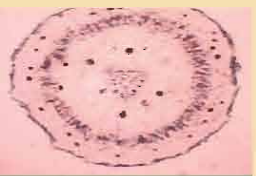
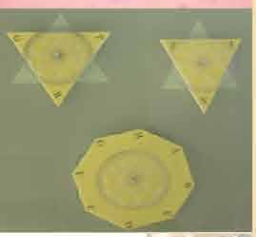
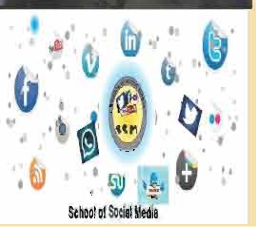
INNOVATION PROJECTS

AN UNDERGRADUATE RESEARCH INITIATIVE OF UNIVERSITY OF DELHI







RESEARCH COUNCIL
UNIVERSITY OF DELHI

Innovation Projects

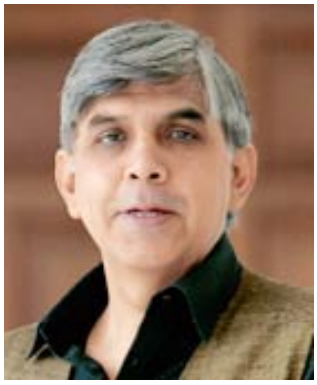
An undergraduate research initiative of University of Delhi

(Summary of the 2013-15 initiative)

Research council
University of Delhi

ISBN:978-93-85611-10-0

Vice Chancellor's words



The university system in India must get attuned to the needs of the society. It must get students to engage with their hands. It stimulates their minds. We must also encourage trans-disciplinary interaction. At the same time, what makes us different is the innovative approach to learning. About four years ago, I launched what is known as innovation projects for undergraduate students who were asked to apply in groups-of up to 10-for any project that they can conceive of in any area of human endeavor and is trans-disciplinary, hands-on and has real-world application. Thousands of students in groups of ten work in these projects which have given rise to new knowledge, new insights into issues that connect knowledge to society and offer solutions to the challenges of the society. The number of ideas, patents and research papers that came up from these projects is indeed surprising. High-end knowledge with immediate practical application is the need of the hour. We are publishing our own peer-reviewed undergraduate research papers. To connect with this effort, we have set up incubation centres that fund start-ups. Within one year of inception, we have 36 start-ups in the pipeline. Industries are coming here to pick up projects. That's where we derive our prime strength from.

Prof. Dinesh Singh

Foreword

Among the significant new programmes at the University of Delhi, the scheme of Innovation Projects has shown a highly successful outcome. For one, it introduces and trains a research sensibility in undergraduate students with the able mentorship of teachers; for another, the results may bring solutions to real life problems in India.

The current publication presents, in summary, the objectives and findings of ... projects funded by the university. The Research Council constantly monitors the progress of the projects and maintains an open door policy on consultations. It is pertinent to note that the current projects have also been presented on the public platform of the Innovation Plaza at Antardhvani Academic & Cultural Festival, within which the Industry Interface was built in.

Students have gained confidence, research experience, hands on apprenticeship and an academic training through the scheme which will bring benefits to their future. The University of Delhi has demonstrated yet again that it participates actively in the growth of the nation.

Thanks accrue to Vice Chancellor, Prof. Dinesh Singh who visualized and created this Innovation programme. Appreciation is due to Dy. Dean Research, Dr. Deepika Bhaskar who minutely coordinated the implementation under the wise guidance of Deans Research and various advisory committees. The Principals of colleges and the teams of teachers and students who constituted a kind of Innovation Club and network have changed the mindset about interactive learning.
I hope this publication will be inspirational for all.

Prof. Malashri Lal
Chair, Research Council,
Dean of Colleges
Dean Academic Activities & Projects

Preface

The scheme of Innovation Projects, a highly successful venture of the University of Delhi is a unique scheme of promoting undergraduate research in colleges and inculcating innovative thinking in students. The Innovation Projects were conceptualized by the Vice Chancellor for the undergraduate colleges of the University of Delhi. The scheme has helped teachers with an opportunity to carry forward their research interests and the students with interdisciplinary exposure and experience of research projects at the undergraduate level. Moving beyond the curriculum bound by a discipline based syllabus, the scheme has inculcated analytical, IT and various soft skills in students. It has also been successful in fostering in new ways of learning. Several projects have demonstrated the viability of the innovations**.** It is clear that the purpose for which the Innovation Project scheme had been launched, which was to generate excitement in trying out ideas and carrying them through by means of practical output, has been fulfilled. The outcome of the projects may build prototypes for problem-solving in the community. Most projects conducted field trips, seminars and workshops. The hands-on approach drew attention to real life problems and got the youth to intrigue the challenges faced by the society. Newspapers have periodically carried reports of the work done in these projects. Several studies are showing possiblities of long-term societal impact. The outcomes of these projects is also being displayed at the Innovation Plaza at Antardhvani, the Annual Academic and Cultural Festival of the University of Delhi. Twenty seven projects were shortlisted for interaction with the industry at the University-Industry Interface at the Plaza. They benefitted tremendously from the exposure and got to know how to write an idea like a business plan so that it can reach an entrepreneurial stage rather than having just a good publication out of it.

The book gives a brief description of the projects of and outlines the significant outcomes of the Innovation Projects of the second round. This gives the readers an overview of the range of ideas supported by University of Delhi and the promise such intiatives carry for the future. It is very encouraging to see that the intitiative has resulted in 112 research publications, nine books and four patents. Compiling and editing the book has been an informative journey helped by student interns at the Viceregal lodge. I am indebted to the Hon'ble Vice Chancellor, Chairperson, Research Council and the three Deans for keeping faith in me and helping me learn so much during this journey.

Deepika Bhaskar
Coordinator, Innovation Desk
Deputy Dean Research
Research Council

Experience of the Student interns at the Vice regal lodge

During our one-month internship at the Viceregal Lodge, we were involved in the task of working on the final reports of Innovation Projects 2013-15. The exposure to this facet of learning has been overwhelming.

Innovation projects inculcate an idea of research covering a wide range of subject areas like economic development, scientific arena, health concerns, cultural diversity, business ideas, environmental issues and digital world thereby entailing a great exposure of knowledge outside the classroom setting. Reviewing innovation projects demanded our profound interest and we are highly obliged that we were given an opportunity that helped us develop an interest in something extremely meaningful.

Reviewing these innovation projects not only provided us a glimpse of the explicit research work conducted in diverse fields but also allowed us to peep into the brilliant minds working together in the university along with their modus operandi. It gave us the opportunity to delve into a plethora of knowledge.

The guidance of a mentor, Dr Deepika Bhaskar, helped us tremendously in constantly giving our work direction and molding it into a vision so as to make us comprehend the idea in a new light. It's been an enriching and exciting experience.

Madhvi Bisht
(Bhagini Nivedita College)

Rashmi Singh
(Gargi College)

Tanya Munjal
(Satyawati Evening College)

Yashika Sharma
(Bharati College)

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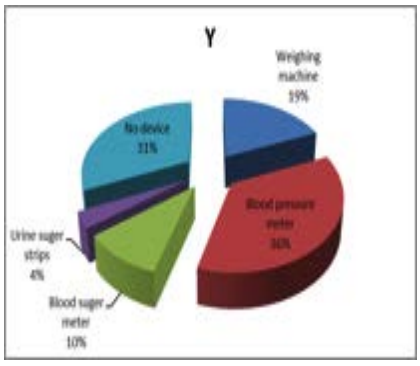
ANDC201- Mobile Healthcare: The Future of Health Management in India- A Feasibility Study.

Brief description

India has one of the youngest populations in the world. However, it is also on its way of having the largest population in the world with non-communicable and chronic diseases (NCD). There is a huge gap between the demand for adequate healthcare and the delivery of the same.
Cost-effective and sustainable solutions are required to make the healthcare available to large segments of the population using innovative technologies (whether proprietary or newly developed). One of the key aspects is to ensure that while the value is provided, the technology should be easy to use and assist with medical diagnosis, chronic disease management, patient involvement and education.
Hence, given inadequate healthcare personnel, reported non-compliance of patients and penetration of mobile phones even in remote corners, mobile healthcare (mHealthcare) offers to be the potential future of healthcare in India. Mobile devices could be effectively used in the better management of chronic diseases by: i) Improving physician's access (real time) to patient information ii) Providing remote patient check-ups to increase medical complications and iii) Decreasing re-admission rates and emergency room visits.



Significant outcomes

i) A basic prototype to read analog data using ARDUINO microcontroller has been developed. We have used Bluetooth shield over ARDUINO by connecting serial data from ARDUINO to corresponding TX and RX pin of the Bluetooth shield. Further work is in progress to develop ready to use application for different operating systems like Android, Windows and Linux using various tools available like Visual Basic, Eclipse IDE for Windows and Android, respectively.
ii) The Project was selected by three students of University of Michigan, USA for virtual participation. Skype sessions were held, which gave students from both DU and University of Michigan an opportunity to exchange ideas.

ANDC202- Development of Low Cost Computer Controlled Science Laboratory Using Sensors And Open Source Hardware And Software Tools

Brief description

Integration of sensors for performing experiments in laboratories is very common in foreign countries. Use of sensors not only eases the procedure of experiment but also minimizes the source and figure of error in results. A traditional data acquisition system, say a 'VernierLabQuest' with supporting software costs about 700 USD, which highlights the requirement of a low cost data acquisition system. We have developed a prototype of a low cost data acquisition system using Open Source hardware and software tools. It comprises Arduino microcontroller board to acquire data and LCDs as display device. Use of simple microcontroller board and LCD like devices which are quite cheap makes the system extremely low cost and easier to implement in experiments. Also, because of simpler mechanism of the system, any trouble shooting and error management in operation can be managed by students themselves. Further, use of mobile phone and Android like Open Source platform to display and log data is already in use at high scale. We are on the way to develop 'Android App' which can be used by students to perform various experiments, just by connecting to suitable hardware which we have already developed.

Significant outcomes

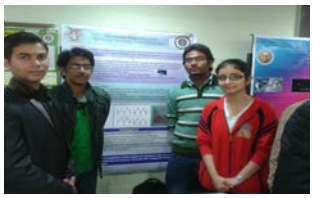
1. A low cost system has been developed. A typical 'Arduino Mega ADK' board and a '16x2 LCD Module' costs about 39 USD and 4 USD respectively, i.e. 43 USD in total, which is substantially less than the cost of a 'Vernier LabQuest' tagged at 1000 USD.
2. Implementation of sensors in experiments minimizes the chances of error in results, which will strengthen the belief of students in theoretical concepts.
3. Simpler concept used in the developed system makes it robust for use and thus requires lesser maintenance.
4. Use of mobile phones in a laboratory will attract the students toward experiments, giving a boost to their interest towards Science as well as innovation.
5. All the software and hardware used by the system are Open Source based which will allow the user to self-tailor and re assemble the system according to the need of experiment and user.

Publications: Six papers

ANDC203- Astronomy Using Archival Data

Brief description

Astronomy has emerged as one of the exciting and challenging fields in recent decades. Modern developments in technology and computational tools have provided a boost in research in this area. Since time immemorial, the quest to know about the various phenomena occurring in the universe has compelled the mankind to come up with the invention of astronomical telescopes and modern detectors like CCD (Charge Coupled Device) camera. Recent decades have witnessed the launch of various astronomical space telescopes and ground-based automated telescopes in order to uncover the truth of the universe. With this project, there is an attempt to introduce the undergraduate students with some of the basics in astronomy and astrophysics using the existing archival databases and virtual observatories with the aid of various computational tools and techniques. This project provided an opportunity to equip them with the basic tools and concepts in the enthralling areas of astronomical research. The hands-on experience acquired in this project on the astronomical data analysis and their interpretation gives them an impetus to do further research in astronomy and other related areas of science and technology. With the advent of various automated telescopes and huge digital sky surveys, the data on astronomical objects have increased enormously. The analysis of huge amount of data thus generated from these projects is a very formidable and challenging task.



Significant outcomes

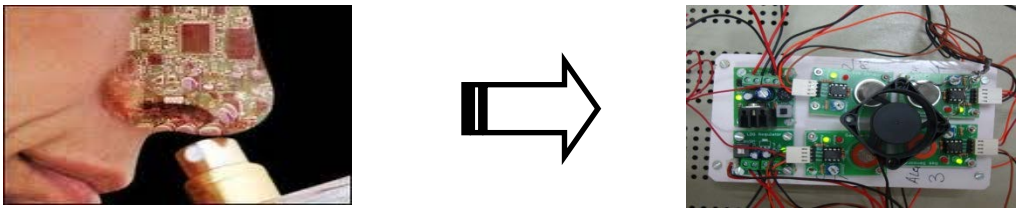
This project envisages providing a basic framework and training for doing research in astronomy so as to motivate the students to make significant contributions towards stellar astronomy and astrophysics. It involves training in a multitude of computational and numerical techniques of data analysis through various standard problems of astronomy, which includes: Hubble diagram (distance-redshift relationship) using SDSS (Sloan Digital Sky Survey), Hertzsprung-Russell diagram of star clusters, Cepheid period-luminosity relationship, Age of open clusters, Stellar CCD photometry, Stellar spectral classification using CLEA and Astronomy with Virtual Observatories (VO). Once sufficient training is received through successful completion of above problems, the following novel problems of Astronomy have been investigated and these serve as a quantifiable objective of this project. It includes Classification of variable stars, Light curve modeling of eclipsing binary stars, Physical properties of exo-planets using the NASA's Kepler data and determination of physical parameters of old population RR Lyrae stars using the Fourier decomposition techniques. These problems involve rigorous high speed computing for data analysis and meticulous interpretation.

Publication- One Paper

ANDC204- Artificial Olfaction Using E-Nose: Mimicking Human Nose for Gas Sensing Applications

Brief description

Existing specific gas sensors advantageously offer smaller size and rigid construction but fail to overcome the final hurdle because of "cross-sensitivity" problems. Worldwide detection of simple and complex gas mixtures by means of an array of electronic gas sensors has led to the development of 'Electronic nose' (E-Nose). E-Nose comprises an array of partially selective gas sensors where each 'gas sensing element' behaves like a specific receptor by responding to different odours (gases) to varying degrees. In the current work, an ultra-low-cost E-Nose module is developed that operates in a stand-alone mode with autonomous capability devoid of any human interference. It is used in the measurement of indoor and outdoor pollutants including methane, LPG, CO_2 and alcohols after being interfaced with a digital multimeter (DMM).



Significant outcomes

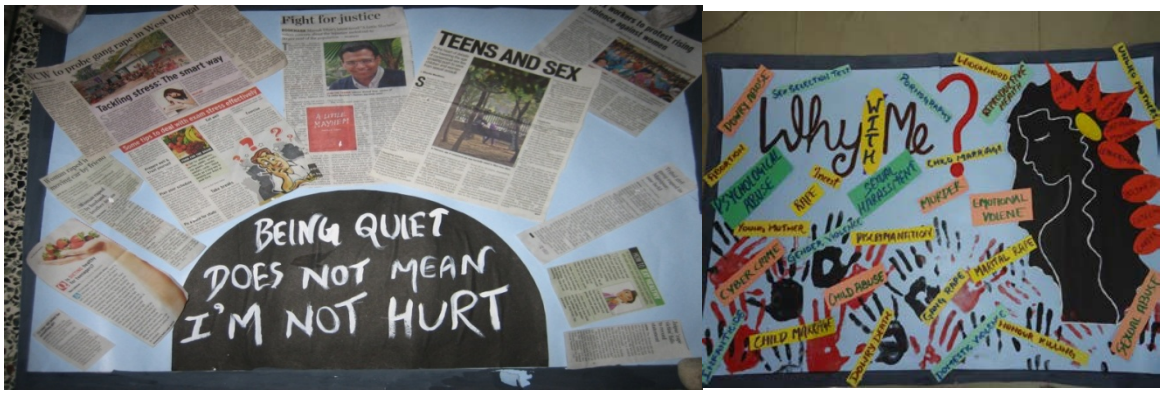
1. Awareness amongst residents (through RWAs) about dangers in having landfills in close vicinity to human habitation.
2. Integration of 'smart switch' hardware with gas sensor array for field trials by making it portable.
3. Use of Bluetooth data transfer protocol to collect gas sensing characteristics data from computer onto hand-held device.
4. Team of undergraduate students developed an ultra-low-cost E-Nose module with autonomous operation capability for the measurement of indoor and outdoor pollutants including methane, LPG, CO_2 and alcohols.

Publication: Three Papers

AM201- A Journey From Just A Girl To An Individual: Adolescent Life Experience

Brief description

Adolescence is considered to be a crucial stage in one's life and when it comes to girls, it becomes more crucial; biologically, socially and emotionally. The girl child grows up from a young girl to an adult through different complex stages of life cycle. The adolescent girl at menarche (onset of puberty) experiences emotional challenges and issues of sexuality. For many, it becomes difficult to adjust between rapid bodily changes and the studies. It has been observed that adolescence is a stage acquired not merely in terms of chronological years; it also involves transformation in mental horizon, social and psychological perceptions and reactions. This project aims to identify those issues and provide awareness on these concerns in a systematic way with the help of experts & also to identify and address major challenges faced by the adolescent girls in varied socio-cultural economical milieu so that awareness and information can be provided for their holistic development and overall empowerment. The Project provides an opportunity to girls to have an interface with the experts and to get proper guidance on the issues related to the family, relations, studies, safety, body and health etc. This piece of the research tries to include and understand the issues of the girls living in hostels and in paying accommodations.



Significant outcomes

The Project has developed a bi-lingual self-help manual "lets raise the voice…Talk it out" for adolescent girls, based on the girls' experiences in order to make them aware and help them in understanding themselves better.
As it has been shown that, after the parents, a very important person in a child's life is the school teacher. Many girls who experienced abuse & exploitation in childhood admitted that they were not oriented for such things, were unaware & totally dependent on the peer. Teacher is rated as the most trustworthy person with whom they can share their personal problems if the proper environment is created.

AM202- Nutrition And Psychosocial Well-Being Of the Rural Elderly In Delhi

Brief description

In contemporary Indian society, the position and status of the elderly has changed as compared to the earlier times where the elderly used to get care and protection. Several factors like urbanization, migration, nuclear families, growing individualism, working women may have contributed to the present situation of elderly people. Thus, status of the rural elderly in terms of profile, socio – economic status, household and occupational responsibilities, psycho-social well-being and nutrition, living in rural Delhi was explored. Two hundred elderly people (106 females and 94 males) were interviewed on the basis of a semi-structured interview schedule on the parameters mentioned above. After that an in depth study on twenty elderly people was done.

Significant outcomes

1. Demographic Profile: Thirty three percent of the people were of the age 70 years and above.
2. Twenty seven percent of the people interviewed were illiterate.
3. Physical Well-Being: Twenty five percent of the people had problems of joints and eighteen percent had the problem of high blood pressure.
4. Financial Status: Seventy percent of the people were financially satisfied. Thirty percent of people did not have their own source of income.
5. Psycho-social Well-Being: Almost everyone had more than fifty percent scores on the psycho-social parameter. Eighty percent of the people had more than sixty percent scores while, one third had eighty percent scores. It was heartening to see situations where children and grandchildren spent some time with elderly people, their psycho social well-being is positive.
6. No or inadequate income and lack of social support systems and facilities were the challenges for sustenance of elderly people and for their physical and mental health.
7. Four Fs (Familial cohesiveness, financial security, Friends and Fitness) were the determinants of well- being of rural elderly population.

ublication: Three Papers

AM203- रंगमंच के माध्यम से ग्रामीण क्षेत्र की ककशोरवय छात्राओं का व्यक्तित्व ववकास

ग्राभीण □ेत्रों भें रूढ़िवाढ़दता, अॉधववश्वास औय शि□ा का प्रसाय कभ होने के कायण, वहाॉ की रड़ककमों भें सॉकोच, बमग्रस्तता, अॉतभमुखता आढ़द नकायात्भक बाव सहज ही आ जाते हैं। ववशबन्न साभाजजक औय ऩारयवारयक दफाव उनकी ववचायिीरता का हनन कय रेते हैं। प्रस्तमत ऩरयमोजना कामु का रक्ष्म मह देखना है कक क्मा यॉगभॉच के भाध्मभ से इन सफका ननवायण कयके आत्भववश्वास औय यचनात्भक □भता को उबाया जा सकता है? इसी रक्ष्म के तहत सवुप्रथभ प्रोजेक्ट से जमडी दस छात्राओॊ, तदमऩयाॉत ग्राभीण □ेत्र के स्कूरों की छत्राओॊ के साथ यॉगभॉचीम कामाु◌िाराओॊ का आमोजन ककमा गमा. जजनभें एकाग्रता, भानशसक व ि◌ायीरयक कल्ऩना◌िीरता, वाचन-□भता, अशबव्मजक्त-कौि◌ि को ववकशसत कयने वारी गनतववधधमाॉ ि◌ाशभर थी. साथ ही, भॉचन अभ्मास, यॉगभॉच के खेर, आिम-अशबनम, जस्थनतमों की ऩरयकल्ऩना, दृश्म-यचना बी कामु◌िाराओॊ का ढ़हस्सा यही.कामु◌िाराओॊ का समखद ऩरयणाभ मह यहा ककछात्राओॊ भें अशबव्मजक्त-कौि◌ि, आत्भववश्वास, खोजी–दृजटट, सॊतमशरत व्मजक्तत्व, प्रफॊध एवॊ व्मवहाय-कौि◌ि आढ़द सकायात्भक गमणों का ववकास देखा गमा.

वकु◌िॉऩ के फाद हभने ऩामा कक वही छात्राएॊ:

-खमर कय अऩने कशभमों को फता ऩामी औय उन कशभमों को दूय कयने के प्रनत बी सजग हमई.

-मह आत्भववश्वास बी अऩने अन्दय उन्होंने भहसूस ककमा कक अऩने आऩ को ककसी से कभ नहीॊ सभझना चाढ़हए.

-यॉगभॉच के खेरों भें उनकी ववषि रूधच ढ़दखी इन खेरों के भाध्मभ ऩमुवे□ण□भता (observation skill) के फाये भें जाना.

-अऩने ऩरयवाय, स्कूर औय दूसये रोगों के साभने अऩनी फात कहने भें जो डय रगता था वह डय कापी हद तक दूय हमआ.

-अऩने सऩनों के फाये भें फात की तथा अऩनी □ानेजन्◌िमों के सही इस्तेभाय की फात बी इस वकु◌िॉऩ से सभझ भें आई.

यॉगभॉच की गनतववधधमाॉ सतत ववकास की भाध्मभ होती हैं. हो सकता है कक कामु◌िारा बववटम भें बी इन छात्राओॊ के शरए राबकायी


ARSD201- Challenges Of Contemporary India: A Gandhian Alternative.

Brief description

India is going through a massive transition where the existing problems are being further compounded. A study was launched for identifying problems which are being faced by the people. Students interviewed people from different walks of life. On the basis of their responses, five most common areas, such as challenges of *governance* (favouritism, red tape, political apathy), *economic problems and offences* (poverty, corruption), *environmental degradation, women* (skewed sex ratio, crime) and *attitudinal change* (brazen individualism, consumerism) were identified as the focus areas. They reflect different forms of violence. Thus, this study examines these problems and provides Gandhian strategies to eradicate them so as to establish a non-violent way of life free from greed.

Significant outcomes

There is a general acknowledgement of Gandhian ways to tackle these challenges. However, people are becoming unaware of Gandhism and merely revere him as a kind of divine being whose ways and ideals cannot be followed by the ordinary people.
However, it is erroneous to think that Gandhism cannot be practiced. This hopelessness only emanates from the fact that we have become obsessed with transient material pleasure corrupting our soul. Gandhi strived to reverse this situation. Hence, he described Swaraj as control over self—to control one's senses. It seems arduous; but there is no alternative.
There is a need to popularize Gandhi, Gandhism and Gandhians through educational institutions, audio-visual programmes and organising Gandhi Melas and festivals all over India. It may further be spread over to other countries which will enhance India's soft power at international level.

ARSD202- Design And Synthesis Of Potentially Biocompatible Bile Acid Base Polymers

Brief description

Synthetic polymers come in a variety of forms and one cannot think of life without them. However, these human made matreials either don't degrade at all or degrade in a very long time, causing a detrimental impact on ecosystems. This project is about the design and synthesis of a new biocompatible and (bio) degradable polymer. Importance of the work is its application in biomaterials such as drug delivery system and tissue engineering etc. The use of natural compounds such as bile acid in the preparation of new materials can improve the biocompatibility of the materials and avoid any potential toxicity of the degradation products when used for biomedical applications. Keeping this in mind, the project work involved the synthesis of novel degradable polymers using naturally occurring compounds such as bile acid (present in human body), succinic acid (present in apples, currants, broccoli, tomatoes, strawberries etc.), and naturally occurring sebaccic acid. The prime objectives of the project were to develop awareness among students about the environmental friendly and potentially biocompatible polymers and provide hands on experience of synthesizing polymers containing naturally occurring compounds based on click chemistry and free radical polymerization reaction.

Significant outcomes

The work started with the preparation of monomer containing bile acid. For this allylic alcohol was reacted with cholic acid (bile acid) in the presence of DCC and DMAP. The prepared monomer was purified using column chromatography and subsequently polymerized with 2-hydroxy methyl methacrylate using free radical polymerization technique. A polymer has been synthesized utilizing click reaction between azide derivative of succinic acid and propargyl ester of sebaccic acid. Compounds have been characterized utilizing routine spectroscopic methods.
Polymers synthesized and reported here in scheme-a can have very interesting biomedical properties and polymer samples are submitted for the exploration of the biomedical properties.
Copolymers of chloric acid derivative and 2-hydroxyethyl methacrylate are found to swell in the presence of water and are pH sensitive which makes it suitable for drug delivery system.
Polymer synthesized as per scheme-b has the potential of being a biodegradable and biocompatible polymer as it is synthesized from naturally occurring starting materials and contains ester linkage in the backbone of the polymer which can be easily degraded. It also contains nitrogen group which makes it a good candidate to act as ligand.
Polymer can be studied for controlled release of drugs, insecticides and herbicides, Diapers and incontinence garments, Grow-in-water toys etc.
Publication: One poster (conference)

ARSD203- Impact Of Social Networking Sites On The Indian Youth: A Study Of Their Life Styles And Its Effectiveness In Nation Building.

Brief description

To study the influence of Social networking sites (SNSs), our team of students and teachers collected perception based primary data on the basis of a survey. The questionnaire had three sections; section I was about demographic details of the respondent, section II was on influence of SNSs on life style and section III was to collect responses on SNSs' impact in nation building. The questionnaire was prepared on google drive. We mailed the questionnaires to 500 respondents. We received only 247 duly filled questionnaires online. Besides the online mode of collecting data, we also got hard copies of the questionnaire filled from people in Delhi-NCR region. To get insights from people of other parts of the country, we visited 2 cities: Mumbai and Chennai. In Mumbai, we collected questionnaire based data from St. Xavier's College, K C College and executives of Bank of Baroda. In Chennai, we collected data from students of Madras University and people of Chennai city. These responses were collected on hard copy of the questionnaire. The team has developed original content of around 200 pages on various aspects on SNSs and is in the process of getting it published in the form of a book.

Significant outcomes

1. Age, Gender and Income were identified as distinguishing demographic criteria influencing lifestyles of Indian youth through sns. Males (55%) seem to be more active on SNS than their counterparts. 58% of users are between 20-30 years of age whereas only 6% are above 40 years. 60 % represented the student category in Delhi and 55 % working class in Mumbai. In all 68 % of our youth respondents are earning.
2. People were concerned about privacy issues.
3. No statistical differences were found for the 'knowledge on social issues' and the 'future role of social media' across cities indicating that socio-economic issues and political concerns are gaining momentum.

ARSD204- Study On Impact Of Environmental Consciousness On Green Buying Behaviour

Brief description

The last decade had witnessed a dramatic increase in environmental consciousness worldwide leaving a profound effect on consumer behaviour, with the green product market expanding at a remarkable rate. The green consumer is generally defined as one who adopts environmental friendly behaviours and/or who purchases green products over the standard alternatives. The study focuses on factors contributing towards environmental awareness of consumers and their green buying behaviour. The market analysis was carried out in Delhi/NCR region and the age of respondents ranged from 15 years to 60 years. The present study has been designed to increase understanding of people's self-reported green buying and other pro-environment behaviours and to determine what beliefs, attitudes, and demographic factors influence these types of ecologically responsible behaviours and finally to identify if consumers are willing to pay more for green products.

Significant outcomes

People lack awareness about green buying practices. They are supporting the environment with their purchasing habits but are not familiar with these attitudes on their own. Secondly, men are more conscious of environment than women. Lastly, during this research, the feedback of some people showed that they have zero knowledge about 'Green Buying/Green Products', but our team introduced these concepts in their mind by explaining them the benefits of green buying.
Age and Income has no impact on green buying behavior. Other facts that came out were:

- Education impacts green buying behavior
- Women and men are equally concerned about conserving the environment
- Women and men equally consider safety to the environment while buying a product
- Actual buying behavior cannot be predicted on the basis of pro-environmental attitudes

These results can be used by private firms to design new products, advertisements, and pricing schemes accordingly as per the need of market. They can also be used by the government while framing the right policies to promote green consumerism.

ARSD205-Delhi Police: Antrik Sarvechan (Delhi Police: Internal Survey)

संक्षक्षप्ि ववरण :

ककसी बी साभाज की करऩना स□भ ऩमशरस के फगेय नहीॊ की जा सकती है, सभाज की समय□ा वमवस्था चमस्त होगी सभाज उतना समय□ीत औय सभ्म सभझा जाएगा । इस सचाई से कोई झॊकाय नहीॊ कय सकता रेककन इसके साथ मह बी सचाई है की सभाज की समय□ा का दामत्व जजस ऩमशरस के कॊधो ऩय है वो बी सभाज का एक नागरयक है औय उसे बी उन सबी ऩयेिाननमों से गमज़ायना ऩड़ता है जजसका साभना हभ आमे ढ़दन कयते यहते है। ऩयन्तम उस आदभी के कॊधे ऩय ऩमशरस की वदी देखते ही हभाया ध्मान उसकी ऩयेिाननमों की ओय नहीॊ जाता औय अक्सय हभ उसे "समऩय भैन " भान रेते हैं जजसके ऩास हभायी सायी सभस्माओॊ का हर भौजूद है। हभाये इस िोध का उ□ेश्म मेही की हभ ऩमशरस वारो को अऩने जैसा आभ आदभी सभझे ऩरयवाय के बयण ऩोषण कयने हेतम ऩमशरस की नौकयी कयता है औय उसके प्रनत एक सॊवेदना औय सहमोग का यवैय्मा अऩनाए जजससे उसके कामु भें फाधाएॊ काभ हो औय सभाज को औय फेहतय फनाने भें वो ज़्मादा सपर हो ऩाए साथ ही साथ उसके भें भें बी आभ आदभी के सकायत्भक सोच ववकशसत हो इस सोच से उसके ऩरयवाय औय सभाज के रोगो का जीवन बी फेहतय हो सके । औय सबी रोग सभाज के प्रनत अऩनी जज़म्भेदायी को सभझे औय हभ हय छोटी फड़ी घटना के शरए ऩमशरस को ही दोषी न ठहयामें

िोध का भहत्व

िोध का भहत्व इसशरए औय ज़्मादा फि जाता है की, ऩमशरस एक ऐसी व्मवस्था है जजसके फगैय सभाज की कल्ऩना सॊबव नहीॊ है, हभाये साभने योज़ ककसी न ककसी रूऩ भें ऩमशरस का कोई न कोई चेहया साभने आता ही यहता है औय चाह कय बी अऩने जीवन से ऩमशरस को अरग कयके नहीॊ देख सकते हैं।

िोध के दौयान कई चौकाने वारे तथ्म हभाये साभने आमे हैं । सभाज भें अधधकतय रोग की याम हभे ऩमशरस भें ही शभरी औय उससे बी ज़्मादा चौकाने वारी फात मह यही की इन भें से ज़्मादातय रोगो का ननजी जीवन भें ऩमशरस से कबी वास्ता नहीॊ ऩड़ा , कपय बी उन रोगो ने ऩमशरस के प्रनत अऩनी सोच नकायात्भक फना री । हभने इस िोध भें मह ऩामा की रोगो के भन भें इस प्रकाय की नकायत्भक छवव मा सोच फनाने भें समनी-समनाई फातें , अपवाएॊ आढ़द ने भमख्मा बूशभका ननबामी है ।

BNC202- Spectral Analysis Of Spoken Hindi Language

Brief description

Acoustic phonetics is a branch of phonetics which deals with acoustics of speech sounds of any spoken language. It digs out the information about amplitude, pitch, intensity, stress, duration of speech etc. from the spectral distribution of the spoken language. Learning acoustic phonetics will be helpful to self-learners or teachers of a particular spoken language. Moreover this analysis can be used by speech therapists in the assessment and recourse of remediation.
It is a well-known fact that among all the languages spoken in world there is no language as scientific and rich as Hindi language. Although English, French, German languages have proved their dominance but there won't be any country in the world where Hindi language is not taught. Factually, in this era of globalization, after French, Hindi is the only language which is capable of rendering expressions or we can say that it is a pitch accent language in which each word has a restricted set of possible tonal patterns.
It is true that a great amount of work has been done on phonetics of Hindi language but no research work has been done on the basis of spectral analysis of the Hindi speech. We are at present trying to study accentuation, annotation, pronunciation of alphabets, words and sentences of Hindi language. In this process we will be able to create speech corpora of some of the great Hindi texts in addition to developing a self-learning Hindi tool.

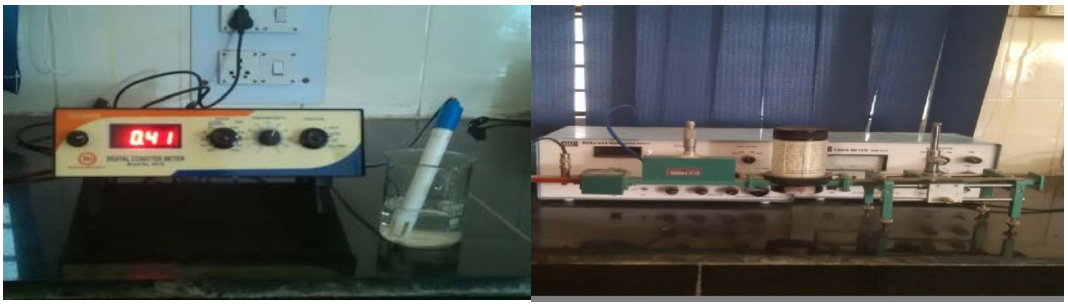
Significant outcomes

Although the aim of this project was to look into the development of age related changes in the spectrograms, the result that came into force is that all the voices are unique to their speakers and they are different for even the twins as well and this quality can be used for voice recognition in Hindi speaking belt.
Speech is made up of two components; a physiological component (the voice tract) and a behavioral component (the accent). The physiological component is a constant and proves to be the characteristic of the speaker. At this time our sample size is small, so this can be looked into with greater detail and a large sample size.

BNC 203- To Study the Measurement of Dielectric Constant of Soil & Linking the Study with Its Fertility

Brief description

Various soil parameters were measured such as water holding capacity, carbon percentage, NPK testing, moisture content, pH level, particle size, composition of soil, conductivity and TDS for its dielectric constant determination. Dielectric studies were done in microwave frequency range (8GHz- 12GHz) using rectangular wave guide cell method. The X-band microwave transmission wave guide setup was used for this purpose. A strong correlation was found between dielectric constant and various parameters investigated. Effects of fertilizers were also studied to optimize the fertility of soil.
It has been observed that the dielectric constant is directly related to the soil moisture content. The study of all the parameters helped in determining the soil's characteristic properties and helped in optimizing the nutrient content and hence the fertility of soil. This study will be of great interest for microwave remote sensing application and designing active and passive sensors.



Significant outcomes

Farmers cultivate annual crops more than once a year, this leads to delay in remedial action for the coming season. Hence, rapid measurement and monitoring of soil nutrient variability is needed to satisfy the precision farming requirements. These problems can be solved by measuring dielectric constant (DC) of soil.
Dielectric constant is a very quick, simple and inexpensive method that farmers and home gardeners can use to check the health of their soil. While pH is a good indicator of the balance of available nutrients in your soil, Dielectric constant and conductivity can almost be viewed as quantity of available nutrients.

BNC 204- Big Brands' Quality Promise: Are They Just Words

Brief description

Food adulteration is still prevalent in our societies and the growing diseases worldwide are the consequences of the same. Looking at the present scenario, some big brands have taken the initiative to provide food of high purity and the health conscious public does not mind paying extra for that. But here the question arises, are we getting 100% value of our money or these claims are just a way to make more money by targeting innocent hungry people for purity and healthy life.

Analytical chemistry is a great tool for exploring food adulteration in chemical laboratory. Our project aims to check the authenticity of claims made by big brands regarding their purity and quality by comparing them with the standard food samples prepared in the laboratory and also compare them with other products available in open market. We also aim to develop critical understanding of labels given on food items.

Significant outcomes

Different sources of adulteration were characterized and a distinction between deliberate and non-deliberate adulteration was made. The effect of different adulterants on human health was analyzed and an overview of health hazards and risk factors associated with food adulterations was interpreted. During the project, an understanding of food additive and adulterant was developed and role of permissible limit for food additives made sense to students.

FSSAI manual guiding adulteration check was identified to follow procedures/methodologies. Literature for different food articles was collected and a framework was designed to meet the requirement with in the undergraduate lab. During performing experiments, certain density based procedures to check adulteration were found to be debatable as they showed adulteration in control (Pure) food samples also.

Samples from different regions of the city were collected to have diversity of food samples and big names from the respective food samples were chosen to make comparative data of adulteration check. Control of all samples were prepared in lab and collected from the trusted source to maintain purity. All tests were performed on library of different food samples along with controls.

BNC205- Role Of Chemistry In Historical Archaeology

Brief description

The word “Archaeology” is derived from the Greek words ‘archaios’ meaning “ancient” and `logos’ meaning “knowledge” or “the science of ancient things”. The function of the historical archaeology does not end merely with the collection of the ancient remains, but must include an intelligent appreciation and interpretation of the same. The Scientific Archaeology is helpful in studying the life of historical monuments and includes both science and art. It is a scientifically ordered branch of knowledge on a certain subject and greatly depends on the principles and methods of Physics, Geology and Chemistry.

The role of chemistry in cleaning and preservation of antiquities and ancient monuments is the objective of our project. The innovative involvement of Chemistry in the preservation of historical monuments will improve the knowledge of undergraduate students, who are studying History and Chemistry.

Significant outcomes

1. This project creates a scientific endeavour in the students of history as well as chemistry. It will also be helpful in showing them the path of conservation of historical monuments and archaeological sites of historical importance.
2. This project will work as a bridge between art, history and science communities.

BW201- A Study Of Familial Violence Faced By College Women Students

Brief description

The project aims to provide a snapshot of the quality of life and quality of living experienced by young college going under graduate students of Bharati College. It seeks to look into the dynamics of fast paced urbanization in India in the globalized and liberal production-system that requires restructuring of gender-relation.

Urbanization fuels migration; leading to a natural progression and social transition where women from lower middle-class come to have some aspiration of entering work force with income, family, household etc. Delhi seen as a "City of Aspirations" is witnessing increasing work-participation of women but also increasing violence against women in the last few decades. Violence in public-places has become the focus of public discourse but violence faced by women in homes and intimate relationships within closed family-structures remains still hidden. In the absence of state structures and inadequate provisioning for urban infrastructure, women are risking their lives by leaving homes to study and work but the home space is equally a severely restricting factor in pursuing their aspirations and to acquire and enhance new skills and competence to fulfil their potential. A connecting link between violence they face inside homes and outside homes is what the project is enquiring.

Significant outcomes

1. It brings out the relevance of a violence free social & cultural universe of both men & women for harmonious functioning of social system & everyday lived experience.
2. As the structural violence keeps re-emerging in newer forms, its prevalence and oversight needs to be countered.
3. The socio-cultural perceptions and practices need to be modified from within the same socio-legal framework.

BCAS201- Low Cost Electricity Generation Using Bio-Photovoltaic Technology- A Green Energy Initiative

Brief description

The increasing demand for energy consumption with decreasing supplies of fossil fuels has led to a growing search for alternate energy production technologies. There is an increased interest in methods of harnessing solar energy for various purposes. A new source that is catching attention is Bio-photovoltaic cell technology. Bio-photovoltaic (BPV) devices are biological solar cells that generate renewable energy through the photosynthetic activity of living microorganisms such as algae and mosses. Algae are incredibly easy to cultivate, requiring only sunlight, carbon-dioxide and water. Thus, offering a remarkably simple and economic way of producing energy. This technology makes use of the high energy conversion efficiency of the silicon based photovoltaic devices, whilst keeping the merits of low cost biological approach. In BPV devices when light falls on algae, a series of photosynthetic reactions take place which can be exploited to generate electricity. The main objective of the project was to construct a Prototype of Bio-photovoltaic device using algae for generation of electricity.

Significant outcomes

This research group has successfully constructed a functional Prototype of Bio-photovoltaic cell using green algae. The team was able to generate a moderate voltage from the BPV cell. The team is now working for optimizing the conditions for higher efficiency.

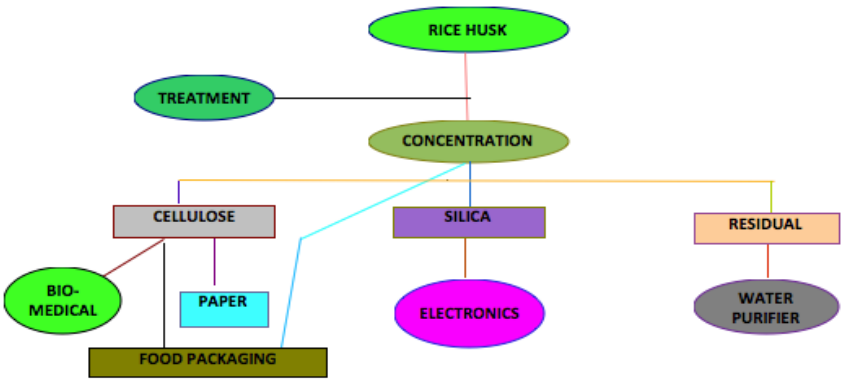
Publications:

a) Presented a Poster titled “Bio-photovoltaic (BPV) : Harvesting Green Energy for Future Technologies” in the National Conference on Nanotechnology and RenewableEnergy (NCNRE-14) held at Jamia Milia Islamia University, New Delhi-25 on 28-29 April, 2014.
b) Oral Presentation titled “ Bio-Electricity Production using Algae- A Brighter Road Ahead.....” in the National Conference on Striving and Thriving Towards Diffusion of Student – driven Research in Science and Technology for Inspired Learning, held at Maharaja Agrasen College, University of Delhi 16 – 17 October, 2014

BCAS202- Agro-Waste Material Management: From Waste To Wealth.

Brief description

Agro-wastes such as rice husk, bagasse, ground nut shell, soyabean husks etc. are rich sources of many significant materials. The agro wastes contain cellulose, silica, lignin, etc. The chemical and physical treatments of agro-wastes make them suitable for food packaging, drug delivery, tissue engineering, and metal decontamination. The rice husk under the controlled heating produces carbon doped silica, which may have catalytic application. In this project, we attempt to separate components like silica and cellulose from Rice Husk and use it to study different applications.



Agro waste material management: From waste to wealth

Significant outcome

Silica and cellulose from rice husk has been economically isolated. The obtained silica is mostly amorphous in nature. The amorphous character is high in isolated cellulose which makes it a better processable for film preparation. The film was further processed to develop the anti-microbial nature in it. Its applications are being investigated. The film has many applications like in packaging of foods etc. The work presents a novel but an eco- friendly way of waste management of agro-wastes. It aims to develop scientific thinking and look beyond the traditional concepts. Thus, redefining waste and creating wealth from waste.

The work has lot of potential in fields of applied sciences and technology development (water purification, developing flexible and hard food packaging material).

Publication: Three Papers & One Poster

BCAS203- Public Awareness And Evaluation Of Probiotics Sold In Delhi

Brief description

Consumers are becoming more aware of the functional foods and the nutritional supplements and the potential role of these products in balance diet and in ensuring good health. In many countries, the functional food market seems to be dominated by gut health products, in particular probiotic products. A probiotic is defined as a live microbial food supplement that beneficially affects the host animal by improving its intestinal microbial balance. Probiotics are available in the form of the various pharmaceutical preparations, e.g. powders, liquid suspensions and tablets, or are incorporated in fermented foods like yoghurt, dahi, lassi, cheese & other food items like ice-cream, fruit juices etc. Developed countries around the world have specific regulatory guidelines for the probiotics. However in India, there is no regulatory regime for these products till date. The aim of this project is to determine the market profile & conduct assessment of the probiotic products commonly sold in Delhi market. Lack of awareness is the major factor affecting the popularity of probiotics and some also cited taste of probiotics products. About 70% of the consumers know that the probiotics are good microbes with health benefits but only 14.3% consume probiotics on regular basis. So, this study also focuses on creating awareness about probiotics using dedicated websites, mass media and through networking with educational institutes. The study reveals that there is an urgent need to put in place a regulatory regime in India to evaluate the probiotics in the interest of consumers.

Significant outcomes

1. There is an urgent need to put in place a regulatory regime to evaluate the probiotics in India in the consumer interests. The probiotics foods' labels must list some basic information such as the name of the strain added in the product, the number of the microorganisms present; health claims if any, best before date and storage conditions so as to help consumers in making informed choices.
2. Pilot study reveals that the probiotic drugs are better compliant in comparison to probiotic food in their labeling.
3. Consumers' survey reveals that 98.1% of the respondent had heard about probiotics out of which only 14.3% consume probiotics on regular basis with others having the view that consumption of probiotics is not good for health. They do not know about the benefits of probiotics which necessarily implies that there is need of awareness among all age groups.

Publications: One paper, two posters

Activities of BCAS-203

BCAS204- Screening And Enrichment Of Polymer Degrading Microbes And Their Application In Environmental Engineering

Brief description

A study in 2014 called Valuing Plastic by the Plastic Disclosure Project and Trucost, estimated that plastic causes about $13 billion in damages to marine eco-systems each year. It also mentioned that the estimate was probably low, given much of the information we don't have yet. The indiscriminate use of non-biodegradable plastics is detrimental to the environment and there are very few technologies that address the problem of plastic wastes in a sustainable manner. In our present work, we have exploited the action of microbial communities to overcome the issue of the non-recyclability of PVC, Nylon 6, PVA and Polyethylene. The possible role of microbes like Bacilliform bacteria, Staphylococcus, Klebseilla and Soil microorganisms such as Actinomycetes among others were tested. A three to five month controlled experiment has shown an adverse effect on the polymer quality.
Although several microbial communities were created, Bacilliform bacterias were found to promote degradation process by a fold of 30±5% than others. We postulated that these microbial communities could be fostered to target polymer degradation by creating them as a consortium. Our research findings suggest that polymers can be degraded with naturally occurring and non-pathogenic microbes in a sustainable manner.

Significant outcomes

No. of objectives were formulated:

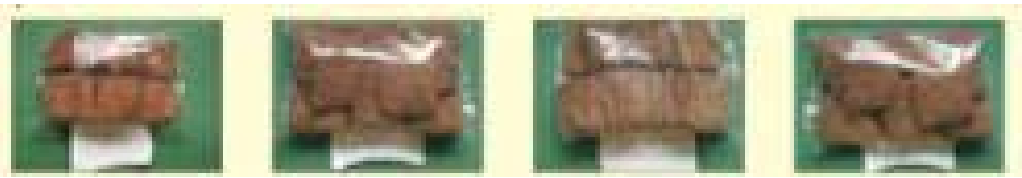
1. To test more number of microbes on polymers, while optimising growth conditions.
2. To create more microbial consortia by bringing together different microbes of importance.
3. Verifying the applicability of these microbial consortia in real time environment such as dump yard or plastic dump sites.

Depending on suitability, performing the technology transfer or patenting.

BCAS205 - To Prepare Edible Packaged, Low Cost Healthy Snack From Fruit And Vegetable Waste And Study Its Effect In Healthy Respondents

Brief description

India is one of the leading countries in the world that produces majority of the world's agricultural produce. But surprisingly, most of its produce is not able to reach the industries and gets spoiled beforehand.
An edible packaged, low cost healthy snack was prepared from fruits and vegetables waste and a market survey was also done in different *sabzi mandis* of New Delhi which included Azadpur, Kesopur and Najafgarh *sabzi mandis.*
The toxicological analysis (Heavy metals and Pesticides), fatty acid characterization, antioxidant and microbiological analysis were taken up for the sample (snack) considering the urgent need of these parameters for patenting the product. No pesticide and heavy metal like mercury, arsenic, lead, cadmium and tin was detected. No pathogenic contamination was observed in the snack.



Significant outcomes

Fruit and vegetable peels are generally discarded in our homes and processing areas of industries; both in the developing and developed countries. However, they are good source of minerals, Vitamins esp. Vitamin –B complex and dietary fibers. They do not contain saturated fat or cholesterol. Hence, formation of a value added snack which is not only cost effective but also nutritious has the potential to eradicate the worldwide malnutrition problems. The product (snack) can be formulated in a very simple manner without the use of any sophisticated machines and thus, resulting in an economical product for the low income group people. The snack can also be distributed to the victims of flood or drought affected regions as it is handy, attractive and has long shelf of life.

BCAS206- Assessment Of Brominated Flame Retardants In Mobile Phones Or Electronic Gadgets, Their Consumption Pattern In North India Region And Carbon Foot Prints From Electronic Waste

Brief description

Information technology has become a part of everyday life for people from a vast cross section of social structure around the globe. However, it has also contributed in e-waste becoming the fastest growing segment of the municipal solid waste stream all over the globe. Consumption pattern of e-gadgets has become important to researchers and policy makers as there are very limited resources of the precious metals which are used in the making of e-equipments.
The problem of e-waste has now become an immediate and longterm concern mainly due to the fact that electronic gadgets contain components made of toxic chemicals and metals which include lead, cadmium, mercury, antimony Beryllium, Brominated Flame Retardants (BFR), Polyvinyl chloride (PVC) and phthalates. Long term exposure to these substances damages the physio-logical systems. This project is aimed at a) assessment of usage of brominated flame retardant in PCB boards of mobiles b) field survey of consumption of mobile phones in north region of the country c) Calculation of Carbon foot prints (CF) of the metals being used in mobiles.

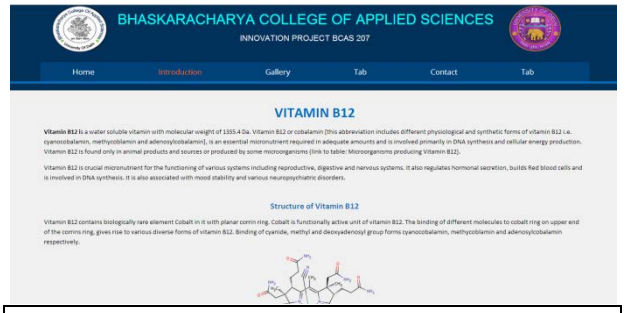
Significant outcomes

- Mobiles have become an integral part of our life.
- This project, helped in understanding the consumption pattern of the mobile phones among the different sections of the society, environmental aspect of e-waste by studying the BFR content present in the mobiles and carbon footprint of metals being used in the mobiles phones
- With more than 91% population in NCR region using mobiles, it is of utmost social importance to research and study the various aspects; social, environmental and scientific, of electronic gadgets to understand its influence on environment.

BCAS207- Understanding Burden Of Vitamin B12 And Folate Deficiency In Young Indians

Brief description

The project aims to understand the burden of Vitamin B12 and folate deficiency in young Indian adults. A questionnaire to gather the details of dietary and supplement intake, socio-economic backgrounds, smoking and alcohol intake habits, genetic and acquired diseases, past medical history and demographic data of the subjects is developed. The levels of vitamin B12 and folate are determined in the plasma samples of the subjects. The preliminary analysis based on 109 samples indicates that large proportions of individuals (59 out of 109) are deficient in vitamin B12 and expected Vitamin B12 levels are lower in vegetarians than non-vegetarians. On the other hand, none of the subjects have low levels of folate. An interdisciplinary approach was used to create awareness among young Indians about deficiency of vitamin B12 and folic acid.



The website created by the team

Significant outcomes

The analysis on 450 subjects revealed that:
1. More than 26% of individuals (120 out of 450) had vitamin B12 levels lower than 150 pmoles/l. Additionally, more than 32% of the subjects had vitamin B12 in the range of 150≤200 pmol/l which is also a matter of concern.
2. There was a marginal difference in the levels of vitamin B12 between vegetarians and non-vegetarians.
3. Compared to females (22.87%, 59 out of 258), more male subjects (31.78%, 61 out of 192) were found to be vitamin B12 deficient.
4. A large difference was found between RDA values (vitamin B12: 2.4 mcg and folic acid: 400 mcg) of these micronutrients and their concentrations in health supplements due to poor absorption. On the contrary, the majority (~62%) of health supplements available in the market contain both vitamin B12 and folic acid. Hence, it is important to understand and revise both the constituent status of folate and vitamin supplemented drugs and the folic acid fortification via food in India.

BCAS208- Lifestyle Interventions In Stress Management: A Study Among Delhi Youth

Brief description

The study undertaken was an attempt to comprehensively research on how we can use our own ancient, indigenous and time-tested style of living for an efficient and stress free existence. It aimed at rediscovering the fundamental principles of lifestyle described in Ayurveda as *Aahaar* (food), *Vihar* (recreation/exercise) and *Vichaar* (thinking). The survey was carried out on students pursuing under-graduation in Delhi NCR. The sample was screened with the help of psychological tests. Those falling in the high-risk area were selected for the study. The sample was further divided into Experimental and Control group. Based on the information collected through psychological tests and dietary survey, suitable lifestyle interventions (dietary, psychological and physical) were carried out on the experimental group. Awareness and lifestyle interventions for better stress management were carried out with the help of lectures, workshops, yoga sessions, regular dietary interventions, to inculcate the concept of holistic wellness and health management.

Significant outcomes

1. The study reveals that people suffering from stress related illness needs to be tackled by stress related practices.
2. Easy accessibility of traditional healthy and nutritious foods, adequate exercise and psychological interventions can bring about positive changes in the physical and mental health of most youngsters.
3. Overall results have highlighted the need and importance of lifestyle interventions in stress management among youth. It was an attempt to integrate several life style interventions especially traditional Indian principles of holistic well-being to manage stressors that affects the youth.

BCAS209- Genetic Curation Of Ataxia Phenomes For Establishment Of Predictive And Rapid Diagnostic Paradigm

Brief description

The aim of the project is to develop a prototype database for hereditary cerebellar ataxia, a group of neurodegenerative disorders that will assist the clinicians in better and rapid decision making for prescribing minimum number of genetics tests to a patient. Detailed analysis of the characteristics associated with various mutations in different genes that are responsible for causing various types of ataxia in different populations worldwide is being carried out through extensive literature mining from the peer-reviewed journals. The comprehensive clinical and genetic information thus collated is being made accessible through a database with web-based query interface with links to external databases like NCBI, OMIM, etc. for researchers.
If a patient with cerebellar ataxia visits a clinician for diagnosis, the clinician will be able to identify the type of mutations by accessing our database instead of prescribing screening of all those that are available. This approach of predicting the diagnosis will be relatively cost effective and less time consuming. Hence, with this project, we shall bring an innovation in the field of medicine by improving its diagnosis techniques for cerebellar ataxias.

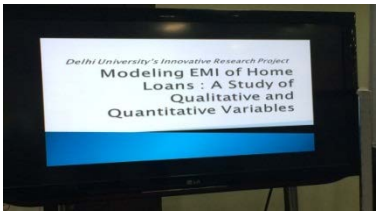
Significant outcomes

1. The database that is being developed will help the clinicians in rapid decision making for prescribing the genetic tests for diagnosis of hereditary cerebellar ataxia that otherwise is a time consuming and an expensive process.
2. The number of mutations to be screened will be narrowed down and the patient will get a better and rapid diagnosis in a cost effective manner.
3. The comprehensive information about the clinical and genetic features of ~350 mutations present in 18 genes out of ~70 genes implicated in cerebellar ataxia is manually collated through extensive literature mining from more than 500 peer-reviewed articles. Various clinical parameters are extracted for all the patients and/or families in detail with mutations reported in different populations worldwide. Detailed tables for individual genes are prepared for all these mutations.

BRAC201- Modelling EMI Of Home Loans: A Study Of Qualitative And Quantitative Variables

Brief description

The focus of the present study is on the Home Loan Industry in India. The study tries to make an in-depth analysis of the Equated Monthly Installments (EMI) pertaining to Home Loans which are taken by individuals from commercial banks /Housing Finance NBFCs in Delhi & NCR Region.
The study made an attempt to model the EMI of Home Loan as a function of no. of variables (qualitative as well as quantitative). Every student researcher was given a target of collecting information from 50 respondents who had taken home loan and were paying EMI to the Bank. Data was thus collected from 500 individuals (finally reduced to 374 after weeding out incomplete questionnaires) who had taken home loans for their properties in Delhi-NCR Region. The entire questionnaire was divided into a no. of questions with each question becoming a variable for the purpose of data analysis. The basic regression model fitted was: EMI as a function of amount of loan, Loan Duration, Family Income, Age of the Borrower, Gender and Loan : Individual or Joint.



Significant outcomes

The results clearly showed that only two variables: amount of loan and duration of loan were statistically significant (as shown by the 't' and 'p' values). Other variables including the qualitative variables were insignificant. After applying Parsimony specification, only three variables were left in the final model. Moreover the starting model and the final model after application of Parsimony showed no major improvement in R Square and other parameters.
Publication: Two Papers

BRAC202- Place And Crime In Delhi: A Study For Crime Prevention Through City Planning

Brief description

Rapid Urbanization and expansion of the cities due to continuous immigration has created many problems in the cities of India. Slums, resettlement and unauthorized colonies, overcrowding and other economics disparities have led to increase in crimes at public places in the cities. The incidences of crime at the public places have become a cause of concern for local administration and law enforcement authorities. To deal with the crimes, the emphasis has been on the law and order. The planning and design of the place play an important role in choosing a place to commit crime by offender & the study is mainly based on the primary data collected through structured questionnaire by interviewing 250 individuals. The occurrence of crime is the result of interaction of law, the offender, target, & place of the crime. The crime originates first in the mind of the offender but it occurs only when they find a conductive place. The micro-physical ecology and landscape design of a place play an important role in the occurrence of the crimes. Understanding of this relationship will help in prevention of crime through planning, designing and the management of the places. Main objectives of this project are to examine the impact of crime on urban mobility & to identify crime patterns and map the micro-environment of hotspot of crime at transit stations in Delhi. The most important aim is to suggest measures for the prevention of crimes through planning and designing of places.

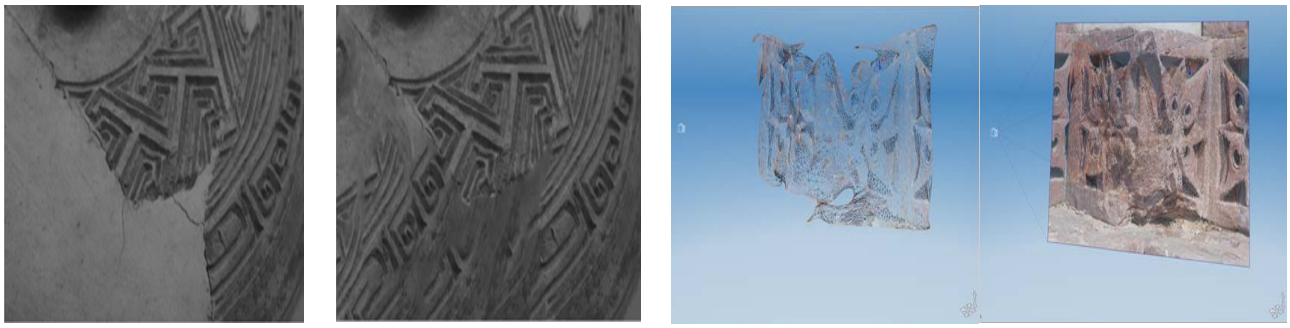
Significant outcomes

1. A model has been prepared to test the awareness of crime prone places and also it has been established that the design of a place play an important role in crime prevention.
2. In this study, the emphasis has been given to the micro-environment and the design of a transit place in controlling and preventing crimes.
3. The study shows that the planning, designing and maintenance of a place are important in preventing crimes along with the other factors. With this perspective intense study of various establishments like Schools, Plazas, Malls, and Shopping centers etc. will be important to make these places safe and crime free and it will reduce expenditure on police.
4. 30% of the respondents do not use the public buses due to crowd issues, while 26% due to the fear of crimes. About 18% of the people feel police's response to crime reporting was poor, however 42% believe that the presence of police give them feeling of being safe in an area, which is good and this is not only police's responsibility to make this city a crime free city, it should be our aim to make crime free city.

CIC201- Digital Reconstruction of Lost Art and Craft

Brief description

Digital reconstruction refers to capturing and reproducing the shape and appearance of an object or a scene, given depth and color profile. Archeological sites and artifacts show a considerable amount of structural complexity, and documenting the details in 3-D with accuracy and precision is still a technological challenge that needs to be investigated for producing a richer scientific datasets. The project aims to adopt a coherent approach to repatriation and non-contact restoration of archeological monuments and lost artifacts by combining high resolution digital imaging, laser scans, image-based rendering, reflectance modeling and thereby generating 3-D impressions in digital and analog formats. For these techniques like image acquisition, view registration, mesh integration and texture generation were explored. This can then facilitate the digital mediation of lost arts and pre-historic artifacts of India and will provide an opportunity to visualize and experience these historical marvels with greater details without damaging the real artifact and sites where light exposure could be damaging.



Significant outcomes

Content aware reconstruction methods were found to be more efficient and accurate for reconstructing 2-D images and paintings as they are mainly based upon models of human perception and use ancillary and automatically extracted information about the art and craft to be constructed.

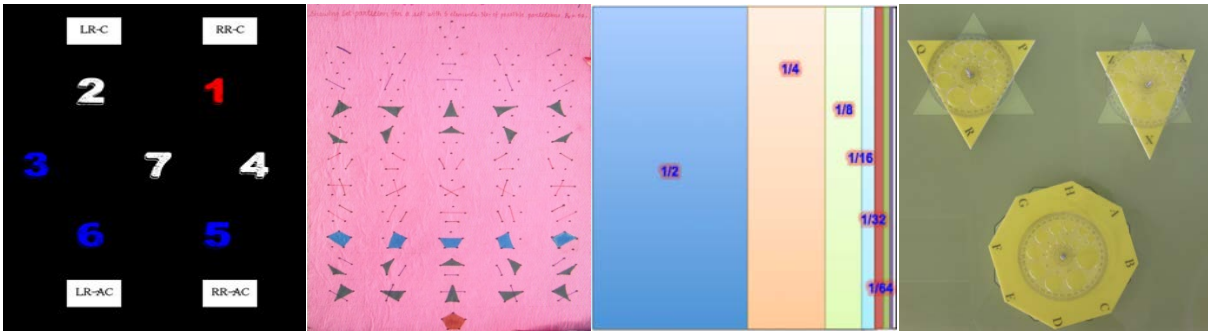
Structure from Motion (SfM) algorithm was used for 3-D reconstruction from 2-D images. It was observed that additive manufacturing techniques can be used for quick restoration.

High resolution scanning data which are more detailed and accurate were obtained. In order to create awareness about the importance of monuments and their preservation, 3-D models were disseminated through CAD sharing platforms like Autodesk 360 and Thingiverse. Android based mobile apps were also developed for getting information about the heritage places in Delhi.

CIC202- Designing Innovative Working Models To Explain Concepts Of Physics And Mathematics Along With IT Based Module

Brief description

Physics and mathematics are two subjects that are labeled as most difficult and related to real world problems and solutions. Both the subjects can be explained and understood in a better manner if learned/taught with help of interesting, simple, working models designed on student's own experiences. The project aims to come up with models and IT based modules that can be viewed on computers and smart phones so as to assist school children, college students and others in understanding different concepts of physics and mathematics.



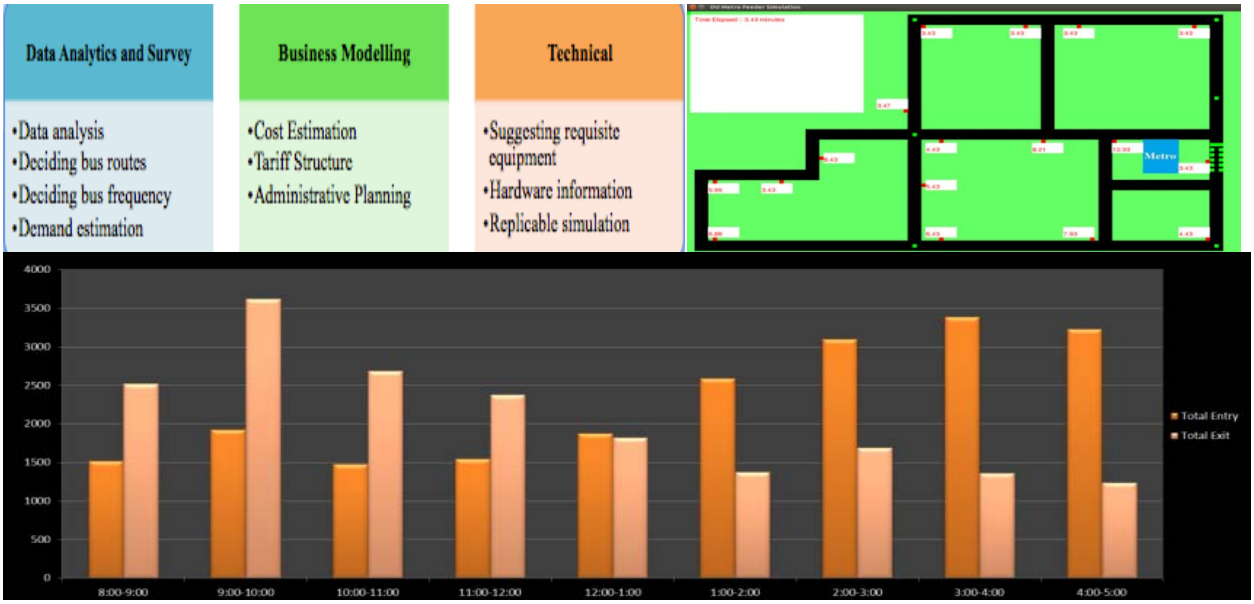
Significant outcomes

- Designed a geometrical shape based model to explain the mathematical concept of symmetry groups using geometrical symmetries in an equilateral triangle, an isosceles triangle and a regular octagon.
- Designed a model to explain the mathematical concept of Bell numbers which describes the number of ways in which a set with *n* elements can be partitioned into disjoint, non-empty subsets.
- Integrated Electronics and Mathematical concepts of "simple trigonometry" by designing a device which can measure a range of heights and distances with ease using a computer or mobile interface.
- Students have designed a wooden board model to explain sum of some infinite series and relation of concept of area, perimeter etc. to various terms of the series.
- Students have developed 6 android mobile apps for mathematical games to provide an educational experience to the young learners. Main themes of these games were: Patterns, Game theory, permutation groups, magic square etc.
- A new mathematical device based on concept of trigonometry for measuring all 6 trigonometric functions values in all four quarters of a circle. The process of filing patent for this is under process.
- Designed a working clock model based on the principle of compound train of gears. Also, a successful model of a magnetic gun and a rotating light lamp was designed.

CIC203- Modeling Metro Feeder Bus Service In University Of Delhi, North Campus: A Feasibility And Financial Viability.

Brief description

The Delhi University (North Campus) "Metro Feeder Service Project" aims to create a financially and technically viable Metro feeder bus system for all commuters within the North Campus area of University of Delhi installed with a GPS system, dynamic service, keeping traffic and population influx in mind and innovative mechanisms of ticketing through RFID cards to facilitate quick payments through DMRC Smart Cards so as to generate time-efficient, cost effective and technologically sound model.



Significant outcomes

- Important nodes identified as per the population density. First layout of the multi-route feeder bus service plan is completed.
- ACO (Ant Colony Optimization) simulation of feeder bus cluster dynamically scheduling them to minimize the waiting time for passengers is completed.
- Review of the available technology friendly vehicles for differently-abled have been completed.
- Data collections have been completed to develop sustainable business model. Possible collaboration with DMRC has been explored. Multiple routes based on mathematically sound model had been generated. A mobile application regarding the bus schedules and current position of buses on the North Campus Circuit has been developed.

CIC204- Template replication- village transformation: Replicating the success stories of Hiware Bazar, Maharashtra.

Brief description

The project aimed at creating a development model for the selected village (Khanpur Japti) based on the transformation in Hiware Bazar conducting surveys of these areas including some other Aadarsh Gaon of Maharashtra through interview method, using questionnaire as a tool. In the later stage, the data collected would be analyzed using appropriate statistical techniques.

Khanpur Japti faces the scarcity of agricultural land and lack of adequate funds for development activities. Majority of the population are engaged as daily wage workers at the nearby construction sites. The issues such as girl education, computer literacy etc. still needs to be addressed on emergent basis. The efforts to overcome this problem brought about a sea change in the village. The project also aimed at designing possible templates customized for the universe of the study, various audio-visual means such as short films/documentaries, posters, brochures etc.

Significant outcomes

The innovative element of the project undertaken can be summarized as follows:

- Creation of possible templates for the solution of problems that arises in villages and which can be replicated in other villages in accordance with the respective requirements
- The approach to the problem through the hands-on measures, other than conventional types, such as blogs, theatre and documentaries, direct interaction with people
- Empowerment of various institutions at the village and people at grass root level for Decision Making

CIC205- Impact of FDI in Multi-Brand Retail on the Local Kirana Shops

Brief description

The growth in the retail sector of the Indian economy has been unusually sharp in the last few decades. The agro-based economy of ours is changing fast in the wake of its dreams to become a developed nation. The increasing interplay of world's countries has also contributed to this phenomenon. We have had a history of *babus* of the Kirana shops meeting our grocery demands every now and then. This entire culture from the times immemorial today seems to stand a stiff competition to the global phenomenon called FDI. The study is centered exactly on this crucial aspect of our everyday lives. It is the relevance of this study which has contributed to the genesis of our idea to conduct this study. With the entry of Foreign Direct Investment (FDI) in India, kirana stores and small traders are worried about loss in business. Once big retail shops are set up, it is argued that the profits of these small businesses would drop drastically and these would be forced to close. This has led many people to believe that there would be a lot of employment and revenue loss.

Significant outcomes

The aim of this project was to ascertain the validity of these arguments using a mathematical model, which will help to analyse if the Indian market is suitable for sustaining the big retail shops & the idea can be percolated to small towns. Let the number of Kirana shops in a locality be X(t) and Multibrand Retail stores be Y(t). Then the differential equation that can model the above situation is

$$\frac{dX}{dt} = aX\left(1 - \frac{X}{K_1}\right) - bY$$

$$\frac{dY}{dt} = cY\left(1 - \frac{Y}{K_2}\right) - dX$$

$$X(0) = X_0, \quad Y(0) = Y_0$$

The parameters a, b, c and d depend upon the factors such as – locality, age group, income group, etc.

CIC206- Improving The Current System Of Junk Management And Recycling

Brief description

The project aimed to identify the waste management system in India and tries to understand the organizational structure and accompanying problems**.** The project is an attempt to organize junk sector by educating them, informing them and transforming their operations management. It aimed at learning about existing business methods of junk disposal by visiting junk dealers and various recycling firms Secondly, developing a better organized mechanism for collecting the junk generated from the targeted institutions. Thirdly, segregating the junk collected scientifically and ensuring maximum retention of value.

Significant outcomes

To reduce the use of paper and to promote its reuse, a notepad has been designed by using one side used A4 sized paper. The notepad has been named 'Re - Think' pad. One side used A4 size papers were arranged in a way to keep the used part on the left and the unused one on right. The sheets were cut into right.

To promote segregation at source, a Dustbin has been designed that urges and compels the users to segregate junk from waste at the household level. The dustbin has two compartments – one for the wet junk (made up of cane and covered with a flap) and the other for the dry waste (made up of cloth).

CVS 201- Integrating Non-Governmental Organizations (NGOs) With Tourism Enterprises In NCR And Beyond

Brief description

Tourism today is much more than just developing products. It is more about quality, insightful thinking and ability to have global information about technology, partners, contacts and responding quickly to global and regional trends. The fundamental task before tourism promotion is to facilitate integration of the various components in the tourism trade as active participants in the nation's social and cultural life. There is a long road ahead. All must work towards a society where people can work and participate as equal partners. Tourism should be a vehicle for international cooperation and understanding of the various civilizations and a harbinger of peace.
The project was aimed at integrating NGOs and Travel companies catering to tourists visiting India. As an increasing number of Tourists want to experience the developments taking place in India in different social sectors, it becomes an absolute necessity that the Travel companies need to collaborate with NGOs actively in different sectors in order to show case their innovations. During course of meetings, the representatives of NGOs presented their ideas to Tour operators and both parties mutually decided to showcase some of the projects to foreign tourists visiting NCR.

Significant outcomes

1. It's a win-win situation for both the sectors as travel agents would be able to cater to this type of special interest tours and tourists would also find a common path to approach NGOs and help them to further strengthen the social sector.
2. A new product line is developed in tourism sector.
3. A new typology of tourism i.e. "Special Interest Welfare Tourism" was also developed which was non-existent till date.
4. A large number of Tour operators have been identified by the research team who expressed their desire to working on this.
5. Many travel organizations have found this initiative extremely innovative and will soon introduce such activities in their itineraries.

DR201- Biomarkers Of Heat Stress And Acclimation

Brief description

The project is aimed to understand the physiological , biochemical and physiological changes in heat stress and acclimation in human and rat model. The blood sample of exercised human volunteers at various degree of humidity is collected and used to study biochemical parameters like thyroid hormone, transaminases etc. The rat model is subject to heat stress and acclimation. Its blood, tissue like heart, brain, liver, kidney, spleen, gut and muscles are collected. They are being used to study the histological changes, to study biochemical stress parameters and also gene levels by microarray.
The significance of the study is to understand the molecular mechanism of heat stress and acclimation and search out non HSP proteins which can be used as biomarkers of heat stress and acclimation.

Significant outcomes

The conclusion of the study is that many other proteins, hormones, cell stress protectors can mark heat stress and the state of acclimation along with chaperone. Hydration levels are important in heat stress as we see that most of the genes that are affected in heat are those related to osmotic stress. Gene expression can now be studied expression in the state of acclimation of heat stressed rate to see whether the cell stress factors show opposite effects in these conditions. Students have learnt how research is done in biology at the undergraduate level.

Publications: Anju Jain, S. Nanda and Shashi Bala Singh Biospectrum of Heat Adaptations**.** Journal of Agroecology and Natural Resource Management (JANRM) 2014; Volume 1, (2) , pp 51-55.

DR202- Controlling Heavy Metal Soil Pollution By Phyto-Remediation: A Greener And Sustainable Approach

Brief description

The primary aim of the project is to remove heavy metals from the soil by an ecofriendly technique and clean up the soil without disturbing its texture and fertility level.
Phytoremediation is considered to be a "green revolution" in the field of innovative clean up technologies. It describes the treatment of environmental problems through the use of plants that mitigate the environmental problems without the need to excavate the contaminated material and dispose it elsewhere. Some plants proved to be popular organism for bio-monitoring to determine and identify the sources of heavy metal soil pollution and their detoxification by phytoextraction techniques.
We have collected soil samples and some of the efficiently growing plant species from the polluted sites to find out the extent of heavy metal accumulation in plant and soil samples besides identifying the hyper-accumulators. Soil and plant samples were digested using green analytical technique for metal analysis (Hanlon 1992a, b; 1998) and analyzed the heavy metal content using Atomic absorption spectrophotometry (AAS).



Significant outcomes

Results clearly suggest that plant species like *Saccharum* sp., *Brassica juncea*, *Tamarix* sp. and *Ricinus sp.* are the efficient accumulators of heavy metal from the soil. The general trend of heavy metal accumulation pattern in soil samples from all the sites was found out to be in order of: Zn>Mn>Pb>Cu>Ni>Cr>Cd.
Phytoremediation is a potent strategy for detoxifying the contaminated soil with inorganic pollutants. It is a greener and sustainable approach which prevents secondary pollution.
Heavy metals can be removed from the soil and no disposable sites are required.
Extracted metals can be further recycled from the contaminated plant biomass where it is supposed to be useful.
Phytoremediation has no detrimental effect on both soil fertility and its texture.
Publications: Three papers

DR203- Bio-Inspired Copper Nanoparticle and Its Application as Antibacterial Agent

Brief description

Bio-inspired methods utilizing plants (plant tissue and extracts) to synthesize metal nanoparticles have received more attention as a suitable alternative to the chemical and physical methods and hence in future will become a part of green chemistry. This is because plants are cost effective, easily able to reduce metal ions, and therefore can be used as an economic and valuable alternative for the large-scale production of metal nanoparticles. Extracts from plants possess both reducing and capping agents for nanoparticle synthesis. The bio-reduction of metal nanoparticles by combinations of biomolecules found in plant extracts (*e.g.* enzymes, proteins, amino acids, vitamins, polysaccharides, and organic acids such as citrates) is environmentally benign, yet chemically complex.
The antimicrobial activity of synthesized copper nanoparticles was investigated against pathogens like Escherichia coli (Gram negative) and Bacillus subtilis (Gram positive) using well diffusion method.

Significant outcomes

After investigating the potential ability of different plant extracts for reduction of copper ions to copper nanoparticles *Beta vulgaris* was selected for further study. Characterization by uv-vis, SEM, FTIR confirmed the synthesis of Cu NPs. The synthesized NPs showed high antimicrobial activity against Gram negative bacteria indicating that these copper nanoparticles, acting as antimicrobial agents, can reduce specific harmful bacteria linked to potentially deadly microbial infections. These copper nanoparticles may also be used in effluent treatment process for reducing the microbial load, industrial and medical application.

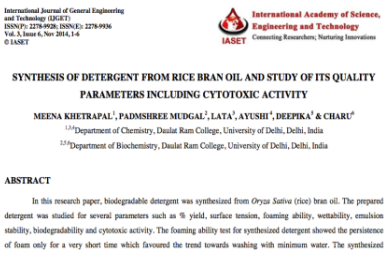
Publications: 1 Poster presentation and Abstract published of the work in "The 5th Asia Oceania Conference on Green and Sustainable Chemistry", 15th-17th January in India Habitat , New Delhi

DR 204- How Safe Are Our Detergents: A Comparative Study And Development Of Bio-Detergents

Brief description

The project was carried out with the following objectives:

- More than fifteen brands of locally available commercial detergents were analyzed for their cleaning action, surface properties, chemical toxicity and bio-toxicity.
- Protocols were standardized for the synthesis of high performance, eco-friendly, non ionic sugar based surfactant from bio waste like barley husk, sugar bagasse and corn cob. Further characterization of the synthesized detergent was done with TLC, IR, ^{1}H NMR and ^{13}C NMR.
- Biodegradable detergents were synthesized from various vegetable oils and their detergent properties were studied.
- To develop enzyme based green detergents, Proteases were isolated and characterized from easily available cheap plant sources.



International Journal of General Engineering and Technology (IJGET)
ISSN(P): 2278-9928; ISSN(E): 2278-9936
Vol. 3, Issue 6, Nov 2014, 1-6
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SYNTHESIS OF DETERGENT FROM RICE BRAN OIL AND STUDY OF ITS QUALITY PARAMETERS INCLUDING CYTOTOXIC ACTIVITY

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ABSTRACT

In this research paper, biodegradable detergent was synthesized from *Oryza Sativa* (rice) bran oil. The prepared detergent was studied for several parameters such as % yield, surface tension, foaming ability, wettability, emulsion stability, biodegradability and cytotoxic activity. The foaming ability test for synthesized detergent showed the persistence of foam only for a very short time which favoured the trend towards washing with minimum water. The synthesized

Publication from the research

Significant outcomes

1. Studies on comparative analysis of commercial detergents could serve as a guide for the public to make an informed choice in choosing their detergents.
2. Detergents were synthesized from Coconut Oil, Mustard Oil and Rice Bran Oil. Their detergent properties like cleaning action; surface properties, chemical toxicity and bio-toxicity were studied.
3. It was found that Apple gourd (*Praecitrullus fistulosus*) is the richest source of proteases. Further purification and characterization of Apple gourd protease was done
4. The innovation was that in view of the growing importance of valorization of Biowaste, for the first time it was reported the synthesis of sugar based detergent from Biowaste like barley husk, sugar cane bagasse and corn cob. The extraction and synthesis of detergent from Bio waste is done using Green chemistry protocols.
5. For the first time it was reported a detergent synthesized from Rice Bran Oil, a cheaper source as compared to other vegetable oils.

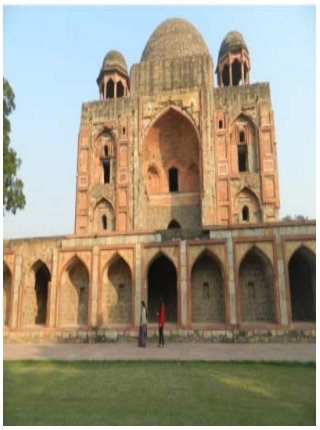
Publications: Two journals

DR 205-Potential Of Tourism In National Capital Region

Brief description

The present study is being undertaken with a view to explore the hidden tourist spots and the potential of tourism in NCR. The study included a tour of the city's tourist spots ranging from the popular sites like Red Fort, Qutab Minar, Humayun's Tomb, Dilli Haat, to the lesser known places like Dadi Poti Ka Maqbara, Khan-i- Khanan's tomb, Mirza Ghalib ki Haveli, Raja ki Baoli and many other such places in order to get first-hand information on issues related to cleanliness, maintenance, transport, publicity, food availability and safety of tourists and also to identify the weaknesses in the growth of tourism in Delhi and NCR.

Raja Ki Baoli in Mehrauli



Significant outcomes

In response to the need of publicizing lesser known monuments and destinations and also towards the problems related to the tourism sector in Delhi/NCR, the project team made the following efforts:

- A website was created to provide an interactive platform for the public to gain and share information about new tourist spots especially focusing on lesser known monuments, religious places, fairs, museums and markets through photos and videos and other real travelling experiences.
- An application has also been designed to create awareness about less popular places along with all the requisite data, for example, location, description, historical background, entry charges, entry timings, transport connectivity, main attractions and the team's own analysis.
- A travel and tourism club was started to organize competitions and tours in order to generate interest and awareness about various destinations.

DR206- Developing A Framework For E-Governance In Daulat Ram College

Brief description

The objectives of the project are to create a framework for e-governance within the college for (Students, Teachers and administrative staff) access, to have a common notice board to upload the notices of various activities, make departmental groups for online or offline student-teacher interaction, upload assignments, attendance and online tests, provide logins to students and teachers, online submission of forms and payment . The project aims at developing a framework for e-governance and the management of processes such as registration, admission, student information, time-table, attendance, library information, examinations, performances, grades, hostel information, and job placement etc.

Significant outcomes

The project has developed a Daulat Ram college new website http***://www.dr.du.ac.in*** in CMS to create and manage Content Management System of the college.
It has also managed successful development of DRC-VLE in Moodle to create and manage Learning Management System of the college. In VLE a teacher can upload Online Lectures, Projects, Assignment, Quizzes, Attendance, Internal Assessment and Notes etc.
Innovation- In Delhi University, at college level Content Management System and Learning Management System has been created and maintained by the students themselves.
The website and portal is publicly available to access information regarding each field. On DRC-VLE, anyone can login as a guest to check the available courses and give constructive feedback.

DCAC201- Creating A More Enabling Environment For Differently-Abled Students In Universities In Delhi Through A Dropout Prevention Programme

Brief description

Secondary data sources suggest that nearly two-thirds of the 1500 plus seats that are reserved for differently-abled students in DU colleges remain vacant in any year (source:http://www.dnis.org/archives.php). This is both an outcome of lower enrolment rate and higher drop-out rate among such students, while lack of appropriate barrier-free infrastructural facilities in colleges is an obvious reason for low enrolment and high dropout rate among the differently-abled students. The empirical research under this project is conducted to highlight the kind of barriers faced by students with disabilities enrolled in different undergraduate colleges of University of Delhi and their role in determining the level of academic engagement of such students. The study essentially reveals that attitudinal barriers posed by the insensitive behaviour of students and staff members in colleges towards students with disabilities are more detrimental than physical barriers to access. The study thus highlights the need for colleges to focus more on eliminating the invisible behavioural barriers by adopting visible sensitization strategies.

Significant outcomes

The results from the primary data based empirical analysis reveals the importance of generating greater awareness amongst the non-disabled peers, teachers and other non-teaching staff members of the University and colleges regarding the problems faced by differently-abled students and the important contribution they can make by being sensitive to the needs of the differently-abled students and by lending a helping hand. With this objective, the team has created 2 online portals: *www.enablethedisabled.in and www.facebook.com/enablethedisabled*, which are fully functional and allow instant communication between its registered members, who post their requests for scribes, readers, audio files etc., which is instantly communicated to all its members, thus enabling quick response.

Publications: A book titled, "Opportunities and Barriers for Students with Disabilities: A Case Study of University of Delhi"

DCAC202- Visualising Economic And Political Impact Of Globalisation On Gaddi Tribe Of Chamba District In Himachal Pradesh

Brief description

Gaddi is a generic term used for the indigenous population of the Bharmour area of Chamba district and some regions of Jammu & Kashmir. The area is called Gadiyar or Gaderan after its inhabitants. Gaddis include caste groups like Brahman, Rajput, Khatri, Thakur, Rathi, Hali, Rihare and Dom. The government has notified the Gaddis as scheduled tribes, irrespective of their castes. Gaddis are traditionally a semi-nomadic pastoral group whose economic activity revolves around sheep and goat rearing (subsidiary occupation), New government policies have drastically affected the traditional way of life of Gaddis affecting their social behavior and economic status. Although today we find several political representatives and legislators, cutting across the political spectrum, from the community but their future still seems to be uncertain. The project attempted at visualizing the subsistence pattern amongst the Gaddis through surveys, data collection and analysis of the data.

Significant outcomes

The survey that interviewed 250 people of the tribe revealed the female literacy rate to be 46.1% which is much lower than that of the males at 83.7%**.** 66% of the population has income less than Rs 5000. There is an urgent need for government intervention to protect their traditional occupation The outcome of this project seems to suggest that although the governments are concerned with the problems being faced by the Gaddis but even after more than 65 years of independence, the Gaddis, especially in remote areas, are far from the mainstream of the country and a lot needs to be done to bring them into mainstream.

DCAC 203- New Medias and Pedagogy: Promoting Liberal Arts Education

Brief description

Delhi University over the past years initiated an inter-disciplinary approach to the teaching and learning process. We aim to facilitate and create a pedagogical tool for carrying forward and providing a possible template that can work in tandem with this approach. Often, curricula and time constraints prevent the adressal of wider social issues and concerns, which cross the boundaries of the syllabi. The purpose of our project is to explore improvements and learning outside the classroom, and to showcase the efficacy of new medias like mobile theme-based exhibitions, short films and online material as pedagogical tools to complement the existing classroom structure, and thus further improve and refine the existing education programme of Delhi University. The project team has conducted extensive research on the "Representation of the Courtesan Figure in Literature and Cinema" and curated a mobile exhibition. Further research will focus on sensitizing the students to document and archive the continuities and creating a teaching module so that exhibition, as a pedagogical tool, can be used for creating templates to study which can be used in academic institutions.

Significant outcomes

The findings from the feedback surveys, indicate that the student body of the University of Delhi is deeply interested and attracted by the notions of learning through exhibitions. It is our belief that the new medias can be successfully integrated into the existing academic syllabus and prove to be a valuable tool to explore subjects which cannot be covered in a traditional classroom setting. The method of these new medias, such as exhibitions and short films, also allow students to learn critical skills such as presentation and communication skills, as well as express creative abilities. The process of creating an exhibition of any topic not only thus provides crucial education to the members involved in the creative process, but then has subsequent value as a learning tool, since those viewing the exhibition are able to learn about a subject in an unfettered manner. Our findings and data thus indicate that the new medias could prove to be a valuable pedagogical to propagate information and awareness about a wide variety of subjects, and prove valuable for both active and passive participants.

DBC201- Impact Of Electromagnetic Radiations On The Behavioral Response Of Dengue Fever Vector *Aedes aegypti*

Brief description

Aedes aegypti, the primary vector for viruses that cause dengue fever, dengue haemorrhagic fever, chikungunya and yellow fever is widespread globally. Today about 2.5 billion people, or 40% of the world's population is at risk of dengue. In India, the records reveal a massive increase of dengue infection in the country in the current years. Mosquitoes exhibit a series of behavioural response to optimize their survival and reproduction. Orientation, feeding, mating behaviour and reproductive behavior are such key behavioural responses. An aberration in these behaviours may be disastrous for the mosquito population. Therefore, specific response of *Aedes aegypti* such as orientation behavior, feeding behavior, mating behavior and oviposition behavior as modified by EMR were investigated in the present research work.

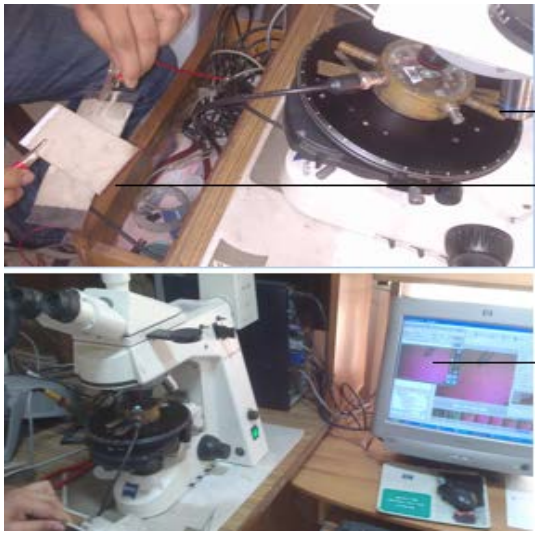
Significant outcomes

The study indicated that UV light impaired growth, development and survival of egg, larvae, pupae and adults of *Aedes*. UV light also impaired the longevity, oviposition behaviour, and fertility of the treated females. A normal female laid 100- 150 eggs within 1-2 days after blood meal. The hatching success of the eggs was 90-95%. The treated females on the other hand laid 70- 75 eggs, after 3 days of blood meal. The eggs laid by treated females had decreased hatching success and increased incubation period.
In the absence of light, the larvae were distributed randomly, and were seen in swimming, floating and resting stage. In response to visible light they moved away from the source of light within 53 sec. They were repelled by the UV light and moved away from the source within 13 sec. The research work conducted in the present innovation project will help in devising appropriate strategy for management of the dengue vector *Aedes aegypti* by altering its behavioural response with the help of EMR.

DBC202- Generation of Electrical Energy by Non-Conventional Methods, to operate Low Power Devices.

Brief description

The project is based on the phenomenon of triboelectric effect. In this project, it was proposed to select the suitable of polymers (in their bulk form) which are rich in charge generation capabilities. On the basis of the experimental data for different combinations of polymers, we found the combination of Acrylic and PVC to be suitable for electricity generation using triboelectric effect. We used the sheets of PVC and Acrylic, coated them uniformly with silver paste to make the electrodes and the electrical and optical response of the same is being observed by varying their dimensions, rubbing strength etc. Below are given some preliminary results based on the experimental data recorded for the above combination.



Significant outcomes

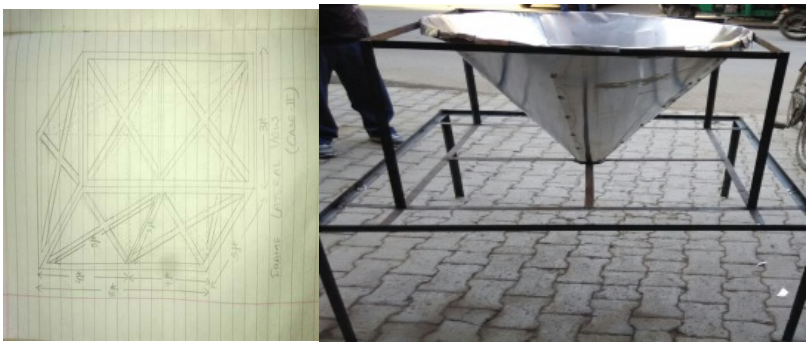
The voltage generated using triboelectric effect for the combination of Acrylic and PVC has been found to depend on the effective surface area of contact, contact strength etc. We observed the generation of ~ 5 V for the contact area of 9 x 5 cm^2 with the sheet thicknesses 0.5 mm (PVC) and 1 mm (Acrylic). With such a significant value of voltage, few unit cells of LCD can easily be energized. Figure 1 shows the switching of a unit LCD cell (thickness 6 μm, area 4.5 x 4.5 mm^2) filled with FLC material LAHS 19. Figure 2 shows the optical response (variation of light transmission intensity with the rubbing strokes) of the same LCD cell. Here, the rubbing is performed manually with an interval of approximately 1 sec. The team has also recorded the electrical response of the same combination with a frequency of ~ 1 strokes/sec [Figure 3]. The sharp peaks of the generated voltage can easily be seen from the figure. They checked the device performance for more than 100 cycles and found no distortions in its voltage generation performance.

DBC203- Study And Improvement Of Various Existing And Development Of New Devices Harnessing Renewable Energy Resources To Make Them Cheaper, More Energy Efficient And User Friendly

Brief description

The team studied different forms of renewable energy (solar energy, bio energy, wind energy, thermal energy, and tidal energy) and devices which make use of these energies. We have done many experiments and got significant results in each case. We increased solar cooker efficiency, bio gas production efficiency, solar light ducting, and energy saving during lift movement. We also make designs of efficient cooler and solar dryer, which have both low cost and effective and multiple uses. Further progress is going on.
Experiments performed:

- Increase in biogas production
- Increase in solar cooker efficiency
- Ducting of light and solar concentrator
- Harness energy from a moving elevator



Significant outcomes

1. The biogas produced in 1litre saw 4% increase as compared to normal conventional method and bio gas production also started very early.
2. The solar cooker made was very efficient and its inner temperature rose to 91^0C in only 2.5 hours and it was very efficient to cook food in summer.
3. The solar concentrator can be used widely during the day time to lighten up the room using solar energy.
4. Elevator model:-Using this concept we can save a large amount of electricity in offices, metro stations, malls, and residential flats. The electricity was generated from moving the elevators that are present inside the elevator car.

Publications and Patents- The idea of solar ducting system was patented.

DBC204- Use Of Photo Galvanic Cell For Solar Energy Conversion And Storage In Electrical Energy

Brief description

An H-shaped tube was used, which was filled with a known amount of solution of Photosensitizes, Sodium hydroxide, Surfactants, and distilled water so as to keep total volume of mixture always fixed. A platinum electrode dipped in one limb of the cell and the Standard Calomel Electrode dipped in another limb of the Cell. The terminal of the electrode was connected to the pH meter.
We used mix basic dye, which has the capability to accept more electron, mix cationic surfactant to enhance the conversion efficiency, and mix acidic reluctant which have capability to donate more electron. It was proposed to explore the use of Photosensitizes and surfactants in Photogalvanic Cell.

Significant outcomes

- It is the only type of Solar Energy Conversion device which has a storage capacity.
- Our experiment reveals that Photogalvanic Cell gives high electrical output with better storage capacity with special attention on reducing the cost of the cell to give commercial viability.
- It is a renewable source of energy.
- Photogalvanic cells are low cost due to the use of dye, which is cheap and used in minute quantities reductant like EDTA, is also not that expensive. So overall working with a photo galvanic cell has lot of scope for its development.

DBC205- A Study Of Crop Yield Pattern With Climate Change Based On Various Physical Parameters Like Temperature, Rainfall, Humidity, Greenhouse Gases Emission, etc. In Western Uttar Pradesh To Make Future Predictions For Better Crop Management And Yield

Brief description

The team has set up independent regression equation to predict wheat yield for 10 districts of western Uttar Pradesh (U.P.) for the first time (calculations have been done for 5 districts till now). Predictions for wheat yield have been obtained using monthly average rainfall and temperature data from 1986 to 2011. No significant correlation of wheat yield has been found with rainfall and temperature hence wheat yield prediction has been done using regression analysis. However a strong correlation has been found between rainfall and temperature for monthly averaged data. Thus using even a single parameter (either rainfall or temperature) has provided equally good results. Predictions have come out with good accuracy (greater than 80 % and in some cases even greater than 90 %). The results show that higher order regression equation with monthly averaged data of a single independent variable can also be used for making reasonably accurate prediction. The team proposes to extend the study by taking daily data of both temperature and rainfall in our upcoming calculations.

Significant outcomes

1. Regression equation for predicting wheat yield developed for the first time for 10 districts of western U.P.
2. Forecasting technique using simple regression model and equation involving only one independent variable developed. This will be particularly useful as detailed data for different parameters is often not available in public domain and involved regression technique. Computations require advanced computing facility, not available to everyone.
3. The team has developed a module for teaching basic forecasting techniques to undergraduate students with basic knowledge of statistics.
4. Organized a one-day workshop of MATLAB software at Deshbandhu College for the faculty and students of the project.

DBC206- Impact Of Climate Change On Various Physical Parameters Of Weather In A Highly Polluted Area Versus Relatively Pollution Free Area

Brief description

The aim of the project is to conduct the environmental studies of two places: highly polluted (Delhi) and relatively pollution free region [Leh (J & K) or Nainital (Uttrakhand)]. The Intergovernmental Panel on Climate Change (IPCC) projects that the global mean temperature may increase between 1.4 to 5.8 degrees Celsius (C) up to 2100. The industrial activities that our modern civilization depends upon have raised atmospheric carbon dioxide levels from 280 parts per million to 379 parts per million in the last 150 years. Therefore, it becomes significant to study the impact of changing global condition of the climate parameters like temperature, rainfall, humidity etc.

Significant outcomes

1. The annual temperature of New Delhi from 2002 to 2013 has shown a clear increment in the maximum, minimum and average temperature. The increment in temperature is the obvious result of increasing pollution in New Delhi.
2. The rainfall studies depicts a positive slope in starting months but a sharp decrease in middle rainy seasons which is an anomalous behavior from 2009 to 2013.

DBC207- Synthesis Of Blends From Biodegradable Materials Based On Adsorption Of Toxic Metals

Brief description

Water is essential for plants and animals. The quality of water for a sustainable environment is decreasing. The major sources of water pollution in Yamuna is domestic waste from urban and rural areas, Industrial wastes, sediments, agricultural wastes, immersion of idols, construction of high rise buildings near water bed, after cremation the wastes are thrown to the river from nigambodh ghat and other ghats, Washing of clothes, Bathing of cows, bisons in rural areas, the use of pesticides, herbicides, insecticides to kill insects in crops in lands near Yamuna.

Significant outcomes

Rice husk was applied to sorption of nickel and copper from aqueous solution. Rice husk consists of 32% of cellulose, 21.34% hemicelluloses, 24.4% lignin and 15.05 % of mineral ash as well high percentage of silica in its mineral ash is approximately 96.34%.
Chemical modification by treating rice husk with H_3PO_4 increase the sorption ability of rice husk for Cu (II) and Ni (II).
Coconut husk: coconut husk contains hemicellulose extractive such as pectins. These constituents make coir dust a useful adsorbent or natural ion exchanger because of hydroxyl and carboxyl group present in its composition.
Coconut husk showed adsorption result for Pb (II), Cu(II) and Cd(II) aqueous solution. It has shown maximum adsorption range of toxic metal with one hour range and 50-60° C. pH 10 is effective range for metal adsorption by coconut husk.
Aloe Vera: the main component of aloe vera is mannose 6 phosphate. It contains groups, hydroxyl and ring oxygen. It absorbs Pb(II) 76%.
Tulsi: Main components of tulsi eugenol, carvacrol, ursolic acid.
With 2g of tulsi in 0.008M aqueous solution of $CuSO_4.5H_2O$, 40.25% of copper was adsorbed.

DBC208- Influence Of Plant Extracts On The Reproductive Physiology And Behavior Of *Aedes aegypti*

Brief description

Dengue transmitted by *Aedes aegypti* is a cause of great concern to public health in India. Union health ministry of India reveals that there has been a dramatic increase in dengue infection in the country. The number of dengue cases reported in 2013 stood at over 70,000 in contrast to 49,576 cases in 2012. The geographic range of dengue fever has expanded too, primarily because of the spread of its principal vector, *Aedes aegypti* which possesses immense reproductive potential. Botanical extracts have advantage over chemical insecticides by being effective, environmental friendly, biodegradable and they do not have adverse effects on natural enemies. Biopesticides are known to adversely affect growth, development and reproductive potential of insects. Therefore, we initiated the research work on various aspects of biology and reproduction of *Aedes* as modified by plant extracts.

Significant outcomes

1. The ethanolic plant extracts of *Ocimum*, *Nerium* and *Citrus* peel were evaluated at three different doses, 100 ppm, 200 ppm and 400 ppm with respect to survival and reproduction of *Aedes aegypti*.
2. The extract of *Ocimum* at 100 ppm was observed to affect the hatchability of eggs and further survival L1 larvae, however, more data is required to substantiate this conclusion.
3. The results indicated that the plant extracts have adverse effects on survival of *Aedes.*
4. The maximum mortality of fourth instar larvae (L4) was determined at 400 ppm of *Nerium* in comparison to *Ocimum* and *Citrus* peel.
5. The effects were dose dependent. The plant extracts impaired behavioral responses of *Aedes* larvae. The treated larvae deviated from their normal wriggling, swimming and resting pattern.

DDU201- Agriculture Management: Prospects And Challenges (A Study Of Farmers' Perception Towards Agriculture Management)

Brief description

The significance of agriculture sector growth has been appraising, by economists, scientists, and policy makers, with increasing demand of food grains across the world. The farmers have been holding an imperative position targeting high yield by using various technologies and scientific inventions to meet the said demand. Adoptions of managerial tact in developing agricultural practices are also contributing in high food production along with other necessities. In the present study, the responsiveness of farmers towards agriculture management, collected through questionnaire, have been studied on various issues covering traditional agricultural practices vis-à-vis managerial practices. The field survey has been executed to collect the data on pre-framed questionnaire by following personal interview method. The responses have been presented through charts, bar-diagrams, and analyzed with data reduction technique viz., principal component analysis.

Significant outcomes

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DDU202- Analytical Modeling, Simulation And Verification Of Emerging Nanoscale MULTIGATE Device Structures And Study Of Government's Initiatives For Growth Of Electronics In India

Brief description

The main objective of the project is to procure information about past, present and proposed initiatives of Central Government in the area of Electronic System and Design and Manufacturing (ESDM) and to compile contributions made by Indian scientists (especially women) in electronics. Apart from above, the students shall develop analytical models for non-classical gate geometry MULTIGATE MOSFET which shall be useful in understanding the device physics. The students through this project shall gain hands on experience with ab-initio modeling and simulation tools which shall be helpful for them in taking up research and development as a career.

Significant outcome

1. Government of India through its National Policy of Electronics has emphasized the need for ESDM sector to meet domestic demand of our country as well as to use the capabilities created to successfully export ESDM products.

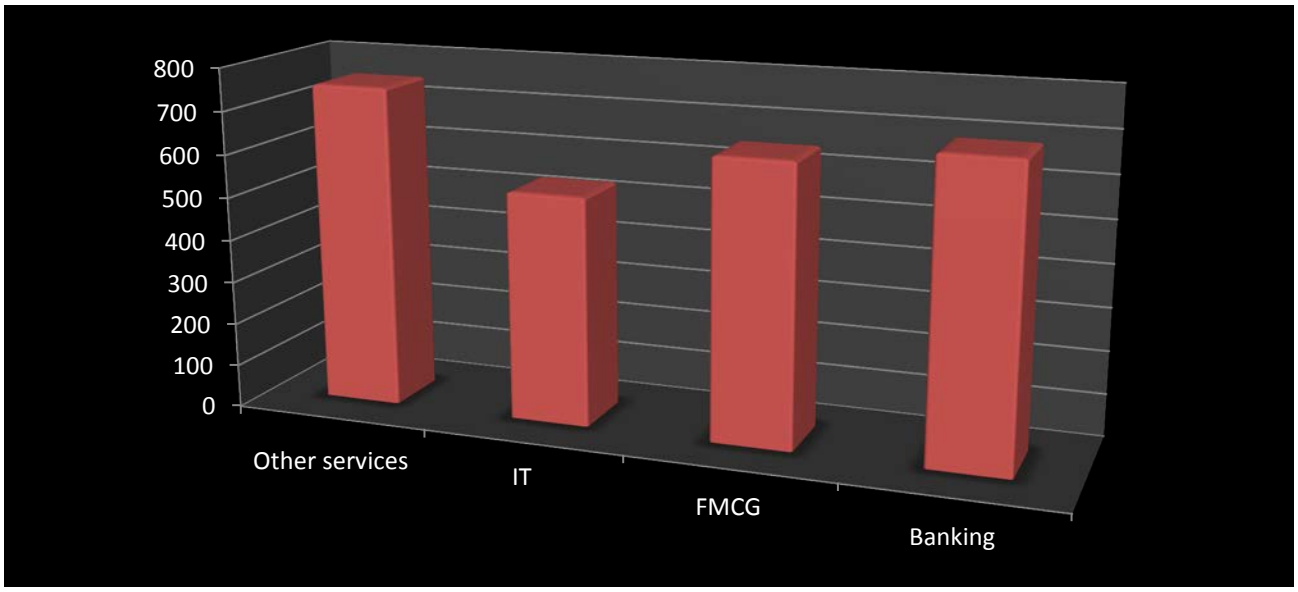
2. Government has initiated the process of setting up of Incubators for start-ups in electronics in Delhi. The incubator will be set up by STPI in association with India Electronics and Semiconductor Association (IESA) and University of Delhi**.**

3. A scheme to enhance the number of PhDs in electronics sector to 1500 per annum by 2017-18 was recommended by the EFC. The scheme is under advanced stage of approval by the Government of India.
4. There has been an upsurge in number of Indian Women Scientists who have become Fellow of the science academies however; in the area of Electronics the response is very meager. The data is as per information available (till July 2014) on academy websites
5. In order to encourage young girls to take up career in science, One Day Seminar on "Women in Science: A career in Science" was organized on October 17, 2014 with financial support from Indian Academy of Sciences, C V Raman Avenue, Bangalore. Special Panel Discussion on Encouraging women in science will enrich science was organized at the end of the workshop which witnessed a gathering of 130 delegates from different institutes.

DDU203- University-Industry Interactions: Importance And Impediments

Brief description

Academics and Industry are two sectors which directly influence an individual's life and are the major aspects of shaping one's life. For a quick, better and stronger relationship between universities (academia) and industry it is important to bridge the gap between the two sectors. Both these sectors were carefully studied and analyzed as to where they lack to communicate and build relations. The focus was on more value addition in graduates so as to fill the requisites of the industry. They attempted at devising plans and structures to ensure skill development in students which can later help in better syncing in of students in industries.



Significant outcomes

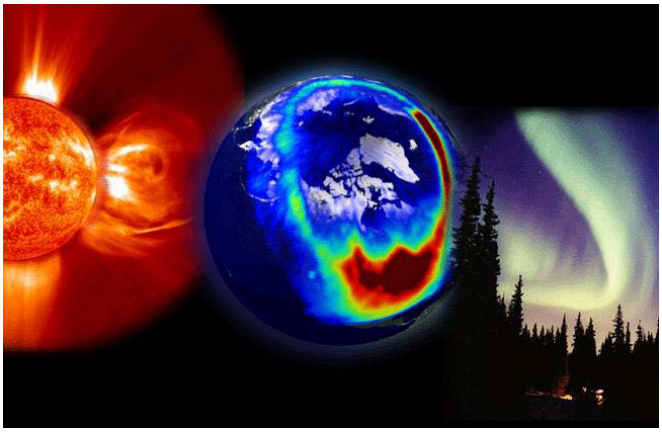
Among the three major sectors surveyed (IT, FMCG and banking), the banking sector has the greatest involvement with the University sector.

The new developed methods are based on cause and effect relationships, which were analyzed by the survey. Therefore these new methods seem to have greater potential to cater to the need of both domains with higher chances of success. Moreover the conventional methods have not really shown much of success in previous efforts.

DDU204- Dynamical Study Of Weather Of Delhi Region

Brief description

Sun is by far the largest supplier of energy to the earth's surface. Any change in the radiative output of the sun also affects the energy balance of the earth's surface and the atmosphere and at some level it influences our climate. Also, changes in the solar spectrum, in particular UV, could enhance this influence by affecting stratospheric chemistry. The sun's influence on earth's climate cannot be measured directly. However, good correlation has been found between different proximities of solar activity and climate records. The study tries to find a correlation between solar activity and weather, particularly in Delhi region. Study accounts the weather data as sun's surface magnetic field data are only available for few decades, not long enough for comparison with climate. This project also points out major misconception within climate science which cannot be overlooked and propose a better method to opt for numerical methods employed in climatic models.



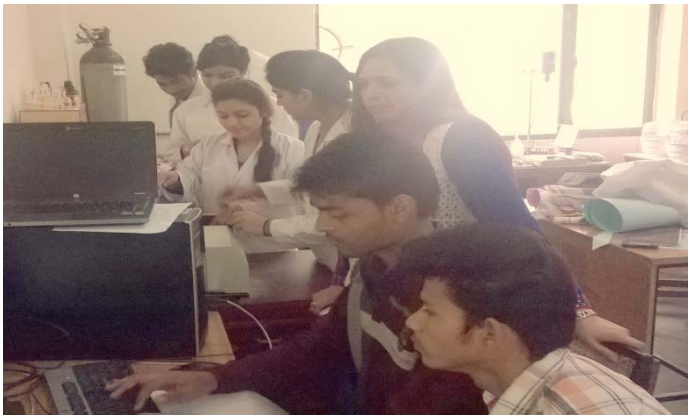
Significant outcome

The sun's influence on climate cannot be directly measured, how strong is the influence of sun on climate and which factor play the influential role in the big as well as the small picture, is the problem to be tackled at the present moment.
Global warming on earth has always been attributed to the greenhouse gases. Though the physics of greenhouse gases and the increase in temperature is well established but yet no correlation has been found among the greenhouse gases and the temperature, rather the behavior are uncorrelated and higher nonlinear in nature implying that other parameters are also responsible for the overall temperature fluctuations on earth. It has identified new causes which are also responsible for global warming. Now, if one has to extrapolate and predict the future climate changes, the climate models and climate scientists has to include these Factors which the project has found.
Publication: One poster

DSC201- Removal Of Toxic Chemicals From Laboratory Effluents Using Green Technologies

Brief description

The chemistry laboratory waste effluent usually contains highly toxic organic and inorganic pollutants including metal ions. Because of different nature and scale of pollutants in laboratory wastes, some modifications are required in the previous available methods. These hazardous chemical wastes pose serious health problems for aquatic plants and animals. The persistency of toxic metals in environment and their ill effects are well known. Out of the various possible solutions to check toxic metal ion pollution, the bio-remediation is of special importance as conventional methods used to remove these toxic metals are quite expensive and have limited applications in terms of efficiency and/or the disposal of secondary waste produced in the process.



Significant outcomes

Coconut Husk, Rice Bran and Orange Peel agricultural wastes could be used as potential adsorbents for the removal of lead, cadmium and copper ions from aqueous solutions. The amount of cation adsorbed (qe) increased with increase in metal ion concentration. Kinetic, equilibrium and thermodynamic results indicate that metal ion removal from aqueous solutions by adsorption proceeded through chemisorption and physiosorption mechanisms. It is found that upto 90% of metal ions (Pb^{2+}, Cd^{2+}, Cu^{2+}) can be removed from laboratory effluents by using Coconut Husk, Rice Bran and Orange Peel.
The use of aquatic plants for removal of metal ions from laboratory effluents may provide the foundation for a novel water treatment technology. With increase in contact time adsorption increases initially and becomes constant after contact time. Increase in number of plants also increases adsorption. From kinetic studies it is proved that adsorption is chemisorption. In solar detoxification it was indicated that appreciable degradation of phenol/aniline takes place in the presence of ZrO_2. In future various nanoparticles of mixed metal oxides will be prepared and their role as catalyst for degradation of organic compound will be studied.

DSC202- Screening Of Local Anesthetics (LAs) For Antifungal / Antimicrobial Activities

Brief description

Local Anaesthetics (LAs) are drugs that block nerve conduction and are widely used for short-term sensory and motor paralysis in clinical practices. Local anaesthetics are considered to cause a disruption of microbial cell membrane permeability, leading to leakage of cellular components and subsequent lysis. LAs can be considered as an adjunct to traditional antimicrobial use in clinical or laboratory setting, in addition to serving as agents for pain control. Bacterial infections generally occur during post-operative surgery, if proper care is not administered. Anaesthetics can be used topically and in the management of cutaneous and vaginal candidiasis. Pin-Vaz et al. (2000) studied the antifungal activity of local anaesthetics against *Candida* species. Hence, efforts have been made to study the effect of three LAs, Dibucaine (2-butoxy-N-(2-diethylaminoethyl)-4-quinolinecarboxamide hydrochloride), Mepivacaine (N-(2,6-dimethylphenyl)-1-methyl-2-piperidinecarboxamide hydrochloride) and Tetracaine {4-(butylamino) benzoic acid 2-(dimethylamino) ethyl ester} on inhibition of pathogenic bacteria such as, *Escherichia coli*, *E. coli 1, Pseudomonas aeruginosa* and *Proteus vulgaris*.

Significant outcomes

From this study the following was concluded:

- On the basis of LAs dose responses, Dibucaine was found to be most effective at 10^{-2}M with an inhibitory zone of 17mm followed by Tetracaine with 16mm inhibition zone in controlling the growth of *Pseudomonas aeruginosa*.
- Whereas, Dibucaine was effective in controlling both *E. coli* and *E. coli 1* at 10^{-2} M with an inhibitory zone of 10mm and 12mm respectively.
- Mepivacaine and Dyclonine showed no inhibitory effect against the clinical samples tested.
- On the basis of dose response of Lidocaine (0.1 - 0.6%) studied, 0.6% LA was found to be effective in controlling the growth of *Penicillium sp*.

Hence, these LAs might prove to be effective in controlling post-surgical microbial infections.

Publications: a poster titled “Effect of Local Anaesthetics on clinically isolated bacteria”

DSC203- Microwave Assisted Extraction Of Active Principles From Natural Resources Using Green Solvents – Ionic Liquids.

Brief description

Here is green a solvent extraction for the Isolation of Active Principles from unexplored medicinal plants mentioned in Ayurveda. The selection of method to isolate active components with best yield and highest purity from natural sources is mainly dependent on the nature of compounds and raw material which is going to be processed. Microwave-assisted extraction (MAE) is an attractive and rapid sample preparation technique, and ILs could potentially be applied as solvents in the MAE of various useful substances from medicinal plants because ILs can efficiently absorb microwave energy.

Significant outcomes

The use of ionic liquid has shown positive results. The caffeine obtained is pure as obtained from NMR and HPLC results. 1- Ethyl-3-methyl imidazolium dibutyl phosphate has proved to be slightly better than the other ionic liquids studied. 25 % replacement of dichloromethane is possible. Increasing concentration of ionic liquid decreases the yield of caffeine. 100% IL has not been able to extract caffeine with the ionic liquid studied.
Publications: One paper titled, "Extraction of caffeine using ionic liquids from *Camellia sinensis*" communicated to Delhi University, *Journal of Undergraduate Research and Innovation.*

DSC204- Development of E-Device Application For Students & Behaviour Analysis

Brief description

This project presents a mobile app which is designed for students of University of Delhi. The app has been developed for android-based phones. Currently, students are required to extract the information related to their attendance, continuous assessment etc. from the lists displayed on the website or notice board. The lists are exhaustive and include information pertaining to all the students of a class or course. Delhi University Information Tool (DUIT) is developed to provide personalized information to the students. Using the app, the students get their own attendance and assessment. Moreover, the app facilitates analysis by providing pictorial representation of student-specific information in form of the graphs, generated using mathematical tools. Additionally, the students can view the notices, their timetables etc. The app interacts with database and web services for its working.

Significant outcomes

DUIT is one of its kinds as it provides personalized information to the students in addition to the general information. It is also unique in providing analysis to the students related to their attendance and assessment. The innovative ideas are as follows:

- 24* 7 available 'Student Information System' on the Mobile.
- Personalized attendance and assessment on the go
- Statistical analysis to show student's progress
- Timetable at student's finger tips
- A crowd-less notice board
- An always available helpline specifically designed for students' needs

Publications: two papers

DSC205- Exploring Chemistry Of Hazardous Chemicals Using Nanomaterials And Quantum Mechanical Techniques

Brief description

Material Chemistry is an important area of chemical research. Metal oxide nanomaterials have attracted increasing technological and industrial interest because of interesting changes in their optical, magnetic, electrical and catalytic properties like mechanical hardness, thermal stability or chemical passivity. At nanometer size, crystallites are influenced by the presence of significant numbers of surface atoms and by the quantum confinement effect of the electronic states and this influences the property of nanomaterials as compared to their bulk phase. Metal oxides nanomaterials are finding a wide range of applications in variety of fields by virtue of their unique property i.e., high reactivity resulting from their high specific surface area, controlled size and distribution. In view of their exceptional catalytic behaviour these metal oxide nanoparticles are best candidates for degradation of many harmful chemical in addition to serve as catalysts for exploring organic synthesis.

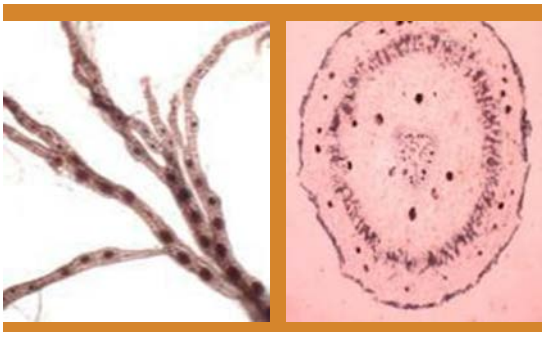
Significant outcomes

The research work has shown innovation pathways in reducing the number of steps in preparation of 3, hydroxyl-butanoic acid, a precursor, for synthesizing biodegradable polymers and in minimizing the use of H_2SO_4 in selective nitration of toluene. More importantly, the project has made a successful attempt to expose innovation in bringing enhanced learning experience for the students in terms of understanding the role of metal oxide based nanocatalysts in organic chemical reactions of importance as well as their use as catalyst in degradation of hazardous chemicals. Nano crystalline metal oxides (MOs) ZrO_2 & CeO_2 and mixed metal oxides (MMOs) ZrO_2-CeO_2 & ZrO_2-La_2O_3 have been prepared via hydrothermal method.

DSC206- Development Of Electronic Database Of Internal Morphology Of Plants And Animals Listed For Undergraduate Course Of Delhi University

Brief description

Proposed work is an effort to work with integration of two departments for ease of understanding with listed objectives. The team has developed electronic database (*in-silico* version) of existing museum (slides, photomicrographs etc.) primarily available in Botany/Zoology Dept. of various colleges of University of Delhi by light microscopy from slides of biodiversity, cytology, histology, pathology, embryology etc. using tools of ICT. Secondarily update this electronic database from Botany/Biology/Zoology museum of Department of Botany/Zoology of University of Delhi. The team is actively engaged in updating this electronic database with Botany/Biology/Zoology museum with reasonable reputation in and around Delhi (in India).



Significant outcomes

It is felt as an addition of excitement in reading/learning. It gives a way of realistic learning for larger dataset. The focus on details cannot be ignored even in *in silico* mode. It is an interdisciplinary effort bringing different groups together. Aspect of creativity was greatly employed in development as well as presentation at various stages of the project. Integration of ICT in education is reflected through this project as well. This is *in silico* version of microscopic world of both plants and animals. This is an out of box approach for the traditional way of learning for the slides in microscopy. It gives economical access to the facility for the larger group of participants surpassing the limitation of physical facilities/resources.

The idea of integrating ICT in the study of microscopic biological material was fruitful among the learners. The concept is not only feasible as well as economical and appreciable among the learners of this generation. The approach was taken as a tool in pedagogy for teaching microscopic biological material.

DSC207- A Study On The Effect Of Soil Pollutant Interaction On Physicochemical And Geotechnical Properties Of Soil Of Different Nature

Brief description

Pollution is one of the most challenging problems of today's era. It draws major public attention and is the result of industrialization, modernization and technological advancement in all fields of life in the global world. The load of sewage and industrial pollutants not only pollute the rivers beds and landfills sites but also contaminate the large area surrounding them causing health as well as construction hazards. The contaminated soil samples were collected from different locations within NCR region such as Yamuna river bed, landfill sites and some colleges of Delhi University. The samples are analyzed for their chemical and geotechnical properties as per standard procedures. The overall impact of the change in geotechnical properties of soil due to the pollutants and their interaction is evaluated and correlated and further evaluation of their impact on the existing and upcoming construction around the river bed is also done. As a remedial procedure the phytoremediation study was also carried out to observe any change in soil contaminant level after growing selected plant species. Results shown so far reflects the effect of pollutants on the chemical properties of the soil.

Significant outcomes

The effect of change in chemical properties and their impact on geotechnical and foundation properties are discussed in detail. The impact of changed soils' chemical properties on their geotechnical behaviour are established and correlated. The outcome of this project helps the civic agencies in understanding the environmental impact on various civil engineering structures which are going to be constructed on contaminated sites. The knowledge of construction hazards due to pollutants helps the city planner to follow the strict norms and design their master plan in such a manner that could cause minimum disturbance to environmentally sensitive zones. The success of phytoremediation study gives a better solution in future to tackle the contamination problems.
Publications: Three papers

DSC(Eve)201- Medical Tourism In India – A Game Changer For Indian Economy

Brief description

The Project Team has worked and created utility at three levels:
a) The research team has collected information connecting the value chain and created a portal named **"Holidays that Heal**" with the aim to provide relevant and required information to medical tourists.
b) The team has conducted survey of foreign patients visiting hospitals in Delhi - NCR regions.
c) We are also trying to develop a mobile application on the website.

Significant outcomes

The team has developed a website 'www.holidaysthatheal.in' for Delhi medical tourism. The website provides useful information and search for:

- Hospitals in Delhi, NCR providing advanced medical treatments
- Treatments and the hospitals providing the respective treatment
- Accommodations around hospitals
- Popular restaurants and food joints in Delhi
- Locations of tourists' interest

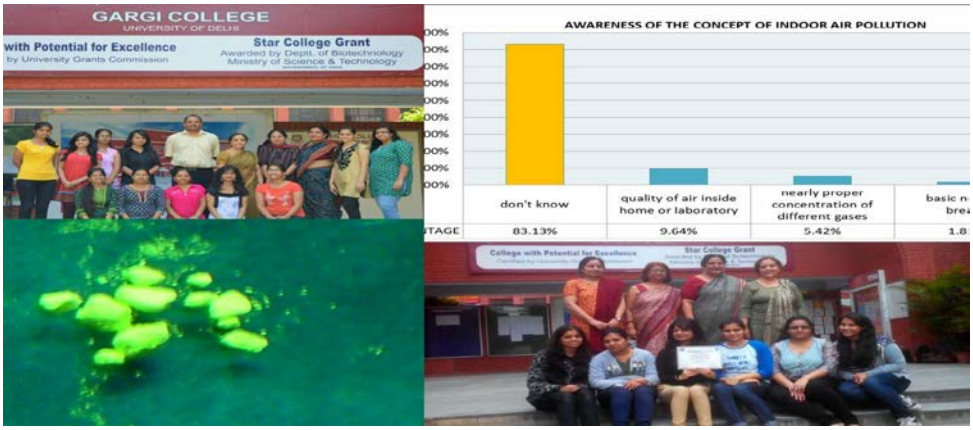
A survey of 131 inbound foreign patients to Delhi coming from 22 countries was conducted:

- To identify the services desired at pre-procedural, procedural and post-procedural stages.
- To identify the factors influencing selection of Delhi as medical tourism destination
- To identify the factors influencing the choice of Delhi hospital for treatment.
- To identify key competitive strengths and weaknesses experienced by inbound patients in Delhi.

GC201- A Green Chemistry Approach To Combat Stress In The Undergraduate Chemistry Laboratory

Brief description

This project was to assess the level of knowledge, attitude and behavior regarding indoor air quality of, and the extent of safety implemented in the chemistry laboratory. Results of various questions are analyzed and discussed in this presentation. It was found that the students who showed high awareness of pollution in the chemistry laboratory were mostly second and third year senior students and not first year students. Major chemicals that were identified included chemicals like cyanides, concentrated nitric acid, pyridine, nitrobenzene, hydrogen disulfide, phosphorous pentachloride etc., which were seen as being linked to adverse health consequences. This research has implications for the designing of interventions for promoting safety, waste disposal and precautionary control in the chemistry laboratory. The students of Chemistry Department then worked on replacing/substituting harmful chemicals in experiments with safer alternative, using 12 principles of Green Chemistry.



Significant outcomes

- For the first time the two highly varied disciplines of psychology and chemistry have come together to highlight the environmental pollution relating to indoor air quality in a chemistry laboratory due to toxic chemicals, and gases, which act as stressors having harmful physical and mental health consequences for students.
- Laid importance to safety measurements in chemistry laboratory
- Green scheme formulated successfully for inorganic qualitative analysis-An important exercise that will help a large number of students to work under Safe, Healthier and Stress-free environment
- Innovative spot tests to detect certain organic compounds have been performed-Further Research work in progress
- Better eco-friendlier Nitrations successfully carried out.

Publications: One paper and two posters

GC202- Solid Waste Management: In Gargi College And Neighboring Areas

Brief description

The project aims at improving the current system of managing solid waste on campus, and also the current levels of awareness respect to waste. On one hand, the team attempted to rectify the infrastructural problems that exist with respect to waste collection and management. For this we set up colour coded dustbins across campus and got the process of segregation going. Once we started seeing the waste get sorted into paper, plastics, kitchen waste and E-waste, we took the next step. For dealing with kitchen waste, we installed a small scale biogas plant on campus itself. Further, we coordinated with Chintan for collection of paper waste and e-waste, and organized a couple of dedicated drives for this purpose. On the other hand, we also tried to instil a sense of responsibility and awareness among the students and workers. For this we put up informative posters across college, put up street play performances, talked to students personally, and also had meetings with the support staff in college.

Significant outcomes

In the project, the innovation lies in the ideology, and the way the team has approached the issue of waste management. Awareness and student involvement has been a big part of all its undertakings. Most city dwellers think of waste management as a mundane administrative task that concerns only the cleaners and municipality. We attempted to change that mind-set. Further, the concept of using biogas plants in an urban scenario is also innovative and rare. While biogas plants are hugely popular in the rural areas, creating acceptance and utility for it here is a task whose prototype the team was able to create on campus successfully.

GC203- To Deepen Understanding Of Practices In 'Ecological Living'- A Multidisciplinary Approach

Brief description

The main objectives of the project were:

- To explore and locate the principles of ecological living within the wider discourse on philosophical aims of education.
- To help deepen the understanding of ecological issues from a multidisciplinary perspective i.e. psychological, sociological and environmental dimensions.
- To enable the process of continuous reflection and personal transformation through hands-on engagement with progressive alternative practices in school internship.
- To create resource materials that can help disseminate information about the key issues in ecological living to schools, teachers, training institutes and other organizations engaged with ecological issues.

Significant outcomes

- The project helped the students to deepen their consciousness of ecological living, created experiential avenues through which they could practice green ideas, helped them to connect with indigenous knowledge and practices that are ecologically sustainable and also helped them to identify ideas that can be used to create an ecological awareness in children.
- They have done an electricity and water audit in our college and have given suggestions for improvement of water and electricity usage.
- They are working on preparing pits for organic pesticides and the interns have used knowledge gained from workshops to create awareness on sustainable practices e.g., creating bottle gardens, studying and making suggestions about the mid-day meal programs, waste segregation, creating ecology boards, doing a play on green practices, recycling materials to create artistic objects, making newspaper bags, etc.
- The team also prepared a compendium of ecologically sustainable activities that can be used by schools and class teachers at different class levels and other audio-visual resources.

GC204- Enabling Technologies For Pine Needles From A Disastrous Waste (Forest Fires) To Multitude Of Applications: Energy, Capacity Building, Employment And Environmental Benefits For Himalayan Regions

Brief description

Pine trees offer exotic beauty but also cause forest-fires. The project aimed at evaluating problems & benefits of pine trees. The important information was collected from locals through a questionnaire in Hindi & English, filled by 60 people of diverse background from 12 regions of Uttarakhand. The generated information pointed out non-growth of crops under pine trees which corroborated with our studies of pine-extract treatment on seed-germination. Pine-pulp was used for making paper mixed with waste-paper, followed by making apple & egg trays and cardboard. Local women were convinced to make products for commercial applications: a sustainable project – Pines for Prosperity.

Significant outcomes

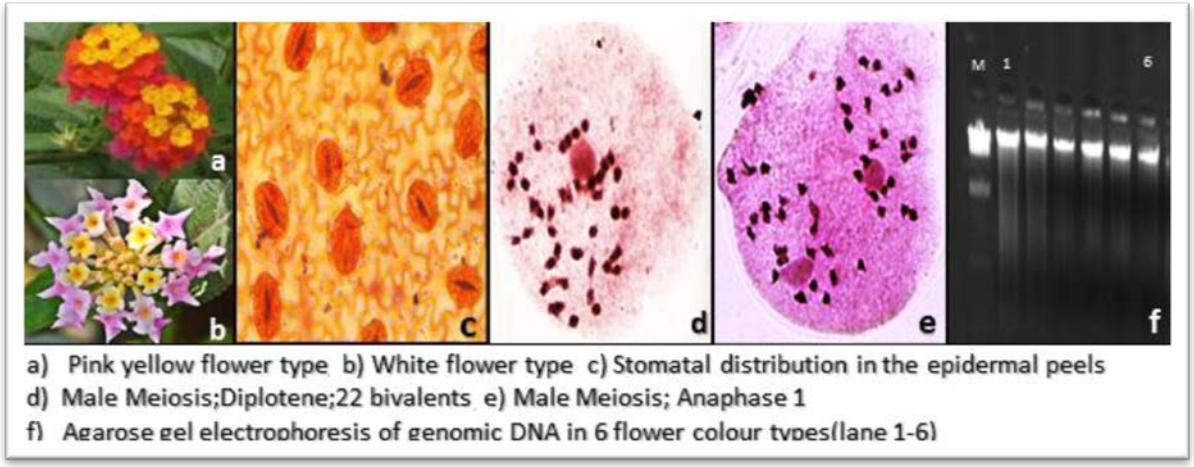
- A unique bilingual survey was generated which could apprise the higher authorities of the problem faced by the local people, their educational qualifications, income and their take on pine needles.
- The recycled paper mixed with pine pulp can be used for making apple and egg trays. Preliminary paper making facilities are generated in the college which will be further upgraded.
- Other useful forms such as decoration pieces, broom handles were another source of income generation for the local people.
- The local people need help from higher authorities as they are not in a comfortable situation due to limited resources. Efforts can be generated in PPP mode to help the local people.

Publications- A paper and a poster

HR201- Plant Invasions: Exploring The Ploidy Connection

Brief description

Plant invasions refer to the ability of exotic taxa to establish reproducing populations in alien habitats. For this, the invasive species may possess some genetic or life history traits that allow them to prompt site resources or avoid predators better than indigenous species, allowing them to be successful invaders. Plant invasions have now become a socio-economic and ecological problem around the world. The study focuses on the research to understand the ecological dimensions and dynamics of plant invasions and to understand the underlying mechanisms. In this context, changes in ploidy level and global methylation pattern have been proposed as the possible determinants of plant invasions. Polyploidy refers to the acquisition of more than two sets of genomes, and has been a major force in plant evolution, changing the plants' morphology and phenology. Additionally, changes in global methylation levels have been indicated to be epigenetical determinant of invasive success.



a) Pink yellow flower type b) White flower type c) Stomatal distribution in the epidermal peels
d) Male Meiosis;Diplotene;22 bivalents e) Male Meiosis; Anaphase 1
f) Agarose gel electrophoresis of genomic DNA in 6 flower colour types(lane 1-6)

Significant outcome

This project is very useful and very informational, which helps to connect macro-ecology with molecular ecology i.e. ecology at the molecular level to understand the genetic mechanism leading to plant invasions. The results of the preliminary investigations seem to be supporting the proposed hypothesis of a positive correlation between polyploidy, hyper-methylation and invasiveness as observed in the difference in the ploidy status and higher % 5-mC value of invasive *Prosopis juliflora* ($2n=4=46$), *L. camara* ($2n=4=44$) n *Ageratum conyzoides L* ($2n=2=4$) as compared to their native species pairs *P. cineraria* ($2n=2=28$) , *L. indica* ($2n=2=22$), *A. houstonianum Mill* ($2n=2=2$), respectively.The study have got some interesting leads and have sampled a wide array of species for the conclusions which are also considered to be threats to Indian bio-diversity. The correlation between changes in ploidy level and methylation pattern and the plant invasions that has been indicated by the preliminary investigations in three of the analysed species pairs can be tested in other taxa.

HR202- Isolation And Characterization Of Protein Component Of Milk From Different Sources

Brief description

The objective of the project is to test in the laboratory whether the chemical standards declared by the branded milks in the market are the same as obtained through laboratory experiments in the college. The following methodologies take place to perform the tests:

- Measurement of density and pH of the milk.
- Estimation of Protein concentration by Spectrophotometer and Chemical analysis.
- Study of Chemical Kinetics of optical rotation o α-lactose using Polarimetry.
- Verification of Calorific value of the branded milk available in the market.

Significant outcomes

- Simulation of possibilities of industrial experiments in the college laboratory environment. The team experimented on the various branded milk and performed various tests and got results which were very close to the results mentioned on the packets.
- The team also developed understanding of the difficulties encountered in simulating industrial experiments in college laboratory environment and innovated ways to overcome it.
- The results of the laboratory experiments are very close to the results obtained through industrial laboratory experiment. This is a demonstration of how similar experiments could be replicated in other areas to promote industry-academy interface. This is the way how students can find the relevance of their undergraduate knowledge in the wider context of industry and entrepreneurship.

HR203- Comprehension Of Ethnic Practices Of Selected Indian Tribes As Pro-Ecological Customs And Their Deviation From The Stream

Brief description

The project is focused to study the age old practices of selected tribes (from Rajasthan & Uttarakhand) of India. The main aim of the project is to understand the practices which have helped tribes in their survival with their ecological and social importance. It also aimed to understand the factors that resulted in deviation from their traditional approach to life with the impact of urbanization and industrialization.
The study was undertaken in the state of Uttarakhand and Rajasthan focusing on selected tribes (Jaunsari, Bhil and Kalbelia). The team examined the habitat and living conditions of the tribes. We interviewed the tribal people about their life and daily. The study of this project analyzed their way of resource management and eco-friendly processes. The work was primarily focused on analysis of their economy, agricultural methodology, their therapeutic approach, water management, other eco-friendly processes in routine life and factors responsible for the deviation from their traditions.

Significant outcomes

Sensible use of resources, economic growth and understanding biodiversity are the prerequisites for sustainable progress. The need of the hour is value added growth with a holistic move toward integrating ecology, culture and integrative traits of the society. Awareness for ecological issues along with proactive government support and participation of NGOs are required. Cultural diversity is closely linked to the ecology and biodiversity. Culture is not only ethical concern. It is also a state of its own sustainability because of a symbiotic relation between habitat and culture. These tribes and their traditions are the nation's heritage besides being ecologically viable and they are facing peril of annihilation due to inadequate knowledge, ignorance, changing atmosphere and impacts of urbanization.

HR204- Public Private Puzzle In Education - Where The Parents Want To Send The Children And Why?

Brief description

The purpose of this project is to identify the factors which are important for selection of any school at the time of admission. Moreover, the level of emotional intelligence among private and public school teachers has also been studied in this project. Significant difference has been observed among the parents selection of private or public school for their children. "Affordability" and "Neighbourhood" were ranked 1st by parents whose children are going to government schools, while "All Round Development", "Emphasis on English Speaking" and "Career Advantage" are being ranked 1st by the parents whose children are going to private schools. Status of the school is also found to be an important factor in case of private schools. This study reveals that private school teachers are a little more emotionally intelligent then the public school teachers which has a direct impact on their efficiency. This paper helps the school authorities in formulating the policies, rules and regulations in order to enhance the efficiency of public schools so that the parents may send their children to public schools without having a second thought.

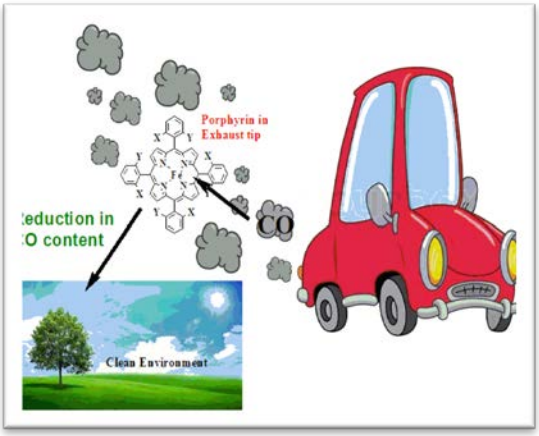
Significant outcomes

"Affordability" and "Neighbourhood" were ranked 1st by parents whose children are going to government schools, while "All Round Development", "Emphasis on English Speaking" and "Career Advantage" are being ranked 1st by the parents whose children are going to private schools. Status of the school is also found important factor in case of private schools. This study reveals that private school teachers are little more emotionally intelligent then the public school teachers which has a direct impact on their efficiency. It was found that a significantly high number of students feel happy while going to government school instead of private school students. This may be due to their pressurised teaching and comparatively greater homework. They also feel that school is a boring place. Students in government schools have "worries about life outside school" more often than students in private schools. Also, teachers do not give personal attention to students.
Publications: One paper

HR205- Developing A Synthetic Molecule Imitating The Properties Of Hemoglobin To Reduce Carbon Monoxide Emission From Automobile Exhaust

Brief description

The emissions from motor vehicles causes air pollution and are major contributors to smog in metropolitan areas like Delhi. The emissions from an automobile comprise oxides of nitrogen (NO_x), CO_2, water vapor, CO, hydrocarbons and other volatile organic compounds (VOCs). Harmful effects of CO from automobile exhausts have been a constant cause of concern and thereby necessitate it to be reduced in concentration from automobile exhaust. Exposure of high levels of CO for short duration in an interior environment may lead to death. After breathing in, CO interferes with the cardiovascular system by readily combining with hemoglobin to form carboxyhemoglobin (COHb). The high percentage of COHb causes cardiovascular disease, neurological damage especially in young children. Research done in the field of automobile machines and manufacture comprise of two major fields of work, e.g. increasing the efficiency of fuel consumption and reducing the toxicity of out-coming exhaust. Thus, there is an urgent need to develop some method to reduce CO emission from automobile exhaust.



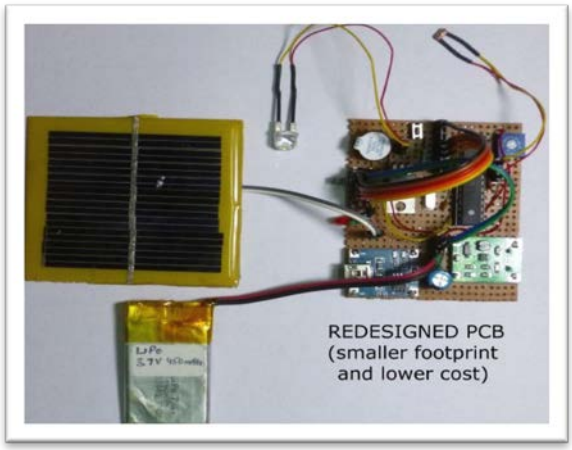
Significant outcomes

Different 5, 10, 15, 20-tetraaryliron (III) porphyrins have been synthesized. The reduction of Fe (III) to Fe (II) was carried out using sodium dithionite for binding of different porphyrins with CO in the different solvent systems. It is found that the different substituents in the tetraaryliron (II) porphyrins do not have very significant effect on the binding affinity of CO and the best results were given in [bmim] [PF_6]. It is also found that the increase in the concentration of ILs in DCM enhances the CO binding with ironporphyrins. With the successful synthesis of the porphyrin molecule that can bind with carbon monoxide, this research can be extended to the testing in combustion engines in closed compartments and ultimately its installation into the automobiles. Another aspect could be to devise methods that would allow the renewal of the installed molecules once they get used up.

HR206- Development Of An Eco-Friendly, Efficient, Portable Lighting Source Utilizing A Renewable Energy Source And A Solid State Lighting Solution – Solar LED Bulb"

Brief description

The project integrates the current solar power conversion, energy storage, and solid state lighting technologies coupled with open source embedded control into a single accessible unit, i.e. the SOLAR LED BULB. The primary source of inspiration for the project being the need to provide a clean alternate lighting source for the rural areas which are still devoid of the basic amenities of cheap, and 24 hour availability of electrical energy. The concept visualised was to design a self-contained single unit consisting of the solar conversion module, energy storage module, control electronics and the solid state illumination source. The unit has automated control for the charging and discharging along with smart control for the illumination levels and ambient light detection. The simple but high level of automation has been provided to keep the operation as simple as possible with minimum technical operation requirements from the user.



Significant outcomes

The rechargeable Solar LED bulb as a single unit is an innovation in itself. The design integrates three of the recent and developed technologies on a single platform along with the added features of the embedded software control. This project has motivated the students to work out their own small electronic projects. The project also promotes the use of open source software and hardware tools and sharing of knowledge. The components used are commercially available off the shelf components which have allowed us to keep the cost down. The automation and open source design allows for ease of use with minimum user intervention and easy adaptability as the hardware can be reprogrammed numerous times without any physical modifications. Besides this being an excellent opportunity to train the students in various aspects of technology, the best part is that the outcome is a product which will benefit a majority of our country's population, and provide them with better resources.

HR207- Designing And Optimization Of Auto-Tracking Solar Energy Based Energy Conversion Module For Rechargeable Appliances

Brief description

With the overwhelming demand of electric/electronic gadgets applicability in the lifestyle of both urban and rural community and added to that shortage of electricity supplies, the project aims at designing a cost effective solar energy based energy conversion module for charging of gadgets. In order words, the project aims to design solar based rechargeable units in order to reduce the dependence on conventional electrical sources and to provide a cleaner and environment friendly alternative. The main component of solar technique is the solar cell (photovoltaic cell). While designing the module, the issues focused comprise portability, accessibility, cost effectiveness and above all efficiency. The concept of the module is to utilize solar energy during sunlight hours to charge the appliance connected, and simultaneously charge a back-end battery for night or low light conditions. The solar energy tracking panel has been designed and optimized for its positioning and orientation, along with ability of sensing maximum solar power. The project integrates the current solar power conversion, energy storage, and electrical/electronic circuitry together with open source embedded control system to form a standalone unit.

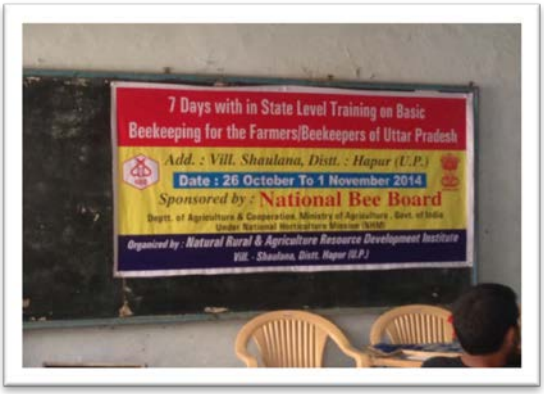
Significant outcomes

The rechargeable Solar LED bulb as a single unit is an innovation in itself. The design integrates three of the recent and developed technologies on a single platform along with the added features of the embedded software control. This project has motivated the students to work out their own small electronic projects. The project also promotes the use of open source software and hardware tools and sharing of knowledge. An optimized automated solar tracking based efficient solar energy conversion module for rechargeable appliances has been designed. The developed model is DIY kit for the purpose of understanding of the students about the working and technology involved in designing the kit.

HR208: Mithaas

Brief description

Promoting diversification in agriculture through apiculture could provide both food, nutritional, medicinal and livelihood security to the rural workforce on an ecologically sustainable basis. Moreover, Honeybees are the only insects that provide food for humans. Project Mithaas aims at spreading awareness and knowledge about beekeeping among farmers who are engaged in subsistence farming and to provide them training to take up beekeeping as an additional source of income. The project also tries to delineate the ecological factors affecting beekeepers for continuing in the occupation and to assess the constraints faced by them. Within the constraints, an exploratory research was carried out in few villages of Haryana and Uttar Pradesh states of India.



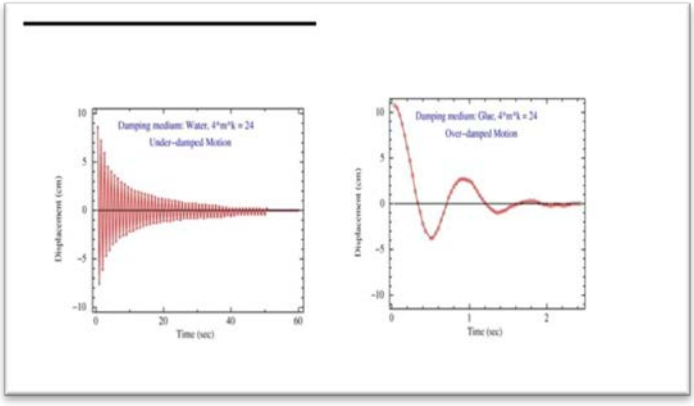
Significant outcomes

- Most people approached were found aware but least interested in carrying or continuing beekeeping. The major constraints listed by the respondents were theft of bee boxes & lack of insurance of theft for same, financial constraint to start the vocation & to offset the losses due to pests and diseases, management of bee colonies during extreme weather conditions & pesticide poisoning, harmful radiation waves from mobile towers, shortage of bee forage necessitating migration and police problems during migration. Lack of awareness about the government facilities in terms of subsidies and marketing also acted as a barrier for the prospective beekeepers.
- The 7 day training program conducted in collaboration with the ministry of agriculture, govt. of India, acted as a major driving force among villagers to take up bee-keeping as an occupation and getting themselves registered with NBB.
- The major challenges experienced by beekeepers were conveyed to the executive director of NBB and requests were made for introduction of insurance schemes covering bees and bee-boxes.

HR209- Understanding The Physical And Geometrical Behavior Of Differential Equations And Its Applicability To Tha Real World

Brief description

This project aims at a better understanding of differential equations through methods of innovative teaching. Differential equations play a crucial role in the entire curriculum syllabus. Almost every real world situation occurring in nature can be described in terms of a differential equation. And the backbone of this understanding comes from mathematical sciences. Students generally solve differential equations with different initial conditions and with final functional forms. But they fail to relate the equations with the geometry of the system. They are unable to visualize different aspects of the functions. The main aim of the project is to provide visual, new and interesting ways of learning the concepts which students learn in classroom teaching. Experiment modules have been designed to enhance the curriculum knowledge of the student. These experiments are designed to be low-cost alternatives to motivate the students for the modeling/prediction aspect of a course on differential equations.



Significant outcomes

The projects restricted itself to exact first and second order differential equations. And looking at the response from the students, these experiment modules can be included in curriculum of undergraduate courses in mathematics and physics. This will discourage rote learning among them. Further, similar low cost experiment modules can be designed for partial differential equations. The team intends to extend this teaching method to partial and higher order differential equations. The team has also planned to make experiment modules for various mathematical concepts used in physics.

HR210- Development Of Zero Discharge, Affordable, Carbon Neutral And Eco-Friendly Bio-Fuel Using In-House Horticultural Waste

Brief description

Biomass has been used as fuel ever since humans discovered fire. The densified form of biomass i.e., the pellets, briquettes etc. are more efficient in burning than raw biomass. Cutting down trees to make wood pellets does not seem to provide solution to the energy crises due to problems like global warming, greenhouse effect and species extinction (due to habitat loss). The need is to come up with something that can fulfill energy demand without harming nature. The project aims at using horticultural waste like lawn clippings, fallen leaves and other garden wastes to generate pellets. It is assumed to be a binder free technology due to the presence of lignin, which acts as a natural binder. It will be cost effective process, since the initial investment is only the pellet mill and other related equipment. The cost of it can be recovered within few months by saving on LPG and other fossil fuels. This technology, thus, provides a greener solution to the problem reduces burden of landfills and generates employment.

Significant outcomes

• Greenoal intends to utilize the untapped potential of biomass by enhancing its product value by densifying different kinds of biomass waste (All organic material that stems from plants, i.e. all land and water waste based vegetation and all organic waste).
• The idea was to expand on the unpopular pelleting technology to make the best out of green waste and lower the consumption of coal and wood for domestic and heating purposes.
• The major innovation is the production of grass and leaves pellets and their analysis to prove that this biofuel is better than coal and wood when it comes to emissions and better than Indonesian coal in terms of its calorific value. Also, the in house implementation of the whole set up, i.e., extraction of raw material, pellet consumption and use of as a fertilizer all in one place.
• This project also aims to explore the potential of small and medium enterprises and local organizations in rural areas to generate energy from their own waste and by product, at a scale that is economically viable.

HC202- Pharmacognostical Studies on Selaginella Sp. and Evaluation of its Antimicrobial Properties

Brief description

Pharmacognostical studies on Selaginella *Lepidophylla* have been carried out with various extracts that are prepared in different solvents. Results of detailed pharmacognostical studies, preliminary phytochemical studies, have been presented. The extracts have been checked for their bioactive properties using disk diffusion method and pour plate method through the calculation of the inhibition percentage values and have also been screened for in-vitro cytotoxic activity against HeLa cancer cell line. The compounds present in the extracts were studied using bioinformatics tools to find about its potential targets through blind docking and the molecules with highest G-score were selected. The preliminary phytochemical screening shows the presence carbohydrates, flavonoids, tannins, saponins, lipids and amino acids. The results for the bioactivity show that Dichloromethane extract was active against Bacillus licheniformis.

Significant outcomes

The dicholoromethane extract of *Selaginella significantly inhibited the* growth of HeLa cancerous cell line and constituted of multiple known biologically active compounds. This research was conducted to understand the interaction of three main contents of *Selaginella that bind to different receptor proteins of cancer cell lines.-*

1. Further exploration of *Selaginella* for its potent anticancer constituents.
2. To make Gold-Nanoparticle of extract for targeted drug delivery system.
3. Collection of more species of *Selaginella*.
4. To make a chemical library of bioactive components of *Selaginella.*
5. More different pathways can be developed using its resurrection property

Publications- One Abstract

HC203- A Study Of Botanical Aspects Of Plants Cited In Kalidas' Literature – A Comparative Analysis

Brief description

Nature has always been a great inspiration of our ancient saints to portray their thoughts in the form of poetry. Kalidas is a world renowned poet; even in the absence of scientific knowledge his descriptions based on his deep observation are quite relevant today. The project aims to provide a joint platform to students from Sanskrit and Botany, so that on one hand Sanskrit students comprehend the botanical significance of Kalidas literature, and on the other hand botany students become cognizant of various forms of literature containing botanical description. The project began with study of original Sanskrit texts from 7 books of Kalidas. The Sanskrit texts were translated to Hindi and English, with the help of books of renowned authors, which were taken by Botany students as a pre-requisite knowledge. After identification of plants, comparative study of all aspects of botanical description and Sanskrit context were taken into consideration so that the information in Sanskrit texts is fully utilized by Botany students.

Significant outcomes

1. This project elucidates the value of ancient writings, as it is felt that age-old literature is falling prey to modernization; and so, Kalidas' work is explained with proper logical and scientific authentication. The joint efforts of Sanskrit and botany students provided new and innovative methods to reanimate the degrading interest of the people about the ancient literature, by providing rational interpretation, which in turn, unveiled the hidden scientific observations made by the poets in ancient times. This project provides a bridge between science and literature, opening new avenues for research scholars.
2. It is an intriguing fact that whatever Kalidas wrote on the basis of his observations in the first century, rationalization has been done for it by giving a scientific explanation in the 21st century. This further unveils a wide scope of carrying out similar studies about plants in ancient literature.

IP201- Exploring and Identifying Ethical Decision Making Patterns in Indian Women Entrepreneurs

Brief description

The study was carried out to explore and identify ethical decision making patterns in Indian women entrepreneurs. The sample comprised 45 women entrepreneurs in the age range of 22-67 years, from varied sectors of Delhi-NCR. A vignette based online survey and probe list were used for a semi-structured interview conducted on the participants. Quantitative analysis on the data was represented through the use of frequency tables and pie charts. Qualitative analysis was based on 15 of the most meaningful and rich interviews from which the relevant themes were culled out using thematic analysis. The salient findings of the study indicated that ethics of quality and customer satisfaction, honesty and fairness in their dealings with all concerned stakeholders were valued. A majority were reluctant to endorse any unhealthy competition among employees. It also revealed that the ethics of honesty was relevant in decision making patterns pertaining to their business. Being a woman and an entrepreneur was a dual load on the participants. Social norms, pressure of familial responsibilities and negligible support for their entrepreneurial aspirations marks the trajectory of the Indian women entrepreneurs with the goal of running a successful and viable enterprise.

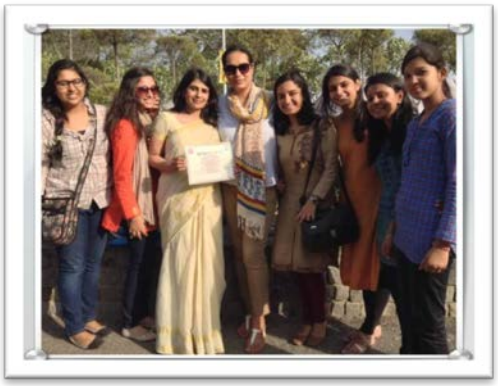
Significant outcomes

The study used an innovative method triad of surveys, vignette based interviews and in depth interviews, to capture the nuances of Indian context. The life narratives of the participants have given a voice to the Indian women entrepreneurs who are present is medium and large scale. The research has unearthed a new facet by highlighting the trajectory of struggles of the women entrepreneurs in the rigid and hostile work environment. Successful entrepreneurship in essence entails a difficult balance of business decision making and ethics. Being a woman and an entrepreneur was a dual load on the participants. Social norms, pressure of familial responsibilities and negligible support for their entrepreneurial aspirations marks the trajectory of the Indian women entrepreneurs with the goal of running a successful and viable enterprise.

IP202- Consciousness as Reflected in Vedānta and Modern Sciences

Brief description

Consciousness is one of the fundamental realities. We are all conscious of being conscious. But the fact that consciousness is an intriguing and elusive phenomenon is beyond doubt. Numerous questions emerge regarding it and these questions have always perplexed human beings. This project titled 'Consciousness as reflected in Vedānta and Modern Sciences' is an interdisciplinary project that undertakes a holistic journey to bridge the gulf between the findings of the modern sciences and that of the ancient Vedāntic studies in order to enable us to form a deeper world-view. The evidences of science and spirituality have been found, walking hand in hand to know consciousness better. This project is about a systematic study of consciousness based on the statements available in Vedanta tradition and modern sciences & this study echoes some of the parallels in the concept of consciousness that is to be found in the Upanishads and that of the findings of modern sciences and thereby enhances our knowledge while giving us a better perspective on the intriguing phenomenon.



Significant outcomes

- This research encompasses the area of epistemology, metaphysics, psychology, modern sciences etc. Among above mentioned areas, the study of consciousness is the most favourite one. Consciousness is the essence of individual and universal reality. It is consciousness through which we all cognize this gross universe. It is consciousness that leads us from gross to subtle, subtler and subtlest aspect of this universe. It is consciousness that reveals its own nature, prompts us to get realized it, strengthen us to transcend all problems related with *adhyatmika*, *adhidaivika* and *adhibhautika* pains and equip us with ecological or holistic world view.
- Enhancements of students' knowledge on Vedanta philosophy- students have been given a set of reference to enhance their philosophy understanding of Vedanta & modern science.

Publications: Two posters

IP203- Picking Up the Treads-A Study Of Endangered Arts and Artisans Of India

Brief description

Art, for centuries in India has been not just a skill or product, but a form of expression of one's own heritage and history. For years, complete families have been working on mastering an art and practicing it as an occupation and thus, taking the rich legacy of the art forward. However with the change in trading practices and a change in the economy, and other trading practices, this tradition is dying. The following study was an exploratory study. It aimed at studying the various endangered arts of India, exploring the perspectives of the last generation artisans, their experiences at being the last of their family to be practicing the art, the hardships involved and looking at finding ways and means in which could assist in the revival of these arts. The surveys brought to light the glaring disparities that exist at various levels, namely- education, income and resources that exist between the producer and the consumer of the arts.

Significant outcomes

The project has been successful in

1. Starting a dialogue between academics and creative arts and moving beyond classrooms to understand cultures, people and arts.
2. Creating understanding for the lives, struggles and realities of artisans in India.
3. Initiation of a knowledge base - narratives, documentaries, survey analysis – of the arts and artisans that can be used by various disciplines to understand the realities better.

IHE201- Opportunities for Women Empowerment Through Value Added Food Products

Brief description

The project aims at improving empowerment of women through value added food products. The target group will be women seeking employment opportunity and are willing to participate in the project. In the second phase of the project, some value added food products were prepared and standardized. Phase III of the project involved Development of Information Communication Technologies (ICTs). These ICTs will be used for conducting trainings on food product development and entrepreneurship. Further, training modules are developed for imparting technical proficiency in production of Value Added Food Products. The last phase of the project aims at identifying approaches to support women's access to market for value added food products.

Significant outcomes

1. Workshop on Community Mobilization- A workshop on community mobilization was organized to inculcate the skills of rapport formation and to guide students about how to work in the community.
2. Development of a Comprehensive List of Value Added Food Products: After an extensive research, the students have developed a comprehensive list of value added food products available in India.
3. Development of three Value Added Food Products and microbial testing to ascertain shelf life: Three value added food products have been standardized and developed: Carrot Amla Candy, Flaxseed Khakhra, Bajara Ladoo
4. Microbial Testing of the Value Added Food Products: Results of Microbial Testing:

- Flaxseed Khakhra - Shelf life of one month at room temperature.
- Carrot Amla Fruit Leather- Is a seasonal product (prepared during winters).
- Bajra Ladoo - Shelf life of 15 days at room temperature.

IHE202- Developing a Sourcing Database & Analyzing the Dynamics of Indian Home Furnishing Industry: Retail & Consumer Perspective

Brief description

As the title of the project is to "Develop a sourcing database and analyzing the dynamics of Indian home furnishing industry: Retail & Consumer perpective so the main focus of this project was to analyze the technical details of home furnishing fabrics and also to develop a fabric catalog, showcasing the variety of home furnishing fabrics available in the Indian domestic market. The project also concentrated on studying the dynamics and economics of the retail stores dealing with home textile industry including the store design layout and visual merchandising elements of these retail chains. Studying the consumer buying behavior for the home textile market was another aspect covered in the project.

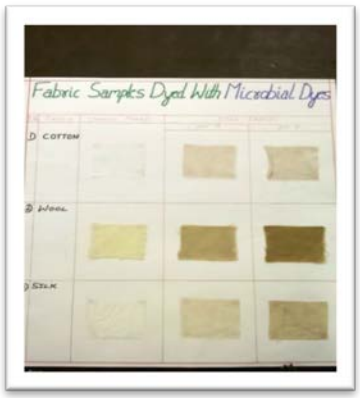
Significant outcomes

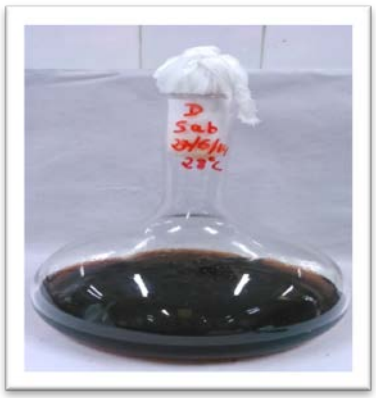
1. The fabrics being used to design the home furnishing collection for exports are very different from the ones used in domestic market. There is no database of the fabric used in the domestic home furnishing industry in technical terms or in terms of their sourcing details. This is the first time a catalog is being made for the Indian market. This catalog is instrumental in solving the topmost queries of consumer of a very high value product like a sofa regarding its technical details in purchase.
2. In future it is planned to make a comparative study of local retail stores with branded retail chains to be done to satisfy the different target groups which are multicultural and with various socio-economic background of Indian market. Further it is proposed to study the customer satisfaction with regard to buying of home furnishing items. Also the physical environment including both the exterior and interior atmosphere is linked to the customer emotions and hence creating an impact on the consumer buying behavior.

IHE203- Optimization & Characterization of Microbial Dyes for Dyeing Different Textile Substrates

Brief description

There is a great emphasis on screening of newer natural colouring material for industrial application as present synthetic dyes and dyeing procedures release high level of toxic effluents which is not safe in terms of health and environment. This evoked a realization to produce more Eco friendly natural dyes from newer sources such as microorganisms. This technology seems to be more commercial, reliable, scalable, predictable and manageable. In the present study an extracellular pigment was obtained from soil isolated fungi *Aspergillus niger* under optimized fermentation conditions like media, time and temperature. Assessment of silk and wool dyed fabrics in terms of fastness revealed good to excellent wash and rub fastness. Percentage absorption and colour value has been estimated to be greater for wool than silk. Solubility test revealed that the colorant is polar in nature. Analysis of absorption spectra and TLC revealed the possibility of single colored component in the crude colorant.






Significant outcomes

The textile processing industry is reeling under the presence of ecological initiatives due to production of large amount of carcinogenic effluent by dyeing processes and thus, is in desperate need of bio colorants that can be mass produced. Use of appropriate selection, mutation and genetic engineering techniques on color producing microbes can significantly increase their pigment production yield and reduced the market price. The study has been able to isolate yet another fungus i.e. *Aspergillus Niger* which shows the possibility of producing a natural colorant and its use as a textile dye. The fungal isolates screened so far have dyed mostly protein, some manmade and very few cellulosic fibers. The extracellular colorant produced by this new isolate has shown dyeing capacity for silk and wool and staining for other fibers. It is possible that the broth contains some bio metabolites that are imparting surface modification to the fiber substrates leading to enhanced exhaustion and fixation.

JDMC201- Creative Solution to Water-Logging Through Rainwater Harvesting

Brief Description

The key focus of this study is to explore the methods to catch rainwater during rainy season can be put to various uses like recharging aquifers for increasing water table, collecting water for reuse in traditional ponds, it will help lower discharge of water in storm water drains that cause the problem of water-logging. This project aims to demonstrate creative solutions to the problem of waterlogging through rainwater harvesting in traditional and modern ways.
Primary hypothesis of this project is that the two (i) Water shortages and (ii) waterlogging are closely tied with monsoons. Effective management of rains could be a solution to water scarcity as well as water logging. Rainwater harvesting should be the focus of water policy of successive Governments in order to improve water table.

Significant outcomes

- Launch of Delhi Jal Board application for registering complaints of water logging, scarcity of water, drainage problems and leakages etc.
- Creation of Bamboo tank & Rain water harvesting tank to find a cheap, collapsible and simple storage system that could store water, keep the house cool and lighted.
- Water window or wall made from toughened glass that could be used for the purpose of storing water for keeping the building cool, providing natural light and being a decorative piece.
- A ten minute documentary was produced to show how global warming and climate change affect lives across the nation and increasing demand for water, which is not only precious from the point of view of humans but also agriculture and ecosystems.

JMC201- State of Life after Sixty in the 21st Century, Delhi

Brief description

The project aims to study the state of the life of elderly above 60 years in 21st century, Delhi in terms of social, mental and physical wellbeing, economic and social security and elderly abuse. The Survey was conducted in 9 Zones of Delhi by interviewing elderly-above 60 years. The exercise aimed at providing necessary action to prevent the rising elderly population from falling victim to such acts and adopt effective mechanisms by which the elderly will be cared and respected and will be able to live a life with dignity.

Significant outcomes

- Delhi has a considerable number of elderly and it is of utmost importance to study their physical, physiological and a social state. The innovation which lies here is that the youth has a taken a step forward to comfort them with their love and affection and help them understand their lives in a better way.
- The team has analyzed each aspect and has successfully drawn out various outcomes. This needs to be reached out to the people in masses which will be done by campaigns, interactive sessions with the elderly.
- This project was an attempt to know the perceptions of the elderly regarding their health, social and mental wellbeing and also elderly abuse. Though most of the elderly suffer from various ailments, they were all satisfied with their state of health and exercised regularly. Few of them admitted that they faced various forms of abuse and were of the opinion that the major cause for this is lack of adjustment and economic dependence.

JMC203- Developing a Cultural and Contextual Understanding of Resilience in Urban Marginalised Girls: Implications for the Formal Education System

Brief description

The study has been undertaken in light of critical function of education to empower all learners to claim their right to a life with dignity. Right to Education Act provides an opportunity for quality education in private schools to children from economically weaker section. The study explores challenges faced by students (who have been admitted in this category), their parents, teachers and principals. The study attempts to record their voices and life experiences. An attempt has been made to understand what factors made them resilient. Research has pointed and has been reiterated in the study that there is a positive correlation between education and resilience. Both students and parents feel that education is a tool for their social mobility that will help them grow despite their socio-economic disadvantages. They feel public (state run) schools are incapable of helping them fulfill their dreams. Despite prejudices faced this group wants to make the most of this opportunity.

Significant outcomes

RTE act promises quality education for all children irrespective of their background but to make it happen there is a need to address challenges at various levels i.e., from the policy framework to curricular issues and implementation within the schools. The need is even more critical from the perspective of the marginalized who are struggling to find a place in the existing hierarchical and exclusionary education system it is not wrong to say that with such a variety of schools, the quality of education will also vary. Quality is being linked to capacity to pay. The RTE act is a promise for all to access and succeed in education as a right and not charity. Children belonging to various disadvantaged groups have diverse needs and to ensure right to education, the system needs to prepare itself rather than ignore these and force the marginalized further on. The study looked at these diverse needs of children from EWS and the role of school in responding to their needs leading to holistic development, with the implementation of RTE.

KC201- To Evaluate the Feasibility of Installing Wind Turbines in Metros

Brief description

The project started in the year 2012 with the idea of generating electricity by installation of small wind turbines on the side of metro tracks. Theoretical calculations revealed that power ranging from 2KWh to 50 KWh can be generated per day. This idea has the potential to bring about not only a substantial reduction in costs of fuel but also cuts down on the electricity bills thereby revolutionizing the concept of green energy. The project aimed to:

- Finalizing angular placement of wind turbine.
- Checking power generated by both horizontal and vertical axis turbine.
- Actually seeking data on the available power and then perform efficiency calculations.
- Proposal for future upcoming metros.

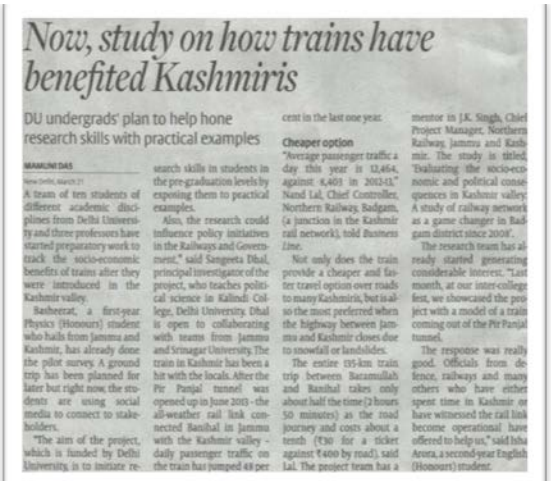
Significant outcomes

1. The wind inside the tunnel is moving entirely in one direction, unlike that in the outdoors where it flows in all directions. This makes it a very good source of energy.
2. There's a similar project in the works in Britain where special 'vertical axis wind turbines' have been designed for being installed along railway tracks. The idea is to have wind energy contribute 70% of the power that Britain's electric train system uses. The project is estimated to generate 2200 GWh of clean electricity.
3. A 500 watt turbine is already installed at one of the metro stations, but we could not generate sufficient amount of electricity. A new turbine has been bought according to our specifications and we came out with exciting results when we experimented with it at different metro stations.

KC 202- Political Consequences In The Kashmir Valley: A Study Of The Railway Network As The Game Changer In The District Of Badgam Since 2008

Brief description

This project highlights the role of Indian railways in Kashmir, which provides the only all-weather connectivity to the Kashmir Valley by connecting the state of J&K to the rest of the Indian railway network. Both as an infrastructure challenge due to the unique mountainous terrain of the state and its consequent politico-economic impact, the Jammu-Kashmir rail project provides a very interesting subject for innovative academic inquiry. The geo-strategic location of the state of Jammu and Kashmir makes it significant as Kashmir being a politically sensitive region the economic development through the establishment of the railway network is going to prove as a catalyst.



Now, study on how trains have benefited Kashmiris

DU undergrads' plan to help hone research skills with practical examples

MANJUNI DAS

New Delhi, March 21

A team of ten students of different academic disciplines from Delhi University and three professors have started preparatory work to track the socio-economic benefits of trains after they were introduced in the Kashmir valley.

Basheerat, a first-year Physics (Honours) student who hails from Jammu and Kashmir, has already done the pilot survey. A ground trip has been planned for later but right now the students are using social media to connect to stakeholders.

"The aim of the project, which is funded by Delhi University, is to initiate research skills in students in the pre-graduation levels by exposing them to practical examples.

Also, the research could influence policy initiatives in the Railways and Government," said Sangeeta Dhal, principal investigator of the project, who teaches political science in Kalindi College, Delhi University. Dhal is open to collaborating with teams from Jammu and Srinagar University. The train in Kashmir has been a hit with the locals. After the Pir Panjal tunnel was opened up in June 2013 - the all-weather rail link connected Banihal in Jammu with the Kashmir valley - daily passenger traffic on the train has jumped 48 per cent in the last one year.

Cheaper option

"Average passenger traffic a day this year is 12,464, against 8,401 in 2012-13," Nand Lal, Chief Controller, Northern Railway, Badgam, (a junction in the Kashmir rail network), told *Business Line*.

Not only does the train provide a cheaper and faster travel option over roads to many Kashmiris, but is also the most preferred when the highway between Jammu and Kashmir closes due to snowfall or landslides.

The entire 135-km train trip between Baramullah and Banihal takes only about half the time (2 hours 50 minutes) as the road journey and costs about a tenth (₹30 for a ticket against ₹400 by road), said Lal. The project team has a mentor in J.K. Singh, Chief Project Manager, Northern Railway, Jammu and Kashmir. The study is titled, 'Evaluating the socio-economic and political consequences in Kashmir valley: A study of railway network as a game changer in Badgam district since 2008'.

The research team has already started generating considerable interest. "Last month, at our inter-college fest, we showcased the project with a model of a train coming out of the Pir Panjal tunnel.

The response was really good. Officials from defence, railways and many others who have either spent time in Kashmir or have witnessed the rail link become operational have offered to help us," said Isha Arora, a second-year English (Honours) student.

Significant outcomes

The Railways has impacted on the development of communication, trade and tourism. The hypothesis of the study thereby stands valid that the J&K rail projects are not only fostering the growth of trade and commerce and movement of goods and passengers but are also proving to be important facilitators of socio-economic change.

In the course of research several important facts, suggestions and recommendations from relevant sources that include people, officials, former bureaucrats, policy makers have emerged which has been incorporated in the policy suggestions of the project. This in turn will help the Northern Railways and the Ministry of Railways, Government of India take necessary steps to make this project people centric and development oriented. The findings and analysis of the project can be incorporated by the Northern Railways to further improve its services in the J&K region.

KNC201- Evolving Capacities Through Intergenerational Practices As An Intervention Programme

Brief description

India is considered as a collectivistic society despite people of various generations not always co-residing with each other. But, with an increase in population and changing lifestyles, there has been a significant change and movement towards a self-oriented or individualistic lifestyle. The objective of the research is at bridging the gap between generations through our intervention. The objective of the study was to investigate the effectiveness of activities facilitating intergenerational shared sites on solidarity, life satisfaction and well-being amongst the generation.
These sites have proven to be effective in evolving the solidarity and well-being among various individuals from different generations, over the course of time. Solidarity, here, refers to unity or agreement or feeling of action, trust etc. especially amongst individuals with a common interest, and includes mutual support within a group. Few types of solidarity focused in this project are- associational, effectual, consensual, and normative solidarity (Bengston and Schrader, 1982).

Significant outcomes

The concept of intergenerational shared sites as an intervention practice is new concept in itself that had benefited the participants in many aspects. To name a few, it gives insights into the current state of intergenerational relationships and few activities that can help in improving their own personal relationships. It has larger implications on the well-being of the society.There were four main outcomes that were experienced by all participants, both old and young**:** increased understanding, friendship and enjoyment and confidence. Indeed, for older participants' issues these outcomes renewed sense of worth and reduced isolation in their relations. Whilst outcomes specifically experienced by young people related to the gaining of specific skills and increased self-esteem. At community level it improves community cohesion and addresses other community- related policy areas, as well as leads to diversification of volunteering and educational institutions becoming more involved in their communities.
Publications: one paper

KNC 202- Reinventing The Brand Positioning Of Indian Tourism In Global Market

Brief description

Destination branding has a significant importance now days, because there is a need for a particular destination to be positioned in buyers' and stakeholders' mind. Every country needs a 'personality' of its own to be identified with the 'brand' it stands for. When consumers decide on a destination, several "brands" compete for their attention. A strong brand is differentiated from others, has several strong advantages when compared to others, and has an attractive appeal to consumers. At present in Indian tourism there is a multi-pronged promotional campaign in key markets across the world with the brand of 'Incredible India' that was launched in 2002. The primary objective of this branding exercise was to create a distinct image or brand for the country. 'Incredible India' campaign has successfully delivered the promise to the tourists. Now there is need to reinvent and redefine its strategy to provide a wider acceptability and visibility in the international market. Indian tourism requires a positioning statement that projects India as a unique destination in the global market. Reinventing the positioning of Indian tourism is a creative exercise that involves branding for its target consumers, which must eventually translate into a positive decision-making in favor of India.

Significant outcomes

The present study has boldly undertaken this task of reinventing the brand positioning of Indian tourism in the global market. To brand India that is so diverse, is difficult. The challenge has been to cover the entire panorama of Indian tourism under one umbrella. Therefore, **this innovative research has evolved a Master brand/ logo/tagline as – 'India Invites**! Be there as a direct call by the high spirited, down to earth, warm and welcoming Indian persona. The umbrella of Master brand can offer many more brands which are appropriate with their own merit in different regions of this land. Indian tourism branding should evolve now as a multi layered presentation. The entire gamut of branding needs a single umbrella like- 'India Invites. Be there' which should unfold the entire range of sub brands.

KNC203- Designing An Effective Social Marketing Strategy For A Successful Implementation Of The "Say No To Plastic Bags" Campaign In Delhi

Brief description

The purpose of the study is to explore how social marketing approach can be used to make the "say no to plastic bags" campaign a success in Delhi. The objectives are as follows:
1. To study select cities in India, where the "say no to plastic bags" campaigns have been successful.
2. To critically evaluate the measures undertaken by different stake-holders in this direction.
3. To analyze the applicability of social marketing strategies, and design an effective campaign for acceptance of environmental-friendly carry bags in Delhi.

Significant outcomes

The most interesting outcome is that it is not the actual price of the non-plastic bags which inhibits people from saying no to plastic bags, but the psychological price or cost involved which poses a serious problem. Psychological price includes leaving the convenience of using plastic bags, especially, for wet products; easy availability; durability; and they need not carry the bags from home.
The innovativeness projected by this research study lies in the fact that by simply using the social marketing strategy of blending all the Ps, i.e., Product, Price, Promotion, Place, Public, Partnership, Policy and Purse-strings, a change in behavior and attitude of the customers and traders can be made. Hence, **social-marketing can achieve what law and advertisements could not achieve.**

Publications: Two papers

KM 201- Factors That Determine The Shopping Behavior Of Customers Of Big Shopping Retail Outlets And Small Neighborhood 'Kirana' Shops - A Statistical Survey Of Customer Behaviour Of Shopping In Delhi And NCR

Brief Description

India today is at crossroads with regard to the retail sector, and the study attempts to unfold a number of speculations on the fate of Indian retail. The main objectives of this project were as follows

- To study the emerging scenario in the retail sector of India based on the shopping pattern of consumers.
- To identify the attitude and behavior of customers in big organized retail outlets and small-unorganized kirana shops.
- To suggest likely shifts/transitions in retailing.
- To study the consumer behaviour by carrying out a primary survey that included capturing responses of 600 respondents through observations, interviews and a structured questionnaire to gain an insight into reasons for their purchase of grocery items from organized grocery stores in big retail outlets or from unorganized retail stores in form of kirana stores.

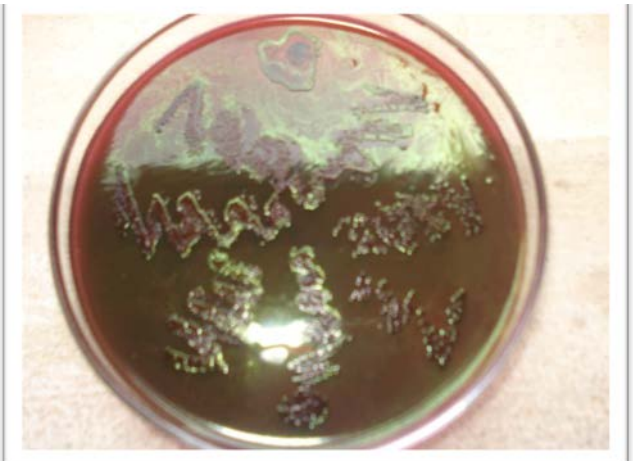
Significant outcomes

The big retail outlets and the small kirana shops are a threat to the existence of the other. They are likely to co-exist for their unique and peculiar attributes that they offer to the consumers. However, there is a shift felt in both the retailing formats. While the big retail outlets are trying to provide services or benefits provided by the local kirana shop vendors to the consumers like proximity to the residents, free home delivery, timely delivery of the products and giving option of making payment after delivery of the products etc.; kirana shops are trying to be more modernized, sophisticated and organized in the display of products and dealings with the consumers besides retaining their existing unique characteristics.

KM 202- To Develop an Early Warning System for Quality Deterioration of Ground Water and its Purification

Brief Description

Aquifers are a source of water for drinking. Apart from, the main source of potable water in many colleges of Delhi University, the groundwater is extracted for variety of other uses. The unplanned expansion of the city leads, almost inevitably, to a grave pollution threat to the Ground water supplies. Therefore, understanding the basic processes about groundwater as well as the factors that can affect its quantity and quality is of vital importance in managing this significant resource. Monitoring provides data on groundwater quantity and quality and is an integral aspect of groundwater management.



Significant outcomes

1. Students involved in the project were taken to a single day tour of the Haiderpur Water Treatment Plant, Haiderpur so, that they can understand the importance of water and simple water purification techniques and to increase their learning experience about water purification**.**
2. A database was developed to track and monitor the quality of ground water and to develop early warning system for quality deterioration. Reverse osmosis was found to be sufficient for purification of the water samples.

Publications: Two posters

KM203- Optimism, ADL and Psychological Well- Being as Correlates of Coping: Enhancing Coping in the Elderly

Brief Description

The project was aimed at studying and understanding the needs and emotions of the elderly. The geriatric population comprises a large percentage of India's population today, and hence they must not be neglected. However, unfortunately, majorities of the elderly today has been forced out of their homes and have been neglected by their own children and families. Hence, for the present study, a sample of 100 elderly persons was selected. This sample was further subdivided into two groups, Group A (elderly persons staying in old age homes) and Group B (elderly persons living with their families). Further, intervention techniques were administered on group A (which have been further explained) to help generate positive feelings within them and thus increase their levels of optimism and well- being.

Significant outcomes

- This project highlights the need for a long-term intervention as an impact can be seen with only 6 months of intervention. This model of combining coping skills, nutrition, exercises, and supportive therapy could be used as a blue-print for the long-term interventions.
- The significant impact was seen through qualitative analysis. There was a marked change in the behaviour of the elderly persons where their earlier coping methods were avoidance, aggression, and pessimism, over time it changed to positive reframing of events and forming of a social network amongst the inmates of the various old age homes. The overall negativity was observed to decrease.
- This can also be seen from the fact that the good rapport with researchers not only led to more comfort and attachment at one level, but also led to insecurity and anxiety about the termination of the project.
- This project also highlights the need for a long-term intervention as an impact can be seen with only 6 months of intervention. This model of combining coping skills, nutrition, exercises, and supportive therapy could be used as a blue-print for the long-term interventions.

KMC201- Impact of Cloud Computing on the Indian Economy and its Derivative

Brief description

The basic paradigms of cloud computing via existing research which was extended in studying the development in the technology supporting cloud computing over the years was studied. Identification of the characteristics and applications of cloud computing has been done. Along with that the study focuses on various institutions which have adopted cloud computing in various areas including academic and public sector & also on the Gartner hype-cycle and came to the conclusion that the popularity of cloud computing saw a boom after 2007 in India. This suggested high expectations that the investors would hold regarding cloud computing and hence would like to invest in this line of business. The study was towards the socio-economic paradigm centering cloud computing which tends to affect and cost dynamics of a particular given firm/organization. The data regarding the growth in the communication and IT sector is considered.

Significant outcomes

Cloud computing offers their services according to several fundamental models
IaaS (Infrastructure as a service)
PaaS (Platform as a service)
SaaS (Software as a service)
There are four types of deployment models for cloud computing depending upon the business needs it provides were identified- Private Cloud, Community Cloud, Public Cloud, Hybrid Cloud. The result was that the graph of cloud computing is increasing till Jan-Feb 2011 where it is observed to have reached its maximum interest. This would be the peak of the Hype Cycle. After which the interest lowers and trough of disillusionment is observed. Cloud Computing in India is no longer a trend; it has matured enough to be used in production environment in India and can be analyzed for its economic implications.

KMC203- Determining Management Education Quality in Northern India: An Exploratory Study

Brief description

This project deals in determining the quality of higher education in Northern India on the basis of data collected through surveys. The collection of data is segregated in two parts- the first deals in collection of data from students and the second in collection of data from the faculty. This will help in a cross-checking of the information obtained from all sources. The questionnaire was prepared keeping in view the objectives of the project with each question helping in one way or the other in determining the objective.
Various institutes were approached by students both personally and through online means to help collect data. The data will help in determining whether there is a decline in the quality of higher education and if yes what factors pertain to it.

Signification outcomes

MBA colleges of Northern India were selected from a vast pool of colleges subject to their rankings as per TIME magazine in the year 2014. A total of 15 colleges were chosen on a sample basis and data for them was collected according to certain predetermined parameters such as quality of teaching, academic staff, personality development, placements and infrastructure. They were divided into 3 tiers and each tier was compared parallel on the parameters mentioned above.
The study found that the colleges grouped under tier 1 were better than those in tier 2 and tier 3 based on all parameters. This showed effectively that quality of education, placements and overall development of the student is better achieved in the colleges stacked under tier 1.

KMC204- Understanding the Desertification and Related Socio-Economic Scenario of National Capital Region of Delhi

Brief Description

Desertification defined as the persistent dilapidation of arid and semi-arid ecosystems by variations in climate and human activities is one of the greatest environmental challenge affecting today. The National Capital Region comprises an area of 33, 5783 square kilometers and encompasses the whole of National Capital Territory of Delhi and spreads across parts of three other states viz. Haryana, Rajasthan and Uttar Pradesh. Socio-economic survey has indicated that human population and natural resources including land, air and water in a single configuration, have been affected drastically by climatic and socio-economic disturbances in the study area. There is a major change in the land use pattern. The toxicity profile of Delhi-NCR has revealed the unusually high level of heavy metal ions in the water and soil matrix in the areas around the industries. An attempt has been made here to postulate a new paradigm for resource assessments that may help to overcome existing shortcomings and a better resource management.

दिल्ली पर मंडराया मरुस्थल में तब्दील होने का खतरा!

Significant Outcomes

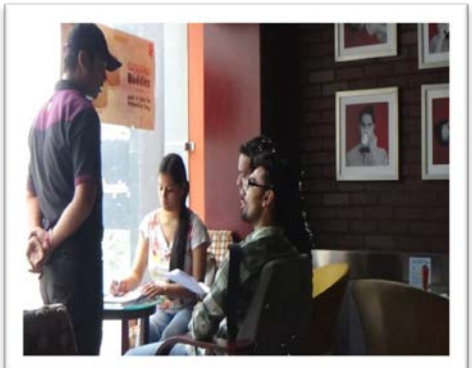
- Green Budget: innovative environmental finance architecture has been proposed. New means can be devised to generate income based on ecosystem goods and services. Taking advantages of these opportunities at both the national and international levels can open new sources of revenue.
- Correlation between ecological degradation and poverty & ecological degradation and food security established.
- Triple IPC-metal complexes formed between heavy metal ions and polyelectrolytes. Batch studies with these combinations are also being carried out. This amendment resulted not only in removal of non-biodegradable heavy metal ions from industrial wastewater bot also immobilization of soil/sand thereby serving as an important tool for mitigating desertification. The highly polluting heavy metal ion rich industrial effluents can be treated with these Inter Polymer Complexes thereby not compromising with the environmental ethics.

Publications: Three papers

KMC205- Workers in Fast Food Outlets: A Glimpse of Their Life

Brief description

The work is primarily based on Delhi city as it has seen rapid urbanization and associated mushrooming of fast food outlets in every nook and corner. Through semi structured interviews and observations large scale data had been generated with the focus on understanding the nuances of their work culture. It gives an insight into the socio-economic conditions of these workers, their problems, aspirations, attitudes toward the job. Attempt was also being made to retrace their family life, academic background. It also studies the perception of the workers regarding the impact of their work on their way of life, family, behaviour and interpersonal relations in general. It has tried looking into their psychological experiences and their reasons for joining this work. The discrimination in salary, work hours, promotion and division of work on gender basis were not reported. The work has potential to capture the dynamics of identity issues among the urban youth who are in their transitional phase. This holds immense significance in today's youth psyche which is often perceived as a social threat. The work throws light on how these issues can be well documented to identify and develop guiding lines for facilitating a work environment with less stress, better living conditions and healthy adaptability.



Significant outcomes

The result shows a shift in the perception of the fast food culture which has got rapid expansion across the world due to globalization and liberalization. The result of the surveys stated that although majority of the workers are satisfied with their job, working condition, pay package, and work environment, there are still certain number of workers who seem unsatisfied due to work pressure, long working hours, low wage rate etc. The disparity in the salary persists substantially. Based on the current study, intensive researches can be planned where realities can be construed through the study of the narratives of the workers. It will help design better opportunities in working places. Since a large number of youth is involved in this work, their sense of wellbeing, issues of struggle and requisites for making the place better can enable the policy makers for newer formulations.

KMC206- Traditional Knowledge and Sustainable Livelihood Pattern in Pratap Nagar Block, Tehri Garhwal, Uttarakhand

Brief description

The forthcoming century is the era of technical possiblism at its pinnacle and the realization of this project will come at the cost of our pious Mother Nature and consequently the very existence of the human race. There has been rampant overuse, misuse and abuse of the nature's bounties. The biological systems of the world have been deteriorated in the wake of illusionary development and their resilience is the need of the hour. We have a lot to learn and adopt from these pristine environs and teach them how their knowledge and customs (with few modifications) can be instrumental in their economic and societal progress leading to sustainable livelihood.
Traditional knowledge of the local communities regarding biodiversity, conservation of natural resources and maintenance of ecosystem have been important adaptive management tools for sustainable livelihood. The communities living in the Himalayan region particularly in the Pratap Nagar Block, Tehri Garhwal, and Uttarakhand are living in a particular physical and cultural milieu for centuries in harmony with their environment. This area lies in the most remote regions of the country and the communities are residing in relative isolation for centuries and have devised sustainable livelihood patterns.

Significant outcomes

- The project has shown new wisdom among the students in relation to their exposure to remote and inaccessible area of Uttarakhand. It is important to mention that area under study is one of the remotest parts of Uttarakhand.
- The lifestyle among villagers is worthwhile to understand in terms of food habits, customs and traditions, management of resources and livestock.
- Human adjustments have been very strongly associated with nature hence strong relationship can be seen for sustainable livelihood.
- Further the project also reflects the old agricultural practices vis-a-vis new practices and role of traditional knowledge and technological innovations.
- The project also showed the role of traditional wisdom in the areas of medicines, water conservation and utilization, resource management etc which are diminishing in the era of globalization.

KMC207- Socio-Political and Psychological Causes of Road Traffic Jams Problems, Their Environmental and Societal Impacts and Suggesting Remedial Measures for Smooth Road Traffic In Delhi-NCR

Brief description

Delhi has earned the dubious distinction of being 'the most polluted city in the world 'according to an international survey. The project aims to find out socio- political and psychological causes of road traffic jam problems; why certain roads are always jammed irrespective of time of the day. Our aim is to find solution to the problem of traffic jams in Delhi-NCR, which affects the citizens psychologically contributing to increased mental stress levels and the environmental impact of traffic jams and most importantly their impact on the society as both are intricately linked to each other.

Significant outcomes

Causes behind traffic congestion were like, lack of traffic management, inadequate public transport, high volume of vehicles, lack of awareness about traffic rules, disobedience of traffic rules, lack of parking space, impatience among people to reach their destination. Out of these, the main cause was the "psychological reason" which contributes a major role in traffic congestion.

Different counselling programmes with drivers of taxis, auto-rickshaws and e-rickshaws; distribute pamphlets in the university campus has been taken place. Masseges have been conveyd to the public through nukkad-natak and social media (facebook etc.) to awaken a sense of civic responsibility among citizens about the importance of adherence to road safety rules and traffic signals in order to avoid accident and secure long life.

Various innovative ideas were brought to focus this issue. One of the best Innovative ideas was that "To use the fluorescent tapes on the rickshaws and auto-rickshaw for ensuring safety to the vehicles at night". The team has displayed banners printed with informative and educational messages.

Publications- Four papers

KMC208- Study on Quark-Gluon Plasma (QGP) and Neutrino Physics (Extension)

Brief description

Quantum Chromodynamics (QCD), a theory of strong interaction (one of the four fundamental forces of the nature), predicts that under extreme conditions of hadronic density and /or temperature the hadronic system would split into its fundamental constituents, quarks and gluons, such that the bulk properties of the hadronic system would be governed by these degrees of freedom. Such a (locally) thermally equilibrated state of matter in which quarks and gluons are de-confined from hadrons, so that color degrees of freedom become manifest over inter nuclear distances rather than just intra nucleonic distances, is called the Quark-Gluon Plasma (QGP). The de-confined phase of quarks and gluons is one of the exciting ideas in High Energy Physics (HEP) with significance in Ultra Relativistic Heavy Collisions (URHIC), interior of massive neutron stars, and possibly in the early phase of the "Big-Bang" model of the Universe.

Significant outcomes

- For the formation and the characterization of Quark-Gluon Plasma (QGP) State (a de-confined hadronic state), The team tried to coin a new density $\rho(k) = \frac{\alpha}{k} + \beta k + \delta k^2$ of states for quarks and gluons. Under this density of states velocity of sound has been computed. That is near to the lattice result.
- Modified surface tension of a QGP droplet under one loop correction in a mean-field potential (Peshier Potential) [7, 9, 10] has been calculated. Hence velocity of sound in this case also computed. The results again come near to the lattice result.

LI201- Designing Solar Engineered Products for the Rural Population

Brief description

The project was designed with the objective of integrating solar energy in lifestyle products for rural spaces such as residential, educational or agricultural and developing prototypes of selected products for use by rural population. Lifestyle of rural population from the villages in Delhi and NCR was observed; some of these areas were covered under the Government programme on renewable energy. Informal discussions were conducted with different groups of residents including adult men and women and children in the age group of 8-12 years. Brainstorming exercises on observations from field experiences yielded many design ideas of solar products based on rural lifestyle. Many ideas emerged. Some important ones are: 1. Solar charpai; 2. Solar jacket; 3. Solar window blinds; 4. Solar mirror; 5. Solar tricycle/scooty; 6. Solar vendor cart; 7. Solar farmer cap; 8. Solar vegetable bag; 9. Solar bandhanwar; 10. Solar cloth belt. Of these, the prototypes of the first five items are in the anvil.


HARNESSING SOLAR ENERGY

An eco-friendly solution for villages

Significant outcomes

Attempt has been made to integrate solar technology into rural lifestyle products in a cost effective manner. The products designed will enable the rural people to enjoy a very basic amenity like lighting and availability of electricity harnessed at home for small services like charging their mobile phones.

The products designed will enable the rural people adequate energy to light up CFL lamps during the night for effective illumination, run DC fans during summer months as well as charge mobile phones to stay connected. Some products like the solar cart will also help in attracting customers as the energy generated would not only help in lighting, but also to run an LED TV.

Patents- Three

LI202- Creating Social Acceptance towards Sustainability Audit of Electronic Products in Planning Modern India

Brief description

The project covers social acceptance towards sustainability audit of electronic products from two view-points which are as follows:
Sustainability concerns:
From sustainability view point, there is a conceptual shift from current industrial system designs, which generate toxic, one-way, cradle-to-grave material flows to cradle-to-cradle system to C2C enunciates a positive and long-term goal to create products which are commercially productive, socially beneficial, and ecologically intelligent. Sustainability is not only doing more with less or "reducing the human footprint" to minimize the symptoms of environmental decline but simply retrofitting with incrementally cleaner, more efficient systems may be an adequate long-term goal.
Consumer concerns:
Consumer has very little information available to choose a sustainable product. There is a need for a framework available to consumers to be able to assess the wise selection of any design. Most of e-waste is handled by the informal recycling units subjecting to release of hazardous substances in the environment and jeopardizing the entire eco-system.

Significant outcomes

The initiative taken in the project to develop the sustainability audit criteria itself is a new concept as there is no such framework available for electronic products.
By increased interest of the electronic products' manufacturers to adopt the sustainability audit of their products, carbon foot-printing could be reduced and thus environment could be protected from further damage due to pollution as well as health of human life, flora and fauna could be preserved.
A website has been launched www.sustainabilityaudit.com to facilitate a campaign (through Facebook page) on the need for such a criteria for electronic products.

LI203- Nutrition Awareness and Food Choices among Students in Delhi Schools: Gaps and Barriers in Practicing Healthy Food Behavior

Brief description

The project was designed with the objective of assessing food habits and nutrition awareness among students (13-15 yrs old) in 5 schools of Delhi. A pre-tested questionnaire was used to obtain information about the nutrition knowledge and food habits of 562 students. The frequency of consumption of healthy/unhealthy foods by the students was assessed using a food frequency questionnaire. Focus group discussions were used to identify gaps and barriers in the practice of healthy food behavior by the students. A communication strategy for promotion of healthy food choices is now being evolved. In addition the study also envisaged sensitizing the undergraduate students involved in this innovation project to the prevailing problem of unhealthy eating habits and its adverse health implications.

Significant outcomes

The study revealed that food habits and diet quality of most school going adolescents were not ideal and needed modifications. Food choices were mainly determined by the taste of the food and not by nutritive value. An innovative communication strategy 'Choose Healthy – Eat Right' was developed for promotion of healthy food choices among school children. The communication strategy comprised-

• Identification of key domains and messages for promotion of healthy food choices among school children.

• Development and dissemination of IEC material with standard messages such as nutrition games, nutrition models, PowerPoint presentations and recipe cum nutrition resource booklet for parents.

• Interactive sessions with school principal and teacher incharges to elicit their participation and support.

• Interactive sessions with students 'Healthy diet meets'.

Publications: One Book

LSR201- Vasudhaiva Kutumbakam: Creating Sustainable Global Partnerships in Higher Education

Brief Description

We live in an interconnected world where borders are becoming ever more porous. Today global partnerships in education are becoming an imperative. The present study thus seeks to examine the effect of exposure to international students on both domestic students and faculty. It further codifies the challenges and barriers preventing international students from adding greater value to institutions. The experiences of Indian students who have gone abroad for higher studies have also been studied in order to illuminate the international best practices and compare them with universities in India. This should help us to suggest robust and viable international partnership programs for institutions of higher learning in India. This study uses both qualitative and quantitative research methods. Data has been collected through face to face interviews, on-line interviews and questionnaires from about 300 students and 50 faculty members from two universities in the NCR- University of Delhi and GD Goenka University (a private institution).

Significant outcomes

Through its course, the project has been able to extend a valuable and culturally relevant insight into internationalization, with a special focus on Indian host institutions, so as to maximize the benefits of international collaborations.
Presence of foreign students was viewed positively by domestic faculty and students. However certain barriers including language, limit the impact of this exposure. Several benefits of studying at foreign universities were identified. These included access to more e-resources and the development of original thought. Students with exposure to short term courses conducted by foreign universities in India appreciated the more participatory style of foreign faculty.

LSR202- Reverse Logistics: An Innovative Approach to Sustainable Green Environment

Brief Description

In a world of limited resources, the rapid depletion of resources has led to serious environmental concerns. Hence, there is a severe need to effectively adopt resource-saving and environmental-friendly practices and an urgent need for and societal demand for a cleaner environment. To deal with these problems, individuals, organizations and governments need to strategize a more sustainable approach to protect what is left of our planet. It applies to manufacturing organizations, service organizations, schools, hospitals and also to non-profit organizations. The United Nations, through its agencies is making all efforts to promote sustainable development, so that future generations do not face consequences of what the present generation is doing. India as a nation also recognizes the issue of environmental sustainability and it appears as one of the key objectives in the Approach paper of the 12th five year plan.

Significant outcomes

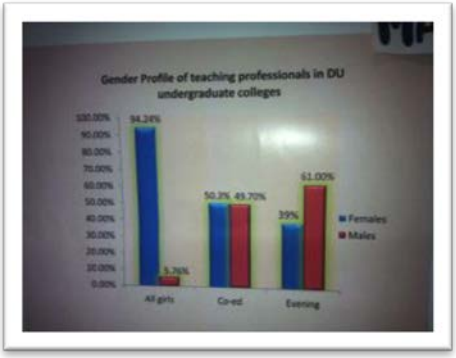
- The project aimed to create awareness at the university level so that they can take necessary steps to protect the environment from e-waste and facilitate the reverse logistics process at the university level by analyzing the opportunities to outsource it.
- The team studied the reverse cycle of electronic products and used this understanding to develop a model to incorporate reverse logistics in Delhi University.
- The project has helped highlight the importance of cutting down CO_2 emission to reduce harmful effects on the environment.
- The project team has also tied up with an NGO called Chintan to help in collecting e-waste and increasing awareness within the college.

LSR 203- The "Successful Professional Woman": Work-Life Balance and Well-Being

Brief description

Given that educational sector is generally perceived as the 'right' choice for women professionals, this project is aimed to understand, both objectively and subjectively the arena of 'work-life balance' that impinges upon the person's well-being. The project aimed for:

- Mapping the changing professional and personal preferences of female workforce in institutions of higher education
- Understanding notions of well-being of women
- Comparison of well-being of female workforce in higher educational institutions- public and private
- Suggest new interventions for women's well-being and empowerment



Significant outcomes

In the study some of the assumptions and inter-relationship between material, relational and subjective well-being were reinforced. It must be noted however that since college teachers are in a similar category regarding income the dimensions of material welfare did not have any significant effect on well-being. What has added to the well-being is in fact self-interest and self-motivation in taking up teaching as a profession, as the relational co-efficient is also weak in strength. It is perhaps the social connectedness that they have with their colleagues at work, positive values and perceptions that they receive in their personal life with respect to immediate family and larger society that have far greater contribution towards achieving a work-life balance. Since the position of subjective is "the capacity to aspire" and aspirations "form parts of wider ethical ideas and metaphysical ideas which derive from larger cultural norms (Appadurai 2004) – the teachers tend to have a higher quality of life because of greater social inclusion.

LBC201- Understanding the Potential Determinants of Obesity among School Going Adolescents in Delhi

Brief description

Adolescent obesity predisposes an individual to adult obesity, diabetes mellitus, coronary artery disease and other non-communicable diseases. Recent studies indicate a rise in the prevalence of child and adolescent obesity, which is at present around 22% in India. This investigation was undertaken to assess the prevalence of obesity and identify its potential determinants among adolescents attending schools of West Delhi. The sample comprised nearly 1100 boys and girls studying in IX to XI standard (aged 13-18 years) in the identified schools. Weight, height, waist circumference, total body fat, blood pressure were measured using standard procedures. A pretested questionnaire was used to gather data on dietary practices, physical activity and influence of marketing practices on food choices.

Significant outcomes

- The findings indicate a rise in prevalence of overweight and obesity among school going adolescents of Delhi as compared to that reported by studies conducted in the preceding 5-10 years. The results also suggest that environmental factors such as easy availability and intense marketing of unhealthy food as well as easy access to personal computers/laptops/smart phones have adverse effects on the dietary lifestyle, physical activity and sedentariness of the affluent adolescents.
- The findings will help the policy makers as well as the school authorities in making more practical guidelines and developing lifestyle and environmental interventions for prevention of adolescents' obesity- a crisis in public health.
- On the positive side, the weight related concerns of adolescents indicate that there is scope for lifestyle and environmental interventions to address the growing menace of obesity among them.

MAC201- Impact of Dilli Haat as a Socio-Cultural and Commercial Oasis on the Urban Youth: Exchanges and Negotiations.

Brief description

The project enables the students to view Dilli Haat not just as a market place but also as an agent of social change amidst capitalist forces of globalization. It includes estimating the awareness and appreciation of folk life by young people, assimilation of folk values in urban youth visiting Dilli Haat and awareness about the challenges to folk art, folk culture and folk people. It attempts at determining the effect of this space on the artisans bringing their art and wares to the city in terms of adapting folk art to contemporary trends.
Moreover, it aims to explore the nature of this alliance between folk and commerce and enquires if it has led to commodification and exploitation of the folk and degradation of the 'real' handicrafts.

Significant outcomes

The project has acquired a concrete shape through the development of a model of the Bioscope conceptualized and created by team. The model uses the concept of a 'peep-hole' to access something not present. Like a conventional Bioscope, Dilli Haat also offers a glimpse into the diversity of the country and its rich folk culture from the comfort of where one lives.
Entertainment and style statements emerged as significant factors that attracted the youth to the Haat. It was also observed that Dilli Haat has been touched by commoditization.
Publications- Three articles & one book.

MAC202- Developing a Connect Between Spiritual Ecology and Sustainability in the University Curriculum Through an Empirical Study

Brief description

Spiritual ecology is the spirit's response to ecological crisis which emphasizes that a sustainable world can be built with the help of a very powerful entity: the human spirit. In line with this hypothesis, the primary objective of the project was to establish a connection between spiritual ecology and pro-ecological behaviour (Spirituality = pro-ecological behaviour) by ingraining higher values in students for lowering damage to the environment and develop a more committed vision to sustainability. Two sample populations, one having an anthropocentric approach to development and the other having ecological renewability and sustainability approach towards the biosphere (University of Delhi and Dayalbagh Educational Institute, Deemed University Agra), were chosen for Quantifying the interconnectedness between ranking on spiritual ecology scale and the level of ecological behaviour.

Significant outcomes

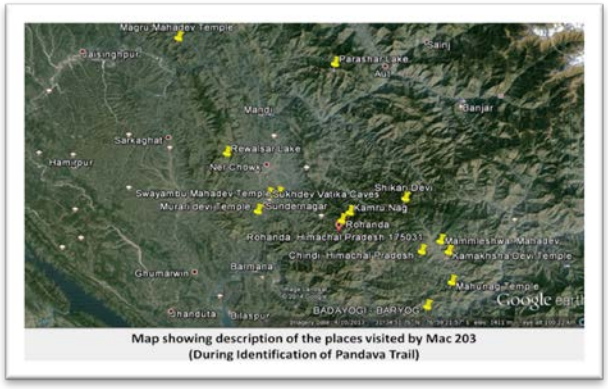
The two data sets of Delhi University and Dayalbagh Educational Institute were found to be slightly different. Spiritual ecological consciousness level as a determinant of Ecological behavior intent is stronger in the DEI data vis-a-vis DU data but the effect is small in both the sets. A scope for future research on the same subject appears imminent since the difficulties encountered by the respondents in the conduct of ecological behavior also needs to be incorporated to have a greater variance explained by the model. It seemed that the spiritual ecological awareness is there amongst the students but the conversion/transformation of this awareness to consciousness level is required at deeper level amongst both the student communities and this might happen with age and with continuous practice.

Publications: One book

MAC203- Identification of Pandava Trail in Karsog Valley of Himachal Pradesh and Influence of Mahabharata Heroes on Local Culture and Folk Songs

Brief description

The objective of the project is to identify the Pandava trail and various temples associated with Mahabharata and to document their influence on local songs and culture. Moreover, it attempts to study, document, preserve and promote the history, culture, heritage, tradition and lifestyle of Karsog Valley.
Thus, to promote responsible tourism practices to benefit conservation of the age old culture of Karsog the study will facilitate in revival of our rich history and the values like love, peace, patience, and importance of family which these epics teach us.



Map showing description of the places visited by Mac 203
(During Identification of Pandava Trail)

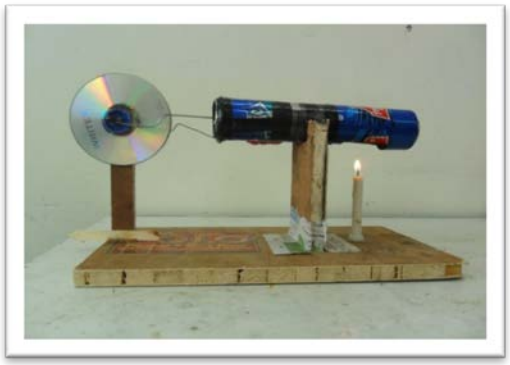
Significant outcomes

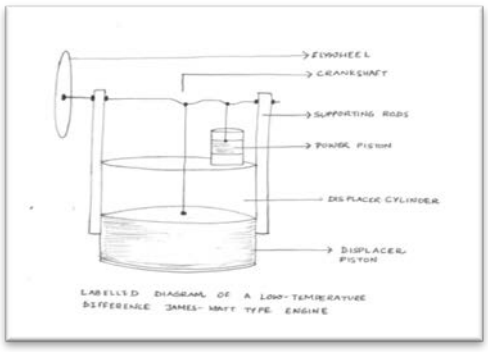
Students visited various places linked to Pandavas of Mahabharata (i)Sukhdev Vatika Caves(ii) Swayambhu Mahadev Temple(iii) Rohanda (iv) Chindi(v) Mahunag Temple(vi) Mammleshwa Mahadev (vii) Kamaksha Devi temple and(viii) Badayogi Temple
As per folklore these temples are said to be built by Pandavas of Mahabharata. Most of these temples are named after Mahabharata Heroes. There was similarity in the architecture style and construction material used across different temples.
The idols are found to be made of same metal (unidentified) and estimated by Archaeological Survey of India (ASI) to be made before 6th century. ASI is also trying to decipher some codes written on these idols. Huge drums said to be made of local plant (Bhekla) which is found in the shape of a shrub. As per folk lore these three drums are connected and are made of a single Bhekla plant by Mahabharata hero “Bheema”.
The project team has made an online knowledge portal, “Let’s go Karsog!!!” so as to enlighten the common people about this unexplored valley, with a plethora of history and natural beauty.

MAC204- Fan without Electricity

Brief description

In this project the main focus was on running a fan without electricity i.e. with temperature difference. Both urban and rural areas are facing the acute problem of shortage of electricity, load shedding, power cuts for hours in a day, blackouts. This can be reduced by using the proposed idea.
Heat energy is the by-product of many industries which is mostly dumped into the environment. This heat energy can be converted into useful energy. There are many methods by which waste heat energy can be recovered and utilized. A fan which runs on heat energy without using electricity is proposed here. Principle of James Watt Engine is being used to get desired utilization of heat energy.





Significant outcomes

The engine created is very efficient for a given temperature difference between the heat source and the heat sink. A low temperature difference engine is developed using a free piston type configuration which fits the purpose.
In villages, the use of kerosene lamps can be replaced by this innovative fan as it gives significant benefits:

- It does not require any electricity.
- The device will be able to light up the house.
- It is economical
- It is safe and environment friendly.

The device, moreover, works on the principle of relative temperature difference. This temperature difference should be a minimum of 5°C. Therefore, the specimen does not require any conventional source of energy for heat energy, especially in a country like India that has extremely high temperatures in summers.

MAC205- Fostering Diffusion of Educational Technologies in Undergraduate Learning for the Students, by the Students

Brief description

The education system today is changing due to ubiquitous educational technologies in support of teaching and learning. Through a comprehensive review, research and analysis of the various educational technologies available and the quality of technology-enhanced learning environments, and in addition to the normal face-to-face lectures, the project seeks to address the following challenges:

- Model for the flexible use of teaching spaces;
- Scaling technology support to meet increasing demands cost-effectively;
- Encourage teaching innovation by providing a state-of-the art testing ground for instructors using educational technology to improve classroom teaching.
- Ensuring a quality learning experience for Undergraduate students when on campus and off campus.
- Engage students at every level of the project, i.e., designing, creation of digital content and remote controlling and monitoring and its management and evaluation assessment.

Significant outcomes

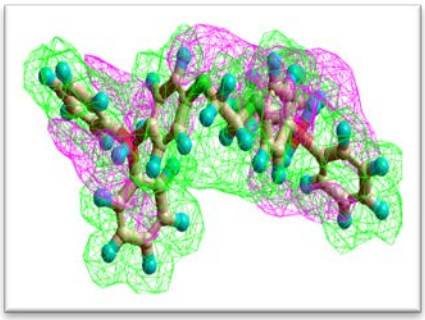
1. Lab in the Wall: It is an innovative and flexible approach to teaching and learning strategy dedicated to providing a student-centered learning environment which provides high quality teaching, leading to an enhanced student learning experience.
2. 'Project Edu-Rath' is an initiative with a driving theme of sustainable literacy amongst the deprived and underprivileged sections of society as part of its corporate social responsibility. It comprises 2 mobile sections, namely, a computer literacy section and a lab section. It has been launched in Dhallupura Village Area of East Delhi along with 2 teachers, 4 student instructors, a coordinator, and a driver.

The products developed under the project won the award for best innovative idea.

MAC206- Characterization of Corrosion Resistance Properties of Hydroxyl Based Compounds in Mine Water Environment from Indian Coal Mines and Empirical Calculations of Thermodynamic Parameters

Brief description

Corrosion is an attack on metallic material by reaction with its environment to form an oxide and other compounds. Coal mining industry is facing serious corrosion problem of equipment and materials which are used during washing/extracting of coal in mining industry. This problem arises due to corrosive nature of mine water. The pH of coal mine water of Assam (Ledo) was found to be 3 which show acidic/corrosive nature of coal mine water. Any unwanted decay is corrosion. Complete elimination of corrosion is not feasible but its prevention would achievable.
The use of corrosion inhibitors is one of the very imperative methods in preventing or minimizing corrosion. The project attempts to explore hydroxyl based phosphonium compound (PEGTPP- Polyethylene glycol triphenylphosphine) that could be used for inhibiting the corrosion of mild steel in mine water environment from Indian coal mines. The use of such substances would simultaneously achieve the economic and environmental goals.



Significant outcomes

Polyethyleneglycol (triphenylphosphine) has proved to be a good corrosion inhibitor in coal mine water as compared to Tetrabutylphosphonium hydroxide.
This hydroxyl based phosphonium compound (PEGTPP) is economical and viable which can improve the corrosion resistance of metals and can be applied on the inner lining surface of the material by immersion or be incorporated in polymer coating thereby reducing the maintenance cost of the materials to a large extent. These compounds will result in cost saving in maintenance of equipment/materials that are used in coal mine industry. The use of such substances will simultaneously achieve the economic and environmental goals.

MAC207- Environmental Impact Assessment of Gazipur Land Fill Area

Brief description

Environmental vulnerability due to unscientific land fill areas is an established fact all over India. East Delhi is also struggling with poor management of land fill areas, causing air pollution, water pollution, health hazards and numerous other problems. All land is valuable, and the impact of its use as landfill needs to be sustainable. The health survey of the area showed that the most common ailments reported were breathing problems leading to asthmatic conditions, nausea, redness in eyes and stomach ailments.
The project attempts to study the environmental impact of Gazipur land fill area on air quality, water quality, sand quality and the effect of such contamination on the health of populations living near the landfill. It also proposes to educate people about the problem and seek effective solutions.

Significant outcomes

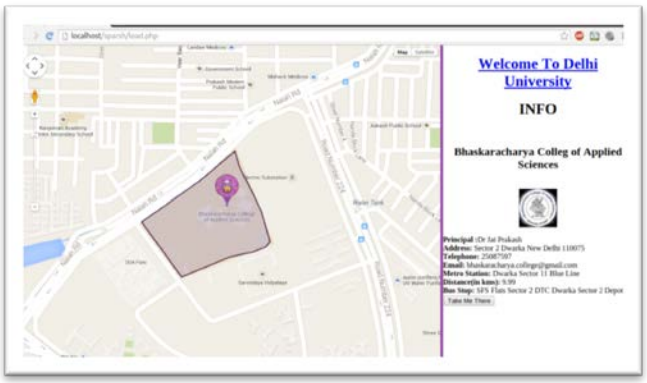
Segregation of waste generated in the college by different categories (Wet, Dry, PET Bottles) of which the organic waste is sent to vermicomposting pits and the PET bottles used in PET garden, resulting in 70% reduction of waste sent to landfills.

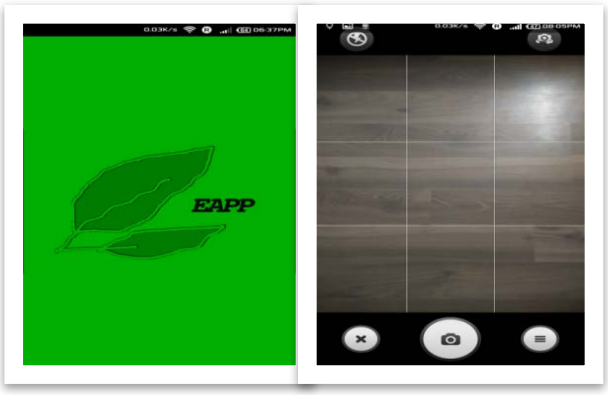
Under this project, Maharaja Agrasen College has **developed a Smart Dustbin within an overall Smart Waste Management System which comprises a smart dustbin fitted with Infra-Red sensors, wi-fi module, Chargeable battery, a control unit fitted with LCD and LED displays and a computer.**

MAC210- Development of University Applications (DU-Apps) for Mobile Platforms

Brief description

In this project, a case study was carried out over a period of one year, investigating how learning experience of undergraduate science students can be enhanced through designing Apps using available mobile technologies. The pedagogy of subjects like electronics and computer sciences is based around problems based learning as well as traditional learning in face to face, online and lab experiments.
The objective was to motivate students to learn and use the technology such as various web applications, operating systems, technical languages, hardware to support this software etc. to create the desired application using digital technology.





Significant outcomes

1. DU-APP-This APP aims at mapping all the colleges of 'University of Delhi'.
2. Red Gold App -This App can save life by facilitating blood donation to a person in need. The app is designed to help the registered users in case of these emergencies.
3. E-APP - Step towards environment consciousness E-app is for taking pictures of our surroundings/environment for any aberration and automatically lodging the complaint with the concerned officials.
4. Background Knowledge Probe App-In courses like honours in electronics, to foster critical engagement with technology, it is essential that students' background knowledge about the subject is probed, are given sufficient time upgrade or to go for course correction counseling before they start their learning journey in the core subjects.

MVCE201- Developing Psycho-Social Profiles Of Indian Adolescents

Brief description

The pre-service teacher-education programme for secondary and senior-secondary teachers (B.Ed.) prepares prospective school teachers to take up the challenge and responsibility of educating adolescents. For this reason understanding and reflecting on the characteristics, needs, aspirations and dreams of the target group should be an integral part of the curriculum. The prevalent scenario does provide basic exposure to current views and concepts but these are influenced by Western views. This project focuses on developing contextually and provides greater clarity and depth to their transactions with school learners. It needs to be recognized that the adolescents come from a variety of contexts, ranging from those emulating the western model (the techno savvy, perennially connected globally) to a rural adolescent trying to deal with rather traditional and limited opportunities being offered by their milieu.
Therefore, it was imperative that a concerted effort be made to consolidate the nuanced and variegated phenomena.

Significant outcomes

Some of the understandings that have emerged from this Project include:

- The pre service teachers' (student project team members) enhanced awareness of issues confronting the present day Indian adolescents,
- A better understanding of adolescents in general and in the Indian context in particular that will be beneficial for teachers- both pre and in-service, teacher-educators and other members of society who need to deal with/interact with this group,
- Sensitizing the pre service teachers and other stakeholders to the concerns and problems confronting the adolescents
- Theory building in the Indian context.
- These understandings will be of particular utility to these groups.

Publication: One paper

MT201- Waste Water Treatment And Corrosion Protection By Development And Evaluation Of Conducting Polymer Nano-composite Impregnated Materials

Brief description

Water, free from hazardous chemicals and pathogens, is referred as clean water and is essential to human health. Unsafe water from all sources contributes significantly to the global burden of disease like cholera, typhoid or hepatitis. Pathogens e.g. E. coli and total coliform are a biological index for pollution and contamination in water. Although use of disinfectants in drinking water can effectively control the pathogenic bacteria but research exposed that chemical disinfectants generally used by water industry like chloramines, chlorine, ozone can react with different components in natural water to produce disinfectants byproduct, many of which are highly carcinogenic. The project aimed to describe the synthesis and characterization of conducting polymers nano composites impregnated materials and their evaluation for antimicrobial and anticorrosion applications.

Significant outcomes

Conducting polymer and metals/metal oxide nanoparticles of anticorrosive and antibacterial properties have been synthesized successfully. The metal/metal oxide nanoparticles in the range of 10-30 nm have been obtained and investigated using SEM and TEM characterization. Incorporation of synthesized metal/metal oxide nanoparticles in conducting polymer matrix was also successfully carried out which was investigated using XRD, FTIR, SEM, TEM and EDX analysis. Results indicate that the size of nanocomposites was observed in the range of 50-80 nm.

Coating of these nanocomposites based epoxy resin was carried out on the mild steel panels using powder coating technique. The durability of coating was investigated by tape and bent test as per ASTM standards which have passed the tests. Salts spray tests indicate that conducting polymers nanocomposites based coating is found to be highly efficient to protect iron in marine environment.

MSC201- The Experience And Correlates Of Happiness Among Young Adults

Brief Description

For a long time, economics has largely neglected the study of well-being and its causes. Most empirical investigations about the measurement and the determinants of well-being are being made by psychologists, sociologists and political scientists. Thus from an interdisciplinary perspective with elements from psychology and economics, this research project aimed to understand the experience and correlates of happiness well-being amongst young adults.
The research had been conducted in Delhi university colleges, in which 3000 respondents were randomly selected from different college of this city.

Significant outcomes

There are significant differences in happiness levels based on gender and socio-economic status. Psychological well-being is the most important factor influencing happiness followed by education and learning, social relationships, security and governance, material well-being and health. Irrespective of gender, students' ideological belief with respect to happiness lays mainly with satisfaction with life at all times and hope in achieving personal goals.
Main recommendations were undertaking structural improvements in resource and educational environment in the university can be an important factor in enhancing students' well-being. Policy planning that reflects skill building capacity which is job oriented and turns students' hopes and ambitions into reality is the pressing need to improve students' welfare.

MH201- Kashmiriyat Beyond: A Study of colonial and Postcolonial Kashmir

Brief description

Kashmir and Kashmiriyat interweaves the locational and political realities and constructs; the serenity and the turmoil; its history and culture as it evolved and what is ascribed; the secular and the fundamental; its historical syncretic assertion against a post independent political construct of Kashmiriyat as the imagined nation within a nation. The projects attempts to understand whether it is at all necessary for a homogenous notion of Kashmir to emerge and fit into the straitjacket notion of the Indian state.
The purpose of the study was to understand the socio-economic and political history of the State of Kashmir during the colonial and postcolonial periods, the current estrangement of large sections of Kashmiris from the Indian Union, the current problems faced by natives of Kashmir, using primary sources.

Significant outcomes

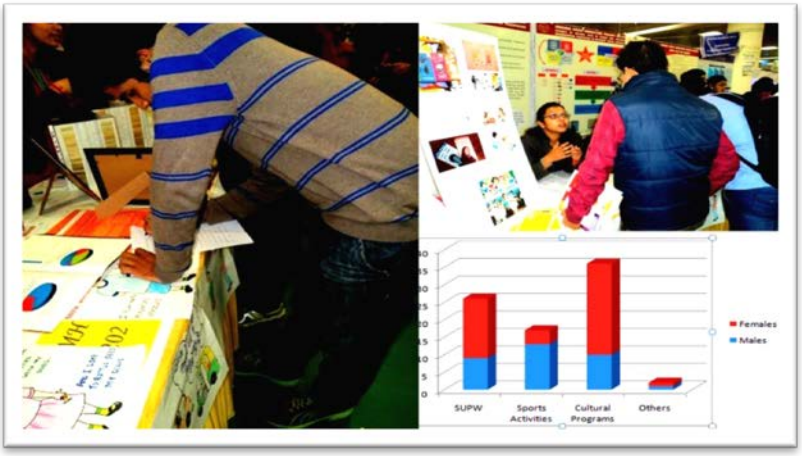
The survey conducted indicated the need for better education of non-Kashmiris on matters of the state, as many participants responded to the identity issue of Kashmir by declaring it no more than a tourist spot. Through interviews it was disclosed that the national anthem is not drilled into most Kashmiri children.
The idea of Kashmiriyat also offers to be a significant tool in providing a kaleidoscopic view of what Kashmir really is. There is no unified cohesive vision of Kashmir's past, and there are internal differences and contradictions of religion, sect, caste, class, region, language and ethnicity. The project concludes on the idea that the differences are its strengths and not its weakness. The rainbow hues of Kashmir's cultural and political past lend it to a fantastic treatment.

MH202- Gendered Socialization: A Comparative Perspective Of Matrilineal And Patrilineal Societies

Brief description

The project stems from the understanding that there exists a stark polarity between the social, political and economic status of women in the society. Parental and societal expectations from boys and girls, their selection of gender-specific toys, and/or giving gender based assignments seem to define a differentiating socialization process. The project attempts to compare the extent and the difference in socialization process in patrilineal and matrilineal societies. The aim of the project is to look broadly at:

- Understanding the differences in the entire socialization processes between matrilineal and patrilineal societies in India
- Studying in detail the status of women in both the societies.
- Comparing the economic autonomy of women in these societies.
- Examining the extent of desirability of matrilineal over patrilineal societies and vice-versa.
- Raising consciousness to identify the social construct which perpetuates patrilineal ideologies in both societies.



Significant outcomes

The use of comparative method enabled to break certain conceptions about inherent differences between patrilineal and matrilineal societies. The common belief that matrilineal structures stands in stark contrast with patrilineal structures has been eradicated through empirical data collected.

It has been found that patriarchy is functional in both the societies. With regard to socialization, it appears that both the societies are gendered in similar ways.

The research also stressed the need to account for contemporary changes in the acceptability of gender norms by the youth in our society. The convergence across class lines in both patrilineal and matrilineal societies shows its decreasing significance in gendered socialization

MH203- Efficacy Of Natural Dyes In Dyeing And Imparting Antimicrobial Properties To Different Textile Materials

Brief description

Most of the synthetic dyes that are commonly used in textile dyeing such as azo dyes are carcinogenic and can produce toxic and allergic reactions. In contrast, natural dyes are bio-degradable, non-toxic and eco-friendly. In the present study, natural dyes extracted from various plant sources were evaluated for their dyeing potential and antimicrobial properties. Dyeing of the different textile material was done by using different mordants and mordanting techniques (pre-, simultaneous- and Post-mordanting). Antimicrobial properties of the dye extracts were evaluated by disc-diffusion method using *Staphylococcus aureus*. The antimicrobial activity of the dyed fabric was evaluated using bacterial reduction method.

RED – RED SANDALWOOD

ORANGE – MADDER

YELLOW – TURMERIC

GREEN – BERBERIS + INDIGO

BLUE – INDIGO

INDIGO INDIGO

VIOLET – RED SANDAL WOOD

Significant outcomes

The detailed study found that natural dyes exhibit several advantages such as higher UV absorption by fabric reduces melanomas; provide antimicrobial finishes; avoid cross-infection by pathogenic microorganisms; reduce odor formation; safeguard textile from staining, discolouration and quality deterioration. It was concluded that natural dyes need mordants for fixing to fiber. Vegetable fibers (cotton) do not hold mordants readily resulting in duller colours compared to brighter colours of animal fibers (wool and silk)
Greater emphasis on using natural dyes in the textile industry can make a valuable impact in the environmental sustainability.
There is great potential in using natural dyes for development of antimicrobial textile finishes as these have several applications.

MH204- More Miles On The Yamuna

Brief description

The project aimed to understand the dynamics of the relationship between the River Yamuna and Delhi. Samples of river water and riverside soil were also collected and tested for toxicity. The tests established unacceptably high levels of toxicity in the river. The aim through the project was to uncover some of the dynamics of the relation between the Yamuna and communities closest to it through a detailed socio-economic survey of villages along the river: Hiranki in North Delhi, and Madanpur Khadar in South Delhi

Significant outcomes

The water quality monitoring reveals that viewing the river in a piecemeal manner cannot yield effective policy solutions. This is a tricky issue because the administrative responsibility of the water in the river lies mainly with the Irrigation Department in each state. Effective policy may call for political decisions that impact on the jurisdiction of states over the river.

It has been demonstrated that the demand for public action on the Yamuna, from communities one would most expect to have obvious stakes in the river, is weak. There is a parallel between the social approach to gender and that to the river.

Publications: Saini Kalawati, Archa Gulati, Aayushi Chawala, Sangeeta, Garima, Sandhaya Bhatiya, “More Miles on Yamuna” Published in Proceeding of National Conference on Striving & Thriving Towards Diffusion of Student-Driven Research in Science and Technology for Inspired Learning , 16-17 Oct., 2014, pp80-87, ISBN 978-81-7273-958-4

MH205- Disaster Preparedness: Developing a Strategy for Vulnerability Reduction through Information, Education and Communication

Brief description

Disaster Preparedness is essential in reducing the risk that the community faces from natural and manmade disasters. This project deals with disaster preparedness at the institutional level. The project aims at building capacity to cope with disasters at institutional level by using IEC strategies, for which following objectives were taken:

- Analyze the physical and social vulnerability in institutions.
- Develop a strategy for vulnerability reduction through IEC.
- Disseminate information to the community through interface workshops.
- Create a spatial and non-spatial database for emergency planning at Miranda House.
- Design a disaster emergency evacuation plan for Miranda House

Significant outcomes

1. Preparing an Emergency kit: A ready to use and handy kit was prepared that can be carried easily, especially if one has to leave the house/ premises hurriedly during emergencies.
2. Emergency Map: A detailed evacuation plan was prepared for the college campus taking into account exit points and classroom capacities.
3. Mock Drill: The members of innovation project in collaboration with Delhi Disaster Management Authority (DDMA) organized a fire evacuation mock drill on 15th October, 2014 which emerged as a great winner as it helped in getting hundred per cent participation from the college community. Observing the outcomes of the project, the National Disaster Response Forces have extended a partnership to replicate the model in malls and other institutions.

MH206- Nanoparticles And Plant Systems

Brief description

Nanoparticles (NPs) can enter and be transported within the cell. By virtue of their minute size, they may alter the responses of the living organisms. The study was undertaken to ascertain the effect of SiO2 nanoparticles on the seed germination and overall seedling growth of three important plants viz. Sorghum bicolor (jowar), a monocot belonging to the cereal family, Poaceae, a legume *Vigna radiata* (mung bean), a dicot belonging to the family Fabaceae and *Polypleurum stylosum*, a unique dicot belonging to the family Podostemaceae under in vitro conditions. The objective was to correlate the results with in silico studies on nanoparticles. This will enable us to understand the phytoregulatory profile of the studied nanoparticles. Experiments were carried out to study the effect two more nanoparticles viz. silver and gold on the above mentioned plants.

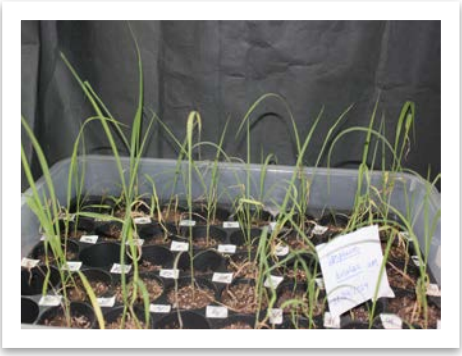


Figure-In vitro raised plantlets transferred to soil.

Significant outcomes

Nanotechnology has a potential in the agriculture sector. But the issue whether plant growth is increased or decreased remains unresolved. This research has shown an enhanced percent seed germination as well as shoot and root length with addition of NPs in the nutrient culture medium. This may be used to increase crop production and therefore in the future, the nanocomposites can possibly be used as 'designer fertilizers'.
The present study shows that NPs can have positive or negative effect on the plant growth. Higher concentrations, in general inhibit the response whereas lower levels of NPs promote the overall growth of seedlings in terms of percent seed germination, average shoot and root length and also the number of root laterals. Loss of green colour of leaves is another effect of NPs observed in the present study.

Publications: One paper published in journal; two books; eight papers as referred articles in conference/ symposium.

MH207- Eureka! My Lab

Brief description

Schools often do not have the provision for good middle and high school level science laboratories especially those run by city municipalities and in smaller towns and areas. The aim of the project is to design, develop and disseminate innovative active learning materials for labs in interdisciplinary contexts. For this purpose, middle and high school level experiments were performed in the college laboratories to standardise and improve reproducibility. These included completely self-designed experiments as well as experiments available on the Internet and in science books and journals, suitably modified and improved. In order to test the materials developed, outreach activities in the form of workshops for school students were planned so that the resource material could be iteratively refined using the feedback from students and teachers.

Significant outcomes

The lab-in-the-box kit designed under this project would make it possible for students to experience the joy of science and its practical uses and applications even in remote areas where there is little to no access to laboratories. It would be low cost but robust. Kits were prepared with equipment as per categories. For each experiment, an attractive card containing the essential information (flash card) was also prepared for inclusion in the relevant kit.

Although the existing kits cover a single area of science but in Miranda House, kits in Physics, Chemistry and Biology are being developed in parallel.

Workshops conducted at DAV School, Pitampura with students and teachers received encouraging feedback.

The resource material developed would be helpful for both school laboratories and students who do not have access to laboratories.

MNC201- People Participation- Political Communication Interface Mapping Socio-Economic Trajectory Of Voters In Delhi

Brief description

In India people applaud the continuation of democracy for the last six decades but this expression is characterized by pervasive dissatisfaction with the one-way apparatus of government. All communication that flows from the power corridors often appears to be partisan and is majorly a formal informative exercise rather than an attempt towards making democracy more participatory. Though the government, political parties, media, business, civil society and other groups make all possible efforts to address people in an attempt to influence their participation in the political system, the nature and extent of people's response to various types of communication is, however, at best a wild guess. This area seems to be still under-researched and no systematic study has been made to understand such behavioral response of the people.

Significant outcomes

Media is the major source of political communication irrespective of socio – economic background of the people in Delhi.
Posters, hoardings and wall writing, pamphlets etc. on which political parties spend crores of rupees have little to no impact on the educated people. These information sources stand at a third place after media and friends.
Political activists fail to perform the role of political communicators and as a source of political information stand at fourth place after media, friends and posters, hoardings, etc.
As against the commonly held opinion, the lack of public participation in Delhi people is not because of lack of interest or time, but because of:

- Insufficient information about participatory avenues.
- Lack of organized efforts by the govt. or parties to enlist participation.
- Ineffective or meaningless communication.

MNC202- Application Of Solar Energy Based Catalytic Technologies And Their Comparative Study For Improvement Of Water Quality Of Yamuna River And Analysis Of Percentage Transparency And Chemical Pollution Of Yamuna Water

Brief description

The main motivation of the project was to utilize the vast renewable, eco-friendly and non-polluting source of energy for treatment of wastewater of the Yamuna river. Water samples of Yamuna were periodically collected from different places in Delhi. The focus was on the improvement of the quality of collected water samples after treating with different photo catalyst (e.g., TiO2), under solar radiation. In that process, firstly, the study continuously observed the transparency of collected water samples before catalytic treatment, during the catalytic process and after catalytic treatment and finally compared the transparency of untreated and treated water. Secondly, it also analyzed the presence of different ions like; Chloride, Iodide, Sulphate, Nitrate and Bromide etc., in the collected water samples before and after treatment.

Significant outcomes

The study showed that the transparency of the water after the catalytic treatment increased enormously from 10% (in untreated water) to 90-99%. Nitrate, Sulphate, halogens like chloride, iodide etc. present in untreated sample were absent in treated sample.

Moreover, this solar catalytic technology uses renewable source of energy for catalysis which will set a milestone technology in this field because of little financial requirement. The same catalyst can be used again several times.

The treated water can be used again for irrigation, industry and household purposes.

MNC (E) 201- EWS Reservation in Public Schools in Delhi: Problems and Challenges

Brief description

One of the great challenges that Indian democratic state has been facing since independence is illiteracy. Despite all efforts made by both central and state governments, more than 30 % population is still illiterate.
The Rights of Children to Free and Compulsory Education Act, 2009 was a historical step in making education universal and inclusive. One of the noble features of this Act is the 25 % reservation of seats in private unaided schools (Public Schools) for the economically wearer sections (EWS) through state funding. However the implementation of this provision has raised many challenges. Therefore, this project attempts to disclose the problems and challenges faced by this section of society and give suitable suggestions for the same.

Significant outcomes

The project revealed some truth that was not known to the society and administration. The problems related to developing an inclusive policy of education have been partly identified. The common men of India including the socially and economically backward sections feel that quality of education in public/private schools is better than that of government schools. Therefore people belonging to EWS are eager to send their children to these schools at any cost. The study also explored that the lower caste and class people are taking little advantage of this provision.
the study finds that the negative and elitist approach of public/private school and half-hearted attempt of the government agencies act as a major obstacle in achieving the mission of the Act. Most importantly the people of upper caste and economically better up among the EWS are taking the advantages of this provision. Thus, efforts to promote machinery to ensure accountability of such schools, to spread awareness regarding this provision among EWS, and to evolve collective actions of government, school administration and NGOs will make the mission accomplished.

PGDAV (Eve) 201- Spending and Saving Habits of Undergraduate Students –A Study of Universities in NCR

Brief description

Today, the lifestyles of undergraduate students in the colleges and universities have been changed drastically due to various reasons. It is fact that spending and saving habits of students has also been changed in the recent years owing to better financial health of the economy, increase in pocket money, rise in the number of teenagers, an increase in the number of nuclear families, awareness towards rituals and traditions, plethora of use of information communication and technology and westernization in Indian culture. The objectives of the study are to examine the habit of spending segment wise of undergraduate students; to study of influencer of purchase decision in purchase habit; to analysis the instruments of saving used; to study the gender wise spending and saving habits in universities of NCR and to study universities wise spending and saving habits among the students.

Significant outcomes

The main finding of the study is as follows:

- More than 80 per cent students got the pocket money as a source of income. On the other hand, 12.5 percent students received the scholarships, which they treat as a source of income
- Only 113 (18.8 percent) students had engaged themselves in different kinds of part-time jobs.
- The majority of students are spenders (30.8 per cent) in comparison to savers (22.8 per cent). Students spend their money on food and beverages, followed by shopping.
- Purchase decisions of undergraduate students are influenced by their friends (53.2 per cent) followed by their parents (41.2 per cent).

PGDAV (Eve) 202- The Social Auditing Of Widow Pension Scheme In North West District Of Delhi

Brief description

The project has attempted to study and understand the lives of the marginal section of widows in our society. In spite of government's schemes to help and support these women, they are often left struggling to get the benefit due to complicated technical processed and corruption within the system. Some facts dictate as follows:

•35% of the widows (interviewed) lived in rented accommodation which does not have basic facilities like toilet, electricity and running water.

•More than 46% of widows are illiterate.

•Lack of vocational training and work opportunity for those who acquire skills and wanted to work.

• There is no attempt to organize these at SHG (Self Help Group).

Significant outcomes

In light of the present situation certain suggestions have come up:

1. At the ground level, limited to a specific area includes nukkad natak, hoardings, pamphlets, awaking the whole society about this schemes and their rights, their powers to file RITS, going to MLA's and MP's, and approaching the local NGOs with the ground data.
2. The big level needs participation of the people at large as it is not area specific. It includes organizing seminars, printing media both newspaper and magazines showing the factual data, television, radio, national NGOs, social leaders.

Apart from the society, government, both at the election, through their manifestos and rallies and during their tenure through various kinds of advertisements like banners, hoardings, electronic and print media try to make the respective folk aware . These days, NGOs and several social groups too are coming forward to make widows aware about their welfare programmes.

PGDAV (Eve) 203- Understanding The Themes In The Poetry Of The Weavers From Different Parts Of India And The Sociological Conditions That Dictate Such Traditions

Brief description

The study tried to comprehensibly understand and document the poetry of weavers from different parts of India especially Delhi, U.P. Haryana, Himachal Pradesh and Madhya Pradesh. The objectives of the project were : to study the significance of poems in their work and daily life, the motivation behind singing while weaving for different occasion like birth, marriages and death etc. , to study the dialectical variations, thematic areas, pattern and rhythm of these songs.
The focus was on the theme in their songs, their sociological conditions and their traditions. Regional variations were found in the themes of their songs ranging from celebration of nature and religion as well to the general mood of the local folk.

Significant outcomes

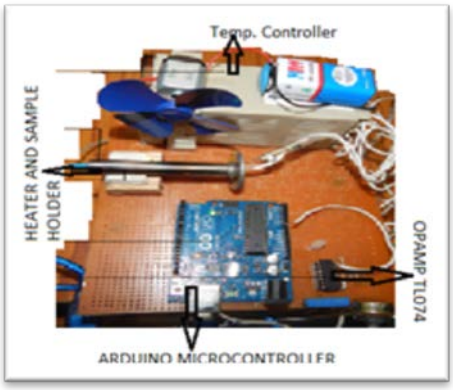
The study finds that most weavers have stopped singing their traditional songs due to the emergence of information revolution by coming of radio, TV, Cellphones. It is also found that there is no relation between the song and the occasion for which they are weaving. The linkage between the work and the singing has lost.
Songs of weavers from Uttar Pradesh mostly reflect their poverty, their problems and issues.. These people expect some sort of support from their government but unfortunately it is rarely ever met. The state governments and the Union Government need to take some necessary steps to support them by providing them with platforms for marketing and selling their products at appropriate prices in the global market. This can also lead possible restoration of their heritage and culture.

RD202- A Study Of Atmospheric Gas Pollution & Hazards Of Ultraviolet Radiation: Their Detection By Synthesis And Characterization Of ZnO Nanorods Based Nanosensors.

Brief description

The project holds the following objectives:

- To fabricate highly selective, sensitive & portable sensors for the detection of Ethanol, Acetone, CO2 and NH3 and to collaborate with Fuji Electric Ltd., Japan & R.J. Electricals (Tinsel.co.in).
- To minimize the power consumption ~ 1W.
- To have a digital display output and to be able to detect very low ppm level (~ 0.1ppm)
- To detect relative concentrations of polluting gases & UV Radiation in 2 areas of Delhi : (a) Najafgarh Nullah (b) Palam



Significant outcomes

1. The sensor was able to detect various gases including NH3, Ethanol, H2O, and CO2. The sensitivity graphs for the same for Ammonia and carbon dioxide. The ZnO showed different sensitivity towards different gases and maximum sensitivity was observed for NH3 & CO2 amongst the aforesaid gases
2. Well aligned & vertical ZnO nanorods grew with different aspect Ratio depending on growth time and concentration. Photoluminescence studies showed the presence of defect states (O2 vacancies and Zinc interstitials) whose relative intensities decreased w.r.t. near band emissions, with increase in growth time.
3. Two types of sensors have been fabricated based on AC and DC sources respectively. The DC sensor has the advantage of being Cordless & operating on Low Voltage (12-24V) and hence quite portable.

RD203- To Study Presence Of The Toxic Chemicals In Gutter Oil Spectroscopic Methods.

Brief description

Gutter oil is the oil extracted from drains or sewage systems. It is widely used as a cheaper alternative for refine cooking oils by small street food vendors. In recent years, increasing attention has been paid to oils consumed by humans. Frying oil, used continuously or repeatedly at high temperatures, is subject to a series of degradation reactions and formation of a variety of decomposition compounds which affects the quality of the frying oil and the flavor and nutritional value of the fried food. General health hazards associated with the consumption of such oils lead to various health issues such as liver cancer, diarrhea, abdominal pain etc. The use of reused oil is increasing mainly for profit making. The study has adopted the UV-Visible spectroscopy technique to study these oil samples.

Significant outcomes

The research work examined the effect of re-heating the refined oils that commonly used in cooking and frying. The results deduced from this research confirmed that cooking at high temperatures will alter the properties of the oils, if not damaged them. The UV spectra of the thermally treated oils changed dramatically when compared with the raw oils.
The recommendation drawn from this study is that; frying oils must not be used more than one time, since their properties will be changed. Repetition of re-heating oils to their boiling temperatures will damage them. The chemical structures will be distorted implying a possibility of changing the oils into harmful substances. When food is immersed in hot oil in the presence of O2, the oil is exposed to three agents that cause changes in its composition: water from the food (which causes hydrolytic changes), oxygen (that gets in contact with the oil and causes oxidative changes from the surface to inside of the food) and finally, the high temperatures (which causes thermal changes).

RLA201- Seismic Vulnerability Assessment Of East Delhi And Mitigation Model Based On Fuzzy Logic

Brief description

Delhi being closer to the Himalayas is tectonically very active and unpredictable to seismic response. Due to the rapid urbanization, the damage potential has increased exponentially. This calls for earthquake risk reduction and hazard mitigation planning. Visualizing the earthquake scenario and its possible after effects is vital for the purpose of emergency planning and preparedness. A basal map of the area under study based on available information about the topography, Soil type, ground water conditions and seismic micro zonation was generated and converted into a digitized form with the help of application software. Data pertaining to population and its distribution, buildings and infrastructures, lifeline facilities was also acquired. The objective of the study was to assess all risks due to earthquakes and develop a simulation model for variant seismic situations (ground shaking intensity, such as PGA and MMI Intensity) and time of occurrence.

Significant outcomes

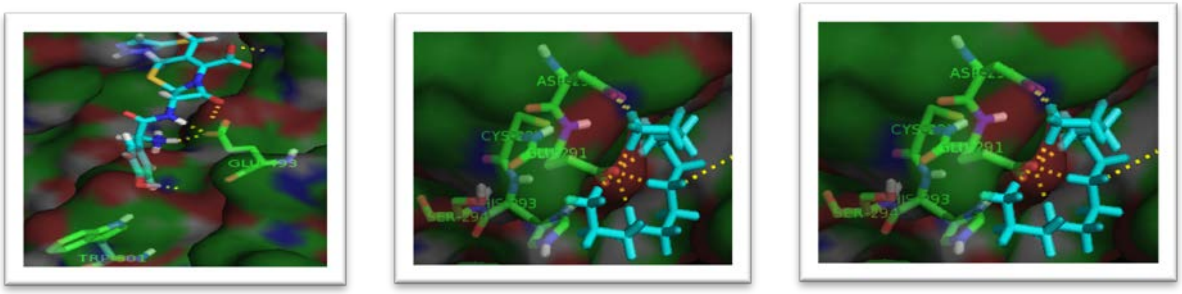
Real time simulation model to assess the damage due to earthquakes and possible mitigation plan has been developed by overlying map of different risk involved generated through ArcGIS as well as by NIDM and other government agencies. The raster maps were generated by dividing the whole areas into 480 section of 1 sq. kilometre each. The map so generated was digitized using colour temperature scale. The information was utilized to build fuzzy membership function to identify hot/cold regions and suggest possible escape routes to minimise the loss life under different scenarios.

Publications: Two papers

RLA202- Structure Based Virtual Screening Of Novel Inhibitors Of Hepatitis C Virus.

Brief description

Project was undertaken in order to find novel inhibitory compounds active against HCV by virtual screening. HCV infection is one of the most dreaded viral diseases infecting approximately 3% of world's population and is a leading cause of liver cirrhosis and hepatocellular carcinoma, in the absence of effective therapeutic agents and vaccine. The project investigated a detailed and comprehensive review of literature to understand Hepatitis C viral pathogenesis. The objective of the study was the determination of best possible 3D structural models of target proteins. Target sites were prepared for docking and docked with library of FDA approved drugs from ZINC.docking.org (Zdd)



Significant outcomes

The study was able to identify molecules with very high binding affinities with important target sites in some of the crucial HCV proteins such as helicase and polymerase. The high binding affinities suggest that these molecules are potential inhibitors as their binding with crucial proteins would disrupt their normal functioning in the viral genome replication.
As the docked molecules are already approved for use as drugs, therefore they can be used in the treatment of HCV patients, after conducting studies on in vivo efficacy of these drugs in patients. Significance of this work lies in the fact that these potential inhibitors are not to be sent for expensive and time consuming toxicological and pharmacological studies.
One of the very interesting molecules, Colestipol was found to bind with multiple sites in more than one HCV proteins with high affinity, making it a lead compound.
Publications: One poster

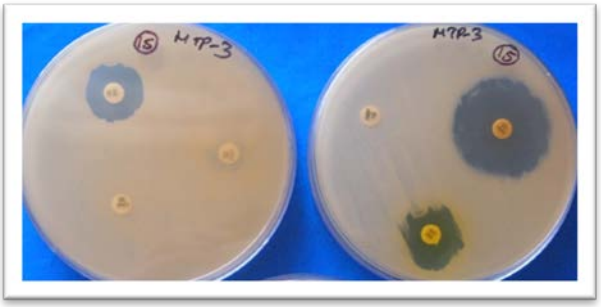
RLA203- To Study The Level Of Antibiotic Resistance In Bacterial Strains Obtained From Waste Water, Treated Water, Ground Water, Surface Water And Drinking Water

Brief description

A major issue in anti-bacterial therapy is the development of antibiotic resistant bacteria (ARB) and multi drug resistant (MDR). This has become a major challenge in developing countries like ours because of several reasons including:

- Rampant use of antibiotics
- Availability of antibiotics – off the shelf, without any prescription
- Non-compliance – incomplete antibiotic treatment course
- Poor hygiene which causes rapid microbial growth and spread of pathogens.

All this has resulted in a situation today, where there is no antibiotic available that is effective for all bacteria. Latest antibiotics also show emergence of bacterial resistance which necessitates the need for a continuous process of seeking, testing, and validating new antibiotics.



Significant Outcomes

MDR was found in drinking samples. In this study, a panel of eight antibiotics belonging to different classes including Amikacin, Cefuroxime, Co-Trimoxazaole, Ampicillin, Nitrofurantoin, Meropenem, Tetracycline and Ofloxacin were used against 16 isolates from each sample.

The work found resistance to Amikacin and Meropenam which are presently used to treat severe infections as a last resort when other drugs fail. Ofloxacin is a second generation broad spectrum fluoroquinolone antibiotic which is known to evolve bacterial resistance fast, but no resistance was found in the samples tested, therefore it can be used for therapy.

Publications: Two posters

RLA204- The Language Of Knowledge: A Comparative Study Of Teaching-Learning Practices In Institutions Of Higher Learning In Delhi

Brief description

Language is a natural gift and important tool in building and sharing knowledge. When it comes to higher education in India, most of learning in terms of books and materials or even classroom lectures as well as most sought after career opportunities are heavily biased in favour of English. In this context, the project explored how this elite preference for English affects the teaching-learning process in higher education. This collaborative effort covered three central universities located in Delhi- Delhi University (3 colleges), Jamia Millia Islamia, IIT Delhi and AIIMS.

Significant outcomes

Findings of the project establish the fact that hegemonic position enjoyed by English as a language of knowledge is causing much alienation amongst a sizeable percentage of students who lack core competencies in English. Lack of quality learning material in other languages or even translated materials along with near absence of provisions like remedial teaching, counseling/mentorship programmes etc. further compound the agony/trauma of such students.

Thus, adoption of an approach which privileges respect for plurality of languages can help stem the rot, a by-product of colonial and neo-colonial legacy and also help produce young women and men possessed with critical consciousness and are socially more responsible and employable.

The team scripted and performed a street play; composed a song that sums up some of the basic issues dealt within the project.

Publications: One paper

RLA205- Impact Assessment of Idol and Religious Waste Immersion in Rivers and Study of Socio-Psychological Factors Behind it:Developing a Recycling Technology

Brief description

In addition to the water pollution caused by industries, religious wastes generated during special festivals like Ganesh Chaturthi, Durga puja or Saraswati puja also add to this problem. Things like flowers, clothes, pigments used for beautification, decorative, ornaments, plaster of Paris, bamboo sticks and various other articles etc., end up in the local water bodies. All these add to pollution of water – not only the surface water but also ground water and ultimately enter into the human system and affect their health in various ways.
Socio-psychology plays a major role behind these activities. The present study aimed at investigating the heavy metal content specifically due to idol immersion of Durga.

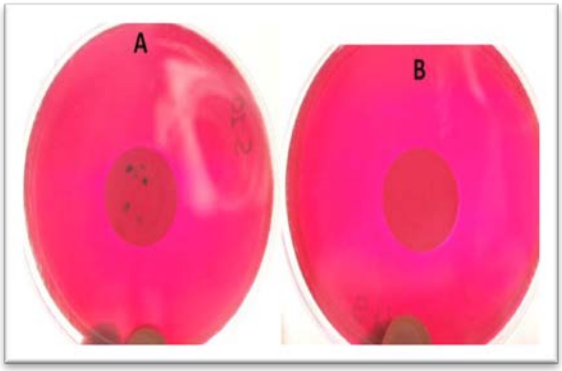
Significant outcomes

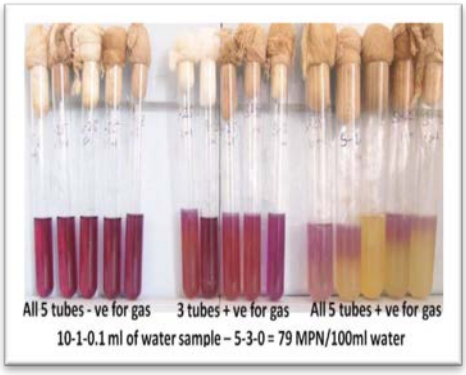
The chemical analysis shows that immersion of idols definitely affects the water quality of the Yamuna adversely. Reduction of heavy metals after the immersions is due to extra water being released. But all these are naturally pushed downstream. So deterioration of the water quality continues through the course of the river. There is general deterioration of the water quality due to other biodegradables and non-biodegradable religious wastes entering into it.
Publications: Two papers

RLA206- Potable Water in Delhi and NCR-Assessment of Quality, Resources and Remediation

Brief description

In Delhi and NCR, water requirement for all sectors like domestic, industrial and irrigation is met from river Yamuna, canals and groundwater. Though the drinking water supply to the inhabitants of NCR has been covered to about 100%, the main source of water remains to be groundwater aquifers whether legal or illegal resulting into receding water levels, increased salinity and poor physico-chemical and microbiological quality. Keeping in view the above issues, this project was envisaged with the objectives to study the water availability to the inhabitants of Delhi and NCR, its safety (potability) and conservation.





Significant outcomes

A total of 69 groundwater samples were collected from NCR and NCT Delhi regions and tested for important chemical and microbiological parameters to determine their potability and type of usage. On the basis of hardness, TDS and conductivity, only 19% of the groundwater samples were found to be fit for drinking, 61% samples could be used only for household purposes and rest were unfit for any kind of use. More than 60 % of samples were classified as Brackish having more than 1000 mg/litre TDS

In all 40% water samples tested were unfit for drinking. Some of the groundwater samples collected from New Palam Vihar, Gurgaon and Uttam Nagar area of Delhi West unexpectedly showed alarming values of TDS, conductivity and total coliforms.

The analysis of water samples from Madanpur Khadar, a government funded settlement colony was shared with an NGO officer of that area who has prepared a case to be presented before Delhi government officials to act upon urgent installation of water treatment plant with piped supply to its inhabitants.

RLA208- Connecting Digital World to Physical World through Social Media

Brief description

The objective was to provide voice raising platform "SUDHAAR" (Mobile app & Web page: *www.sudhaar.org*) for citizens to report civic issues, governments to track, manage, and solve. The app primarily allows citizens of Delhi to raise voices if they come across a potholed road, unattended garbage, water logged streets, traffic jams and anything related to woman safety.
The study of this project also focused towards an App (an application), which targets civic issues and woman safety. Wide access to mobile phones will make it an ideal platform for government and citizen bypassing the need for traditional physical networks for communications and saving the time of both – citizens and public service personnel in both emerging and developed economies. The idea is to make local government bodies (Mohalla Sabha, RWA) more accountable to Social issues which were assumed to be carried out by the state government earlier.

Significant outcomes

- Website: the team launched their own website www.sudhaar.org that included a map in the homepage which will show all user submitted complaints with pin points. It has a blog page as well as feedback form for the user so that the team can share their experience with general public and response to public grievances.
- Android application: launched an android application on Google play store for public use. They have a real time database which will reflect the data on the website so they are using a cloud database in the form of PARSE to store the data. It will provide notification to the users on real time basis.
- Created a Facebook page and twitter account, through which they can exchange their views with the general public and also make them aware about their app and its public use.

RLA(eve)202- A Gendered and Ecological Reading of MGNREGA- Notes From Margin.

Brief description

MGNREGA (Mahatma Gandhi National Rural Employment Guarantee Act) is an instrument to bring reform in rural economy. The primary objective of the scheme is to augment wage employment which is to be done by focusing on strengthening the natural resource management. Addressing the causes of chronic poverty like drought, deforestation, soil erosion can be of great help to encourage sustainable development and environmental progress. The secondary objective of the scheme is to check the 33% participation of women. This can be done by giving equal opportunities to women to work and earn their living. Also the right to get equitable amount for the work being done would be a praiseworthy measure in making women economically independent. It is fundamentally a multi-purpose programme aimed at helping labourers with fixed wages and also enhances self-esteem in an individual.

Significant outcomes

MGNREGA is inclusive of many loopholes and implementation problems and there have been talks of the budget being reduced. MGNREGA is the need of the hour and needs a qualitative improvisation in its implementation, effectiveness and the perpetuated inequality in wages irrespective of caste, class and gender.
Skill training and learning should be provided under MGNREGA, so that people can engage themselves on small scale-jobs unlike depending on MGNREGA soul-heartedly. Stitching, Weaving, Beautician courses can serve the purpose of making people self-dependent.
Linking each College or any other Educational institution to a village to make the marginalized aware of their rights and the real meaning of the Act would then be effective for them. Field experience should become mandatory for the qualification of the job. This could also work well to sensitize the students.

RNC201- Center for Ethics and Values, Learning values through community service.

Brief description

'Students and community are complementary to each other as they are mutually constituted – that is, there is a reciprocal relationship between them'. The assumptions made were: 1) if students add ethical values to their pursuit, the community around them will automatically be transformed. 2) Students being an integral part of the community, service learning would add value to both of them. Students' values and integrity can shape society – also the act of learning and well-being of students is dependent on the community and the vice versa. 3) Integrity of students as well as people in the community is vital for welfare or wellbeing of both. Hence, to promote this factor, it is important to know its status in the society. In terms of learning values through service, it was learnt that until you develop a feeling of ownership of a particular thing, community or place, you can't develop a sense of belongingness, responsibility or commitment towards it.

Significant outcomes

It was found that learning values through community service embeds the student, individually and/or in teams, into a credit-bearing learning environment where they have community exposure and earning of appreciation for their project work. The project team believes that integration of service-learning projects into curriculum is mutually beneficial for the students and the community group involved. Such benefits in terms of exposure and understanding are difficult to achieve by any other method.
Seven values that are attainable through community-service are: honesty and integrity; boldness and confidence; trust and faith; responsible freedom and citizenship; team spirit and solidarity; modesty in lifestyle; and community feeling.
It is by offering the community with solutions that fit their needs, and delivering the results community expects that one can nurture relationships with the community.

RNC202- Awareness of consumer rights in contemporary India "A comparative study of backward areas and metropolitan cities"

Brief description

The Consumer Protection Act (1986) has been held up as the most progressive legislation which seeks to uphold consumer rights through the provision of an easily-accessible quasi-judicial redressal mechanism. However laws can be effective only when complemented by consumers' awareness of their rights and responsibilities. Consumer education has therefore become an important part of the national development agenda. The objectives of this project are –

a) To assess consumer awareness on the basis of geographical location and occupational differentiation.

b) To study the role of consumer courts, NGOs and research institutions in consumer protection and welfare.

c) To examine consumer interest in knowledge of their rights and responsibilities.

Significant outcomes

The study revealed a metropolitan-backward divide in consumer awareness. Among occupational categories, farmers appear to have the least awareness. Most pertinently, awareness of the right to consumer education is uniformly low across sectors and occupations. This is crucial as it empowers the consumer to assert all other rights. Sellers continue, with impunity, to deny consumers' the right to be informed. Cumbersome court procedures discourage attempts at judicial redressal of grievances.

Greater consumer protection in the emerging rural market is therefore imperative. Better enforcement of existing laws, an overhaul of the redressal mechanism and sustained formal and informal consumer education strategies including awareness-raising campaigns, through TV and public gatherings, would be steps in the right direction.

RNC203- Comparison of methodology of Dabbawala of Mumbai with Courier Company

Brief description

The project tried to analyze the working of these organizations keeping in mind the expectations of the customers and the employees of these organizations. The project throws light on how these organizations differ in their time management, revenue generation, cost management and the future these organizations hold. Moreover, the project lays the foundation for the young entrepreneurs to spring. Incorporating the positive attributes of both Mumbai Dabbawalas and Courier companies, one can devise a new service-delivery system for catering to the needs of the society with optimum efficiency.

Significant outcomes

• Research found that the homemade food is in great demand in working class of Delhi. Delhi does not have an efficient train system like Mumbai but use of other means of transport i.e. metro and DTC buses can be adopted for the dabba system in Delhi.
• If aviation ministry allows the use of commercial drone-system, then Courier Service Company can use it as a faster delivery system.
Looking at the current position of the Dabbawalas, they have to pay attention towards their advertisement to increase the number of customers. Moreover, the dabba can be made as per the choice of the receiver and they can stay upbeat to the rising trend of ready-to-eat lunch. Also, they have restricted themselves only to Mumbai despite having a tremendous scope in cities like Delhi. Gradually expanding their work, the Dabbawalas can emerge as an international organization.
The Courier Companies have a lesson to learn from Dabbawalas regarding their strategy to charge other companies for advertising them. Making use of this concept they can at least nullify their revenue lost in advertising. Also, they have to pay attention towards efficiency. Drones and Geo-tagging can be used to reduce delays in deliveries.

RC201- Exploring The Use Of Bio-Catalysis In Laboratory Chemical Reactions: A Green Chemistry Approach

Brief description

Biocatalysis is one of the pillars of Green Technology which builds a bridge between chemistry, biochemistry and other life science branches. The properties of enzymes are being exploited as biocatalyst for achieving specificities like chemo-, stereo, or region-selectivity along with accelerating the rate of reaction in a cleaner and safer way, following green chemistry principles. Biocatalysis involves enzymes (extracted/ isolated from plants) which circumvent protection & deprotection of functional groups leading to 'atom economy' and 'step economy'. Such specific physical and chemical properties of enzymes make them a very attractive target for exploration in chemistry laboratories. The most exploited class of enzymes as biocatalysts include Lipases, Oxido-reductases, and Hydrolases which in application, almost cover all major industries like textile, detergent, animal feed etc.

Significant outcomes

Various commercially available sources were screened for various enzymes performing peroxidase, catalase, lipase, and esterase assays and further used for studying kinetics.
The effects of temperature, concentration, pH on the enzyme activities obtained from different sources were studied in detail. The Michaelis-Menten kinetics was followed by the peroxidase enzymes extracted from turnip and cabbage. The Km value evaluated from line Weaver-Burke plots is 0.017M (for turnip) and 0.001M (for cabbage). The optimum pH for enzyme assay (peroxidase) was between 6.7-7 (for turnip) and 7.4 (for cabbage).
This basic information related to the biocatalysts project might further facilitate our knowledge of getting the solution conditions standardized for carrying out the chemical reactions more specifically and selectively for getting the desired products.

RC202- Comparative Codon And Amino Acid Usage Biasness Within The Sequenced Genomes Of Bacterial Phylum Firmicutes

Brief description

The project aimed to understand the codon and amino acid usage of an important bacterial phylum Firmicutes using data from complete genome sequences. The Firmicutes are Gram-positive bacteria with a low GC content (less than 50%). Many Firmicutes produce endospores, which can survive extreme conditions and are resistant to desiccation. Many known members of Firmicutes are known for their pathogenicity and economic importance. Firmicutes are important candidates to study the bias associated with the codon and amino acid usage within their genomes. The study investigated coding sequences of 362 Firmicutes genomes to understand the genome-wide pattern of codon usage bias and role of habitat and lifestyle in shaping this codon usage bias.

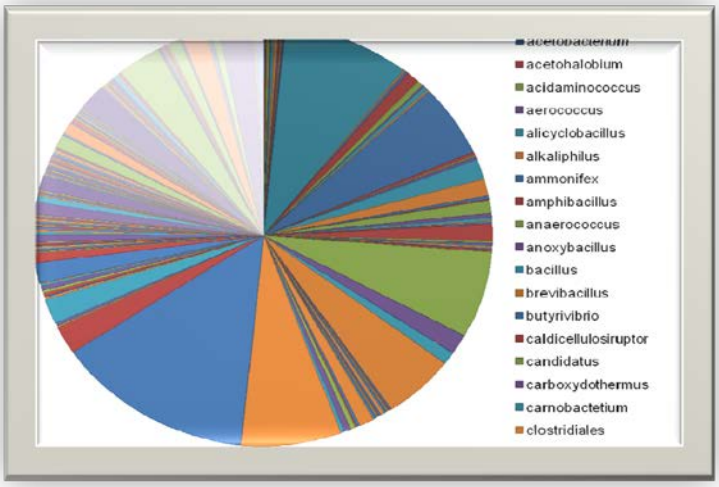


Fig. 1: Representation of various sequenced genomes of phylum Firmicutes under various genera.

Significant outcomes

The project included the study of 362 complete genomes belonging to the phylum Firmicutes. These genomes were downloaded and categorized according to the genera sequenced. It was found that in Firmicutes:

1. A and U-ending codons were preferred over G and C-ending codons
2. The most frequent codon contexts found were AAA-GAA, GAA-GAA and AAA-GAU, 3) direct relationship of GC content with the usage of specific amino acids like alanine, proline, glycine, valine and leucine.
3. The habit and habitat influences the codon usage. It was found that non-pathogenic Firmicutes use more repository of codon as compared to pathogenic ones.

RC203- The Profile of Financial Inclusion among the Rural Households in South Haryana

Brief description

Since the Eleventh Five Year Plan, inclusive growth has been the priority of the government. As a part of Inclusive Development Agenda, the study of financial inclusion particularly inclusion of rural population in a state like Haryana-which enjoys the status of one of the most developed and growing state in terms of per capita income, industrial output, consumption pattern and urbanization- becomes crucial and specifically if talking of southern Haryana where, despite being industrially sound, seems to be backward as compared to northern part in terms of the variables mentioned above. Geographically Haryana constitutes four divisions, twenty tree districts and more than ninety blocks and southern part includes bigger districts like Bhiwani, Mahendergarh and Rewari.

Significant outcomes

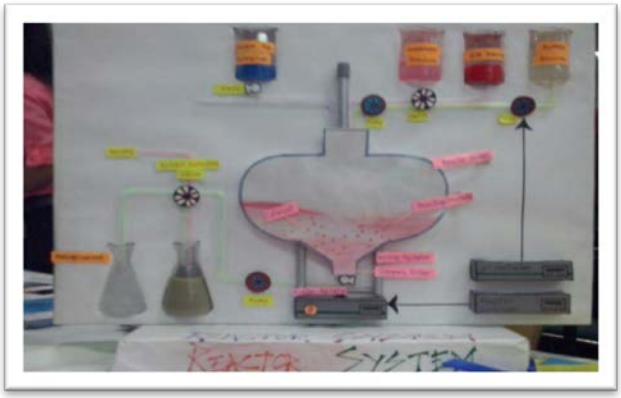
The financial inclusion indices of all the districts had shown negative results and it was concluded that the rural household population of South Haryana was still not included in financial inclusion and a lot of work was required to be done in this direction. The project tried to sensitize the rural population of south Haryana towards their awareness of financial inclusion. Most of the people were not aware of the policies of the government for getting financial accessibility and affordability of financial products and were still dependent on unorganized financial assistance from the local lenders who charged heavy hidden cost of interest. There needs a lot of work to be done in terms of Banks Penetration, Bank Services and Bank Utilisation and this is possible only when public sector banks and private sector banks are allowed to operate in rural areas. The awareness campaign needs to be more accelerated and asset creation be made top priority.

In view of this, it is suggested that the government must augment the campaign for opening the accounts in these banks and also connect the schemes under their ambit. The inclusion would be intense provided there is a linkage between banks-co-operative banks-micro financing institutions-post offices and the SHGs.

RC204- Study and Removal of the Chemical Pollutants In Waters of Yamuna & Industrial Effluents by Using Sustainable and Economically Viable Method

Brief description

The aim of this project proposal was to study the various chemical pollutants present in the Yamuna and to study the economic factors that cause this continuing pollution. The aim was at designing, synthesizing & characterizing an economically viable catalytic system which not only overcomes the traditional drawbacks of homogeneous catalyst, but in turn will facilitate the degradation of organic pollutants (especially azo dyes) present in waters of the Yamuna and industrial effluents, and has a good prospect for large scale application.
In this context, oxidative degradation of chemical pollutants can be performed using environmentally benign oxidant (hydrogen peroxide), in the presence of reusable heterogeneous catalyst under mild conditions. This is a facile, cost-effective, and environmentally friendly procedure that avoids the use of expensive activators and excess of reagents.



Significant outcomes

The study had worked on an environmentally benign method for oxidative degradation of azo dyes by H2O2 at room temperature using silica supported Nickel phthalocyanine catalyst, NiTSPc@APTES@SiO2. The most important factors influencing the catalytic degradation of azo dyes were the catalyst loading, H2O2 dosage. The advantages of this method include green approach, simplicity, economic viability, easy recovery and recyclability of the catalyst, and no metal sludge formation unlike the other known homogeneous catalytic methods.
Also, the study had optimized various reaction conditions: those that allow for maximum removal of dye using lesser amounts of catalyst and oxidant, and those requisite for complete removal of dyestuffs in short duration of time, following green protocol.
The utilization of this method demonstrated the considerable potential for an effective degradation of organic pollutants in large scale at room temperature.

RC205- An Interdisciplinary Study Of High Pollution In Indian Context

Brief description

The main objective of the project was to study light pollution, about which common people rarely know, in the country especially at Delhi-NCR. The light pollution is estimated through 'Star Counts', a tool widely used globally, using guidelines set by International Meteor Organisation. The ground based direct count and DSLR-Camera images are analysed and compared with global satellite measurement of light pollution. After learning about constellations, star count, limiting magnitude, etc. through workshops at Nehru Planetarium, we are analyzing data from Delhi and other less polluted places through MATLAB and other software. Effects that light pollution has on human are also being studied.

Significant outcomes

The project looked at the possibility of correlating space based data modeled to represent light pollution on the ground, with actual ground based observations which become possible with no sophisticated tools and analysis involved. The method allows for widespread observations as citizen science and also allows for simple techniques to measure temporal changes in light pollution patterns. Interdisciplinary correlation studies of light pollution measures across the country show some expected correlations of light pollution with demographic data, while also showing up a few complex patterns outside these simple correlations.

The project also undertook a literature survey of the study of the effects of light pollution on nocturnal wildlife present in urban and semi urban areas. Effects on non-nocturnal life disturbed by city light pollution were qualitatively studied. More quantitative studies of disturbances in urban bird life, both nocturnal and diurnal; and light pollution's effects on human beings with special reference to ophthalmic and behavioral one are in progress.

Publications: One magazine

RC206- Challenges In Valuing Intellectual Property: An Empirical Study Of Indian MSMEs

Brief description

The study focused primarily on the valuation aspects of IP in the context of Indian MSMEs. As the valuation of IP is linked closely to 'IP protection' and 'commercial exploitation' of IP; the study also gives due consideration to these two aspects. Accordingly, the study first focuses towards the strategic and economic effects of IPRs by exploring as to why, or why not, do the MSMEs acquire and protect IP. The study examined the reasons behind poor acquisition and protection of IP among Indian MSMEs. Secondly, the study explored various scenarios where IP valuation is required for MSMEs and the important issues commonly faced by them in this regard. Thirdly, the study reviewed various approaches to the IP valuation and also evaluates prevalent tools of IP valuation methodology: both qualitative and quantitative. Finally, the study seeks to suggest a suitable methodology of IP valuation for the Indian MSMEs.

COLUMN

Ignoring a vital asset

Manifold benefits of IP protection and valuation are largely under-appreciated in India

Indian MSMEs are at a particular disadvantage, as they lack the knowledge, expertise, or resources to manage their IP and prevent the theft of their ideas and products. Some find it difficult even to identify and describe their IP assets

Significant outcomes

The study administered the survey of 120 Indian MSMEs selected from Delhi (NCR), Haryana and Uttarakhand. It has come up with some exciting findings. It was found that while IP protection plays a critical role in the growth of Indian business sector, the MSMEs usually lack understanding how IPRs drives competitive advantage. The Indian MSMEs are at a particular disadvantage because they lack the knowledge, expertise, and/or resources necessary to manage their IP and prevent the theft of their ideas and products. Most Indian MSMEs are unaware about the concept of IP, their infringement and legislations to protect IP. Some of them find it difficult even to identify and describe their IP assets. Further, many Indian MSMEs do not apply for IP protection due to high capital requirements.

Publications: One article

Can be accessed at: http://epaper.financialexpress.com/388762/Indian-Express/05-December-2014#page/13/2

SRCA201- Effect Of Anaemia On Academic Performance Of Under Graduate Students Of East Delhi Colleges

Brief description

Worldwide, iron-deficiency anemia is a significant problem especially in developing countries. Iron deficiency anemia is defined as having a blood hemoglobin level below standard as prescribed by WHO which is 12.3g/dL. There is strong evidence that iron deficiency anemia is associated with poorer performance on development ratings in infants and with lower scores on cognitive functions tests in children. However most of these studies have excluded young adults in the tertiary institutions.
This study was therefore intended to evaluate the effect of anemia on the academic performance of undergraduate students in Delhi of East Delhi colleges. Camps were organized in East Delhi colleges. Total 454 students (age group of 17-20 years) registered which included133 males and 321 females.
Other objectives of the project were:

- To sensitize and create awareness about anaemia on the academic performance of college students.
- To correlate the prevalence of anaemia with the economic status.

Significant outcomes

1. As per the WHO standards, the average hemoglobin for a healthy human being is prescribed to be 12.3gm/dL. The data collected showed average hemoglobin of 13.27gm/dL. It was proved statistically that the population from which the sample was taken had an average hemoglobin level of more than 12.3gm/dL.
2. For female population, the sample average was estimated to be 12.61gm/dL.
3. Statistical analysis of data collected concluded that in the age group of 17- 20 years, the academic performance is independent of the prevalence/absence of anemia.
4. Further test concluded that anemia is gender specific.

Publications: A research paper titled 'Effect of anemia on academic performance of undergraduate students' based on the half yearly analysis during the National Conference on 'Striving and Thriving Towards Diffusion Of Student-Driven Research In Science and Technology for Inspired Learning' organized by Department of Electronics, held in Maharaja Agrasen College, University of Delhi.

SRCA202- Mutation Analysis Of PPARγ, ABCC8, KCNJ11, And CALPN10 Genes In Type 2 Diabetes Patients In India

Brief description

Several studies have revealed that the first degree relatives of individuals with type 2 diabetes (T2D) have a significantly higher incidence for T2D. Further, concordance rates for monozygotic twins, ranges from 60-90%; much higher than those for dizygotic twins. These studies are indicative of a genetic basis in incidence and manifestation of T2D. Candidate genes for the same are selected on the basis of their involvement in pancreatic β cell function, insulin action / glucose metabolism, or other metabolic conditions that increase T2D risk (e.g., energy intake / expenditure, lipid metabolism). Till date, more than 50 candidate genes for T2D have been studied in various populations worldwide. However, results for essentially all candidate genes have been conflicting. Possible explanations for the divergent findings include small sample sizes, differences in T2D susceptibility across ethnic groups, variation in environmental exposures, and gene-environmental interactions. Present study would focus on ascertaining the mutational status of few of the candidate genes like PPARγ, ABCC8, KCNJ11, and CALPN10 in the Indian population.

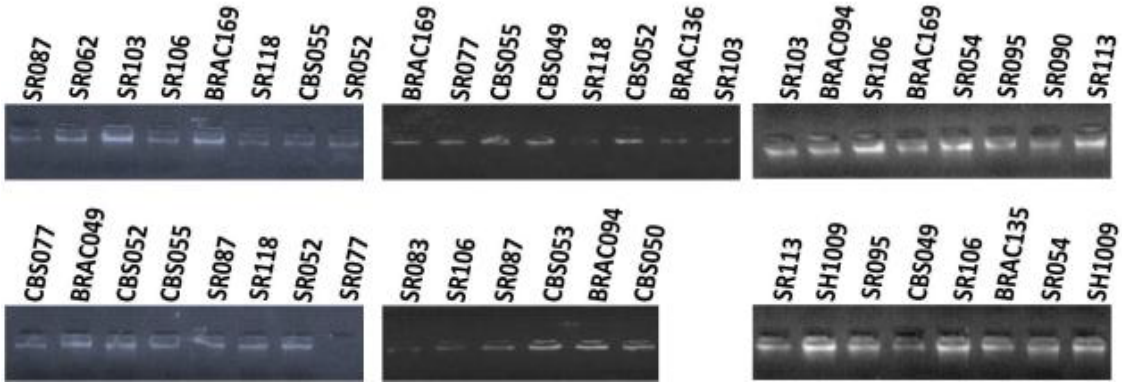


Figure: Representative gel pictures of isolation of genomic DNA from samples. The isolation was done in duplicates and both the sets were checked by agarose gel electrophoresis, affirming the successful isolation as well as intactness of the isolated DNA.

Significant outcomes

Three candidate genes from Indian population were looked into and assessed the relative risk for polymorphism reported in other populations. The relative risk observed for $PPAR_{\gamma}$ and CALPN10 genes were in the same range as observed globally. However, for KCNJ11, it was enhanced two-fold with reported values for American and European Populations.
The fact that KCNJ11 gene associated with regulation of secretion of insulin and glucagon is suggestive of the metabolic aspect associated with T2D affected people in India. Possible explanations for divergent findings include small sample sizes, differences in T2D susceptibility across ethnic groups, variation in environmental exposures, and gene-environmental interactions. These conflicting results demand a large scale population study.

SRCA203- Development Of E-resource On Standard Procedure Of Operation And Applications Of Important Electronic Devices Used By Undergraduate Science Students

Brief description

The project is developing a complete e-module for understanding the operation of most important electronic devices and how to use them for performing various experiments. The module would be self-sufficient containing entire information in the form of presentations, laboratory manuals for individual device, animations to describe operation of the devices and correlated video demonstration of important experiments. This module would be available online on our portal emanualz.wordpress.com. The devices and components under study are: Cathode ray oscilloscope, Digital Storage oscilloscope, Function generator, Regulated DC power supply, Multimeter, Diodes, Bipolar junction transistor, Field Effect Transistor, Metal Oxide semiconductor field effect transistor, Silicon controlled rectifier, uni-junction transistor, Integrated circuits, IC tester, LCR meter, spectrometer and spectrophotometer.

Significant outcomes

Innovative videos and animations containing relevant information on the theoretical as well as the practical aspects of the devices have been developed. They enhance the enthusiasm among young researchers towards study of electronics practical. Analysis shows that the students who learn by visual means score much better than the students who are just taught verbally in the classroom. Hence for students these e-modules are more convincing and can be used for efficient learning

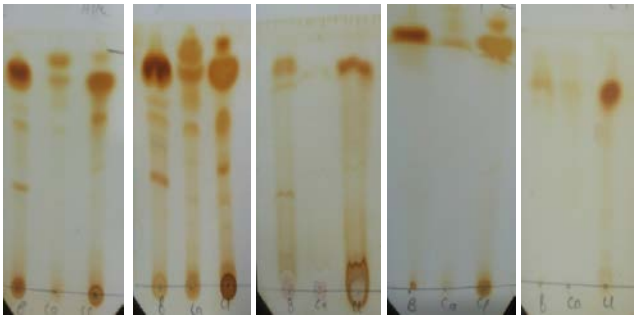
Publications: Two papers

SRCA204- Antimicrobial And Phytochemical Studies On Some Indian Spices Against Multi Drug Resistant Human Pathogens.

Brief description

Spices are considered as rich source of bio-active antimicrobial compounds and are indispensable components of Indian cuisines since ancient times. To provide a scientific basis to traditional uses of Elletaria cardamomum, Syzygium aromaticum and Piper nigrum, their aqueous and organic seed extracts, isolated phytoconstituents and combinations were evaluated for antibacterial potential against gram positive and gram negative bacteria. The spices alone or in combination showed good inhibitory activity against all the tested bacterial strains.

At present, it has been estimated that about 80% of the world population rely on botanical preparations as medicine to meet the needs as they are considered safe and effective against certain ailments. Besides, spices are known for their unique aroma and flavour derived from compounds known as phytochemicals or secondary metabolites; these are antimicrobial substances that are capable of attracting benefits and repel harmful microorganisms.



Significant outcomes

The preliminary results provided a basis for the use of these spices as antimicrobial agents as well as aqueous extracts showed good inhibitory activity in combination, which supported their use together in traditional food preparations.

In conclusion, the spices alone or in combination possessed good inhibitory activity against all the tested bacterial strains. Although aqueous extract showed good inhibitory activity in combination, which support their use together in traditional food preparations. The presence of most general phytochemicals might be responsible for their therapeutic effects.

Publications: 1.Research Article entitled "Antibacterial potential of Elletaria cardamomum, Syzygium aromaticum and Piper nigrum, their synergistic effects and phytochemical determination" published in Journal of Pharmacy Research, 2014, 8(8), 1090-1096.

2. Review Article entitled "phytochemical evaluation and pharmacological activity of Syzygium aromaticum: a comprehensive review" published in International Journal of Pharmacy and Pharmaceutical sciences, 2014, 6, 8.

SRCA205- Antimicrobial Studies of Size and Shape Dependent Silver Nanoparticles on Microbes Responsible for Food Decay

Brief description

Silver has been used as an effective antimicrobial agent since ancient times but its effectiveness on edible products has not been established. The project proposed to synthesize silver nanoparticles of different size and shapes and study their effect on bacteria that leads to spoilage of food. The objectives were as follows:
a) To establish a suitable and reproducible protocol for synthesis of different sizes of silver nanoparticles using aqueous method.
b) To establish the effect of concentration of silver ion & capping agent on particle size.
c) To study the in vitro toxicity effect of these nanoparticles on erythrocytes.
d) To investigate the antimicrobial effect of these nanoparticles against most common food spoilage microorganism i.e. Bacillus and Pseudomonas, using their pure cultures.

Significant outcomes

In this project a new synthetic route of preparing silver nanoparticles in aqueous solution at low temperature was described and coated with a weak adsorbing agent like polyacrylic acid on the particle surface which controls the particle size.
The results of the hemolytic experiments show that silver Nanoparticles were non-toxic up to 0.635mg/ml in rat's erythrocytes. On the other hand already available food preservatives like Sodium Benzoate showed significant extent of hemolysis at the same concentration. The observations indicated that the silver nanoparticles exhibit strong antimicrobial effects on gram positive and gram negative microbes responsible for food decay with extremely low toxicity to Rat's RBCs. Such preparations may be important leading to development of new formulations for food preservation. The data generated in the study would help the food processing industries to effectively use the technique to prevent microbial spoilage of food.

SEC203- Girl Child in Education for All: A Comparative Study of Lalitpur and Lucknow.

Brief description

Literacy is a very important factor for a nation's progress. The desire of any nation is to literate its citizens at least at primary level and girl child is no exception to it. Keeping this in mind the Sarva Shiksha Abhiyan (SSA) came into existence in India in 2005. The literacy rate of males in India is reported to be about 82% whereas for females it is about 65%.
Of the two chosen districts, Lalitpur is the poorest with a literacy rate of about 63% while Lucknow is the richest economically reportedly having a literacy rate of about 77%. However, in both the cases the literacy rate of females is reported to be comparatively low.
The main focus of the project was on the education status, wherein the two chosen districts of Uttar Pradesh were visited. It also examined a girl child's growth and level of knowledge in these areas.

Significant outcomes

While comparing schools run under the Sarva Shiksha Abhiyan in Uttar Pradesh, taking Lucknow as the richest district and Lalitpur as the poorest, it was concluded that in majority of schools there were insufficient numerical strength of teachers but they are expected to be engaged in multiple tasks, inadequate rooms for the students, insecure buildings, no routine disbursing of scholarships and gradual out-sourcing of some of its services in the name of Public-Private Partnership (PPP).
On the basis of these realities, the project proposes, for the betterment of the schools under SSA and its students, the following steps:

- There should be regular appointments of suitable teachers with requisite qualifications and skills.
- The buildings of the schools should be renovated as per their needs.
- The provision should be made for separate classes with ample space.
- Teacher-student ratio should be duly maintained
- Scholarships should be regularized.

This project enabled awareness generation among the teachers, principals and other officials of these areas about their duties under the Act of Right to Education. The project got covered by the local and regional newspapers as a result of which it can draw attention of the concerned authorities to the status of education of this country.

SEC204- Assessing Poverty and Health Rights of Handloom Weavers in Areas of Western-Uttar Pradesh-An Historical Analysis

Brief description

The dispersed and decentralized handloom sector embodies the traditional wisdom, cultural wealth and secular ethos of our country. It is not just a source of livelihood for lakhs of weavers and artisans, but also environment friendly, energy and capital saving and labor-intensive form of art that has secured India's presence in millions of homes across the globe.

There has been an upsurge of interest on the history and conditions of handloom weavers in India in recent years. There has, however, been a dearth of microscopic studies relating to the health rights and poverty among the handloom weaving community of India in general and of Western UP in particular. Handloom weaver as a person devoid of basic health rights and subjected to the most inhuman form of poverty – has never been the central theme of the practical research works

The present project intends to highlight the forms of poverty and deprivations prevalent among them such as lack of physical necessities, assets and income; social inferiority, isolation, physical weakness, vulnerability, season ability, powerlessness and humiliation.

Significant outcomes

Low level of education, meagre wage rate, deficiency in the requisite infrastructure facilities for the weaving class was noticed during the course of survey. Young persons were not found to be interested in weaving work due to its potential meagre earnings.

The State's neglect of this sector despite their contribution to national economy in terms of generation of self-employment as well as employment is quite evident. The state's measures to uplift the ills of weavers have failed to reach the poor weavers. The schemes for health insurance and medical support for occupational hazards have rarely reached the weavers of the regions under study.

Innovation team SEC 204 convinced the District Magistrate of Amroha, Mrs.Kanchan Verma to initiate the process of registration of the weavers of the district so that they will have access to the Government welfare measures.

Publications: One book and one article.

SBS201- Understanding Culture and Language: Bridging the Gap between Delhi and Northeastern Students

Brief description

The inability to understand other cultures leads to huge disparity and misjudgment. Often it is the lack of respect for someone's cultural practices that cause many undesired hostilities. In the recent past the students from Northeast who have come to study and work in the city of Delhi have been subjected to various kinds of discrimination because of their different physical appearance and cultural habits. The project, therefore, seeks to help understand the various problems of northeast students in the city because of their cultural habits and language barrier. The end result would enable these young people to identify ways to adapt to the environment and culture of Delhi and also help them understand the different cultures of India, in general. The project was also aimed at creating a harmonious environment whereby the various kinds of misunderstanding between the locals and students of Northeast in Delhi are done away with. The team involved in the project did some sociological survey of the problems that the Northeast students face specifically in terms of cultural practices and linguistic disabilities. Besides, the team also looked into the stories on discrimination because of racial orientation and explored how their problems are represented in the minds.

Significant outcomes

The study primarily involved the student community and incorporated a survey of perception of various administrations to the plight of the Northeastern people and a comparative survey on newspaper reportage in incidents involving the Northeastern youths in the city of Delhi. As far as the linguistic barrier faced by the students of Northeast is concerned, one of the ways to overcome would be to initiate a kind of a remedial course for Hindi for them.

Understanding the beauty of language and culture of each community in India can add meaning to the motto of the country –"unity in diversity". It is hoped that the larger public can benefit from the comprehensive findings and understand what each one can contribute towards promoting harmony.

SBS202- Monitoring and Modeling Socio-Economic Impact of Land Use/Cover and Pollution Along Yamuna, Delhi.

Brief description

The water quality of Yamuna at the point of its entry into Delhi matches the water quality standards in terms of Dissolved Oxygen (DO) and Bio-chemical Oxygen Demand (BOD). The BOD level in the Yamuna has been in the range of 12 to 51 mg/l. The range of Chemical Oxygen Demand in Delhi varied from 50-155 mg/l. However, during its exit, the water quality becomes unfit for any purpose. This study analysed the present status of the Yamuna. Despite ongoing research efforts on land cover and land use patterns, there remains a need for development of basic land cover datasets providing quantitative, spatial land cover information. With the rapidly growing population in Delhi, pollution levels are at an all-time high and continue to become increasingly dangerous to city residents. Delhi is subject to pollution in all forms and has been categorized among the top ten most polluted cities in the world. The pollution of the Yamuna has a variety of impacts on Delhi's environment. This study analyzed the land use/cover (LULC) of the past, present and futuristic modeling along the Yamuna and evaluated Land use/cover Change (LULCC) on the basis of socio-economic parameters.

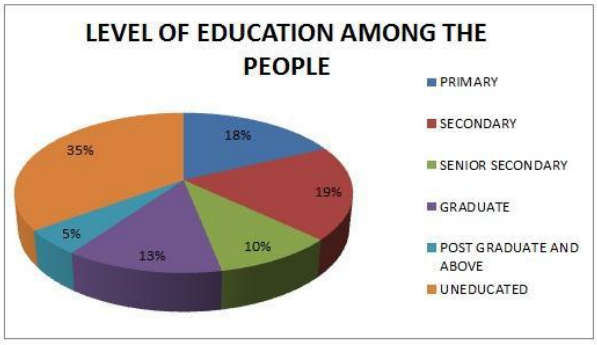
Significant outcomes

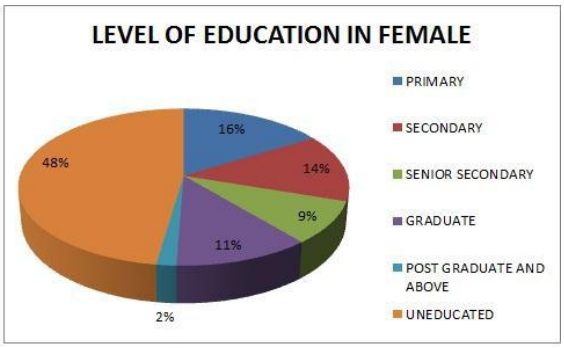
This study is based on primary data which was collected from field survey. Secondary data was also collected but it was supported and authenticated by primary data. The persons have been interviewed according to a well-structured questionnaire which has included the personal characteristics of the respondents, their concern for types of land uses like residential, industrial and commercial, their knowledge about industrial development and types of industries and pollution from industries. For understanding the water quality, people were interviewed about the sources of water pollution, their perception about the problems and diseases caused due to deteriorating water quality, risk assessment, health hazards, impact of land use change on human society, role of government, effectiveness of the recent water pollution control measures and suggested penalties against the polluters, along with various prospects in the field of water pollution control.

SBS Eve 201- Religious Segregation in Residential Pattern of Delhi: A Study of Causes, Measurement And Consequences

Brief description

Segregation is unhealthy for the development of a society. Location of housing is a determinant factor of a person's access to the job market, transportation, education, healthcare and safety. It is believed that persons residing in neighborhoods with high concentrations of low-income and minority households face higher mortality risks, poor health services, high rates of teenage pregnancy, and high crime rates. These neighborhoods also have higher rates of unemployment, and lack of access to job market and transportation, which hinders households from fully accessing employment opportunities. The result of isolation and segregation of minority and the economically disadvantaged might lead to income inequality, which in turn reinforces segregation.





Significant outcomes

Measures of segregation are useful tools for the analysis of patterns causes and consequences of residential segregation. The data for residential segregation were collected from electoral roll of Delhi, January, 2014 as no religious data are made available to us below the district level which is inconsequential for studying residential segregation. Henceforth, in this work two measures of residential segregation have been applied to know the extent of segregation. Along with, through fieldwork attempts have been made to know the demographic characteristics, occupational structure, socio-cultural conditions and their aspirations. In the end the end result was the Muslims, in most of the cases, willingly opted for separate residential pattern from the people belonging to different religious adherents. Only miniscule minority stated that they were denied accommodation in Hindu majority area they also bemoaned that they were discriminated in provision of job opportunities and even in provision of municipal services. We felt that these people feel alienated from the mainstream of the cities. We proposed that efforts should be made to settle them with the people belonging to different religions. It is ideal to settle people belonging to all religions in all the colonies of the city.

SBS(Eve)202- Terra Incognita: Exploring, Mapping and Documenting Socio-Economic and Cultural Characteristics of Western Himalayan Borderland Areas of India

Brief description

The field work comprised visits to three villages namely Sari, Parsari and Reini in Uttarakhand. Under second lap seven villages namely Chhitkul village, Tabo Monetary, Namgia village, Gue (village and mummy), Key Monastery, Langza (Fossil Park), Kibber village and various spots of Kinnaur and Spiti area of Himachal Pradesh. Under the third lap of field visit in Lahaul and laddakh region team Terra Incognita surveyed Gondla Jispa village, Sarchu hamlet, Pang hamlet, Tso Kar lake, Puga village, Sumdo hamlet, Karzok village, Mahe village, ChumaThang (wild life sanctuary and grassland area), Saboo village, Pangong Tso lake, Khardung-Pass, Diskit village, Hunder hamlet, Hanu, Dah (Aryan village) and Garkone and Lalung Villages in this part of Borderland India. Besides collection of primary data, interaction with localities and cultural fragrance of these borderland areas was done.

Exploring the Unexplored was the main objective of this research work. The Western Himalayan region remained deprived due to its position. The project was an opportunity to explore and study the vulnerable character of landforms, people, economy, society, culture, and climate altogether in a systematic manner.

Significant outcomes

The project was able to explore certain things:

- Mapping of unexplored areas in Himalaya.
- Finding major geographical landforms of Himalaya.
- Finding million years old fossils in the Himalaya.
- Interacting with the peculiar socio-economic and cultural characteristics of borderland areas of India like Bhotia tribe of Uttarakhand, peculiar Buddhism culture of Spiti, Aryan race in Dah-Hanu of Ladakh and nomads of Leh and Nubra valley.
- Borderland areas have been inaccessible to the people of India, so fieldwork in such remote places gave students a lifetime achievement feeling.

SBS(Eve)203- Innovative Micro Enterprises of the Hinterland: Evidence from their Sustainable Business Models And Practices for Inclusive Growth

Brief description

While taking rounds of the Trade Fairs of Delhi and Craft Mela of Surajkund, it was found that a large number of Micro, Tiny Enterprises and Entrepreneurs were coming from different rural and remote pockets of India. These entrepreneurs and their enterprises were showcasing products which have some distinctive features. Furthermore, the most revealing aspect of financing is the amount of lending which is as low as Rs. 20,000 in most of the cases. The project aimed at investigating the business models and practices of micro and tiny enterprises of the hinterland to find their innovative practices, entrepreneurial ability and sustainable models which may be replicated for inclusive growth; to map out their business models, entrepreneurial ability and innovations profile to investigate sustainability. It also explored the possibility of standardizing these innovative business models and practices based on their success story.



Siginficant outcomes

The following findings were made by the study:

1. LLP and Company concept are not practiced in these enterprises.
2. Maximum micro enterprises are indulged in handicrafts business.
3. Lack of institutional support has come out as the most dominant hurdle in the functioning/ growth of small enterprises
4. These micro enterprises are also engaging in innovative practices for better efficiency and savings in cost.
5. As far as production technique is concerned, skilled labor based production techniques is being used, along with use of self-made equipment, tools and machines.
6. Majority of the micro entrepreneurs adopt no measures to check the quality of their products.

Publications: Micro-enterprises Hold Key to „Make in India‟ Story”, The Millennium Post, 5th January, New Delhi

SGTB201- Phosphonium Compounds as Corrosion Inhibitors for Microbial Corrosion

Brief description

The project aimed at studying the effect of some Phosphonium derivatives as corrosion inhibitors in Sulphuric acid at room temperature i.e., 25° C in the presence of some cultures.

1. *Pseudomonas fluorescens* is a common Gram-negative, rod-shaped bacterium. It has an extremely versatile metabolism, and can be found in the soil and in water.
2. Properties:-The formation of differential aeration cells is one of the most common mechanisms of MIC in the presence of P. fluorescens. This bacteria cause pitting corossion on the steel surface through bio film formation and further colonisation.
3. *Cladosporium spharospermum* has a worldwide distribution. It is a leaf mould commonly isolated from air, soil, foodstuffs, paints and textiles.
4. *Desulfovibrio* is a genus of Gram negative sulfate-reducing bacteria. Desulfovibrio species are commonly found in aquatic environments with high levels of organic material, as well as in water-logged soils.

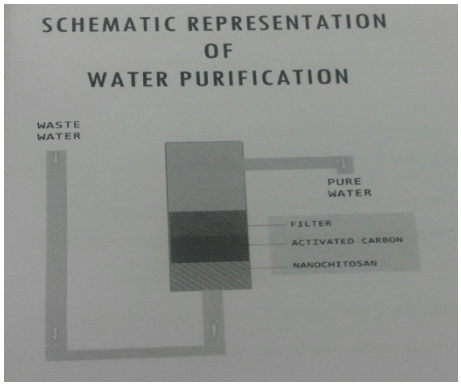
Significant outcomes

The project showed that these Phosphonium compounds are potential inhibitors with over 95% efficiency. The efficiency of these inhibitors improves in the presence of these three microbes. This result was not shown in some of the earlier studies. The corrosion inhibition studies by different techniques was studied in the presence of these microbes and then in the presence of these inhibitors and finally together in the presence of these two (microbes and inhibitors) together. This inhibition becomes lesser as the temperature increases mainly because of the decrease in surface coverage.
Similar result was shown when the study at higher temperature is carried out in the presence of inhibitors and microbes together, a result which can be attributed to the fact that these microbes do not grow at higher temperature and in fact become less efficient
Another interesting aspect of this study was that the inhibition efficiency increases with the increase in concentration of the inhibitor.

SGTB202- Designing of Integrated Portable Water Purifier with Reusable Nano-Chitosan for Individual use

Brief description

With overall development in all spheres of life of human beings, it is the right of everybody to get healthy and pure drinking water. Nanoscience and nanotechnology is the most important emerging field which has great potential for applications in day to day life.
The aim of this research project is to develop a low-cost water purifier by the undergraduate students and to develop a small sized device i.e. integrated flask or water bottle so that it purifies and stores the potable water. It could be carried along anywhere easily. It also focussed around the use of easily available materials which are cheap and can remove toxic metals and other organic impurities. Chitosans, obtained from crab-shell fulfill all these requirements. These are easily available, economical and can be regenerated easily after the use whereas other absorbents have high reactivation cost.



Significant outcomes

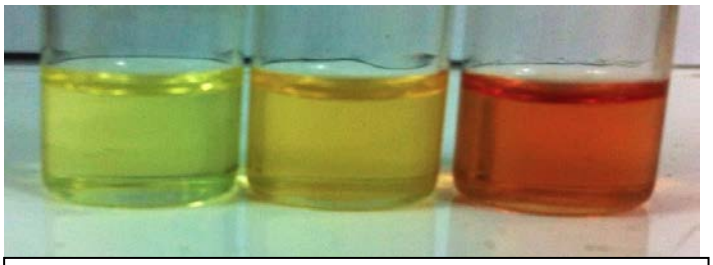
Although the wastewater purification is a very challenging task particularly in the case of drinking water. In this project research team have tried to solve this problem and found the following:

1. The use of chitosan for filtration and removal of impurities gives better results as compared to the commonly used activated charcoal.
2. Nanochitosan synthesized, even have enhanced property for the removal of impurities i.e. metal ions and organic impurities.
3. Nanochitosans and chitosans after the use can be regenerated for futher use. It has been established that the use of nanochitosans is more favorable than that of other adsorption substances such as ion exchange resins and activated charcoal etc. This work can be extended to small scale wastewater purification.

SGTB203- Role of Nano-Crystals in Energy Harvesting Using SnS thin films

Brief description

SnS films promise to be a good, non-toxic inorganic based photo-voltaic. However, at present solar cells based on SnS have very poor efficiency. One way to increase efficiency is to improve absorption or electron-hole generation by adding metal clusters of quantum dots (QDs) of appropriate material. We would be looking into $CuInS_2$ (CIS) QDs. CIS is one of the most promising ternary semiconductor material for application in opto-electronics. It has a small direct band gap of 1.5eV matching well with the solar spectrum, high absorption coefficient $\sim 5x10^5$ cm^{-1}, high photoconductivity, low toxicity and high environmental and electronic stability. Although progress has been done in growing CIS quantum dots (QDs) by chemical route and understanding the optical properties of polymer-QD composites, their electrical and structuralproperties have not received attention so far. The proposed project aims to study various aspects of interaction between SnS or polymer (poly (3-hexylthiophene) (P3HT)) and CIS QDs to grow high efficiency photo-active layers.



CIS QDs of different colors. The different colors are due to the difference in particle size. These samples are of those prepared by students purely under teacher's supervision.

Significant outcomes

A simple technique to synthesize $CuInS_2$ (CIS) QDs has been developed and QDs of various sizes corresponding to different colors namely green, yellow and red were synthesized. The QDs were added in toluene and the mixture was ultrasonicated for about two hours. It resulted in homogeneous dispersion of QDs in the toluene. The absorption and photoluminescence (PL) spectra of the suspension was studied using Shimadzu spectrometers. The absorption spectrum showed excitonic peak, giving evidence of QD formation. Based on this, their band gap and size has been calculated.
While a four times improvement of efficiency was obtained in SnS solar cells when silver metal clusters were imbedded in SnS, the efficiency of the pristine SnS solar itself was very low and not satisfactory.

SGTB204- Identification of Weapon Holders in Crime Cases (in process)

Brief description

The weapons used in crime cases, including revolvers, pistols, swords, daggers and rods, are generally made up of iron or an alloy of iron. During commission of a crime, nanoparticles of iron are transferred from the weapon to the palm of the suspect. The fatty acid constituent of palm's sweat transforms the transferred iron to iron (II) ions. The latter form stable, intensely colored, chelates with a number of complexing agents. This project synthesized ligands belonging to triazine functional group for identification of weapon holders. When these complexing reagents were sprayed on the hands of a person who had earlier held a weapon, a colored, iron (II) chelate was precipitated, thus identifying the suspect. In cases where a suspect murders a victim, and before fleeing the scene of crime places the weapon in the hands of the dead person, to make it appear like suicide, a colored precipitate will not appear since sweating ceases immediately after death. It will thus be possible to make a distinction between a suicide and a homicide.

Purple coloration on palm due to immobilization of iron ions released by a (mock) weapon

Significant outcomes

The mechanism by which nano particles of the concerned metal are transferred from the weapon to the palm of the user has been elucidated. The interaction between the transferred metal particles and the sweat secreted by the palm has been studied. Some of the reagents that give stable, colored derivatives with the transferred chemical entities have been synthesized.

Two derivatives of triazine which are very sensitive to iron (II) ions have been synthesized. These are –

i. 3-(2-Pyridyl)-5,6-diphenyl-1,2,4-triazine (A)
ii. 3-(2-Pyridyl)-5,6-diphenyl-1,2,4-triazine-p,p′-disulfonic acid monosodium salt hydrate (B) (B)

These two reagents form a stable, red precipitate with iron (II) ions. When a person (read accused) holds a pistol, revolver, dagger, sword or an iron rod, small nano particles of iron from the surface of the weapon dissolve in the fatty acid content of palm sweat and are transformed into iron (II) ions. When either of these reagents is sprayed on the palms of the weapon holder, a red coloration appears. As a consequence these reagents assist in identifying the weapon holders in crime cases. It is for the first time in India that compositions which identify weapon holders have been synthesized indigenously.

SGTB205- Role of Team Sponsorship in Promoting Women Sports: A Case Study Approach of Badminton & Hockey in India

Brief description

The project research focused on whether the relationship between mass media & sports has profoundly influenced both institutions and whether this relationship has passed through a series of stages, the first of which was parallel development, with the mass media reaching a broader audience through new technologies & market growth while sports were attracting a growing base of paying spectators. Next, that their trajectories will begin to intersect—the commercial mass media especially after their emergence in electronic form will increasingly view sports coverage as an inexpensive way of supplying much-needed content. Those women's sports will be correctly perceived as ideal for capturing audiences for advertisers. That, public or state media will also recognize sporting events as opportunities to reaffirm national culture that includes and is not restricted to gender equality and to bolster patriotism amongst both the male & female demographics of the economy. That, as the economic infrastructure of women's sports develops to the level of a bona fide industry; sports entrepreneurs will begin to see the mass media as important for generating interest among spectators that includes both men & women, and sponsors who are looking to target both sets of consumers.

Significant outcomes

The commercialization of sports in turn is a by-product of mass media & rise of professional sports that includes and is not restricted to the marriage of media & sports, the evolution of sports writing & content development that is free from gender bias and commercial value of photography, radio & TV that is monetized to promote women's sports.

By participating in sports like hockey, young girls growing up to be women of maturity, which is the subject matter of study under the research project, are getting socialized to become involved in sports and to stay involved in them for employment, income & status in society. The youth that includes young boys & girls are changed as a result of their socialization into sports, and accept women's participation and achievement as they would with their own gender without all the biased complexity of the previous generation that see women's right to access & equal opportunity as a threat to male dominance, and a risk to family structure & hierarchy.

SGTB206- Development and Challenges in Sports- A case study of Indian Cricket

Brief description

Cricket is the most commonly followed sport not only in India but also in the major part of South Asia. The popularity of the game has left its metropolitan niche to make foray into smaller townships and even into the rural areas. The mass following of the game, its history, close correlation with environment, mystery and mythology, sociology, peace and international understanding compels one to undertake a research work that is likely to unfold some interesting facets of this noble game. The present study will entail the role and contribution of University of Delhi in nurturing the talent and producing some outstanding cricketers of national and international level who have brought name and fame to the university and the country.

Significant outcomes

1. The cricketers are lamenting the lack of suitable infrastructure (both personnel & material) in developing top cricketers in the Colleges and the Universities.
2. The data gathered points out that there is an urgent need to strengthen the present composition of the level of competition both at Inter-College and the inter-University level by adopting longer version of the format rather than the present shorter version of the game. It is widely accepted that the longer format of the game helps the budding cricketer evolve basic skills of the game. These basic skills are later honed by coaches when these cricketers climb up the ladder.
3. It was concluded that availability of technical expert like Sports Psychologists, Physiotherapists, Nutritionists and coaches in the University and in College helps the players to enhance the performance.
4. It was also concluded that the in campus job opportunities should also be available through the performance in sports so that they can grow in career and sports simultaneously.
5. The indifference of college/University administration towards their internal assessment and attendance is a major drawback in churning out top cricketers. The present system does not take care of the two above mentioned objectives. In fact, both (internal assessment and attendance) are a major source of worry for a cricketer. Consequently they are not able to concentrate fully on their performance on the field. Remedial measures are to be adopted to undo this malaise.
6. There is an urgent need to develop an alternate curriculum for sportspersons to take away the burden of internal assessment and attendance. At present, the students are always under pressure to obtain higher percentage in their academic results. The level of performance of the player on the field could constitute about 50% of the total marks. Secondly, the curriculum for a cricketer should be more cricket-oriented with sprinkling of academic subjects sparingly.

SGTB207-Analysis of Ecological Footprints (EF) From the Various Socio Economic Strata

Brief description

Ecological Footprints (EF) is one of the world's most ubiquitous and rigorous sustainability metrics. EF is a strong communication tool and is an indicator that accounts for the human demand on global biological resources. EF analysis is a method of evaluating the demands made by each of us on earth's ecologically productive land area by our patterns of consumption of the food & our share of built up land (ecologically degraded). There is so much to do by this project but mainly the aim of this project is to sensitize young minds of all ages from various socio economic strata towards environmental issues. The significant feature of EF is that it can be used to design a life style, a business or an institution so it will help to make the students aware of the adverse impacts their actions may have on the environment and introduce a scientific approach to analyze how their lifestyle affects the health and life of the planet. In order to have a sustainable survival for the generations to come, there is an urgent need to create environmental awareness amongst diverse populations. The study focuses on two programs as follows:

- GREEN NEIGHBOURHOOD PROGRAMME &
- THE GREEN SCHOOL PROGRAMME (GSP): Environmental challenges are on the rise. There is a need to innovate with current technologies so that we can improve the environment around us. Through the GSP, the study focuses on the issues being faced by schools and also helps fix the problems to some extent.

Significant outcome

1. It will help schools to prepare an inventory of their resources and systematically collect information about their environmental performance.
2. The analysis of this information can be used by network of schools or by city or by state government to do comparative evaluation so that the best practices can be disseminated for all to learn. The school children are quite aware of the environmental issues and the degradation of air, water and land that has occurred due to anthropogenic activities.
3. The data reveals that girls are more updated than the boys regarding environmental issues but both genders want a green, clean and safe planet.

SGTB208- Development of a User Friendly Android Based Mobile App for Providing Awareness and Information on Spinal Cord Insult and Injuries.

Brief description

The project involved the making of a much needed mobile app for wide use for persons with spine injury as well as for general awareness so that prevention is possible. Spine injuries, at one go, affect almost all functions of the body, loss of sensation and mobility below the level of the injury. It causes lifelong disability and lifelong care is required to maintain a person with spine injury in good health and in action.
The mobile app is a user friendly e-manual of all that a spine injury entails and explains the precautions to be taken to avoid complications which can often be fatal. Presently, the modules are ready in English and a Hindi voice over is being done such that it can be used by a larger section of society. It has relevant line diagrams, photographs, and videos embedded in the app. The language is such that it almost speaks to the person using the app. The navigation is very simple.
With the collaboration of the Indian Spinal Injury Centre, it has reached a level which, in content, is unmatchable and unparalleled. The students interacted with a close select group of patients who were taken into confidence about the app content, and their feedback has been very useful and encouraging. As soon as it is ready in the Hindi voice over, we shall be ready to put it up on the Google Play Store for free download.

Significant outcomes

This the first mobile application which deals with spinal cord injury made in India in the context for the primary consumer, i.e., persons with spine injury. The information is available in English with Hindi voice over. Information regarding equipment used by a spine injured person for life available in India is also provided. The modules on aids and appliances as well as welfare schemes available are entirely from India. Motivational modules containing information on case studies and emotional wellness aim to provide acceptance of persons with spinal cord injury in society. The app has ample pictures and drawings for easy understanding of processes and procedures thereby have been largely appreciated by patients undergoing rehabilitation in Indian Spinal Injuries Centre who would wish to possess the App.

SGTB209- Understanding the Problems Faced by Science Students Due to Language Barrier and Suggesting Concrete Remedial Measures for their Confidence Building Through Providing Study Material in Hindi

Brief description

Science students of Delhi University come from different backgrounds and many of them face problems due to lack of command in English. The language barrier affects their confidence and performance. This project aimed to understand their problem and help them overcome this barrier. The nature and extent of problem was accessed through seminar and survey among various students. The suggestions from the teacher in handling such situations are also analyzed.
Bilingual teachings, selection of science books in Hindi, separate counseling/tutorial for students are few practices which are emerged as solution. It is further planned to organize debates/seminars to draw concrete remedial steps.

Significant outcomes

Through discussions, seminars and survey conducted by the students, a message has been spread regarding this problem. Students gained confidence that they can discuss/interact with their teacher in different languages. It has improved their performance in class and their overall development.

SGND202- Understanding the attitude of college- Students towards religion and politics

Brief description

The project builds upon the premise that religion plays a key role in the lives of Indians. Rituals, worship, and other religious activities form a very prominent part in the daily life of an individual. Religion organizes social life in modern India. Most festivals are celebrated by people of all communities, irrespective of which religions these festivals belong to.
The attitude and outlook of youth (especially of more informed and awakened college-students) towards the issue of religion and politics, (i.e. communalism and secularism) is the focus of the present study. Indian youth (comprising around 65 percent of the population under the age of 35) can transform India into a developed society by assuming a constructive role in this matter. In the 21st century, India can march ahead with equal participation of every community in the process of maintenance of social harmony. The cooperation and contribution of youth of every section of society is essential.
At a time when the nation is passing through some turbulent times with incidents of vandalism in some places against some communities, marring the secular and tolerant image of the country, shouldn't the youth, hailing from all across the country, leaving behind the baggage of faith and religious identity commit themselves to foster communal harmony and play a proactive role in maintaining communal and social harmony? College students need to join together to thwart the narrow-minded policies of the polity with an iron hand to create communal harmony. Given the present situation of uncertainty and insecurity, if serious attempts are not made to counter the campaign of communal hatred, the very unity, integrity and progress of the country will be at stake.

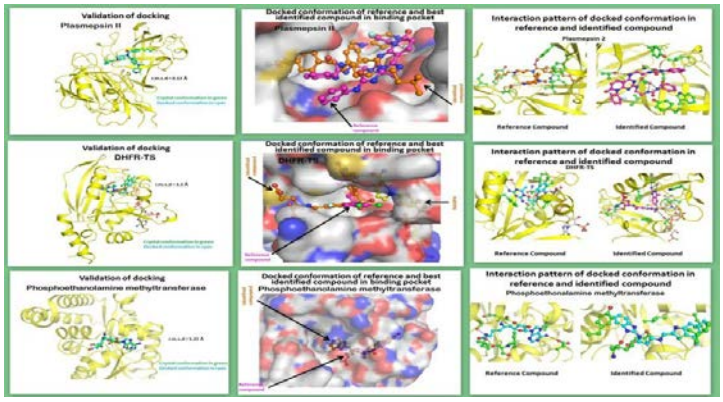
Significant outcomes

Preliminary review of literature on the subject has been attempted. The students were divided into three study groups viz. (a) readings on *secularism in India*, (b) readings on the *role of youth in Indian politics* and (c) *research methodology* with an objective to study specific aspect of the study project. The weekly meetings of all three groups were held to appraise ourselves with the progress of the work. The discussions with a few colleagues from other departments of the college were held on regular basis.
Data for the study is mainly the primary data collected through social survey. Field work had been conducted in the colleges and other educational institutions falling in the territory of Delhi and Gujarat. Analysis of the data collected so far is being done through statistical tools of analysis, especially computation of means, crosstabs, correlation and OIS regression analysis, quantitative data collected through field work. The group had held a Seminar where the distinguished scholars from different fields give their meaningful insights.

SHC201- Drug Design through Molecular Modeling Studies, for Selected Drug Targets in Plasmodium falciparum, to Combat Drug Resistance against Malaria

Brief description

Due to lack of antimalarial vaccines, there has always been high demand for generating new drugs. Drug resistance acquired by the parasite is the major problem in treatment and complete eradication of malaria. In this regard drug targets essential for parasite growth have been explored based on minimal homology with targets present in Homo sapiens. These targets are screened against antimalarial leads provided by GSK chemical library that can inhibit parasite growth by 80% at 2 micromolar concentrations available in tdrtagets.organd https://www.ebi.ac.uk/chembl/. In this study, compounds were docked with the different conformations of drug targets available in PDB database and then reported with their binding affinities. We have investigated three different proteins selected out of 9- Plasmepsin II, Dihydrofolate reductase and N-methyl transferase using Autodock and Discovery Studio, the virtual docking program. These features provide approaches for identification of new drugs which can be tested in vitro. Thus there is an urgent need for discovery of new and more effective anti-malarial drugs.



Significant outcomes

For the protein Plasmepsin II, 9 different hits with best lig score 1 were identified with minimum one pose of the ligand. The lead compounds had better interaction energy than the reference compound. Reference compound had a total interaction energy at -76.73 kcal/mol which was the sum total of total Van Der Waals forces and electrostatic energy.

In case of DHFR-TS there were three top hits. Reference compound had total interaction energy at -81.52 kcal/ mol was greater than the total interaction energy of the lead compounds. This was a result of the greater interaction of the lead compound with the protein. In case of Phosphoethonalamine methyltransferase there were thirteen top hits. Reference compound had total interaction energy at -67.74 kcal/ mol was greater than the total interaction energy of the lead compounds**.**

Publications: One in International Journal; one poster; one oral presentation.

SHC202- Development of an Android application for the real monitoring of toxic environmental pollutants

Brief description

This project aimed at the integration of a gas-sensor array prototype with open-source hardware and software platform like arduino and android. Novel application, testing of commercially available MQ gas sensors for common environmental pollutants was conducted. The production of gases were done at university laboratories and verified by general techniques and used for the purpose of testing the commercially available gas sensors. Controlled amount of gas concentration in ppt (part per thousands) and ppm levels were generated in the current study by the design of a unique ppm chamber. The changes in the resistance of gas sensors were monitored by measuring the voltage across the gas sensors connected in voltage divider configuration, and the analog voltages were fed to the analog input of the microcontroller and real time data of sensor voltage at various ppms of toxic gases were monitored and logged in the database of an android program.
An array of gas-sensor module in the form of wearable device was prepared with the vision that the general masses can be enlightened regarding the atmospheric quality of a particular place, and they can contribute to crowdsourcing

Significant outcomes

Programs for real time acquisition of analog data of sensors were created and its readings on serial monitor were observed. According to the demand of the project after completion of first phase the next challenge was to connect arduino to pc via Bluetooth as a replacement of USB. For this purpose a Bluetooth module (HC 05) was chosen as it was cheap and easily available in market and was arduino compatible moreover it is small in size as compared to Bluetooth shield. A code had been created to display the readings from arduino to PC using Bluetooth on a serial monitor. Concentrating on the eco aspect of the project, the project aims to promote the importance of environment and tries to prevent the accidental losses of life which now a days is very common due to the negligence that is done with the handling of toxic gases The project successfully collaborated the commercially available components and developed a sensing module which is very economical and can be used for multiple gases.

SHC203- Biochemical Assessment of Toxic Heavy Metals in Bacterial Strain Growing in Polluted Waters: A Step towards Bio-Remediation

Brief description

Delhi water supply comes from the Yamuna, yet due to increasing urbanization, the pollution of the river has reached alarming proportions with low Dissolved Oxygen (DO), high Biological Oxygen Demand (BOD) and fecal coliform, and toxic levels of heavy metals like Cu, Cr, Fe, Zn and Ni. This project involves an analysis of the various physico-chemical and biological parameters of the river Yamuna, along with the isolation of native metal-accumulator bacteria and the examination of their ability in bioremediation. Additionally, we have successfully constructed a Microbial Fuel Cell (MFC) for the generation of electricity using Yamuna water, thus harnessing the polluted Yamuna water as a source of clean energy.

Significant outcomes

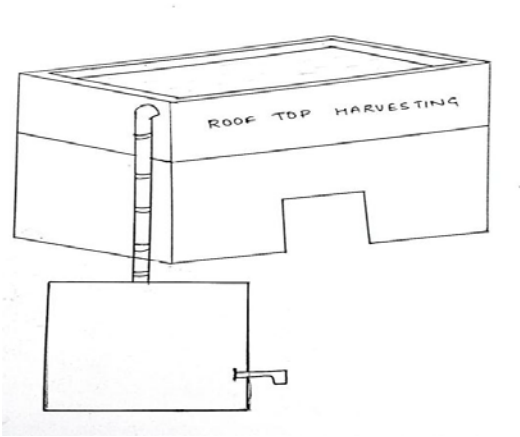
1. Through the construction of A MFC, it was shown that Yamuna/wastewater can be used to generate electricity for running low voltage equipments. And through this process the water can also be purified and used for other purposes.
2. We have used nanotechnology for creating better electrodes for the MFC using simple readily available materials like carbon cloth and utilizing local small scale furnaces. Significant increase in the generation of electricity is expected from these innovative modifications, rendering the MFC capable of running bigger electric equipments
3. MFCs led to the generation of green energy in the form of electricity from Yamuna water and also treatment of waste generated in daily life thus leading to effective bioremediation. The MFCs thus hold the key to future energy problems and also help us give the future generations a clean and green planet.

SHC204- Water Harvesting Techniques for Development In Nagaur District, Rajasthan.

Brief description

Nagaur district has arid to semi-arid type of climate with frequent monsoon failures. The inconsistent monsoon resulting into widespread drought implies a deepening of the already severe water crisis. The short spells of monsoon recharge the groundwater and surface-water bodies. In current past, intensification of agriculture has over exploited its ground water with limited recharging and developed recurrent famine. The food and water security of the district solely rely on the intensity of monsoon and ground water. So, this is a detailed study about different rain water harvesting techniques and water conservation and possible feasible approaches of drinking water supply for Nagaur district. Simultaneously, the high concentration of fluoride in ground water leads to severe health issues. The study is based on the data collected by the students on the basis of experience gathered on this subject as well as personal interactions with affected inhabitants in rural areas. It is suggested that the recharging of wells using non-conventional water conservation techniques, restoration of traditional water bodies, sustainable planning of water utilization and proper education on the issue may help in addressing the present crisis.

Significant outcomes



Roof top rain water harvesting is the accumulation of rain water on the roof top which thentravels/flows through the pipeline and is collected and storage is done in water

SHC205- Milk Adulteration and its Effect on Young Population

Brief description

India is the world's largest producer and consumer of milk and vegetarianism being the mainstream way of the dietary practices here, milk plays an important role in the formative and varying stages of human lives. Delhi is considered among the most polluted cities so it becomes necessary to analyze the milk and its impact on the young population. Adulteration of milk is a crime against humanity and Supreme Court is also on the verge of implementing stringent measures against it. In microbial and biochemical approach it was found pathogenic strains of bacteria of public health concern such as *Salmonella*., *Staphylococcu*s, *Streptococcus* and *Escherichia* by using various differential and selective media like SS, XLD, MacConkey, BHI etc. and to find the exact microbial strains using 16S ribosomal RNA sequencing approach was being tried out through this project. Persistence of some antibiotic resistant microbes in milk, identification and characterization of which would be a crucial aid for better treatment and therapies for bovine animals have been found**.**

To spread awareness and educate the society about milk adulteration, the project team has visited and interacted with the households and distributed simple adulteration detection kit made by them.

Significant outcomes

Some novel toxic substances in milk matrix and antibiotic resistant pathogenic microbial strains detected which have not been reported earlier. These findings may be of great importance to improve human health and designing future therapeutic therapies.

The occurrence of agricultural and household pesticides residues in food is an alarming issue. It analyzed few samples of milk by GC-ECD earlier and after getting positive results, students have analyzed it by using GC-MS and a cocktail of toxic substances have been found which were not reported earlier and is being further analyzed with a biochemical aspect.

The presence of Formalin was in 100% samples while urea was nil. Presence of cane sugar was also only in 10% sample. But in another study presence of toxic substances was found which are harmful for human. A casual attitude of consumers about testing Kits awareness was observed, required anxiety about adulteration and pollution was also low because no immediate and direct effect is seen to their health.

SHC206- Real Time Traffic Solution

Brief description

At present traffic signals are either controlled by an "optimal" timed cycle maximized to suit an expected flow of traffic for the time of day or manually. Huge variation in traffic volume and many other factors make the traffic signal cycles unbalanced even on a “typical” day. Keeping such needs in view, the project aims at providing a real time traffic density controlled algorithm to monitor the traffic lights in an optimum way. The performance of the proposed system as compared to the existing system was found to be more efficient in terms of lesser waiting time. A software simulation in Java was developed to provide a graphical representation of the proposed algorithm. The results were further verified by creating an interpolating polynomial for green light timing using Newton’s divided difference method. The project further suggests use of LCD displays at preceding junctions for information about traffic congestions, in order to encourage citizens to take alternate routes, thereby preventing increase in traffic congestion.

Significant outcomes

The traffic system at the intersections being controlled by pre-set timers leads to wastage of precious time. It is thus becoming increasingly necessary that traffic signals are controlled by smart systems based on traffic density. This project is a step towards this direction. The algorithm developed suggests timings of a signal on a four-way junction based on real time traffic. The real time traffic is evaluated using sensors linked with the traffic lights. The same work can be extended to a T-crossing also. The sensors used to detect traffic density can also be used to display the same on a LCD screen at the immediately preceding junction to caution the commuters about heavy traffic and suggest diversions in order to avoid more congestion.

1. Keeping in view non-uniform widths of roads in the city, the algorithm takes length as a measure of traffic on roads. If the width of the roads is more, the length of traffic accumulated is less and with high rate of clearance, the time of clearance of traffic is less. Whereas, on roads with less width the length is more and accordingly the time will be more.
2. Third is the better utilization of cycle timings by optimizing the right turn green signal timing, as data suggests only about 25-30% of the total traffic takes right turn at such junctions. This allows utilising the saved time in parallel traffic clearance in opposite direction, resulting in more traffic getting cleared.

SHC207- Doing 'Nothing': The Invisible Work of Women

Brief description

The current definition of work itself is biased against women as it takes into account only those activities that are performed in return for money. Much of women's work remains outside formal wage-labour relationship and thus by definition becomes 'non-work'. Women's work includes a broad range of activities that are ill-defined, but take up more than an average workday. They contribute positively to the family, community and the country, but remain unrewarded. Responsibility for unpaid work sometimes even prevents women from taking up paid work, making them economically dependent on others. The present study examined the value of the unpaid work of women, the impact it had on their lives, and also questioned the association of women and unpaid work in a patriarchal society. The study is based on a primary survey carried out by student members of the team. A total of 225 socio-economically diverse households in Delhi were surveyed using a questionnaire that included closed and open ended questions. The respondents were married women, some in paid employment and others not engaged in a formal wage-labour relationship. The study also tried to analyse the role of media in not only reinforcing social stereotypes, but constructing the already prevalent stereotypes in newer and more forceful ways.

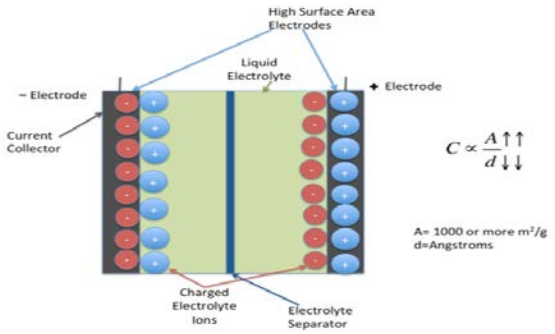
Significant outcomes

The unpaid labour of women contributes to the productivity of countless family businesses and farms all over the world. Unpaid labour in the form of housework too contributes positively to the nation by taking care of the physical, mental, psychological and emotional needs of its children, elderly and sick persons. It also allows the labour force to function efficiently. It is therefore imperative that women homemakers be included in the category of workers. They must certainly not be clubbed together with prisoners and beggars, as it is the case at present. Women themselves do not want a monetary reward for their housework. But they crave for dignity. It is important that children are socialized in an environment where there is no gendering of roles. They must be encouraged to perform household chores along with other members of the family. This will ensure that women have time for rest and leisure and an opportunity to take up paid work, should they so desire.

SHC208- Experimental Investigations on Ion – Conducting Polymer Gel Electrolytes Suitable for Applications in Electrochemical Devices

Brief description

Modern society is demanding portable electronic devices (e.g., mobile phones, notebooks, and cameras) which are small, thin, lightweight, and flexible. Hence, for configuring such design and fabrication of novel energy storage devices, polymer electrolyte exhibiting the intrinsic properties such as thin-film forming ability, flexibility as well as the relatively high ionic conductivity and wide operational electrochemical window are considered to be most promising. Polymer electrolytes can be prepared by two ways; firstly by mixing solid solutions of electrolyte salts in polymers (solid polymer electrolytes (SPEs)) and by trapping "ion gels" of electrolytes in the polymer matrix (gel polymer electrolytes (GPEs)). SPEs shows very low conductivity, so more and more research is done developing high performance GPEs. Recent year, several polymer matrix materials which include poly(vinyl alcohol) (PVA), poly(ethylene oxide) (PEO), poly(acrylonitrile) (PAN), poly(methyl methacrylate) (PMMA)etc. have been investigated for preparing high-performance GPEs. In order to develop future wearable electronics devices, polymer electrolytes are the need of the times. Conventional polymer electrolytes are of two types: solid polymer electrolytes (SPEs) and gel polymer electrolytes (GPEs).



Significant outcomes

The conducting carbon namely, carbon black, MWCNT and GO as an ionic conducting promoter for ion gel, has been demonstrated for the first time. The use of carbon dopants have improved to the ionic conductivity of ion gel compared with that of pristine ion gel dramatically. Homogeneously distributed MWCNT acts as a 3D network in MWCNT-doped ion gels, which provides a high degree of continuous and interconnected transport channel to facilitate the ion transport and resulted in a considerable increase in the ionic conductivity. Free standing conducting carbon doped ion gel polymer electrolytes were successfully synthesized and electrochemically characterized.

Publications: Two posters.

SHC209- Women's Participation In Politics And Society In Post-Globalisation Era: A Comparative Case- Study Of Three Districts: Rohtak (Haryana), Amritsar, (Punjab) And Sri Ganganagar (Rajasthan)

Brief description

The processes of globalization have unfolded a very complex scenario of new opportunities as well as challenges. Therefore, there is an urgent need to revisit the space, status, dignity and honour of women in our traditionally vertical and patriarchichal society. The research team has actively participated among the locals of the regions of the study to grasp different dynamics of the problems under probe. The traditional prejudices and societal biases perpetuated by different sections of the society have been identified, in the course of the study, to be mainly responsible for the present marginalization of women. The study suggests a counter-hegemonic strategy so as to change mindsets and innumerable stereotypes in our day-to-day life. This requires whole-hearted efforts at various levels involving civil society groups, NGOs and more importantly, Self-Help Groups (SHGs) of women.

Significant outcomes

The special outcome from the project has been that the hegemonic structures of domination working in a subtle and imperceptible manner are at the root of a patriarchal mindset, which in turn, leads to multiple forms of gender discrimination and crimes. This calls for all-round and comprehensive measures- social, economic, political, cultural and even ideological-to build a society based on equality and gender justice. Focus is on adopting a counter-hegemonic strategy to fight the patriarchal mind-set so as to finally demolish it completely, which must begin with the throwing out of innumerable stereotypes in our day-to-day life into the dust-bin of history.
Similar studies can also be conducted in other regions which will be helpful in devising specific strategies to deal with the menace in different regions as well as evolving a national policy for an integral and comprehensive treatment of the subject.

SRCC201- AZMAT: Reposessing Respect

Brief description

The project aimed to rehabilitate a community of women manual scavengers. The research team had worked with 18 women in the village Nekpur, Ghaziabad. These women were subject to social exclusion and lack of education. To eliminate the root cause of the problem, 128 toilets were constructed across the village. Training was given to them in detergent making, along with basic literacy. The community is now proficient in manufacturing detergent Neki. Recently diversification into the production of phenyl took place. Detergent is sold in rural areas through retail shops, and phenyl finds institutional demand in bulk in urban and semi-urban areas. The project has greatly improved the quality of life of the women. Project Azmat is an endeavor to liberate Manual Scavengers by providing them with a sustainable source of livelihood.

Significant outcomes

A two-pronged approach was followed to implement the business model of Project Azmat. In order to ensure that the women never continued the practice of manual scavenging, the first step was to replace dry latrines with eco-friendly toilets. 128 two-pit toilets were constructed in the village in collaboration with Sulabh International Social Service Organization. The second step was to rehabilitate the women by providing them with an alternative source of livelihood.
Beneficiaries:-
The Women: By building up a sustainable business model, 18 women from being manual scavengers to manufacturers of detergent of a brand that is their own.
Villagers: By constructing 128 eco-friendly two-pit toilets, health and sanitation conditions for them were improved. The demeaning practice has been eradicated thus eliminating any possibility of further victimization in present or future.

SRCC202- Personality profiling- Human Technology interface with a focus on critical thinking and innovation

Brief description

In today's dynamic global world, the academic and job related responsibilities are extremely demanding and seek individuals to comfortably carry out not only routine tasks but also many challenging tasks that keep coming on a frequent basis. The research suggests that personality factors are related to the level of effectiveness/achievement of individuals. The new challenging requirements of the workplace demand individuals to demonstrate high order personality traits like creativity, critical thinking, innovation etc. in addition to low order personality traits and be involved in lifelong learning process to keep up with the demands.
The project aimed at studying the personality profiling of current generation of students to find their orientation towards learning. The project aims at evaluating their higher order personality traits like creativity, critical thinking and innovation. This study has chosen college going students as 'subjects'. The study has 16 personality tests. The project also aims at finding new ways to assist the process of personality profiling with the help of improved human technology interface. Based on the statistical analysis, the study explores new vistas for research to dig further the subject and find out some more critical factors responsible of mediating, moderating and making of personality.

Significant outcomes

The factors impacting the personality in its making have also been studied widely. The study had attempted to examine the role of information technology contributing to the building up of personality traits. This study could be used as foundation for developing a roadmap for newly adopted agenda.The project primarily aims to evaluate the readiness of our youth towards challenging work responsibilities of today's times.
The project's outcomes may be seen in light of government's skill development initiatives and find out which kind of soft skills programs may be more suitable for the current young generation. The study could be used as a building block for creating a model for assessment and development of required skill sets to cater to the needs of present times.

SRCC203- Corporate Social responsibility: Initiatives, Implementation strategies- an Impact Analysis

Brief description

The project aimed at pursuing the CSR endeavors of pertinently established Indian companies in order to gauge their effectiveness for benefitting the society as a whole. The project aims at familiarizing students about the innovative CSR activities taken up by the various companies in India. Of the 11 companies whose CSR activities were taken upon, the works of 4 companies were studied in detail incorporating field visits, official l& beneficiary interviews, primary data collation etc. The most commendable aspect of the project was to develop an idea. In the minds of the students that old connotations attached to CSR being more like an act of charity and grants have now been changed to it being an act of carrying out social welfare programmes that are sustainable for both the company as well as the beneficiary. Projects like ITCs E-Choupal, DSCLs Shriram Kisan Vikas Programme, NTPCs ash mound are a clear sign of companies focusing more on their own sustainability as well as that of beneficiaries and environment.

Significant outcome

- The visit to the NTPC helped the team to know about the new techniques in waste disposal. The way NTPC has used ash, a serious water pollutant, as a medium for growing plants makes for a commendable example of best use of waste. Similarly the DSCL visit led to a finding on how it has adapted a new technology by LAFARGE to convert the Calcuim Hydroxide leftovers into good quality cement. The adoption of this technique has helped DSCL to cut down on its waste disposal costs and in effect served as a new and sustainable business.
- Similarly all other 3 companies have a benefit towards the society but companies have realized mere act of charity wouldn't suffice and extra efforts are called for.
- Companies have begun to internalize socially responsible acts in their normal business functioning to maximize the positive impact created on the society. Though this realization has dawned upon the companies, yet a lot still remains to be conquered in the field of corporate social responsibility towards making it an indispensable part of conducting business.

SRCC204- Understanding the Indian Family Business: A Narrative Approach through oral accounts

Brief description

The business families are diverse in terms of area, size, region and nature. The purpose of this project is to analyze the feasibility and sustainability of family businesses with special reference to India. Ten family businesses were identified for the project. The diversity allowed seeing how local innovations and business ideas have fuelled entrepreneurship in family concerns which have often been perceived to be "traditional" and therefore "status quo-ist". The oral narratives may actually point to a reality in business which is at a variance with these long-held views about family business. The advantage of oral narrative is its unstructured format and a degree of informality. This can bring to the fore the ignored elements in family business for example, the role of family values, the women in the family and their contribution in business decisions, etc. The family business model can actually be a rich and sustainable source for innovation and entrepreneurship.
A National Colloquium on Family Business was organised by the College at the India Habitat Centre in April, 2014 where the Keynote Speaker was Mr. Uday Kotak.
The College is actively engaged in the process of setting up a Centre for Family Business and Entrepreneurship in the near future to research on related areas.

Significant outcomes

Some traditional businesses in Delhi, particularly in the Chandni Chowk area were taken up, for example, the famous Ghantewala, Kanwarji or Chainaram, Ram Chandra and others. The members of the business families extended their cooperation and their willingness to speak to the students provided fascinating stories of their enterprises, some of which are several generations old. These stories are being put together so that a more complete picture about individual family businesses would emerge. These are narratives in their own voice, not mediated by a third person because in such a case a certain amount of critical interpretation may also creep in. In this project, the effort will be to keep the narratives stand on their original rendition. Commentaries, wherever necessary will complement the stories.
India has a plethora of family businesses that have survived more than three or four generations. These businesses are making a substantial contribution to the growth of the Indian economy, and hence expect the government to offer a more targeted support.

SPM201- Teacher Absenteeism in Higher Education, Maladies and Remedies: A Case Study of University of Delhi

Brief description

Teachers are the transmitters of knowledge who help ensure that children learn. Not so long ago all the leading national news dailies carried headlines stories suggesting the sudden, unscheduled visit of the Vice Chancellor of University of Delhi to some prominent colleges led to a chance discovery of phenomenon of growing absenteeism (unauthorized) in the University, The news generated lot of heat and dust but unfortunately it could not be translated into a meaningful debate involving the primary stakeholders of the system –the teachers, students and administration –rather it led to clarifications, accusations and counter accusations. Absenteeism is both intriguing and frustrating and yet there is no governmental policy on it. High rates of teacher absence often signal deeper problems of accountability and governance that are themselves barriers to educational progress. This project tried to probe the issue in utmost objective manner as there were very few authoritative studies on teachers 'absenteeism in higher education.

Significant outcomes

This project carried a lot of importance as education itself is one of the key sectors of social as well as public policy which plays a dominant role in modernizing as well as launching a civil society into a greater horizon of physical as well as meta physical excellence. Based on responses from students of various colleges it was found that absenteeism exists in University of Delhi. Mixed responses from the students received as the students did feel that absenteeism has really impacted their performance. It has led to dissatisfaction and apathy towards the system but the system of internal assessment did stop them from giving their responses openly. Investigations also confirmed that male teachers tended to be absent more often than the female counterparts. Some students also feel that the substitute teachers are not effective in the classrooms because of lack of continuity in educational programme.

SPM202- A study of the access to free and compulsory education provided by Right to Education Act to the Dalit child located in the slums of Delhi

Brief description

The need to understand the access to free and compulsory education provided by the Right to Education Act to the Dalit child located in the slums of Delhi realized through this project. If their children get quality education, it may go a long way in undermining the Caste System and strengthening the civic society. An outreach programme that aims to undertake the project in a slum of Delhi was planned.
The paper attempts to throw light on the ongoing pattern of education in the Delhi slums under the Right to Free & Compulsory Education, 2009. In this exploration the paper particularizes the Dalit community, thus centering on the lowest denominator of the society to study the influence of the RTE Act. The Dalit community represents not only an economically weaker class but also a class that is socially discriminated against. The paper also focuses on such aspects as no detention, no corporal punishment, no board examinations, ban of tuitions and the feasibility of CCE, in the assessment of the provisions of the Act.

Significant outcomes

It is not fair to put the first generation Dalit learners to begin their educational journey with other children in the same class. It results in low self –esteem for a Dalit child. The sensitive handling that is required by a teacher to address the teaching in a mixed class is often not there. In view of field- reality, a model framework of intervention could be to allocate such clusters as Sanjay Basti to one NGO or to one corporate house as part of corporate social responsibility to run a school to hold remedial classes for its children, say in a community centre/school nearby, and to monitor its progress. There are approximately 2000 clusters in Delhi. For every 10 clusters, a head supervisor may be appointed to examine one school a day. These schools should act as facilitating agencies, undertaking required hand-holding for the Dalit students. The level of education at which entry to teach in such a school could be permitted is class XII. The fresh from school volunteers, will be given small achievable targets to ensure good learning outcomes for the Dalit students.
The voucher system could be put in place to make these schools deliver. School vouchers give parents some say in their child's education.

SPM203- A Socio-Psychological study of mental health of northern states of India

Brief description

The aim of the project was to study the mental health conditions across various strata of the society. Mental health conditions were studied on psychological and social basis. Newspapers are full of news of road rage, aggression in schools, domestic violence, suicides etc. These kinds of behavioral patterns and their predispositions are at an increasing rate day by day in our society. There is a need to understand the phenomena of ill mental health and its manifestations in various behavioral forms. This study will help to understand the disharmony prevailing personal and social life due to ill mental health. Various Mental health camps were organized to impact psychological training programs to the people suffering from ill mental health. These training programs were imparted at Prayas Observation Homes for under trial juveniles for a month. Awareness about mental health was spread mainly through Nukad Natak and processions amongst other methods used. Two centers were established to impart psychological assistance to the people who were suffering from ill mental health (at Swan Adhyatmik Society, Preetam Pura and at Refugee camp Peeragari, Paschim Vihar). More than 500 people approached to seek the psychological assistance from these centers.

Significant outcomes

One of the objectives of the study was to understand the juvenile's mental health conditions. To achieve this purpose, the study was focussed towards juvenile delinquency and "Prayas shelter Home" in Delhi was selected for the target group. Data of 50 under trials was collected in the case study form. It was found that mostly under trials were caught under the crime of theft, rape and attempted to rape crime in the present study In this study, the under trials reported that internet and movies were a strong influence for their criminal activities. According to the study all cases were found cognitively intact on mental health examination. Most of the undertrials in the present study belonged to lower, middle or poor category. In this study, the juveniles reported that bad company and peer pressure was a major cause of their drug addiction. Most of the juveniles reported domestic violence in family and disharmony in relationships between family members. Majority of under trials were reported as extroverts found high on aggression and antisocial behavior also.

SAC202- Soiless culture- Hydroponics

Brief description

By 2050, the world population is estimated to reach 9 billion. Soil has therefore become a fundamental resource that must be protected as a matter of urgency. There has been a continued degradation of soil. Soil degradation means decline in soil quality caused by its improper use, usually for agricultural, pastoral, industrial or urban purposes.
Hence, soil degradation is a serious environmental problem globally and may be exacerbated by changes in climate. It encompasses physical, chemical and biological deterioration. Soil degradation happens when it loses its quality and productivity. Human activities and natural disasters are primarily responsible for soil degradation. Hydroponics is a form of gardening / farming that does not need soil in the traditional sense. Instead all the nutrients that a plant needs to grow and thrive on are delivered directly to the root zone through the watering system. 'Soil' is needed as an inert medium in the form of perlite, rockwood, clay pebbles or coco fibre to support the root system. The nutrients can be derived from either inorganic or organic mineral salts.

Significant outcomes

Hydroponics is a method of growing plants without soil. In nature the soil provides various nutrients and is also a means of physical support for the plants. For the project undertaken, soil was replaced by inert media, coco peat and perlite were used as mediums to grow the plants. Nutrient solution was provided to the inert media. For comparison, similar plants were also grown in conventional soil medium. The comparison was made on points like quality of flowers or fruits, growth of vegetation per unit area and, pest attack on plants. Plants grown for the project work were different varieties of basils, lilies, tomatoes, different salads, bell pepper etc. Findings reveal that hydroponics can offer an alternate means of food production and anything that can be grown in a conventional garden can be grown hydroponically. On a larger scale, this method has proved to be cost effective as well as it can effectively be used for crop production where soil is not available as in deserts or in space or in regions where the soil is infertile.

SAC203- Green Diesel- A sustainable alternative fuel for the future

Brief description

Transesterificaton of oils to their corresponding Fatty Acids Methyl Esters(FAME) has recently been recognized as an easy and cost effective technology for biodiesel production , mainly on account of the desirable physiochemical properties of the biodiesel produced. The experiments show that optimum yield of Gutter oil (Waste vegetable oil) and Linseed oil was obtained at 0.6 % of catalyst whereas yield of Karanja and Jatropha was at 0.9%.The physical properties of oils and biodiesel were also studied.The vital parameters of gutter biodiesel viz., density, specific gravity, viscosity, iodine value, and calorific value were at par with the biodiesel obtained from the plant sources. The properties of biodiesel prepared from different oils are consistent and conform to the ASTM (American Society for Testing and Materials) standards.

A Symposium on **Green Diesel** was organized by the Innovation Project Group on 28th August 2014 in the Seminar Hall of Sri Aurobindo College. Student members of the Innovation Project presented the results of biodiesel research which was well appreciated. The Symposium was graced by the presence of two eminent scientists in the field. Sh. Jai Uppal, Sr. Consultant, Alternate and Renewable Energy and General Secretary, Samyak Vikas Sanstha (SVS), a renowned name in the field of Alternate and Renewable Energy was the chief guest and gave a talk on Technology Options in Biofuels.

Significant outcomes

The project has tried to find hitherto less explored alternatives to the conventional petro diesel. While exploiting the established plants as raw materials to biodiesel have their own socio-economical-ecological problems, gutter oil recycling has shown great promise as an adjunct viable raw material for the production of biodiesel. This practice will also not encroach upon the much vital agriculture area utilized for conventional agriculture crops. Gutter oil can thus be exploited as a cheaper and viable alternative for biofuel blends.

Present studies have shown some encouraging results indicating the potential to exploit Gutter oil for the production of biodiesel. Considering the fact the thousands of liters of waste oil is generated in mega cities like Delhi, a pilot project involving its collection and recycling will help in mitigating soil and water pollution due to this waste product.In addition, this may also prove to be much more cost effective alternative to conventional diesel. Recycling of gutter oil will also help in mitigating the water pollution.

Two publications.

SAC204- Synchronizing Education and Employment opportunities for the differently abled

Brief description

The first ever world Report on Disability, produced jointly by the WHO and the World Bank, suggests that more than a billion people in the world today experience disability. 300 surveys have been conducted by way of structured questionnaires which targeted the visually challenged students, employees and persons from various corporate sectors.
One of the trained students has been hired by an NGO, Society for Child Development under its programme Trash to Cash for providing sustainable employment opportunities to persons with disabilities. He is going to different parts of the country to impart training to the persons with disabilities for self-employment.
The project had been initiated to bridge the widening gap between the existing education system and the potential for employment for visually challenged persons. Primary purpose of the project was sensitization of the students and teachers of the university to open up jobs opportunities to visually challenged persons for that no. of seminars and workshops were conducted in different colleges of university.
The electronics students have tried to build an indoor navigation system to enable the visually challenged persons to have free movement in institutons without any assistance from others. They have designed a low cost circuit for this purpose.


Significant outcomes

Sarthak Education Trust has made University of Delhi the academic partner for carrying out its larger goals to provide suitable employment for persons with disabilities through our innovative project.
A workshop was conducted in Miranda House with the support of Lakshita, Enabling Unit of Miranda House to provide employment opportunity for the persons with disabilities. Four companies interviewed 109 persons with disabilities to provide suitable jobs.
A sensitization workshop in Sri Guru Gobind Singh College of Commerce with the support of Jagriti was conducted to sensitize the College students and staff about the needs and problems faced by the persons with disabilities in carrying out their day to day work
Publication: Two papers

SAC (eve) 205- Determining language (English/Hindi) preferences in the commercial world as used by customers, companies and commercial conditions and the factors that dictate such preference

Brief description

This project is a combination of two disciplines commerce (marketing) and language (English/hindi). One obvious feature of how language operates in social interactions is its relationship with power which can be both influential and instrumental. Neither rule nor law, neither discipline nor hierarchy influences power to the extent that language does. It inclines us to behave in certain ways, adopt opinions and attitudes without any obvious outside force. Language operates in such social phenomena as culture, advertising and the media. We are never physically coerced into buying what the advertiser shows us, nor do we suffer any penalty for our 'sales resistance, yet quite a number of our buying selling decisions and other commercial transactions are influenced by a play of language. This 'Instrumental' power of language is different from the explicit Instrumental power of the sort imposed by the state, by its laws and conventions or by the organizations for which we work. Language operates above any dictate of the state; it is completely democratic, free flowing and liberated. It operates in business, education and various kinds of management taking on hues from personalities, position and the milieu. The data had been collected from all spheres of market i.e. malls, sadar bazaar, local regional market, similarly all age groups and different occupation have been covered resulting in good combination of data collection and exact picture of market obtained. The present study is descriptive and analytical in nature.
In future, companies will be more oriented towards language for better communication, so this study will be more beneficial for them.

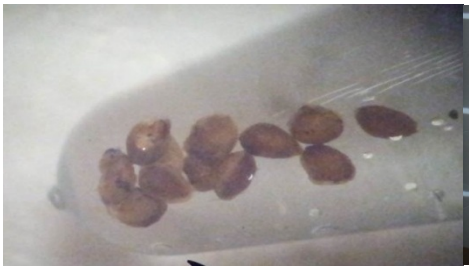
Significant outcomes

After doing this study some suggestions are given as follows:-
- Most preferable language in business interactions is local language.
- Local languages are the ways to built better communication with customers although Hindi and English are suggested best Communication standared Modules.
- Local factors responsible for language preference in business interaction.
- Cultural influence is the cause that leads companies to bring changes in language preference.
- The overall trend in language preference is towards English.
- There is potential and desire for language trainability amongst users across all levels.

SAC206- Building Biodiversity Database for Vesicular Mycorrhizal Fungi in Delhi

Brief description

Almost all land plants form symbiotic associations with Arbuscular mycorrhizal (AM) mycorrhizal fungi which perform vital functions in the phosphorus cycle that ultimately result in a 20% net increase in photosynthesis.
The study was conducted in 10 Delhi forest sites and one site from Himachal Pradesh in India which included hill region of Aravalis and Himalayas respectively. India as a country boasts of its climatic and soil variations, and hence scope for much diversity in agriculture. These practices affect mycorrhizae both quantitatively and qualitatively. An understanding of their taxonomic status, geographical distribution, occurrence and abundance is of prime importance in understanding ecosystems functioning and exploiting them as biofertilizers and to increase the bioavailability of immobilized soil minerals. Several checklists such as catalogue of life, INVAM, AMF biodiversity in India, a checklist or identification manuals have proven as effective tools for mycorrhizal research and application. Even with such a huge ecological importance, AMF species diversity in India is poorly known despite the fact that India is one of the major biodiversity centres.




Significant outcomes

1. Checklist as a database available at amfungi.aurobindo.du.ac.in or www.amfungi.in which serves as a quick reference for knowing which Glomomycotean fungi is expected at any Indian location and can be further used to fill gaps at India region in world distribution maps of AMF
2. Raised pure culture of some AMF where international success rate is just 2%. Biotech companies all over India are approaching them for cultures
3. This information about region specific diversity of AMF has important implications for use of non-indigenous AMF inoculation for commercial purposes in horticultural and land reclamation studies. In addition to providing information to scientists and researchers in the field of mycorrhizal fungi, the list will be used by officials in central and state government, besides Botanical survey of India to develop a list of AM fungi that are common in each state to help expedite the process for obtaining the research isolates and cultures.
4. The team developed collaborations with organic farming Kendra organization at Rattangarh Rajasthan named 'Divya Jotie Rishi'.

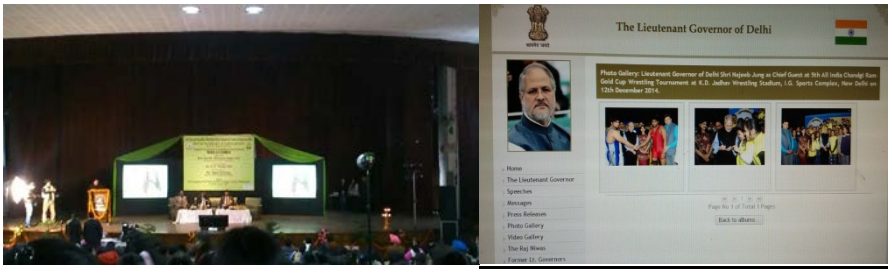
SAC(eve)207- Giving Time, Time and Again: Exploring Psycho-Social Determinants of Volunteerism in Sporting events

Brief description

The purpose of the study was

- To examine how motives are associated with the amount of time spent volunteering at different sporting events.
- To examine how role identity is associated with different types of volunteering work and with length of service as a volunteer.
- To examine how individualism and collectivism relate to perceived personal responsibility.
- To examine how individualism and collectivism relate to perceived social responsibility.

The study will involve a multi-pronged research strategy. It will involve qualitative analysis, experiments and surveys.
A survey (N=300) was conducted to know the participants' current level of involvement and length of service as volunteer. Data was collected from IPL cricket matches, IPL kabaddi and All India Chandgiram Wrestling Tournament held in Delhi during the period of 2013-2014. The findings suggest that individualism v/s collectivism, pro-social behaviour and voluntary function dimensions like career and values are positively correlated with volunteerism. The obtained data indicate that the mean score of male volunteer participants on voluntary function dimension were higher than female counterparts.



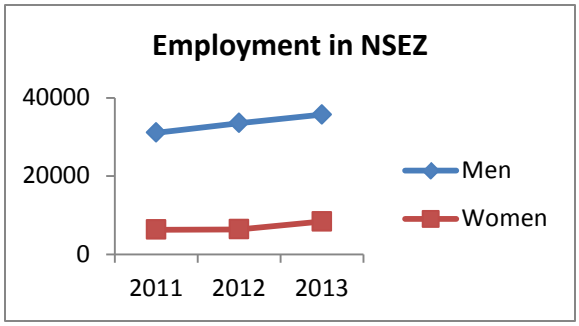
Significant outcomes

Through this project students were able to know more information regarding how motivation relates to volunteerism and who are the people who develop these kinds of activities. It will be useful to concentrate on the questions: What reasons do they have in these kinds of voluntary activities and how do they decide to join organized groups to participate these kinds of activities. Why do some people participate individually? How role identity and motivation relate to volunteerism? All these questions were explored for an answer.

SGGSCC201- Special Economic Zones: A Comparative Analysis of China, India and Korea

Brief description

The research focuses on three Asian countries, namely, South Korea, China and India, vis-à-vis their SEZ policy and evolution as more and more countries are adopting these trade promotion zones for manufacturing and trading in multiplicity of goods and services. SEZs have distinct rules from that applied in Domestic Tariff Area (DTA), offer quality infrastructure and hassle-free business environment enabling an economy to promote and diversify exports, attract FDI and create a strong competitive basis. SEZs in select countries which have traversed different evolutionary paths and have different levels of success have been compared. While China and Korea capitalized on prospects generated by SEZs, Indian scenario has limited success. The factors like changes of government in power and policies, labour laws, location, infrastructure, administration, Regional Government's policies, overall SEZ framework and incentives offered, impact the performance of SEZs. The overall economic and political climate and its stability in three select countries considerably differ and so, differs the SEZ policies and the extent of success SEZs have reached.



Significant outcomes

1. The success of Chinese zones provided impetus to similar enclaves in India and Korea. SEZs, in all three countries are growth engines for economies to achieve large-scale industrialization with special tax incentives for foreign investments. These countries are steadily extending to newer directions and adding or expanding its operations.
2. *Land acquisition issues* settled offering adequate compensation, resettlement, rehabilitation and employment to displaced families. With good compensation packages, displaced have purchased business and housing land, opened shops vicinity, earning well or living on rental income and did not seek jobs in SEZ units.

SGGSCC202- Sustainability As An Innovative Business Strategy - Challenges And Key Drivers For The Corporate World

Brief description

The Indian economy is the world's eleventh largest by GDP and the fourth largest by purchasing power parity. The economic growth over the last few decades has brought with it social and environmental pressures as well as the need to raise the standards in terms of sustainability measures and corporate governance. The "Age of Abundance" is over. In the new world, resources are scarce and Sustainability is a business imperative. Organizations that act in a sustainable manner not only help maintain the well-being of the planet and people, they also create businesses that will survive and thrive in the long run. In the last decade, sustainability has become an increasingly integral part of doing business in any industry. For companies to balance their financial, social, and environmental risks, obligations and opportunities, sustainability must move from being an add-on to 'just the way we do things around here. . Globally, companies are taking initiatives to curb GHG (Green House Gases Emissions) and are disclosing relevant data. An innovative instrument like GREENEX, by BSE is a commendable move in the right direction and would strengthen this trend. This requirement would initially be applicable to the top 100 companies in terms of market capitalisation. The New Companies' Bill has suggested that companies with a turnover exceeding Rs. 10 billion would spend at least 2% of their average profits over the previous 3 years on CSR. The purpose of this study is to contribute to understand the corporate processes for developing a sustainability report & Key drivers or Bottom line benefits of sustainability reporting. The study will help to understand the obstacles faced by the corporates and the way in which organisations have transformed their overall working, accounting practices to incorporate the idea of sustainable performance into strategy of the company.

Significant outcomes

1. The study would help to understand the obstacles faced by the corporates and the way in which organisations have transformed their overall working, accounting practices to incorporate the idea of sustainable performance into strategy of the company.
2. The sample companies of GREENEX of BSE would act as a benchmark for medium and small scale enterprises and results are expected to encourage them to adopt this as a voluntary initiative.
3. Various stakeholders including investors & consumers would find this study really useful to assess the GREENEX companies as a profitable & responsible investment opportunity. As this study is trying to establish the profitability, turnover patterns and their stock market performance vis- a-vis the other top market performers covered by various indices over a period of time.

Publication: One paper.

SVC201- Modernization of Hindi Language

Brief description

Hindi is a modern Indo-Aryan language and is a decedent of Sanskrit, the earliest speech of Aryans settlers in north-west frontiers of India. Passing through various stages of evolution over a period of time- from classical Sanskrit to Pali- Prakrit and Apabhransha, the emergence of Hind is in its earliest forms can be traced back to 10th century A.D. Hindi sometimes is also referred to as Hindavi, Hindustani, and KhariBoli. All languages are inherent to changes and development as they are subjective in nature language grows with time as it gathers mass support and crosses regions and borders. As the aim of this project is Modernization of Hindi Language & The process of modernization is an over growing, never ending process. Indian languages are no exception to this.

Language, like stream of water, flows (भाषा ब ताि ीर) in a continuous direction and forms its own course which changes and modifies with time, it takes in words from other languages, or discards the terms which are not required by the society and continues to flow. Language is intimately related to the perception of the outer world and the sensitivity of the inner, and the thinking process of the speech community. The language undergoes significant changes in order to meet contemporary needs and aspirations of the changing society. This process is known as the modernization of a language.

Significant outcomes

1. Modernization of a language is a natural process which occurs due to changes in culture and society. Language is dynamic in nature and thus its flows can be stopped or curtailed. Hindi has always been an inclusive language and this is not a recent phenomenon but has been prevalent for over a millennium.
2. This evolution has only enriched the language and has made it popular, progressive and widely acceptable making it the language of the masses. This only strengthens its roots not in our mother land but also in the foreign lands.
3. By this project, came to know about the thinking of some people who still do not feel good having Hindi language as the mother tongue of India. They still think that whoever speaks in Hindi they do not have mind, they are not properly educated & they are backward, which is wrong thinking. Yes! English is very attractive and good language but it does not mean that Hindi is not good language which shows a person as a backward person.

SVC202- Studies on Circadian Variation in Secondary Metabolites Composition and/or Concentration in Commonly Used Medicinal Plants of Delhi Using HPLC Fingerprints and its Socio-Economic Impact

Brief description

The composition and/ or concentration of secondary metabolites in medicinal plants vary with respect to circadian rhythm (i.e. 24 hours cycle). The broad objectives of the project are:

i. Identification of Delhi flora for their medicinal properties especially which are being used by common people in Delhi and nearby areas.

ii. Qualitative phytochemical screening of these plants for various secondary metabolites at different time points within a diurnal and annual cycle e.g., steroids, terpenoids, tannins, saponins, fatty acids, anthocyanins, leucoanthocyanins, coumarins and emodins etc.

iii. Generation of HPLC fingerprint of selected medicinal plant extracts collected at different time point of the day and night, to know when they are most effective.

iv. Communication of thus obtained information to common people so that they can effectively make use of these medicinal plants with lesser cost and higher output terms.

Significant outcomes

- Generation of HPLC fingerprint of these medicinal plant extracts collected at different time point of the day and night, to know when they are most effective. Also NMR and mass spectrometry based analyses of the same for detailed study.

- Molecular biology approaches to reveal the mechanism underlying this timely response of generation of secondary metabolites in medicinal plants is the next target to understand the systems biology of the same, specifically the epigenetic mechanisms.

- Communication of thus obtained information to common people so that they can effectively make use of these medicinal plants with lesser cost and higher output terms.

Publications: Two papers and two posters.

SVC203- Buddhism is Dead, Long Live Buddhism: Literature, Films and Historical Constructions

Brief description

The project is basically on Living metaphors of Buddhism. Those who were a part of this project were all attracted by the very high levels of general awareness of Buddhism in India. While the religion was finished by the time Akbar started his round table with various strands of religious/spiritual thoughts. How then an average Indian needs no introduction to Buddhist religion, motifs and metaphors and iconography. The chant of 'Budhham Sharanam Gachchami' does not need any introduction to any Indian. Buddha finds himself sitting on the shelves of shops, hotels and even homes of people who are no way connected with Buddhism. Representations in films and Hindi literature suggest how basic principles and symbols sustain the ever increasing popularity of Buddhism. Sumitranandan Pant in his poem बुद्धकेप्रति writes, "दुखोंसेनिर्वाणप्राप्तिकरशान्तिअमृतलाएतुमजनहित ,दयाधर्म , अष्टांगसाधनाभवजनकोदीकरुणाप्रेरित.

The basic objective of this study is to understand why and how Buddhism in India has sustained and grown despite having eclipsed in medieval India. How have the representations in films and Hindi literature aided in this process? It is pertinent to understand the oxymoron inherent in the theme itself

Significant outcomes

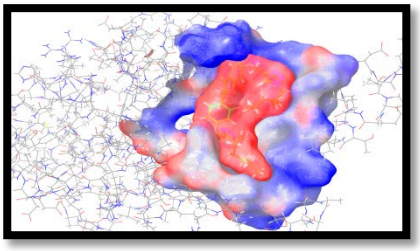
The most remarkable development that was noted during our explorations in Delhi, Dharamshala and North Eastern States like Sikkim and Arunachal Pradesh was that Tibetan Buddhism has overtaken Buddhism in India in almost all forms and manifestations. This absorption of Indian Buddhism by Tibetan Buddhism is something that needs to be debated fully, Also, the popularity of this fast growing religion is derived from its dynamism and adaptability; factors that are leading diverse people to embrace Buddhism all over the world like- to find solace from hectic lifestyle for most westerners, spiritual experience.

By this project, got a chance to know about the Buddhism & good thing is Buddhism ia almost in every corner of India, But one difficulty came is that The men and women who hung the calendar or photo of Buddha knew almost nothing of him. He was bhagwan, period! Yet Buddhism in its metaphorical form, was present everywhere, was known all over India.

SVC204- Design, Synthesis and Biological Evaluation of Novel Oxygen Heterocyclics as Potential Antitubercular, Antibacterial and Antiviral Agents

Brief description

Tuberculosis wipes out 2 million people annually worldwide. It mostly affects individuals with compromised immune systems, such as diabetics and HIV patients. In addition to these, multidrug-resistant and extremely drug-resistant strains of Mycobacterium tuberculosis have become a serious challenge in the treatment regimes. Low-cost TB drugs are in constant demand, and there is a resurgence of research in the pursuit of alternative and integrative medicines from the locally existing medicinal flora. Natural products continue to provide leads for the development of novel drugs to treat the rapidly growing numbers of patients with multi- and extensively-drug resistant tuberculosis.
Flavonoids are known to exhibit numerous beneficial biological activities such as inhibition of key enzymes, antibacterial, antiviral and antioxidant behaviour. Recently, chalcones, flavones, flavanones with Naphthalene, Pyrrole, piperizine, benzoazepine, morpholine and similar heterocyclic units in the rings A, B and C are reported to have excellent antitubercular activity. Presently we are designing novel drug molecules which might prove to be more effective antitubercular, antibacterial and antiviral agents. Of particular interest to us is the antitubercular activity of natural and synthetic flavonoids.



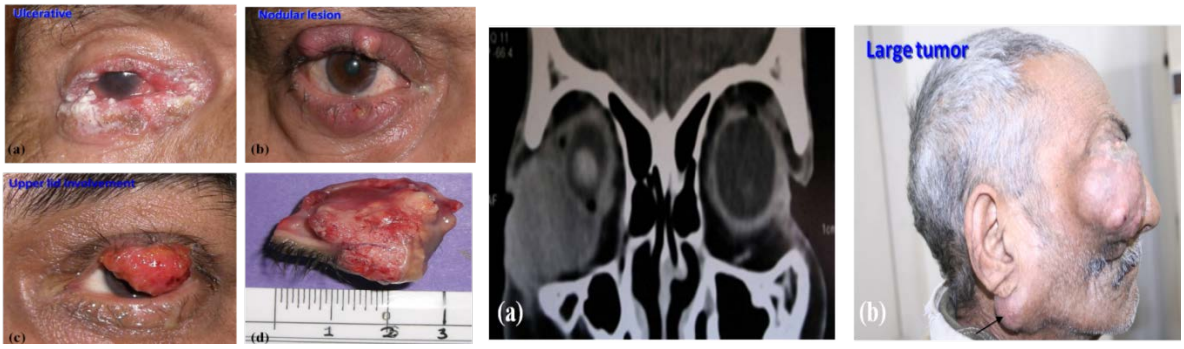
Significant outcomes

We have designed 231 novel antitubercular compounds which were subjected to in silico screening with PtpA & PtpB. For each ligand, protein–ligand complex were all subjected to energy minimization. Based on the result of the docking studies, a family of six top scorer flavanones having nitrogen in the heterocyclic ring is being synthesized. These synthesized compounds will be then subjected to biological evaluation.
A family of seven potent antitubercular chalcones has also been prepared. These compounds were subjected to experimental BSA binding and in-silico docking studies. BSA binding studies have shown that these compounds bind moderately to BSA/HSA, major drug binding protein in the body. Moderate binding will ensure the bioavailability of the drug. The synthesized compounds have shown reasonably good bioavailabilty and can be taken up for further studies.
Publications: One article

SVC206- Immunohistochemical Evaluation of Candidate Makers for Sebaceous Differentiation and their Association with Aggressive Eyelid Sebaceous

Brief description

Sebaceous Gland carcinoma (SBC) is a malignancy associated with the pilosebaceous unit and occurs at ocular and non-ocular sites. PPARs (α,γ,δ) mediate epidermal growth, differentiation, and lipid metabolism. COX-2 is the inducible form of cyclooxygenase, for prostaglandin synthesis and is often expressed in various non melanoma skin cancers. We aim to study the role of PPAR-γ, PPAR-α and COX-2 in eyelid SBC. PPARγ (Peroxisome Proliferator Activated Receptor γ) are transcription factors whose target genes have been identified and most of them are involved in adipogenesis, glucose metabolism and angiogenesis. PPARγ also plays an important role in carcinogenesis and is up-regulated in many tumor tissues and its ligands, (troglitazon) can induce apoptosis and exert ant proliferative effects in human colon cancer.



Significant outcomes

1. The intense cytoplasmic COX-2 expression in eyelid sebaceous cell carcinoma and increased expression scores in higher tumor grades implicate that COX-2 might be an early marker of neoplastic transformation and point towards cases of ocular SBCC which are likely to behave aggressively and these patients need to be followed up carefully for recurrences.
2. The data support the prognostic effect of COX-2 and PPAR-γ in SGC and emphasizes the potential clinical relevance of additional research in this field. The inhibitors of COX2 such as NSAIDs are known to reduce the risk of many cancers by suppressing and preventing tumorigenesis, thus demonstrating a role of COX2 as a biomarker in cancer progression.
3. The field of tumor markers is ever expanding with many new candidate markers either in clinical use or under active evaluation. Innovative project-206 has given an excellent opportunity to our students to identify novel drug targets/biomarkers (COX-2 and PPAR-γ) for the first time in eyelid sebaceous cell carcinoma

Publications: Two posters.

SVC207- Determinants of Sovereign Ratings and Its Implications for Economy and Financial System- An Empirical study

Brief description

In the present study, we compare the models used by the main rating agencies - Moodys, S&P and Fitch Ratings to identify the most reliable model of sovereign ratings. The study involves comparing different methodologies to determine the robustness of the model. The fundamental determinants of sovereign ratings are examined to identify their relative importance and give policy implications with special reference to India. The study uses factor analysis for extracting the main determinants of sovereign ratings. The ordered logit and ordered probit models are fitted for examining the relationship of the determinants with the sovereign ratings for each rating agency.

The study shows that economic strength, inflation and governance indicators are significant determinants of sovereign ratings. It was suggested that a country (India) should focus on economic growth, good infrastructure, a conducive business environment and control inflation in order to improve its ratings.

The study is useful for policy makers, regulators and global investors. It also contributes to the international finance literature.

Significant outcomes

- On comparing the rating models used by the different rating agencies, it is observed that many determinants are common between the agencies. However, the results indicate that the different rating agencies give different weightage to the factors.
- Of the three agencies, Moodys model is found to be most reliable. It has a higher percentage of correct predictions compared to its counterparts. The prediction of S&P and Fitch are found to be weaker. This may be because these agencies have not given adequate weightage to the good Governance indicators.
- The Governance factor is seen to be a very important determinant of sovereign ratings. The countries with good governance have a higher likelihood of getting better ratings from Moodys.
- Another determinant which is significant in majority of cases is the economic variable. Moodys is likely to assign high sovereign ratings to an economically strong, diversified and competitive nation.

SVC208- Design, Synthesis and Evaluation of Novel Chalcone And Coumarine Derivatives as Anticancer Agents

Brief description

Flavonoids are the most well studied group of phytochemicals, the consumption of which has proven to be a natural and safe way to combat cancer. Among these flavonoids are Chalcones and Coumarines. Many mechanisms of action have been identified, including the inhibition of tubulin assembly, inhibition of angiogenesis, induction of apoptosis, anti-estrogenic activity and reversal of multidrug resistance; or a combination of these mechanisms. Chalcones / Coumarines are natural products that display various biological activities, including anticancer properties. Compelling data from laboratory studies indicate that these compounds have important effects on cancer cell growth and proliferation. Many mechanisms of action have been identified, including the inhibition of tubulin assembly, inhibition of angiogenesis, induction of apoptosis, anti-estrogenic activity and reversal of multidrug resistance; or a combination of these mechanisms. Based on these results, Chalcones / Coumarines appear to be promising anticancer agents.
This is an era in Science where we are exploring our ancient roots and where we can delve into the molecular mechanism of bioactive compounds which are exhibited in Mother Nature. One of the objectives of this project is to design and synthesize potential derivatives of Chaconnes or Coumarone using traditional knowledge of plants, which will further be evaluated for Anti-Cancer activity using cancer cell lines.

Significant outcomes

Chalcones can be produced in laboratory very easily by using condensation reaction in the presence of suitable catalyst.
The list of compounds that have been synthesized is given. Samples of recrystallized form of each compound are being screened over cell lines and the compounds are earlier reported to have properties like anti-malarial, anti-inflamatory, anti-fungal, anti-bacterial, antinoceceptive etc. Results are awaited for anticancer activites. A PC- based double beam spectrophotometer was also purchased for identification of the compounds from Systronics (India) Limited.

Publications: A review article titled 'A Review on mechanisms of Anti-Tumor Activity of Chalcones' .

SVC209-Potential of Organic Farming in Combating Salt Stress and its Socio Economic Aspects

Brief description

Organic farming has considerable potential in soil carbon sequestration and helps in ameliorating soil tilth, curtailing bulk density, increasing water infiltration and microbial activity which help in gradual release of nutrients. Organic agriculture is seen as an alternative to current agricultural practices which are unsustainable, given the harmful consequences of environmental degradation, declining crop productivities and concerns of chemical contamination. While the progress of organic farming has been slow in India, the potential is vast. The farmers would agree to replace the chemical based agriculture with the organic methods only if it is profitable. The study was undertaken to assess the precise value of different naturally available fertilizers and manures singly and in combination for major pulse crop, *Vigna radiata* in India and to study the salinity tolerance in black gram after organic fertilizer treatments and to analyze the socio-economic aspects of organic farming in combating salt stress. The principal aim of agriculture is to produce high quality, safe and affordable food for an ever-increasing worldwide population.

Significant outcomes

1. This project has cogitated deeply on raising awareness about a major problem the staple food of India is facing, which is salinity. If the farmers are made aware of the problems faced they can adopt the preventive measures to reduce the salt stress.
2. The project is inter-disciplinary as it is engaging streams of economics ,helped the students to learn about different biochemical processes involved in combating different types of abiotic stresses. They have learned how to grow the plants in the fields under different climatic conditions. They have learned various enzyme assays, protein isolation, SDS Page profiling methods.

Publications: Two papers

SVC210- Mathematical Modeling and Simulation Of Neural Network Based Controllers for Robots.

Brief description

The project tries to implement a smart approach for real time detection and extinguishing of fire blown in industries using an autonomous mobile robot. Industries of today's world are a great place for fire to blow up. There are many factors due to which an industrial fire may be caused. The project tries to present methods to detect potential factors and minimize their effects. Also if accidently a fire gets blown up, then there are methods described in the project to extinguish the fire as soon as possible.
Develop algorithms based on artificial neural network technique to control the position trajectory of the robotic arm so that it tracks the desired trajectory as closely as possible for all times in spite of parameter variation, uncertainties and nonlinearities present in the system. Our aim to design a neural network based controller for robotic arm that is capable to draw a circle. The project tries to present an improved approach over conventional approach.

नई सोच और इंजीनियरिंग का नायाब नमूना है 'अंतरध्वनि'

महोत्सव

नई दिल्ली | रोहित पंवार

ऑपरेशन में डॉक्टर की मदद करता है 'जेस्चर कंट्रोल रोबोट'

कंपन से बताता है आगे का रास्ता

आग का पता लगा सकता है फायर फाइटिंग रोबोट

रीढ़ की हड्डी से जुड़ी बीमारी दूर करने के लिए स्पाइन वेदा

Significant outcomes

The project is an attempt at contributing to the field of autonomous machines to be used for high precision day to day work. The robots of today are involved in work dealing with heavy machinery and simple logical demonstrations. The influx of robots in complex logical environments with great working precision is yet to be seen in today's world. There is a need for the robots to be able to simulate how we humans function, which is one of the core aspects of our project. Our demonstration here would show that the physical model for robots combined with the conventional method for self error-fixing would help robots function in a more efficient and accurate manner, which would then allow them to become an integral part of our daily life. The Industrial fire fighting robot can prove to be a revolution in industries. The number of accidents, loss of property and life can be minimized to minimum with the help of this robot.

SSC201- Computational Methods for Statistical Analysis in Astrophysics

Brief description

The work aims at constraining cosmological parameters using data. Astrophysics and Cosmology draw on a variety of expertise from Physics, Maths and Computational Physics. While particular problems may be specific to cosmology, techniques like data analysis, computation, modelling etc which are studied by students in different contexts can be applied to these fields. Hence what the students learnt in the project can be applied to more advanced problems. This realisation by the students will be a very important step in their education.

We began by considering a toy model with limited number of parameters (α_1,α_2,α_3..) such that:

F_i (αi) = C_i,

where Cis are the observables.

With this model we studied how to define a merit function, quantify agreement between model and data, then by maximizing the agreement obtain best fit parameters. Any useful procedure must provide: 1) best fit parameters 2) estimate of errors on the parameters 3) possibly a measure of goodness of a fit. We learnt techniques like $\chi 2$ -test, calculation of Fischer Matrix and estimation of confidence levels, Monte Carlo simulations. These techniques involved understanding of statistics use of Mathematica, IDL.

Significant outcomes

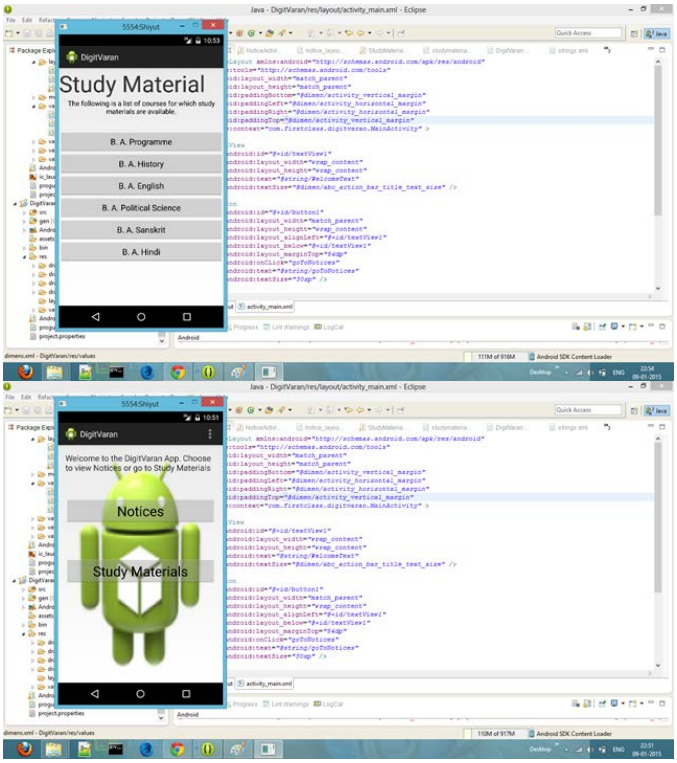
1. The data analysis techniques that the students have learnt as part of the project are not limited to Cosmology. Data Analysis is a very vast field that finds application in all fields.
2. The Variable Chaplygin Gas model is able to account for the observations regarding the evolution of the universe.
3. In order to constrain the parameters of the variable Chaplygin model we do a statistical analysis of the Gemini Deep Deep Survey (GDDS) look back time estimates of high z-galaxies. The total GDDS sample consists of 20 old passive galaxies distributed over the redshift range $1.308 \leq z \leq 2.147$

One publication

SSC202- Digit-Varan: A Comprehensive Digital Enviornment for Visually Challenged Students

Brief description

Digit-Varan aims to overcome problems faced by visually challenged students in undergraduate learning institutions. It is a comprehensive information acquisition, storage and delivery system, designed specifically to fulfil requirements of visually challenged students of colleges of University of Delhi.



Significant outcomes

To arrive successfully at its aim the Digit-Varan team has conducted a survey, and focus group and personal interviews which have helped it find answers to following questions: (i) what information is used by regular undergraduate students that helps them participate fully in the academic and non-academic learning environment (ii) In what form is this information most suited to the needs of visually challenged students (iii) Which extra *enabling* information is needed by visually challenged students and (iv) What kinds of digital platforms are most suitable for the information requirements of visually challenged students. The study attempted to answer these queries.

SSCBS201- Predicting The Financial Crisis Of Companies Based On Cash Flow Statement: An Innovative Approach

Brief description

Ratio analysis has been a widely used technique to assess the operational and financial stability of a company. It reflects liquidity, solvency as well as profitability of a corporate entity. However, it has been seen that academicians have questioned the technique innumerable times and critiqued it as limited to the world of "nut and bolts". This project hypothesis is based on the parameters- Ratios based on cash flow statement have the capability of predicting financial crisis., the new model proposed has the capability to identify the company likely to go bankrupt after one to three years, the new financial ratios are feasible and accurate in predicting the financial crisis of a corporate. The conventional system of Ratio Analysis from Balance Sheets followed an accrual system which led to certain disparities and inaccurate prediction of the Bankruptcy of companies. Thus, a lot of companies which reflected a healthy financial position on paper were cashless in reality. This led to the dire need of developing more accurate predictors of the bankruptcy of companies. The solution was seen in Cash Flow Statements.
Following objectives have been stated for the study:

- To develop new ratios based on cash flow statement to predict the financial crisis of a company.
- To present a suitable model for Indian environmental situation by the means of new financial ratios to identify which company is likely to go bankrupt after one to three years
- To assess the feasibility and accuracy of the new financial ratios in predicting the financial crisis

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Significant outcomes

With a concrete model in place to discriminate among companies which are financially stable from those which are likely to go bankrupt, following are the possible implications:

1. The company's managers can assess the bankruptcy risk and continue the company activity by the use of the model and avoid the excess losses and worsening of the company's situation by accomplishing planning and proper action.
2. The model can be useful in selecting and purchasing the stock of companies by investors. The prediction of the financial situation of the firm can help the investors and creditors to be trustful of the return on investment and demand and avoid excess expenses as much as possible.
3. Financial and credit institution and banks can assess the companies by the use of the model, and also in the process of the credit rating of the companies and decision making regarding credits, the use of the model results in more accurate and scientific outcomes.

SSCBS202- Health Insurance scheme for Domestic workers: Public Private Partnership

Brief description

This paper examines the health insurance scheme for domestic workers in Public Private line families i.e. RSBY in Delhi region, the awareness and perception of domestic help employers and unorganized domestic workers about existing and proposed health insurance schemes, the view of the State and evolve contribution criteria, the hospital management's perspective and concerns for wider coverage under health insurance and insurance companies concerns for effective implementation of health insurance schemes. It also aims to explore the possibility of Public-Private partnership in healthcare insurance. This project has tried to evaluate the perceptions and the viewpoints of various stakeholders involved in Health Insurance. Along with that, the survey done on the households and domestic workers provide us the analysis using SPSS that there is unwillingness of the households to contribute the premium of their domestic workers whereas the domestic workers are willing to pay the premium by themselves. At last, the paper recommends ways which can be incorporated to make a health insurance scheme effective.

Significant outcomes

The perceptions of various stakeholders were analysed and the shortcomings of the scheme are as follows:

1. Low enrolment figures
2. Claim settlement and corrupt practices
3. Less public expenditure on health & various health schemes running parallel
4. Willingness of the domestic workers

Some recommendations are as follows:

1. Clearing off the dues
2. Raising awareness among the beneficiaries
3. Designing an appropriate benefit package
4. Use of generic medicine to reduce co-payment costs
5. Empanelment of public hospitals.
6. Role of Resident Welfare Associations (RRWA).

SSCBS203- E-Mentoring In Delhi University

Brief description

Mentoring is the transfer of knowledge between a less experienced mentee & a more experienced mentor. E-mentoring connects mentor & protégé through a virtual environment. The broad objective is to develop DU Mentoring - an E-Mentoring web site for University of Delhi. "Behind every successful person, there is one elementary truth: somewhere, somehow, someone cared about their growth & development. This person was their mentor. Mentoring brings together the expert and the novice such that the former shares his knowledge, wisdom & skills with the latter. DU Mentoring is an online mentoring program where alumni and seniors of various colleges and departments of University of Delhi connect the current student community and provide guidance for education and employment. Features like registration, selection of mentors, chat, discussion forum, e-get together, double security check etc. have been incorporated.

Significant outcomes

1. E-mentoring has never been used in the University of Delhi but some Universities like IITs & IIMs have been using the concepts of e-mentoring. However, this has never been explored in University of Delhi. This project is an effort to connect the Alumni with the pursuing batch of students for the purpose of providing guidance relating to the academic and professional pursuits.
2. The project gives an opportunity to a mentee (current student or alumni) to seek guidance related to professional challenges like transitioning to a new course, entrepreneurship, employment, networking, research etc. from the experienced and skilled mentors (alumni) via an online space, at a time that suits them.
3. At the same time, it gives an opportunity for the mentor to get connected to their college life and participate in current development of the college. We believe that expertise of the mentors will help in improving the quality of the current students and help in growth of the college.

SSCBS204- Financial Inclusion, Issues And Challenges – An Empirical Study

Brief description

The recent developments in banking and insurance technology have transformed the financial system from the traditional brick-and-mortar infrastructure like staffed branches to a system supplemented by other channels like automated teller machines (ATM), credit/debit cards, internet banking, online money transfers, etc. Certain people, particularly, those living on low incomes, cannot access mainstream financial products such as bank accounts, credit, remittances and payment services, financial advisory services, insurance facilities, etc. This situation is detrimental not only for the individual who is excluded, but also for a nation's economy as micro savings are not properly channelized into the productive sectors of the economy. A long growing concern sought to be addressed by the Government of India, financial inclusion seeks to bridge the gap between the "financially excluded" and the providers of financial services. The aim of the project is to develop a sustainable model for inclusion in India through primary as well as secondary research. The foremost question that we seek to address is about the unification of financial independence to the underprivileged on one hand, and maintenance of a cost effective business model for financial institutions on the other, into one system. A financial system that inculcates these concerns is bound to be sustainable, and this is what we seek to attain.

Significant outcomes

Through the secondary and primary data the study concludes that there is a strong structural exclusion which has divided our economy into people with no income, low income and high income. There is a need to strengthen the infrastructure for delivery of financial services. Government efforts can only open bank accounts for the poor but cannot make them active accounts. Hence, there is a need to alleviate poverty for achieving true financial inclusion.

The primary study and secondary data analysis show the main stumbling block in achieving financial inclusion is the Earning Capability. Thus, the focus of the study is towards 3S Income Generation Model:

- There should be a Self-generating flow of income
- The income should be Sufficient
- The income should be Sustainable

SSNC201- Isolation, Identification and process development of fungal lipases for their potential applications in Industry

Brief description

The investigation on "Isolation, and Screening of Lipases producing fungi" was done under the rightful guidance, concerning the possible aspects of Lipase in the research arena from its source to classification, to its properties and realizing the potential of lipase in the present and future enzyme industry with its various features and applications in various fields. In the present study, soil samples from the different vegetation areas and areas near oil refineries and dairies were collected. Then sample was harvested with which serial dilutions were performed and later spreading was done. Spreading resulted in the growth of different kind of fungal colonies and later they were point inoculated on potato dextrose agar plates with the purpose to obtain a pure colony. A total of 20 cultures were isolated from the soil sample, amongst them only 4 of them were found to be lipase producer as zone of hydrolysis was produced on Tributyrin Agar Plate. The isolate was microscopically characterized and sent to Indian Agricultural Research Institute, New Delhi for identification.



Significant outcomes

During the study a number of fungal isolates were collected from soil samples of different geographical areas. Out of 80 fungal isolates only 10 fungi are showing lipase activity. However, only 6 fungal species have shown more lipase activity than those of the others. And these are

1.Alternaria alternata
2. Penicillium aurantiogriseum
3. Penicillium pinophilus
4. Aspergillus fumigatus
5. Penicillium purpurogenum
6. Penicillium citrinum.

In addition, it was found that 15 species of fungi are dye producing species out of which 2 are identified. Out of these 2 isolate the *Penicillium purpurogenum* is producing lipase, dye, oil, and fragrance altogether.

SSNC202- A Cross-Sectional Study on Professional Stress, Depression, Alcohol Use & Quality of Life among IT/ITES Professionals in Selected Companies in NCR-National Capital Region

Brief description

The aims & objectives of this research are to critically study, explore & understand the followings:

- To study prevalence of professional stress, risk for developing depression, harmful alcoholic effects & the quality of life among the IT/ITES professional in selected companies located in NCR Region.
- To study the association between stress, risk of developing depression & harmful effects of use of alcohol & the quality of life.
- To study the effect of general characteristics & job profile on professional stress & other variable like depression on quality of life & harmful use of alcohol. Stress contributes to psychological problems like susceptibility to depressions; harmful use of alcohol & thereby affects the quality of life. In frequent instances, corporate professionals use alcohol to get relief from anxiety, stress & depressive symptoms. Most subjects feel unprepared to manage stress, and many of them feel unprepared to handle them. They lack the basic coping skills & therefore are unable to manage uneven situations in their daily life. Thus, the overall quality of their life is often found to be miserable. There are frequents sign of early burnouts among the young professionals & at times their career comes to a standstill.

Significant outcomes

Identification of various IT & ITes companies in the selected areas has been done by ways of physical visits to various IT parks & hubs located in the selected regions. Most of the companies were found to be located in Gurgoan and Noida region apart from New Delhi. However, students were unable to identify and locate IT & ITes companies in Sonepat and Gaziabad region. Therefore, the focus has now been on the companies located in New Delhi, Gurgoan and Noida. Students were able to understand and imbibe the concepts of the research project work. They were able to plan and organize themselves in small groups with reference to identification of companies in the selected geographical region, preparation and printing a consolidated questionnaire forms for all the selected scales/ measurement tools, liaison with the selected companies, follow the protocols, visiting various companies in the selected regions in small groups for primary data collection and interactions with the subjects.

SSNC203- Novel anticorrosive, antipollution coating for the prevention of pollution

Brief description

The utilization of seed oil in the manufacture of useful polymer coating can help in bringing down the cost of production. When metallic materials are put into corrosive environments, they tend to have chemical reactions with the air and water. The effects of corrosion become evident on the surfaces of these materials. For example, after putting the iron into a corrosive atmosphere for an extended period, the iron starts rusting due to oxygen interaction with water on the iron's surface. Therefore, metal equipment lacking any preventive (anti-corrosive) measures, may become rusted both inside and out, depending upon atmospheric conditions and how much of that equipment is exposed to the air. There are a number of methods for preventing corrosion, especially in marine applications. Anti-corrosion measures are of particular importance in environment where high humidity, mist, and salt are factors

Coating material at different concentrations

Significant outcome

An attempt has been made to develop linseed oil based poly urethane fatty amide (PULFA), fatty amide) [PULFA] resin was synthesized by using a one-shot technique at room temperature from diol linseed fatty amide [DLFA; a monomer obtained from the aminolysis of renewable resource, such as linseed oil with diethanolamine and sodium methoxide used as a catalyst] 1.0 mol, and varying ratio of toluene -2.4(6) - diisocyanate [TDI, 0.08 – 1.5 moles] in minimum amount of xylene without any chain extender and catalyst. In this process, phthalic acid/anhydride which is normally used in the synthesis of polyesteramide was completely replaced by TDI as in case of uralkyd. The mode of reaction and structure of the resin is ready to confirmation by physico-chemical tests and spectral analysis. The performance of the coatings on mild steel strips is ready to test by physico-mechanical and chemical resistance rests.
The coating material prepared by innovation team is better than the other coating material and is stable upto 290°C.

SSNC204- Where Chemistry Meets Culture: Estimation of Nutrient Content of Food Cooked by Different Methods and its Impact on Health of People of Various Regions of India

Brief description

India is home of diverse cultures, languages, food habits and this diversity is evident in prevailing different cooking methods in the different regions of our country. Major percentage of Indian population is still continuing with customary cooking methods, without knowing the resultant output. This contributes as one of the important aspect of health issues. This project reflects the consequences of nutrients during various cooking methods. The losses of nutrients under some the heads have been studied and compared for different cooking methods. A number of methods have been used to measure nutrient contents which are based on UV-visible spectroscopy and other methods. The amount of nutrient in the various samples (corn, wheat, chickpea, rice, egg, potato, tomato, ladyfinger, spinach, capsicum and different milk product) cooked by different methods were estimated and the results were analyzed and compared with uncooked samples to measure the loss of nutrients.

Significant outcomes

Food is essential for the growth of an organism consisting different types of nutrients.
But invariably cooking methods like boiling, steaming, baking, and frying etc. at times deplete no. of essential nutrients.
This innovative project is being conducted to identify the trends in cooking to minimize the essential nutrients losses.
The variation in results with variable trends in cooking will reflect the minimization in loss of essential contents of food. This will clearly develop a pace to follow the same by the users.
When the different cooking methods were adopted, it was observed that there are definite losses of various nutrients present in the food materials. The loss is exhibited not only as per the cooking habit but by virtue of the region also. To maintain the proper nutrient contents, it is advised to go with appropriate cooking habit in different regions and environmental conditions.

SSNC205- Assessment of microbial & chemical quality of drinking water samples from various technologies available to make it potable.

Brief description

With a goal of ensuring good public health, drinking water samples from Municipal water supplies across 12 select localities of Delhi-NCR were aseptically collected. Four basic, but mutually distinct domestic water purifying technologies were chosen from the market and standardized. Thereafter, several elementary chemical and microbiological parameters for water potability were selected, and for each water sample, one untreated (control) and four treated samples (using 4 select technologies), assessment for potability was carried out {before and after treatment} and comparisons were made. Students involved in the project were guided to develop water evaluation instruments. They were then sent for drinking water quality assessment in rural areas and also for spreading mass awareness about clean drinking water. One of the main objectives of the project was to inculcate scientific temper and to hone the skills of methodical working among the undergraduate students, and to motivate them for meaningful scientific research. Most importantly, the importance of safety of potable drinking water was emphasized and the use of an economical, easy to use "COLI-CHECK" kit for assessing their drinking water supply was recommended.

Significant outcomes

It is reassuring that the MCD drinking water supply across Delhi-NCR is of reasonably good quality, adequately treated and safe for consumption. Chemical parameters like pH, total hardness, conductivity, turbidity and TDS values of the MCD water supplies were found to be mostly within permissible limits. Based on microbiological tests like MPN, spread plating on special culture media, water testing kit *etc*., the quality of drinking water supply in most localities within proper Delhi was found to be generally better than that in surrounding areas (NCR). As expected, Reverse Osmosis technology proved to be the best technology for rendering/enhancing water potability, followed by other techniques. However, considering the ease of operation, cost/maintenance and portability of equipment, the use of inexpensive Zero-B tap attachment may be highly recommended to the end users, particularly if they have not been using water purifiers till now due to financial constraints

SSNC206- Solid Waste Management through Enhancing People Awareness for Environmental Sustainability in Delhi

Brief description

This project has generated public awareness among the people regarding solid waste management for sustainable development particularly in North Delhi. The importance of Solid Waste Management can be understood by rapid increase in research and government policies in this context e.g., the Prime Minister himself started SWATCH BHARAT ABHIYAN. Solid waste has been continuously managed by various government and private agencies. In Delhi, sixteen landfill sites are already filled up and existing sites have reached their saturation point and are overflowing. Acquisition of new sites is a very difficult task for the authorities. This is perhaps because collection, segregation, transportation and disposal of wastes are not up to the mark. Waste is generated at household, individual and institutional level and disposed off in an improper manner. In order to understand the current situation the project team carried out direct contact with the waste generators i.e., individual households through random sampling.

Significant outcomes

- Waste management approach should be introduced at the various academics standards
- From the analysis of collected primary and secondary datait can be concluded that present rules and regulations are inadequate both in terms of assessing quantity / quality of waste and to enhance people's participation
- Sustainable solid waste management requires not only efficient collection, proper disposal but also waste reduction, reuse, recycle and resource recovery etc
- The important aspects regarding waste management is to improve organizational capability and to enhance people's participation
- The team worked in this direction for enhancing people's awareness through various meeting with people in parks, societies, schools and colleges
- To expand people's participation the team used latest methods of communication like Facebook, Twitter, Whatsapp and local newspapers like Jag Utthan, Asal News.

SSNC207- Morphology Controlled Synthesis of Multiferroic Nanomaterial's by Wet Chemical Method and Evaluation of their Magnetoelectric, Optical and Photo-Chemical Properties

Brief description

The objectives of the project include Preparation of multiferroic nanostructures (sphere, tubes and rods) like $BiFeO_3$, doped alkaline earth and transition metals either on A site or B site of perovskite structure such as $BiFe_xMn_{1-x}O_3$, $Bi_{1-x}Sr_xFeO_3$, $BiFe_{1-x}Ca_xO_3$, $BiFe_{1-x}Mg_xO_3$, $BiFe_{1-x}Cr_xO_3$, $BiFe_{1-x}Zn_xO_3$, $Bi_xLa_{1-x}FeO_3$, and Pb $(Fe_{1-x}Nb_x)O_3$ using surfactant method.

Significant outcomes

The project team had gone through the literature available related to magnetoelectric materials and their preparation routes in the domain till now using Sci-finder scholar, Scopus, Sciencedirect, Pubmed, Google scholar and information also gathered from the various journal references present in central science library, University of Delhi. Chemicals, apparatus and instruments were procured from the competent vendors. Experimentation were planned to achieve the proposed objectives as mentioned above. They had synthesized the precursors of various aimed materials such as for $BiFeO_3$ and $Bi_{1-x}La_xFeO_3$ using co-precipitation and microemulsion methods. Preliminary observations have shown marked success as found using techniques: Powder X-Ray Diffraction, UV-Visible Spectroscopy, Raman Specroscopy, and Fourier Transform-Infra Red Spectroscopy (FTIR).

VC201- Exploring Psychosocial Stressors, Coping Strategies and Mental Toughness in Delhi University Sport Students

Brief description

The project research focused on some of the stressors experienced by DU sport students and the strategies they use to cope with the stress. The study also explores 'mental toughness' in DU sport students. Ninety three sports students who participated at various levels were included for the study. The data was collected in two sessions. In the first session a semi structured interview was conducted to assess the various stressors. In the second session two scales i.e. Coping Responses Inventory and Psychological Performance Inventory were administered to measure mental toughness. Although DU sports students used both approach as well as avoidance coping responses to deal with stressors, they were more likely to use approach coping and behavioral coping rather than avoidance coping and cognitive coping. The analysis of the semi structured interview identified 15 kinds of stressors: relationship, personal, gender stereotypes, role conflicts, training, equipment/facilities, competitive environment, climatic & weather conditions, finances, travel & accommodation, nutritional issues, support network, selection, media attention and officials' and referees' decisions. The results also indicated that the participants would benefit if they improved their mental toughness skills a little bit. The results also indicated that 'problem solving' (dimension of coping responses) was significantly related to a majority of dimensions of 'mental toughness'.

Significant outcomes

1. There were no significant differences between the three levels for the various dimensions of mental toughness except on the dimension of self-confidence. On this dimension sports students playing at international level were observed to be the most confident.
2. Differences were also explored between IGI and other colleges for the variable of mental toughness. However, no significant differences were found on any of the dimensions of mental toughness.
3. The 8 dimensions of coping responses were also correlated with the 7 dimensions of mental toughness. Out of the 56 correlations, 10 correlations were found to be significant and can be considered as ranging from low to moderate. The dimensions of problem solving belonging to coping responses inventory had significant correlations with all but one (negative energy) dimension of mental toughness. The strongest correlation was found between visualization and imagery control (mental toughness) and problem solving (coping responses).
4. No gender differences were found on the dimension of mental toughness.

ZH201- Empowering the Elderly from Weaker Sections

Brief description

The present project is designed to study the following objectives:

1. To identify the key life challenges and problems of elderly from weaker sections of the society using insider's perspective
2. To develop modules to improve the status of poor elderly on the measures of health, social support, loneliness and security
3. To assess the changes in the well-being through participative interaction targeting awareness building, guidance, provision of support, and self- employment generation
4. Sample: The total sample of the study will include 300 elderly residing in various colonies and zones of Delhi.

Design and Plan of Study: the study was completed in two phase
Phase I: The first phase was focus on door to door survey for quantitative data collection
Phase II: intervention module will be developed.

Significant outcomes

Rapid social change of the present time brought about drastic lifestyles and life stresses, in which elderly from weaker sections are at the frontline of the daily harsh life.
It was found that empowerment could be done through awareness among youth who can not only help themselves but also help the elderly to get rid their irrational belief, provide them support and awareness about their health and empowerment. Five research papers from the project were also presented by students in the national seminar organized by Sri Aurobindo College on social changes in contemporary India: Psychological dimension and social response. On the basis of qualitative data analysis it was found that social support, leisure activities, and security play important role in empowering elderly from the weaker sections. Qualitative data analysis also suggests that government should make policies for empowerment of elderly. Family, children also may play important role in empowering the elderly by providing them social support, encouraging them to participate in leisure activities and providing and help them regarding the benefits of government policies.
Publications: Five papers

ZH202- Assessment of Cytotoxicity and Genotoxicity of Yamuna Water in Delhi Region by Plant Based Bioassay.

Brief description

River water pollution is a universal phenomenon affecting both established as well as emerging market economies. Due to the increasing population and high demands of goods and services large numbers of new cities and industries are mushrooming up in every nook and corner of various countries.
In an attempt to study genotoxicity and cytotoxicity of polluted Yamuna water, water samples were collected from seven different locations of the river in Delhi region. Various water quality parameters like pH, salinity, electrical conductivity, turbidity, dissolved oxygen, total dissolved solid were measured with the help of standard instruments. Tap water was taken as control. The results showed sharp decline in root length and root number. The root tip squash preparations showed significant cell and chromosomal abnormalities. Tremendous variations were observed in cell and nuclear shape and size. In certain cases cell nuclei appeared as an aggregation of micronuclei. It was quite unique to find highly differentiated xylem elements in the zone of meristematic activity. Lot of cells was found to be undergoing abnormal mitosis especially at metaphase and anaphase stages with formation of chromosomal bridges. This report proves the cytotoxic and genotoxic effect of Yamuna water, a cause of major concern, since lot of crops are being grown on Yamuna bed using this water for irrigation. This report is a cause of major concern as lot of farmers around the Yamuna bed use this polluted water for irrigation of seasonal vegetables and fruits which are directly consumed by the people of Delhi.

Significant outcomes

The abnormal images of cell and nucleus obtained in the work can be used to create awareness among the farmer using Yamuna water for irrigation and it can also be used for mass awareness campaign to educate people about the harmful effect of water pollution. A study was also done to assess the presence of heavy metals in water samples collected from different sites. Preliminary results suggest the presence of Cu, Cr, As and Zn from the various sites.
Two publications.

ZH203- Development of Innovative Eco-Friendly Bio-Degradable Polymer Composites (substitute for plastics and filters)

Brief description

The project research programme aimed at addressing the issue of environment degradation caused by the toxicity, non-biodegradability and non-recyclability of waste polymeric materials that are used in packaging, carry bags, roofing sheets and numerous other applications Project aims to develop an innovative lightweight biodegradable composite based on polymer derived from non-edible oils extracted from plant seeds and lignocellulosic fibers obtained from plants, as an alternate to composites derived from petroleum based synthetic polymers and inorganic fibers. The composite so developed will be eco-friendly and attempts are being made to make it biodegradable. The selection of raw material was based on the availability of non-edible vegetable oils and vegetable fibers that are found in abundance in India and other parts of the world

Significant outcomes

A wide variety of polymers, especially polyurethanes, have been prepared by taking advantage of the leaves of Agave sisalana found in abundance in India. This natural fibre was chosen as the reinforcement for the polymer to develop polymer composite. Thus, a polymer composite derived completely from bio-resource was developed. However, biodegradability of this composite is a bigger challenge and the attempts were made to make it biodegradable through this project.
The composites developed in the project can be used for various applications like making carry bags, roofing sheets, protective sheets, packaging, insulation material etc. that has lot of utility in public life. Selected compositions will be delivered to the industry for moulding a specific automotive component and tested for their performance.

ZH204- Use of Innovative Raw Materials for Handmade Paper Making

Brief description

The core scientific objective of the project was to study the use of some innovative raw materials such as weeds like *Parthenium, Lantana* and *Water Hyacinth* and agricultural wastes such as bagasse, wheat straw and rice straw for handmade paper making. Additionally, the project aims to recycle waste paper generated by different sections of the college community, thus contributing to the betterment of environment. The recycled paper is proposed to be converted into a range of usable paper products. The paper recycling laboratory also serves as a learning opportunity to students of environmental studies. Also, working on many different aspects of handmade paper making closely, inculcates a sense of enterprise among students. The results of the study indicate that the innovative raw materials used have the potential to replace the raw materials that are either expensive or taxing the environment.

Paper recycling machinery had been installed at the college campus. With the installation of this machinery, the college can offer basic training in handmade paper making to interested groups of society.

Significant outcomes

Excellent quality paper is generated by a blend consisting of fibres from rice straw and bamboo in the ratio of 80%:20% respectively. This is suitable for all fine end uses such as writing quality paper and artistic writing pads. Cardboard strength paper is obtained by blends consisting of bagasse and bamboo (70%:30%) and *Lantana* and recycled paper (80%:20%). A triple source blend of *Lantana*, wheat straw and recycled paper (20%:60%:20%) yields a high quality paper with very good strength and lustre. However, water hyacinth yields poor quality paper unfit for any end use.

This project has offered an opportunity to the undergraduate students of Chemistry, Botany and Life Sciences to learn the basics of paper science and get hands on practical experience in methods of handmade paper making. The interdisciplinary nature of the project has helped students to appreciate the interdependence of knowledge.

ZH205- Effect Of Heavy Metal And Trace Elements In Water On Human Health Status In Delhi-NCR Region

Brief description

The toxic heavy metals entering the ecosystem leading to geoaccumulation, bioaccumulation and biomagnification. Therefore, a better understanding of heavy metal sources, their accumulation in the soil and the effect of their presence in water and soil on plant systems seem to be particularly important issues of present-day research on risk assessments. Heavy metals like Fe, Cu, Zn, Ni and other trace elements are also important for proper functioning of biological systems and their deficiency or excess could lead to a number of disorders. Hence, a case study can be undertaken to assess the long-term effect of polluted (sewage/industry effluent) water containing heavy metals (As, Hg, Zn, Cu, Ni, Cd and Pb in groundwater/tapwater and their content level in water at various places, along with the health strata of the individuals living in these areas This study will enable us (a) To get the heavy metal profile in groundwater/tapwater of the area under study, (b) To explore the effect of particular heavy metals inducing health problems in Delhi, NCR. We may also suggest the locales for plantation of heavy metal absorber plants in that area like, Indian mustard (*Brassica juncea*), Sunflower (*Helianthus annus*), Water hyacinth (*Eichhornia crassipes*), Cactus (opuntia) which have been described as heavy metal (Cu, Cd, Cr, Ni, Zn, Pb, Hg, As) cleaner. (c) This will help to clean the ecosystem as well help the locales to cut the risk of heavy metal intake.

Significant outcomes

The water samples collected (MCD water) from the selected 10 sites throughout the year, were analysed for the quantification of heavy metals (*As*, *Cd*, *Cr*, *Cu*, *Ni* and *Pb*). It was found that *Cd* was not detectable from the samples. However *Cr*, was detected from few samples in 7 sites and *Ni* was detected in few samples of site 3 (Wazirpur). However, the *As*, *Cu* & *Pb* were detected in all the sites though, the values were lower than the permissible limits mentioned by CPCB in most of the cases. As per CPCB (Central Pollution Control Board) guidelines, if there is presence of multiple heavy metals even below the permissible limits, the water is not safe for drinking purpose. Although, these heavy metals are known for causing various diseases, the repective study did not find any correlation between the heavy metals present in water sample and resident health status. However, this study suggests the presence of heavy metals in and around the surrounding of the studied sites, which may create health problems in near future. The presence heavy metals in drinking water (MCD) may be due to contamination in local supply lines in the study sites.

ZH206- Psychology of Dharma and Happiness as reflected in Bhagavad Gita

Brief description

The Sanskrit word “dharma” has joined “yoga” and “karma” in common English usage. Dharma is often taken to mean “religion” or “duty.” But these meanings are incomplete. In the Gita, Lord Krishna refers to dharma in progressively deeper ways, shedding light on the meaning of the term and its importance for personal spiritual growth.
In life we all encounter ethical conflicts, although perhaps less dramatically than Arjuna. As we shall see, the Gita helps us make intelligent decisions by showing how ordinary piety fails to deliver the endless satisfaction of service to God
In the project: “psychology of dharma and happiness as reflected in bhagavad gita” in relation to the “trigunas” i.e. sattva , rajas and tamas it was seen that, people high on sattva guna and some of the rajas guna were more happy and satisfied with their lives whereas people high on tamas guna were low on achievement and contentment .
For this purpose developed a personality and happiness Inventory in the name of Inovation, Pesonality and Happiness Inventory based the Bhagvad Gita and responses were collected from 750 people who are 18 years and above. Results indicate that, *Sattva guna* was dominant in 70% males and 40% females. The *Rajas guna* was found to be dominant in 76% males and 70% females. In many cases Sattva and Rajas, both are found to be prominent factors of personality.

Significant outcomes

In the project, research has provided a comparative study of happiness as perceived by general public and that presented in the Bhagavad Gita. This research has worked towards how the three personality traits (Gunas) viz. Sattva, Rajas and Tamas affect the attainment of true happiness and contentment as mentioned in the Gita, and its relevance in the modern society.