and timings from the last hurdle to the finish line needs to be reduced. Additionally, athletes in all levels need to reduce their 400m flat time in order to clock better performance in 400mH.

**Keywords:** *Athletics, Hurdles, Stride pattern, 400m Hurdle, 400m sprint*

## **Inexpensive Digital Apparatus to Observe Reaction Time and Force of Tumble Turn Swimming Movement**

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Doing the fast and effective Tumble turn is one of the most critical skills that makes a faster swimmer over longer distances. The Force and reaction time is very important to perform accurate tumble turn in swimming events. The aim of this research is to an apparatus that can measure the force and reaction time of a swimmer. In Sri Lanka, there are many talented swimmers but not enough facilities to measure the reaction time and the force of tumble turn. The force describes as a push or pulls upon an object that causes to change the direction of the swimmer. The Reaction time shows the ability of the swimmer to respond in a quick turn. Arduino and Thing Speak software needs to design digital circuits of apparatus. The Laser sensor and receiver are connected 3 m distance away from the wall. The swimmer entered a 3 m zone; the timer will activate. It will measure the duration of the tumble turn when the swimmer leaves the 3 m zone. The force sensor ( $F=2000N$ ) is attached to the wall to measure the force. When the swimmer touches the wall with the legs, the force calculates from the apparatus. School-level team ( $n=10$ ) swimmers were used to observe the reaction time and Force corresponding to the tumble turn. Also, the high-speed camera (50Hz) was used to determine the kinematic of the movement's patterns of the tumble turn to measure the validity of the data. The analyzed average force and reaction time of the participants were Force (4.14N) and Reaction time (6.507s) respectively. The reaction time and force of the tumble turn can measure through this inexpensive digital apparatus in any practical session of tumble turn.

**Keywords:** *Apparatus, Force, Reaction Time, Tumble Turn, Swimming*

## **Perception and Application of Olympic Values Among Multi-Level Athletes in Sri Lanka**

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The ‘Olympic Values’ reflects the core essence of ‘Olympism’, the philosophical base of the Olympic Movement and acts as an integral component to discover and practice the holistic nature of developing humankind. The study is aimed to discover the perception and application of three Core Olympic Values: Respect, Excellence and Friendship among multi-level athletes in Sri Lanka. Further, the study highlights the most practicing Olympic values among each level and focused on the challenges of practicing and application of Core Olympic values in Sri Lanka. An extensive literature review assessment was carried out to build up the conceptual framework for the study. A qualitative research design with semi-structured in-depth interviews was conducted to examine the perception and application of Core Olympic values. The study population was identified from Olympic, National, University and School level athletes in Sri Lanka. Ten athletes were selected from each level (N=40) by using purposive sampling method. In addition, biographical narrative research method was used to highlight the athlete’s personal observation towards the practice of values. The conclusion revealed that the most perceptive and applicable value practiced by those athletes is Friendship. Though they practice Friendship, Excellence and Respect, most athletes didn’t know these values as Olympic values. Most of them have little knowledge about the values. Specially, the school level athletes did not know these values. The recommendation of the study is to hold more programmes, workshops and activities about Olympic values for the Athletes, Coaches, and other relevant staff. It is recommended to start this educational programme from the school level to obtain better results.

**Keywords:** *Application, Core Olympic Values, Multi-Level Athletes, Perception*

## **Factors Influencing the Intrinsic Motivation of National Level Volleyball Coaches in Sri Lanka**

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The aim of this research was to investigate the factors influencing the intrinsic motivation of National level Volleyball coaches in Sri Lanka. This study was undertaken by focusing on the matters that were recognized from the National Volleyball tournaments which were held in the last five years and through the records of the Sri Lanka Volleyball Federation. A group of 46 subjects, were in National level Volleyball coaches, participated in the study. A COM questionnaire was applied to assess the several intrinsic factors that influence coach motivation. These included remuneration, training and education and adequate facilities and standard equipment. The study has provided conclusions after wearing out detail scientific analyses of data using IBM SPSS statistical tool. Widen a hypothetical variant and to formulate hypotheses of the study were identified to achieving the research objectives. The major conclusions are that coach motivation is a highly sensitive concept which is affected by a multiplicity of factors. The study also asserts that the issue of motivation as a personal or inherent factor in coaches predisposes and coaches to develop a certain mind set regarding their careers. The result has shown that 91.30% male and 8.7% were female in the respective sample. 28.26% of coaches have represented from 40-44 and 45-49 age categories in the entire sample. Based on the findings, all the hypotheses were accepted including remuneration, education/training and facilities/ equipment impact on coaches' intrinsic motivation of National level Volleyball coaches in Sri Lanka. This study provided valid and important facts to be implemented by the Sri Lanka Volleyball Federation, Volleyball coaches association and main stakeholders to the development of the National game in Sri Lanka. This study is helpful in bridging the knowledge gap of the respective research area.

**Keywords:** *Intrinsic Motivation, National Level, Volleyball Coaches*

## Characterization and Authentication of Isolated Rhizobia from Some Selected Host Plants

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Rhizobia are naturally occurring soil bacteria, of them plant growth-promoting Rhizobacteria (PGPR) have an ability to fix atmospheric inert nitrogen into plant utilizable forms like ammonia and amino acids. Rhizobia are either specific or promiscuous for nodulating certain legumes under different environmental conditions. In the present study, Rhizobia strains isolated from soybean (*Glycine max*), groundnut (*Arachis hypogaea*), mung bean (*Vigna radiata*), cowpea (*Vigna unguiculata*), common bean (*Phaseolus vulgaris*), and white clover (*Trifolium repens*) were purified using selective culture media and characterized morphologically, biochemically and physiologically. According to morphological characterizations, Rhizobia were found to be gram-negative and rod-shaped/roughly rounded bacteria. The colony appearance was gummy, white, opaque, or immersed. Biochemical characteristics were tested against five different antibiotics (Tetracycline, Cloxacillin, Ampicillin, Ciprofloxacin, Doxycycline, and Metronidazole), five different amino acids (L-tryptophan, Urea, Glycine, Cysteine, and L-tyrosine) and six different carbohydrates (D-glucose, Galactose, Fructose, Lactose, Mannitol, and Sucrose). Tetracycline was given solitary observation for the resistance of selected strains. Sucrose and dextrose were optimally utilized by Rhizobia besides mannitol. Utilization of amino acids by many strains was restricted to Cysteine and L-tyrosine. Green gram and cowpea strains were fast growers with acid-production in BTB and BRYMA, while soybean and common bean Rhizobia were detected as slow growers. Similar results were obtained in UV absorbance of Rhizobial culture densities at 254 nm wavelength for their growth rate. Following the physiological characteristics, many strains were restricted to the 6.5-9.5 pH range and 0.5% -1% salinity levels. There was optimized growth of all strains at 32<sup>o</sup>C and 35<sup>o</sup>C temperatures incubation. Authentication gave a respectively high performance with a particular host plant. Groundnut, cowpea, and green gram obtained excellent potential to nodulation out of other Rhizobia inoculated legumes. Anyhow, this study implies the importance of selecting the most effective and efficient Rhizobial strain for a particular physical and biochemical conditions of the host plant and rhizosphere. The recorded properties of isolated Rhizobia confirmed their potential to implement sustainable agriculture by promoting them as biofertilizers to replace chemical N fertilizer.

**Keywords:** Authentication of Rhizobia, Nitrogen Fixation, Nodulation Rhizobium Characterization, Rhizobium Spp.



## **Effect of Heart Rate Reserve Method Intensity Training on Weight Loss and Cardiorespiratory Fitness Among Overweight Sedentary Men**

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The purpose of the study was to examine the effect of heart rate reserve method intensity training on weight loss and cardio-respiratory fitness among overweight sedentary men. To achieve the purpose, 100 overweight men were selected as subjects, who were working in the private garment sector in Sri Lanka in addition, all participants were classified at baseline as sedentary, which was defined as reporting exercising less than three days per week for less than 20 minutes a day over the previous 6 months. Their age ranged between 21 and 35 years. They were divided into two equal groups based on their BMI scores as experimental group and control group. Before the experimental period, both the Exercise group and the control group were tested on their BMI and cardio-respiratory fitness. The experimental group underwent 12 months of cardiorespiratory endurance training based on heart rate reserve method intensity. The experimental group underwent 30 minutes of exercise, 3 days per week, with an intensity of 70% of THR (heart rate Reserve method) for 12 months. The control group underwent no specific training. After the experimental period, both the exercise group and control group were tested on their BMI and cardio-respiratory fitness. The collected data were analyzed statically by using the T ratio and the results showed that there was a significant difference between the experimental group and control group on BMI and cardio-respiratory fitness 0.05 level of significance. It was concluded that heart rate reserve method intensity training reduces body weight and improves cardiorespiratory fitness in overweight, sedentary men.

**Keywords:** *BMI, Cardio-Respiratory Fitness, Heart Rate Reserve Method Intensity Training*

## Evaluation of Locally Available Cassava (*Manihot esculenta*) Varieties for Starch Production and Physicochemical Characterization of Cassava Starch

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The present study was conducted to analyze and compare the physicochemical and functional properties of cassava starches extracted from eight different local cultivars of cassava (MU 51, Suranimala, HORDI MU51, Swarna, Kirikawadi, CARI555, CA01, Shani), harvested from Horticultural Crop Research and Development Institute, Gannoruwa, Sri Lanka. In addition, the basic morphological characteristics and some chemical properties of cassava plants, tubers, and leaves were also evaluated. The extracted starch yields of selected cassava varieties ranged between 53.74-69.35%. The moisture, ash and pH values of cassava starch from different varieties ranged between 10.04-10.64%, 0.03-0.17%, 5.51-6.26, respectively. The amylose content of cassava starch varied as 17.55-18.66%, however, the values were not significant at  $p < 0.05$ . The highest total phenolic content (0.03 mg GAE g<sup>-1</sup>) of cassava starch was reported by the Shani variety. The L\* (97.18-98.69), a\* (-0.63 to -0.77), b\* (1.64-2.15) values and the whiteness index (8.66-9.64) of the cassava starches were also evaluated. The average particle size of starch granules significantly varied between 2.55-9.75  $\mu\text{m}$ . The water absorption capacity (0.76-0.96%), swelling power (5.03-6.46%), solubility index (0.0077-0.0181%) and syneresis (29.04-36.18%) varied considerably among the cassava varieties. The gelatinization temperature of cassava starch ranged from 63.90-67.40 °C and the texture parameters of the cassava gels were evaluated using the Brookfield Texture Analyzer. The keeping quality of cassava starch was observed in polyethylene and aluminium packages for three months. The Cyanogenic glucoside content of cassava starch was determined by spectrophotometry and the values (4.69-13.05 mg kg<sup>-1</sup>) varied significantly at  $p < 0.05$ . The study revealed that the physicochemical and functional properties of cassava starches were greatly influenced by the variety of cassava, and these findings will eventually help to identify the potentials of cassava starch in food and non-food uses.

**Keywords:** BMI, Cardio-Respiratory Fitness, Heart Rate Reserve Method Intensity Training

# **Session 07**

Undergraduate Poster Presentations

*Social Sciences and Languages*

## **Factors Affecting the Academic Performance in Ordinary Level Students of Junior Schools at Galle District**

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Students' academic performance is crucial in any country. Taken as a whole, junior schools' Ordinary Level students' academic performance is less when compared to the other schools' Ordinary Level students' academic performance in Sri Lanka. 321 students failed the 2019 Ordinary Level examination in Galle district, which is the highest number of students who failed the Ordinary Level examination within a year in the Southern province. On the other hand, Southern province had recorded the highest number of students that are eligible for Advanced Level 2019. Therefore, the main objective of this study was to identify the factors that affect the academic performance of Ordinary Level students in junior schools at Galle district. Better academic performance is measured by having an "A" grade in 6 main subjects in the Ordinary Level exam. 200 students were selected as a sample using multistage cluster sampling technique while primary data were collected using the questionnaire method. Binary logistic regression was used to analyze the main objective of the research. The data were analyzed using the statistical software SPSS and 21 variables were used for analysis. Through all these variables, number of tuition classes and study hours per day were positively significant at 0.05 significant level respectively to students' academic performance. Students at junior schools receive fewer facilities than students of other schools. But the variables that were used to measure the students' facilities were not significant. Therefore, it is clear that fewer facilities had no effect on the academic performance of junior school students. Social media usage, sports and extra-curricular activities, romantic relationship, test anxiety, stress level, motivation, sanitation facilities, insufficient light, inappropriate classroom, over-crowded classes, misplaced boards, health, school attendance and gender were not significant on the students' academic performance.

**Keywords:** *Academic Performance, Binary Logistic Regression, Ordinary Level Students, Junior Schools*

## **Identification of Factors Influencing Yield Fluctuation of Maize Farmers in Anuradhapura and Monaragala districts**

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The Agricultural sector plays a key role in the Sri Lankan economy and cereal crops contribute a large share in the agricultural Gross Domestic Products of Sri Lanka. The second most demanding cereal crop is maize in Sri Lanka; cultivated in over 70,000 hectares of land around the country. Over the last decade the local maize production has been highly fluctuating, this research was designed to find out factors that affect to the maize production fluctuation. The main objective of this research was to identify the factors influencing yield fluctuation of maize farmers in Anuradhapura and Monaragala districts. Multi-stage cluster sampling technique was applied to select the sample of 200 maize farmers (n=200). Primary data was collected through a pretested structured questionnaire. The data collected from the sample were analyzed using descriptive statistic and inferential statistical methods in SPSS software. A multiple linear regression was used to reach the main objective. The results showed that, in socio-economic factors, farmer age and experience on maize cultivation had a positive and significant influence ( $p < 0.05$ ) on the production. Factors such as temperature, soil, availability of extension officers, loan, upland of land type, training program and land extent were also determined to positively and significantly influenced at ( $p < 0.05$ ) level to the maize production fluctuation. It was found that minor irrigation, home garden and low-land of land type and pest control were negative and significant at ( $p < 0.05$ ) level affected to the maize production fluctuation. Finally, it can be concluded that maize yield fluctuation over the last few years due to environmental and some socio-economic reasons. Government policy makers should be focus on this regard and need to make a ground level development strategy to empower the livelihood of local maize farmers and supply infrastructure facilities like irrigation projects and input markets, while transportation sector should also be developed as soon as possible to increase the production.

**Keywords:** *Anuradhapura, Maize Production, Moneragala, Yield Fluctuation*

## Standardization Methods for Large Scale Examinations in Sri Lanka

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From the moment the Z score was introduced for University admissions from General Certificate of Education (Advanced level –A/L) examination has become a controversial issue in Sri Lanka. This article explains the behavior, strengths, and weaknesses of the Z scores with various shapes of statistical distributions for different subjects and further the strengths and weaknesses of the min-max method and robust method for Z scores and the effect of percentile ranking method on the ranking of the students' performance. Each different alternative methods are compared and tested with simulated data using descriptive analysis. It is revealed that there is no significant difference between the different subjects that consist of different distributions. Furthermore, using Z score when standardizing each individual compulsory and optional subject scores proves to be more effective than the min-max standardization method and robust method. Overall Z score for all the combinations that consist of different distributions has the same shape and behavior. After standardized overall Z score using the min-max method, the scores of all the scales for the min-max method are in the same range and the standard deviation and variance are approximately the same, the percentage and the number of students with the highest and lowest Z score in all combinations can be obtained as a percentage by using the percentile ranking method. Higher Z scores have a higher percentile rank and smaller Z scores have a lower percentile rank. This method makes it easier to get the percentage of students with high Z scores and the number of students with low Z scores.

**Keywords:** *Min- Max Method, Percentile Ranking Method, Robust Method, Z Score*

## **Research on Effectivity of Using Blackboard/Whiteboard Method as an Aid for Basic Chinese Grammar Teaching in Sri Lanka (With Special Reference to Sabaragamuwa University of Sri Lanka)**

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The development of the modern technology provided many substitutes to number of fields in present Sri Lanka. But considering the field of education, it still seems to be very difficult to adopt with modern technology and it seems still outdated with traditional approaches. Especially in the field of language studies, the use of teaching aids is not satisfactory. When it comes to learn a foreign language, the use of teaching aids is very much important since the use of teaching aids do a vital role throughout the whole language teaching and learning process. Although Chinese grammar is the easiest part in the ocean-like Chinese language, Sri Lankan students are always messed up with the grammar patterns of the mother tongue and the third language- English. In Sri Lankan classrooms, the major teaching aid used for teaching basic Chinese grammar is still the traditional blackboard/whiteboard method. So, this research totally focusses on measuring the effectivity of traditional blackboard/whiteboard method that are currently using in teaching basic Chinese grammar in Sri Lankan classrooms. On the basis of theory, the primary data were collected through separate questionnaires distributed among the lecturers and students in Sabaragamuwa University of Sri Lanka. Then the collected data was monitored through extensive reference of relevant research articles, books and websites published internationally and especially in China. The findings and results depicted that the use of blackboard or whiteboard throughout the whole lecture in the grammar teaching class is not effective for the beginners. Both Students and teachers agreed that there should be better and effective substitutes of modern teaching aids to replace the traditional blackboard and whiteboard. The findings encourage to use multimedia, computer and mobile applications, flashcard games as some effective ways of aids that can be used in basic Chinese grammar class and it is recommended that those traditional teaching aids should be replaced with modern technology and should be promoted.

**Keywords:** *Basic Chinese Grammar, Chinese Beginners in Sri Lanka, Teaching Chinese as a Foreign Language (TCFL), Traditional and Modern Teaching Aids*

## **The Depiction of migrant trauma as a Gendered Experience: In Relation to the Cinema of Hanif Kureishi**

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Migration from the periphery to the Centre in the acquisition of migrant fantasy is traumatic in responding themselves to the migrant turbulence through the pathway of assimilating to the Centre while adhering to inculcated implications of home. The borders of migration from east to west negated female diasporic subjects that reflected in a way their passive reaction to the migrant fantasy. Hanif Kureishi as a Pakistani cinematographer with tangible experiences of the migrant turbulence upsized diversified underplays of migration as a Gendered experience in his respective movies, 'My Beautiful Launderette' (1989), 'The Buddha of Suburbia' (1993) and 'My Son the Fanatic' (1997). The research is predominantly qualitative in nature and the researcher deployed theoretical interpretations of Homi. K. Bhabha, the Freudian conceptualization of the trauma theory with feminist theories of Simon de Beauvoir and Judith Butler. In data interpretation, the researcher had utilized evidence triangulation to derive diversified perspectives. The plight of female subjects in the diaspora addressed by Kureishi as female exclusion from the masculine success journeys in the west. Kureishi's forte of the implication of female gaze point employs the idea of one generation holding the ethical doubt regarding the entire scenario of migration. Females' fluctuate between the masculine counter-parts financial dreams and their inculcated roots of the east. Females were upsized as epitomes of passive, de-sexualized beings and symbolized female sacrifice at the verge of queer diasporic subjectivity. The findings of the study are reminiscent of females' incapability to mingle themselves in the center that constantly upsize traumatic psychology. Kureishi's matriarchs had identity formations of flexible roots in the periphery than in the Centre that reverses back to the homeland as a fixed idea. The findings of the research will derive novice avenues for future research paradigms that will be effective for the future research dimensions of migrant cinema.

**Keywords:** *Gendered Experience, Hanif Kureishi, Migration, Trauma*



## **Strategies to Overcome the Socio-Cultural Aspects in Hindi-Sinhala Translation**

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The translation is a factor that determines the existence of a language. It keeps the inter-connection between two different languages while nourishing the language. Translation became a global need and enabled effective communication among people. The translator occupies a responsible place in this process and has to face various kinds of issues such as socio-cultural aspects while doing their translation. Socio-cultural aspects represent the relevant language and society. Therefore, dealing with those aspects is a challenge for the translator. In this context, this paper discusses the available socio-cultural barriers in translation from Hindi to Sinhala, based on the selected ten short stories of Rabindranath Tagore. The main objective of this study is to identify the socio-cultural problems and examine the strategies to overcome the particular difficulties. Qualitative approaches were put in place to this study using secondary data. According to the finding of this study, practical issues of socio-cultural aspects had occurred when translating Rabindranath Tagore's selected ten short stories. Translators should have to face difficulties in socio-cultural aspects while transacting with the source language and target language. This study was examined the strategies to overcome those issues using methods of borrowing, description, adaptation, substitution, omission and addition. This study concludes with strategies for effective Hindi-Sinhala translation.

***Keywords:*** *Issues, Socio-Cultural Aspects, Strategies, Translation*

## Issues Confronted by Noguchi Tadashi in Translating Culture Specific Terms in Sinhalese Novel “*Viragaya*” into Japanese

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In the field of literary translation, Sinhalese to Japanese translations are infrequent compared to other language pairs. In addition, there is a scarcity of study on Sinhalese and Japanese translations. The purpose of this study is to look into the cultural barriers that Japanese translators face when translating Sinhalese literary works into Japanese, with a particular focus on Noguchi Tadashi’s Japanese translation of *Viragaya*. The research was conducted by using both primary and secondary data. While the Sinhalese novel, *Viragaya* by Martin Wickramasinghe and its Japanese translation by Noguchi Tadashi were referred as primary data, other available reading materials relevant to the study were taken as secondary data. The collected data was later analyzed by using Content Analysis Method. The data analyzing process was mainly done focusing on cultural issues occurred in the Japanese translation. As per the findings of this study, Noguchi Tadashi, the translator has encountered several issues while translating terms related to religious events and festivals, food items, household equipment, clothing and ornaments, and terms related to human relationships, especially in terms of finding equivalence in Japanese language. Instead of employing equivalent phrases in Japanese, the translator has sought to use other strategies such as explanation, generalization, and adaption. Inconsistency of several culture specific terms was also found as an issue. Furthermore, it was discovered that, despite the translator’s utmost efforts to overcome cultural barriers by employing the aforementioned strategies, he was unable to convey the original meaning of several cultural specific words in most cases to the target audience. In conclusion, this study shows that due to the cultural differences between the two cultures, Noguchi Tadashi was unable to successfully translate number of culture specific terms in Sinhalese into Japanese, which had a negative impact on delivering the original meaning of *Viragaya* to a Japanese audience.

**Keywords:** *Culture, Issues, Language, Translation, Source Language, Target Language*

## **Folk Worship and Beliefs: A Study of Based on Lunugala Area**

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The deities worshiped by the folk people are the folk deities. The deities are understood to be past with the biological aspects of the folk people. In that sense, the importance given to the worship of folk deities can be seen in the context of the life of the hill country people who are south Indian inhabitants. Numerous texts have been written on the local deities being worshiped in the area as a part of the Lunugala area. Many parts of the mountains as a whole have been taken as study sites. However, no separate study has been carried out so far on the texts which are an administrative division of Badulla District and the local deities are worshiped so this study is included. Thus, the study, it has been carried out with the aim of examining the folk deities and beliefs in the case in the Lunugala Area. The information and interviews obtained from the field study serve as primary sources for study. Texts on folk worship, Research, Articles, Magazines, and Internet References are secondary sources. Methods such as field research analysis, descriptive interviews have been in this study as well as, historical approaches and sociological approaches. All the people living in the Lunugala area are included in a category of workers irrespective of caste. Due to the fact that the majority of the people living in the area are Hindus, many folk temples have been set up in all the villages. The male and female deities worshiped by these people are classified as household deity, tribal deity, guardian deity, professional deity can be classified as a non-professional deity are various types of deity. On this basis, the worship of the gods in carried out by these people. Although all the folk deities are generally worshiped, it can be seen that these people have given more importance to the professional deities of the hill country. In the tradition of worship among these people, they build temples to the deities and perform festivals, as well as perform various rituals based on faith. Worship very according to the attributes of the deities and the occupations in which they are performed. So the faith that emerges through this worship is an energy that emerges among the people. Through this it was possible to know that beliefs differ in terms of deities and that there is a close connection between worship and belief. Therefore, it is possible to see from the field study that the beliefs and deities of the deities are outdated despite some chronological changes in the worship of the local deities by the people of Lunugala.

**Keywords:** *Folk Worship, Lunugala Area, Rituals, Sacrifice*

## **Retranslation as a March Towards Translation Quality: A Comparative Study on the First Sinhalese Literary Translation and Retranslation of E. R. Braithwaite's 'To Sir With Love'**

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Many scholars are interested in studying what lies behind the word 'Retranslation'. Thus, it still remains as a hypothesis. The scenario behind the existence of multiple translations for one source text has caught the attention of theorists for the recent past years. The present study was done in the local context to examine its main objective on the effect of retranslation on translation quality. The researcher comparatively analysed both translations and selected parallel six passages from the Source Text and the two Target Texts of between 500-600 words as samples incorporating the purposive sampling technique. Revision was done as a content analysis adhering to the revision parameters namely, accuracy, completeness, logic, facts, smoothness, tailoring, sub-language, idiom, mechanics, layout, and organization and thereby the translation quality was ranked based on the criteria introduced by Brian Mossop. To analyse and compare the texts in depth, descriptive comparative analysis method was used. Twelve government translators from the Department of Official Languages were selected to carry out the revision of each selected texts. They were provided with the revision criteria and instructed to correct and rank each passage individually by comparatively analysing the source text, first translation and the retranslation. The grade of 'A' was given if the passage was 'deliverable without further revisions', 'B' was granted if the passage was 'deliverable with just a few minor revisions', 'C' was given if the passage 'requires major revision work'; and lastly 'D' was offered for 'undeliverable; which needs retranslation'. In the first translation, five out of six passages were ranked as C and the remaining passage was ranked as D. All the passages of the retranslation were ranked as B since it still needs some minor revisions. When compared to the first translation, the retranslation has overall achieved a quality translation with slight corrections to be fulfilled, which also will conclude that retranslation process subsequently bestows more quality translations for the next generation of readers by simply minimizing shortcomings encountered in the earlier translations.

**Keywords:** *First Translation, Literary Translation, Retranslation, Revision, Translation Quality*