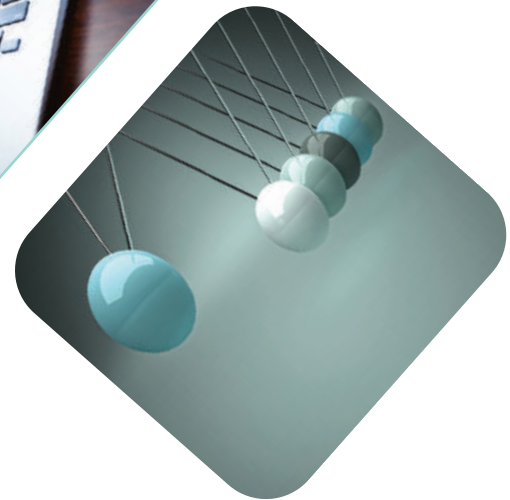




BSH MAGAZINE 2024

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Department of BASIC SCIENCES & HUMANITIES



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Vice Chancellor's Message

Science occupies the "discovery space." The scientist's goal is to get a deeper understanding of the natural world. Engineering occupies the "design space." The engineer's goal is to take that understanding of the natural world, and apply it to something useful. Science and engineering are both important to develop technology in the society. I am thrilled to announce the second edition of magazine of Basic Sciences and Humanities.



Prof. Dr. Shahid Munir (TI)
Vice-Chancellor UET Lahore

This publication is a nice effort by the department to showcase their research, ideas and contributions to the field of basic sciences and humanities. This magazine will provide a valuable resource for members of the department, as well as for the wider academic community, to stay informed about the latest developments and trends in the field. The diverse content of the magazine will reflect the rich intellectual climate of the department and the wide range of disciplines it encompasses. I am confident that this magazine will become an important tool for promoting the department and its achievements both within and outside the university. It would certainly foster and inspire faculty and students both to think critically and write effectively by utilizing this platform. I wish the best to magazine team, faculty and the students of the department to make this magazine a success. I encourage everyone to actively contribute to the magazine and help spread the word about its current volume.

Department's visionary Team

Prof. Dr. M. Shahid Rafique
Dean Faculty of Basic Sciences
and Humanities



Prof. Dr. Sajjad Ahmad
Chairperson Department of Basic Sciences
and Humanities



Are Pesticides Harmful to Health?

By Prof. Dr. Sajjad Ahmad
Professor-Chemistry

Pesticides, introduced in 1945, revolutionized agriculture by controlling pests and boosting crop yields, making affordable food accessible to a growing global population. Their role was crucial in the Green Revolution, which transformed farming worldwide. However, modern research reveals that even small pesticide residues in food can pose serious health risks to humans and animals.

The Global Pesticide Market

The pesticide industry is valued at over \$100 billion, with more than 1,000 pesticide types currently in use globally. Herbicides make up 49% of this market, followed by fungicides and bactericides (27%) and insecticides (19%). Just four corporations control 56% of the global market, producing not only pesticides but also the base chemicals involved. This corporate concentration raises concerns about regulatory transparency and public health.

Health Risks to Vulnerable Groups

Children and the elderly are the most

vulnerable to pesticide exposure. Due to their smaller body size and behaviors like playing on the ground or putting hands in their mouths, children are highly susceptible. For example, in 2014, primary school children in Bordeaux, France, experienced nausea, headaches, and skin irritation after nearby vineyards were sprayed with fungicides.



Chronic exposure to pesticides, even at low levels, has been linked to cancer, neurological disorders.

Environmental Impact

Pesticides harm ecosystems, particularly pollinators like bees, which are

vital for biodiversity and agriculture. Pesticide exposure impairs bees' neurological functions, causing disorientation and population declines. Over the past two decades, global bee populations have dropped significantly, threatening food security. Pollination by bees and other pollinators contributes over \$200 billion annually to agriculture.

Rising Food Demand & Pesticide Usage

With the global population projected to reach 9.5 billion by 2050, food production must increase by 60%. Studies suggest that eliminating pesticides could reduce fruit production by 78%, vegetable production by 54%, and grain production by 32%. To meet rising food demands, global pesticide usage continues to grow, presenting a dilemma between productivity and safety.

Preventative Measures

To reduce exposure, experts recommend:

- Washing fruits and vegetables thoroughly under running water.
- Peeling outer layers of produce where residues concentrate.

- Trimming fat from meats, as pesticides accumulate in animal fat.
- Choosing organic produce, which is grown without synthetic pesticides.



Conclusion

Pesticides have undeniably supported global food production, yet their adverse effects on health and the environment necessitate caution. As food demands rise, stricter regulations, sustainable alternatives, and a shift toward organic farming will be essential to safeguard public health.

Leveraging Vector Analysis in Real-World Problems

By Dr. Arshi Khalid

Associate Professor-Mathematics

Vector analysis is a mathematical tool used extensively across various fields, providing solutions to problems involving quantities that have both magnitude and direction. From physics and engineering to computer science and economics, vector analysis helps model, predict, and optimize real-world phenomena. Below are some key applications of vector analysis in different domains.

Engineering: Fluid Mechanics and Structural Analysis

In fluid dynamics, vector analysis helps model the behavior of fluids. The Navier-Stokes equations, used to describe fluid flow, are vector equations that take into account the velocity field of a fluid and its pressure and viscosity. These equations are critical for understanding airflow over wings, water flow in pipes, and the dynamics of liquids in various systems.

In structural engineering, vector analysis is used to analyze forces within ma-

terials. The stress tensor describes how internal forces are distributed across a structure, such as a bridge or building, helping engineers ensure safety and integrity under various loading conditions.

Computer Graphics and Animation

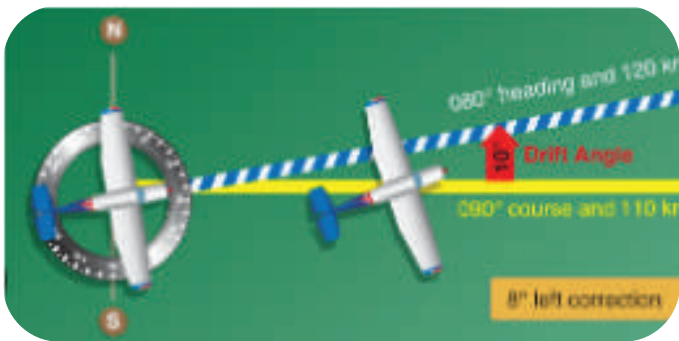


Vector analysis is central to 3D graphics and animation. In computer graphics, normal vectors are used to determine how light interacts with surfaces. The angle between the light vector and the surface normal, calculated using the dot product, helps simulate shading and reflections. Additionally, 3D transforma-

tions such as rotations and translations of objects are performed using vectors. These transformations are essential for creating realistic movement and visual effects in animations and video games.

Robotics and Navigation

In robotics, it is used to model the movement and control of robotic arms or autonomous vehicles. For example, the Jacobian matrix, derived from vector calculus, relates joint velocities to end-effector velocities, enabling precise control of robotic movements.



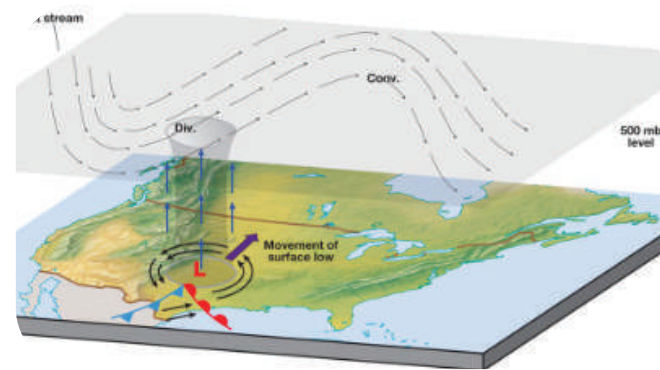
In GPS navigation, vectors are used to determine the shortest path between two points, considering both distance and direction. These calculations are essential for autonomous vehicles and drones.

Economics and Finance

In economics, vector analysis is used for optimization problems. For example, linear programming models often represent resources, costs, and constraints

as vectors to find the best allocation of resources.

Weather and Climate Modeling



In meteorology, vector fields represent wind velocity and ocean currents. Using vector calculus, scientists can model the flow of air and water, predict weather patterns, and understand climate change.

Conclusion

Vector analysis is a powerful mathematical tool with diverse applications in the real world. From understanding forces in physics and optimizing resources in economics to modeling fluid flow and creating realistic computer graphics, vector operations are essential in solving complex problems across many domains. Its ability to represent both magnitude and direction makes it indispensable in fields requiring spatial analysis and dynamic systems modeling.

Impact of Sewage Water Irrigation on the Safety and Quality of Vegetables for Human Consumption

By Dr. Ghufraana Samin
Associate Professor-Chemistry

As global populations rise and water scarcity becomes a pressing issue, the use of sewage water for irrigation is being explored, especially in water-stressed regions. While it can be a cost-effective and nutrient-rich alternative, sewage water irrigation raises serious concerns regarding the safety and quality of vegetables for human consumption. This essay examines the risks of microbial contamination, heavy metal accumulation, and the impact on health.

Benefits of Sewage Water Irrigation

Sewage water contains essential nutrients like nitrogen, phosphorus, and potassium, which are beneficial for plant growth. Using it for irrigation can enhance soil fertility, reduce the need for chemical fertilizers, and boost crop yields. Additionally, sewage water provides a more affordable water source, especially in regions where fresh water is limited, benefiting small-scale farmers and alleviating pressure on freshwater resources.

Risks and Challenges

Microbial Contamination Sewage water can harbor pathogenic microorganisms, including bacteria (e.g., *E. coli*, *Salmonella*), viruses (e.g., hepatitis A), and parasites (e.g., *Giardia*). When vegetables are irrigated with untreated sewage water, these pathogens can contaminate the crops, posing serious health risks, particularly if the vegetables are consumed raw or inadequately cooked.

Heavy Metal Accumulation

Sewage water may contain heavy metals such as cadmium, lead, mercury, and arsenic from industrial waste. These metals can accumulate in vegetables, posing long-term health risks like kidney damage, neurological disorders, and cancer. Cadmium and lead, in particular, are highly toxic and can cause severe health issues, including developmental delays in children.

Impact on Soil Health

Continuous use of sewage water can alter soil properties, leading to contami-

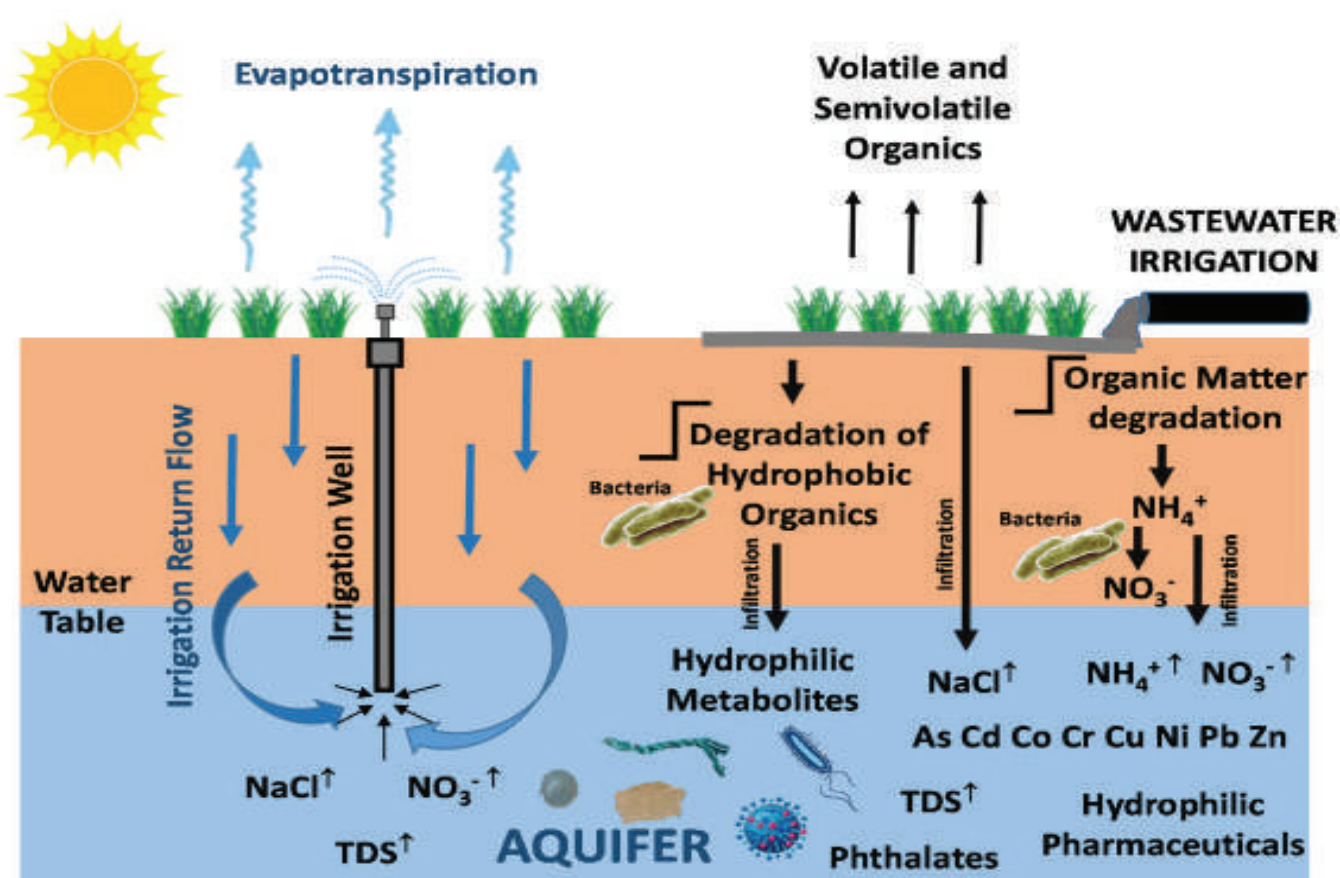
nation with heavy metals, salts, and other pollutants. This can degrade soil quality, reduce agricultural productivity, and cause soil salinization, which inhibits plant growth.

Mitigation Strategies

To reduce the risks, effective treatment of sewage water is essential. Advanced treatment processes like membrane filtration and ultraviolet disinfection can reduce contaminants. Regular monitoring of water quality and soil contamination is necessary to ensure safety. Additionally, using soil amendments or phytoremediation can help mitigate heavy metal buildup in soils.

Conclusion

While sewage water irrigation can address water scarcity and enhance soil fertility, it also poses significant risks to vegetable safety due to microbial contamination and heavy metal accumulation. By implementing rigorous water treatment, monitoring, and public education, we can minimize these risks and promote safe agricultural practices, ensuring a sustainable and healthy food supply.



The Interplay of Democracy and Constitutionalism

By Mr. Kamran Shaheen
Assistant Professor-English

Introduction

Democracy and constitutionalism are two foundational principles that underpin modern governance, shaping the relationship between citizens and their governments. While democracy emphasizes popular sovereignty, political equality, and majority rule, constitutionalism focuses on the adherence to a constitution as the supreme law, limiting governmental powers and protecting individual rights. Together, they provide the mechanisms for accountability, legitimacy, and the protection of fundamental rights, essential for ensuring stable and just societies. This article explores democracy and constitutionalism from various angles.

Democracy

At the heart of democracy lie several fundamental principles that ensure the fair and equitable participation of all citizens in the governance process.

Popular Sovereignty:

This principle asserts that the authority of the government is derived from the consent of the governed. In a democratic system, the ultimate power rests with

the people, who express their will through voting and participation in political processes.

Rule of Law:

Democracy is characterized by adherence to the rule of law, meaning that all individuals and institutions, including government officials, are subject to and accountable under the law. This principle ensures that no one is above the law.

Political Participation:

Central to democracy is the active participation of citizens in the political process. This includes voting in elections, engaging in political activism, participating in public debates, and holding elected officials accountable through various means such as petitions and protests.

Democratic Institutions:

These institutions ensure that political power is distributed based on the will of the people and that no single branch of government becomes too dominant.

Constitutionalism

Constitutionalism refers to the adher-

ence to a constitution as the supreme law of the land. This means that all government actions and laws must conform to the principles and provisions laid out in the constitution. Constitutionalism is essential for ensuring that government power is limited, accountable, and constrained by the rule of law.

Significance of Constitutionalism:

The significance of constitutionalism lies in its role as a bulwark against tyranny and arbitrary rule. By establishing clear limits on government authority and protecting individual rights, constitutionalism helps to prevent abuses of power and safeguard democratic principles.

Relationship with Democracy:

Constitutionalism provides the framework within which democratic governance operates. While democracy emphasizes the participation and sovereignty of the people, constitutionalism ensures that this participation occurs within a framework of legal constraints and protections.

Global Examples:

Constitutional frameworks vary across different political systems, reflecting diverse historical, cultural, and institutional contexts. For example, some countries have written constitutions that codify the fundamental principles and structures of government, while others rely on unwritten conventions

and traditions to guide their governance.

The Future of Democracy and Constitutionalism

As we look to the future, several emerging trends and challenges will shape the evolution of democracy and constitutionalism.

Advancements in Technology:

While these technologies offer new opportunities for civic engagement, they also raise concerns about privacy, misinformation, and the manipulation of public opinion.

Globalization and Interconnectedness:

Increasing globalization has led to greater interconnectedness among nations, facilitating the exchange of ideas, cultures, and resources. However, globalization also poses challenges to traditional notions of sovereignty and national identity.

Digital Democracy and E-Governance:

The digital age has democratized access to information and empowered citizens to participate more directly in political decision-making through online platforms and digital tools. E-governance initiatives improve the efficiency, transparency, and accessibility of public services.

Application of Calculus in diverse fields of Science and Engineering

By Dr. Abdur Rehman

Assistant Professor-Mathematics

Calculus is a fundamental branch of Mathematics that deals with the study of change, motion, and optimization. While it may seem abstract and unrelated to daily life, calculus has numerous practical applications that impact our daily lives in various ways. Here are some examples:

- **Physics and Engineering:** Calculus is crucial in understanding motion, forces, and energy. It's used to design and optimize systems, such as bridges, buildings, and electronic circuits.
- **Medicine and Biology:** Calculus is used in medical imaging, drug development, and understanding population growth and disease spread.
- **Economics and Finance:** Calculus helps model economic systems, understand markets, and make financial predictions.
- **Computer Science:** Calculus is used in machine learning, data analysis, and algorithm optimization.
- **Optimization:** Calculus helps find the most efficient way to accomplish tasks, like finding the shortest path or minimum cost.
- **Data Analysis:** Calculus is used in

data visualization, regression analysis, and statistical modeling.

- **Weather Forecasting:** Calculus is used to model weather patterns, predict storms, and understand climate change.
- **GPS and Navigation:** Calculus is used to optimize routes, predict satellite orbits, and provide accurate location information.
- **Materials Science:** Calculus helps understand material properties, stress, and strain, leading to advancements in materials technology.
- **Computer Graphics:** Calculus is used to create realistic simulations, animations, and visual effects in movies and video games.

These examples illustrate how calculus has a significant impact on various aspects of our daily lives, from the design of structures and systems to medical advancements, economic modelling, and technological innovations.

The Roles and Responsibilities of Educational Research

By Dr. Shazia Karim
Assistant Professor-Mathematics

Introduction

Educational research plays a crucial role in improving educational practices, policies, and outcomes worldwide. By employing systematic inquiry, it aids educators, policymakers, and stakeholders in making informed decisions. This research spans areas such as teaching methods, learning outcomes, policy analysis, and the integration of technology in education.

The Purpose of Educational Research

Advancing Knowledge

A primary goal of educational research is to expand the understanding of how students learn and how education systems function. By investigating theories, testing hypotheses, and analyzing phenomena, researchers contribute to a growing body of knowledge essential for refining educational practices.

Informing Practice

Educational research provides valuable insights for educators. Findings can inform teaching strategies, curriculum design, and classroom management techniques. For example, research on differentiated instruction highlights the benefits of tailoring teaching methods

to meet diverse student needs, resulting in improved learning outcomes.

Guiding Policy

Policymakers rely on educational research to shape and refine education policies. Research identifies the strengths and weaknesses of existing policies, offering data-driven recommendations for improvement. For instance, studies on class size have influenced policies promoting smaller classes to enhance student achievement.

The Responsibilities of Educational Researchers

Ensuring Ethical Conduct

Educational researchers must uphold ethical standards, such as obtaining informed consent, safeguarding participant privacy, and avoiding harm. These considerations are vital when working with vulnerable groups like children and adolescents.

Ensuring Rigor and Validity

Researchers are responsible for maintaining methodological rigor and ensuring the validity and reliability of their findings. This involves using appropriate methodologies and trans-

parently reporting research processes and results to build credibility.

Disseminating Findings

Effective communication of research findings is essential. Researchers share their work through academic journals, conferences, and policy briefs to ensure accessibility and practical application.

The Impact of Educational Research

Improving Teaching Strategies

Research has enhanced instructional methods, such as active learning, which fosters student engagement through collaborative and hands-on activities. Similarly, formative assessment research underscores the importance of regular feedback in improving learning outcomes.

Enhancing Learning Environments

Studies on classroom management, motivation, and school climate provide insights into fostering inclusive and supportive learning spaces, leading to better student performance and reduced behavioral issues.

Integrating Technology in Education

Educational research explores the role of technology in enhancing learning. For example, studies show that digital tools, such as educational software and online platforms, personalize learning and increase student engagement.

Challenges in Educational Research

Addressing Diverse Contexts

Educational systems differ across regions and cultures, posing challenges in applying research findings universally. Researchers must consider these contextual differences when conducting studies.

Bridging the Research-Practice Gap

Despite its value, educational research often struggles to influence practice. Bridging this gap requires effective communication and collaboration between researchers and educators.

Ensuring Adequate Funding

Securing resources for large-scale and long-term studies is a persistent challenge. Advocating for the importance of educational research is essential for sustained support.

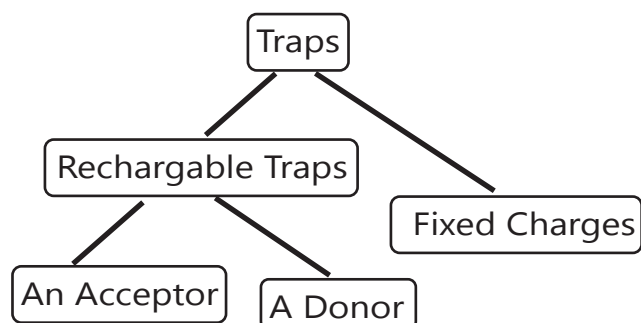
Conclusion

Educational research is integral to advancing knowledge, enhancing teaching practices, and shaping educational policies. Researchers bear the responsibility of ethical conduct, methodological rigor, and effective dissemination. Despite challenges, such as diverse educational contexts and funding constraints, the field continues to contribute significantly to education. Future directions, including interdisciplinary approaches, big data utilization, and a focus on equity, will further address the evolving needs of education in the 21st century.

Acceptor Type Traps in CMOS Devices

*By Dr Nosheen Shehzadi
Assistant Professor-Physics*

Traps are physical quantities that act like doping agents, enhance recombination, and increase leakage in semiconductor materials. They can be classified into fixed charges and rechargeable traps.



Fixed charges are fully occupied by either electrons or holes, making their charge constant. As a result, electron-hole recombination through these traps is not possible. On the other hand, rechargeable traps are distributed within the band gap of semiconductors or insulators, enabling electron-hole recombination. These rechargeable traps are further classified into two types: acceptor and donor. An acceptor-type trap ("eNeutral") remains uncharged when unoccupied but gains a negative charge when it captures an electron. A donor-type trap ("hNeutral") remains uncharged when unoccupied

but acquires a positive charge when it captures a hole. Both trap types play important roles, but studies suggest that acceptor-type traps significantly impact device characteristics.

Device reliability is a critical concern in the electronics industry, as devices often face abrupt operating conditions that can lead to failure or shortened lifespans, causing considerable losses. Metal-oxide field-effect transistors (MOSFETs) are key components in the electronics industry due to their cost-effectiveness, low power consumption, low operating voltage, and high speed. However, as MOSFET technology scales down, short-channel effects emerge, degrading device performance.

A major cause of scaling issues is the traps at the Si/SiO₂ interface or Si substrate, which introduce variability. The presence of interface traps increases leakage currents, reduces memory holding time, affects mobility, raises power consumption. To address this, simulating interface traps using tools like Sentaurus TCAD is crucial to avoid timeconsuming experiment.

Histry of Perfume Industry

By M. Hakan Ahmad

Perfume has been an essential part of human culture for thousands of years, with its origins tracing back to ancient civilizations. The earliest known use of fragrance dates back to the Egyptians around 3000 BCE. They used fragrant oils and incense for religious ceremonies, beauty routines, and embalming. Perfume was considered a luxury reserved for royalty and priests, symbolizing both divine and sensual power. The art of perfumery spread through the ancient world, reaching the Greeks and Romans, who further developed the craft. The Greeks introduced the concept of "aromatherapy," using fragrant oils for health and wellness. Meanwhile, the Romans, known for their lavish baths, used scented oils and perfumes to enhance their personal care rituals.

During the Middle Ages, the perfume industry flourished in the Islamic world. Islamic scholars refined the techniques of distillation, allowing for the extraction of essential oils from flowers, herbs, and spices. This advancement led to the birth of modern perfumery. When these methods spread to Europe in the 12th century, perfume-making

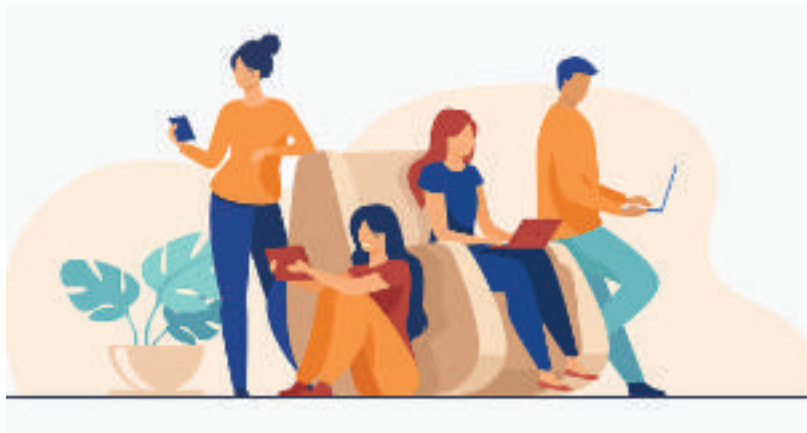


became a thriving industry in cities like Florence and Grasse, France, which remains a perfume capital today.

By the 18th and 19th centuries, the perfume industry began to commercialize. The development of synthetic fragrances in the 19th century opened new possibilities for scent creation, leading to the production of iconic perfumes such as Chanel No. 5 in the 1920s.

Today, the perfume industry is a global, multi-billion-dollar market, combining art, science, and luxury, with numerous global brands offering a wide array of fragrances for every taste and occasion.

Phone Addiction: A Growing Concern



By Suneha Nawaz

In today's digital world, phone addiction has become a widespread issue affecting people of all ages. Mobile phones are designed to be engaging, but this ease of access can lead to excessive use that disrupts daily routines, productivity, and even mental well-being. Signs of phone addiction include constantly checking notifications, losing track of time while scrolling, and feeling anxious when the phone isn't nearby. This addiction can lead to sleep problems, anxiety, and reduced social interactions, impacting both health and relationships.

Why is it so addictive? The allure of notifications, instant gratification from social media, and the endless flow of content can keep people glued to their screens.

Solutions for Phone Addiction:

- **Set Screen Time Limits:** Most smartphones have features that allow users to monitor and limit usage.
- **Turn Off Non-essential Notifications:** Reducing notifications minimizes the impulse to check the phone repeatedly.
- **Create No-Phone Zones:** Designate areas like the dining table or bedroom as phone-free to encourage face-to-face interactions and relaxation.
- **Engage in Offline Activities:** Hobbies, exercise, and social outings.

Phone addiction can be managed by building awareness and self-discipline. By setting boundaries and prioritizing real-life connections, we can enjoy the benefits of mobile technology without becoming overly dependent.

Climate Change and Its Devastating Impacts on Pakistan

By *Nadia Aslam*



Climate change refers to long-term changes in the average weather patterns on Earth. The primary cause of recent climate referred to change is the increase in greenhouse gases. These gases trap heat from the sun, causing the Earth's temperature to rise as global warming. This article highlights the causes, effects, and solutions to Pakistan's climate crisis, offering insights into how the nation can adapt and build resilience.

Causes of climate change in Pakistan:

Every year, Pakistan loses almost 27,000 hectares of natural forest area. In 2022, Pakistan lost 49 ha of tree cover, equivalent to 19.3 kilotons of CO₂ emissions. The average annual temperature has

increased by about 0.63°C. By 2050, it is projected that the average temperature will rise by an additional 1.3°C to 1.5°C. Due to a "lack of effective green policies" and poor enforcement, initiatives aimed at improving the environment, such as the "Clean and Green Pakistan" program and the "Ten Billion Tree Tsunami," their success has been limited. Industrial emissions accounting for about 30% of Pakistan's total greenhouse gas emissions is based on the Pakistan Economic Survey 2020-21.



Disasters due to climate change:

In 2022, Pakistan's southern and southwestern regions experienced devastating floods triggered by climate change-induced unusually heavy monsoon rains, killing more than 1,700 people, affecting 33 million others, and submerging approximately one-third of Pakistan. From 20 to 26 June 2024, 568 deaths were reported as a result of

extreme temperatures, 141 of whom died on 25 June alone.

Pakistan's 7,000 glaciers as inundation caused by 'outburst floods' continues to endanger the lives. . Over the last 70 years, Pakistan has seen an 80% reduction in per capita water available Nearly 70,000 people affected daily by hazardous smog. Between 1992 and 2021, climate-related disasters resulted in losses of \$29.3 billion, equivalent to 11.1% of Pakistan's 2020 GDP. As of 2023, around 60% of the population is food insecure, and 22% are undernourished due to reduced crop yields, inflation, and climate impacts. Staple crops like wheat experienced yield reductions of 15-18%, driven by erratic rainfall, droughts, and heatwaves.



Solutions:

Promote Sustainable farming water-efficient methods and climate-adaptive crops to safeguard food production. By disaster management like Strengthen flood control, resilient infrastructure, and early warning mechanisms. Promote clean energy Shift as develop

solar, wind, and hydropower projects to curb reliance on fossil fuels. Use renewable energy, Expand solar, wind, and hydro power to reduce emissions. By afforestation as strengthen tree-planting programs like the "Ten Billion Tree Tsunami". Policy Reforms to enforce climate policies and integrate adaptation into planning.

Conclusion:

Pakistan is facing escalating climate crises that threaten its economy, environment, and people's livelihoods. Addressing these challenges requires urgent and coordinated efforts to mitigate risks and adapt to a changing climate.

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If you really think that environment is less important than economy, try holding your breath while you count your money.

-Guy McPherson

Understanding and Reducing Our Carbon Footprint



By Adan Tazeb

Introduction:

Imagine if every step you took left a mark on the world—one that couldn't easily be erased.

This is essentially what happens every day as we go about our lives, but instead of footsteps, we leave behind carbon emissions.

The concept of a "carbon footprint" refers to the total amount of greenhouse gases (GHGs) emitted by our activities, expressed as carbon dioxide equivalent (CO₂e). As university students, understanding and reducing our carbon footprint is crucial in the fight against climate change.

What is a Carbon Footprint?

A carbon footprint measures the total greenhouse gases (GHGs) we produce,

expressed in carbon dioxide equivalent (CO₂e). Every action, from powering our campus to the food we eat, contributes to our carbon footprint.

The Impact:

Carbon emissions drive climate change, leading to rising temperatures, extreme weather, and health issues. Understanding this impact underscores the importance of reducing our carbon footprints.

Measuring and Reducing:

To tackle our carbon footprints, we first measure them using online calculators that assess our transport, energy use, diet, and waste.

Here are simple ways to reduce:

Transportation: Use public transport, bike, walk, or carpool.

Energy: Turn off unused electronics and advocate for renewable energy on campus.

Diet: Reduce meat and dairy consumption; try plant-based meals.

Waste: Recycle, compost, and minimize single-use plastics.

Lifestyle: Buy only what you need and support sustainable brands.

Case Studies:

Universities like Harvard are leading with fossil fuel reduction commitments, while cities like Copenhagen aim for carbon neutrality. Student groups also

drive sustainability efforts on campuses worldwide.

The Role of Universities:

Universities can implement policies to cut emissions, invest in green buildings, and promote sustainable research. Student initiatives are key in fostering grassroots change.

Conclusion:

Each of us can make a difference. By reducing our carbon footprints, we contribute to a global effort to combat climate change.

Small daily changes lead to significant positive impacts. Let's act now for a sustainable future!



Resources:

Carbon Calculators: [Carbon Footprint] (<https://www.carbonfootprint.com/calculator.aspx>), [CoolClimate Network] (<https://coolclimate.berkeley.edu/calculator>)

Sustainability Organizations: [The Sierra Club] (<https://www.sierraclub.org/>), [Greenpeace] (<https://www.greenpeace.org/>)



Green Chemistry

By Mahleej Sattar

WHY PROMOTE GREEN CHEMISTRY?

Green chemistry focuses on designing chemical processes and products that reduce or eliminate the use and generation of hazardous substances. Its goal is to make chemistry safer and more sustainable, protecting both human health and the environment. Although the U.S. has started integrating green chemistry into education and research, other countries, like the United Kingdom and Australia, are leading the way with well-developed programs and specialized research centers.

To promote green chemistry effectively several steps are essential. Funding Research: Investment in green chemistry research is crucial. In 2006, the U.S. House of Representatives proposed a significant funding bill to allocate \$84 million over three years to support green chemistry programs at institutions like the National Science Foundation and the Department of Energy. These funds would help advance green chemistry innovations and encourage the adoption of eco-friendly practices in industries.



Action item:

Promote green chemistry topics in school and college curricula by encouraging institutions to include them, using resources like the American Chemical Society's "Going Green" booklet.

Training the Next Generation of Chemists: Education is key in spreading green chemistry practices. Universities like the University of Scranton and the University of Oregon have started incorporating green chemistry into traditional chemistry courses, creating a foundation for future chemists to adopt safer practices.

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Green chemistry is replacing our industrial chemistry with nature's recipe book. It's not easy, because life uses only a subset of the elements in the periodic table. And we use all of them, even the toxic ones.

-Janine Benyus

Innovations Ahead: The Next Generation of Technological Devices

By Aíza Zaigham



Introduction

The evolution of technology has been a driving force in shaping modern society. The future of technological devices holds immense potential to revolutionize our lifestyles, industries, and global systems. This article explores the transformative possibilities of these innovations, highlighting their advantages, disadvantages, and potential solutions for the challenges they present.

Technological devices are expected to become more intelligent, efficient, and interconnected. Advances in artificial intelligence (AI), the Internet of Things (IoT), and quantum computing will redefine how we interact with the

world. Autonomous vehicles will reduce traffic accidents, while AI-driven health-care diagnostics can save lives with early disease detection. Smart cities will emerge, integrating devices to improve energy efficiency

and resource management. Immersive technologies like augmented and virtual reality will create new opportunities in education, gaming, and remote collaboration.



Advantages

The benefits of these advancements include enhanced productivity, improved communication, and innovative solutions to global problems. Technology will make daily life more convenient, facilitate remote working, and create cutting-edge tools for scientific and medical breakthroughs. Smart

homes and wearables will also enhance healthmonitoring and safety.



Disadvantages

Despite these benefits, challenges persist. Overreliance on technology could reduce human creativity and essential skills. Cybersecurity risks, such as data breaches, will increase with interconnected devices. Environmental concerns may arise from electronic waste, and the digital divide risks excluding vulnerable populations from accessing these benefits.

Solutions

To mitigate these issues, ethical regulations, robust cybersecurity measures, and widespread digital education are crucial. Governments and corporations must collaborate to make technology accessible and sustainable, ensuring fair opportunities for all. Recycling initiatives and renewable energy solutions should also be prioritized.

Conclusion

The future of technological devices offers boundless opportunities but demands responsible innovation. With the right balance of advancement and accountability, technology can drive a future that benefits humanity and preserves the planet for generations to come.



The first rule of sustainability is to align with natural forces or at least, not try to defy them.

-Paul Hawken

Best Practices for Leading Effective Meetings

By Ramisha



Running an effective meeting is crucial for maintaining productivity and ensuring that objectives are met. The first step in organizing a productive meeting is to set clear objectives. Without a defined goal, meetings can quickly become unfocused and unproductive. Communicate the purpose of the meeting in advance to all participants so they understand the expectations. A well-structured agenda is also essential for keeping the meeting on track. It helps outline key topics, allocate time for discussion, and ensures that important points are addressed. Sharing the agenda ahead of time allows participants to prepare, making the meeting more efficient. Inviting the right people is another important factor. Only those who are essential to the discussion should be invited to avoid unnecessary distractions.

Too many participants can lead to confusion, while too few might miss critical perspectives. It is also crucial to start and end the meeting on time. Respecting participants' schedules ensures that everyone remains engaged and that the meeting doesn't drag on unnecessarily. During the meeting, encourage participation from everyone to gather diverse viewpoints and ideas.

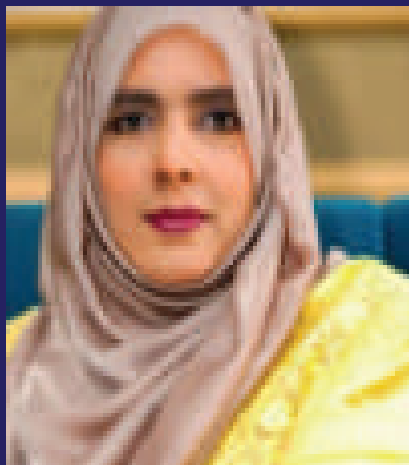
Finally, summarizing the decisions and assigning action items at the end of the meeting is key to ensuring accountability. Clearly define who is responsible for each task and set deadlines. After the meeting, send out minutes or a summary to reinforce the action plan. Following these steps will help ensure meetings are productive, efficient, and valuable for everyone involved.

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**If you want to execute fast,
gather the mass.**

-Lex Sisney

Invited Seminar Psychological Empowerment



Seminar on Psychological Empowerment
Resource Person: Dr. Hafsa Farrukh
(Clinical Psychologist)



Organized and Presented by: Dr. Ghufrana Samin
(Associate Professor-Chemistry)
(Advisor Society of Basic Sciences-SBS)

Dr. Hafsa has completed her MS in clinical psychology with distinction (Gold Medal). Currently, she is member of the Americal Psychological Association, member of the Australian and New Zealand Mental Health Association and certified cognitive and dialectic behavioral therapist.

The Seminar was both insightful and engaging. The keynote speaker shared research -backed strategies to enhance self efficacy, meaning and impact, which resonated strongly with the present students and faculty.



Invited Seminar Psychological Empowerment



The Q&A session was lively, with questions ranging from the application of coping strategies in daily life to techniques for creating healthy workplace environment. There was also an exclusive session in the end to interact with students individually and counsel them on day-to-day stress management. Feedback from students revealed they acquire psychological empowerment after they got a chance to share their emotional burden with an expert of the field.



Departmental Seminar

Seminar on Democracy & Constitutionalism
Resource Person: Mr. Kamran Shaheen
(Assistant Professor-English)



Speaker discussed in length how democracy and constitutionalism have had a complex often tumultuous relationship in Pakistan.

Group of students and teachers were captivated through thought provoking questions by the speaker which often tug at the very heart of democratic state. It sparked curiosity through an engaging discussion.



Departmental Seminar

Seminar on Code of learning Strategies to learn effectively

Resource Person: Dr. Nosheen Shehzadi
(Assistant Professor-Physics)



Speaker delivered clear concepts on how students should actively test themselves on the material taught, rather than just rereading or reviewing class notes.

Sports Fiesta 2024



The Sports Fiesta at the university was an exhilarating event, bringing together students, faculty, and staff for a celebration of athleticism, teamwork, and social spirit. With a variety of sports competitions from soccer and basketball to cricket and chess.

Sports Fiesta 2024



The event brought everyone together, filled with various games and activities for all. It wasn't just about competition; it was about bonding, showcasing talent, and fostering a sense of unity.

The energy, the cheers, and the spirit of sportsmanship made it unforgettable, leaving a lasting impression of how sports can inspire and connect people.

Activities with Final Year Environmental Badge



Environmental Intern Program at BSH:

Our students from Environmental Sciences took the stage to share their internship experiences in the field.



Memories from Final Year Trip

Activities with Final Year Enviornmental Badge



Bidding Farewell to our wonderful students from session 2020 in Enviornmental Science Program.



Industrial Tour

The industrial trip for the chemistry students was an enlightening experience that combined education, exploration, and practical exposure. Organized as part of their academic curriculum, the trip took the students to a renowned chemical manufacturing plant and a research laboratory. In the research laboratory, the students were introduced to cutting edge technologies like spectrometry, chromatography, and nanomaterial synthesis.

The trip concluded with an interactive Q&A session where students posed questions about career opportunities, challenge in industrial chemistry, and advancements in the field.



Student Outreach Admissions 2024 at BSH

The faculty at Basic Sciences and Humanities made great efforts to attract and encourage prospective students to apply in offered programs at UET Lahore Faisalabd Campus. Faculty members visited high schools and board centers for the admission drive in order to reach students.



Laboratory Infrastructure Enhancements

The Basic Sciences Department, led by Prof. Dr. Sajjad Ahmad, has made significant strides in advancing its chemistry laboratory infrastructure. Under the direction of the department head, several initiatives have been taken to improve the chemistry lab's infrastructure and functionality.

Safety Improvements

Emphasis was placed on improving laboratory safety protocols. A comprehensive review and update of safety measures were implemented, including the installation of safety equipment such as eye-wash setup, fire extinguishers, and gas suckers. Safety training workshops for faculty and students were organized regularly to ensure that lab protocols are consistently followed.



Renovation and Modernization of Lab Facilities

The department head spearheaded the renovation of outdated laboratory spaces, resulting in an enhanced environment conducive to both teaching and research. New equipment and technology were introduced.



Expansion of Laboratory Space

The department successfully expanded its laboratory facilities, allowing for more hands-on training and experiments.

A collection of moments at Annual Dinner by SBS



The Society of Basic Sciences' Annual Dinner organized by Dr. Ghufrana Samin (advisor SBS) was a truly memorable event, bringing together students and faculty in a warm, celebratory atmosphere. The event was marked by inspiring speeches, dazzling performances, and delicious food that reflected the spirit of togetherness. Highlights included the recognition of student's achievements and a heartfelt farewell to graduating seniors. It was an unforgettable evening, fostering connections and creating cherishable memories for everyone.



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Stellar Achievement...



Muhammad Umar
Successful Placement with
Bestway Cement Ltd.



Usman e Ghani
Successful Placement with
Gohar Textile Mills



Afaq Hussain
Successful Placement with
MM Pakistan Pvt Ltd. (MMP)



Muhammad Awais
Successful Placement with
DEH group of companies

Hearty Congratulations to the placed students !



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Prof. Dr. Sajjad Ahmad

