GLOBAL RESEARCH JOURNAL

ISSUE NUMBER 8, 2024

GLOBAL RESEARCHERS FEATURED:

Prin. Dr. Rajkumar M. Kolhe
Dr. Amit Phillora
Sarita Chauhan
Dr G. A. Asif Jamal[1] and Dr P. Elavazhagan[2]
Roxanne Boodhoo
Prof. Dr. Parin Somani
Dr. P. Prabhavathy

GLOBAL RESEARCH TOPICS COVERED:

Sustainability and Resilience
Artificial Intelligence
English Literature
Allelopathy
Biology
Education
AI and Machine Learning

WELCOME TO ISSUE 8

Message from Chief Editor

Global Research Journal (GRJ)~ Sharing Knowledge Through Research

Dear Esteemed Readers,

On behalf of the entire Global Research Journal (GRJ) team, it is with great pleasure that I present to you Issue 8, themed "Sustainability and Resilience in a Changing World 2024."

This special edition is a culmination of the outstanding discussions, insights, and innovations that emerged from the Global Research Conferences 2024, held from the 8th to 10th of August at the prestigious King's College, Cambridge. The event brought together leading researchers, educators, practitioners, specialists, and students from across the globe, each contributing their unique perspectives to address the pressing challenges of our time.

In this issue, we explore critical and diverse areas including Medicine, Mental Health, Leadership, Project Management, Health, and Science. Each article encapsulates the depth of knowledge and forward-thinking approaches that are essential for building a sustainable and resilient future.

I would like to express my deepest gratitude to all our contributors for their exceptional research and unwavering commitment to advancing knowledge. Your work is the cornerstone of this journal. Additionally, my heartfelt thanks go out to our dedicated readers, whose continuous support and engagement inspire us to strive for excellence with every edition.

Thank you for being part of this journey towards a more informed and resilient world.

Warm regards,

Prof. Dr. Parin Somani
Chief Editor, Global Research Journal

You are welcome to find us at
www.globalresearchjournal.info

LONDON ORGANISATION OF SKILLS DEVELOPMENT (LOSD)

You Can Reach Your True Potential

LOSD

LONDON ORGANISATION OF SKILLS DEVELOPMENT

In the world of skill development and personal advancement, LOSD stands at the forefront of excellence and opportunity.

Join LOSD as a participant, course instructor, speaker, writer, or become an LOSD Champion!

What We Offer:

- **SkillFlex Program: Enhance your skills with CPD Accredited Programs. Virtual and physical sessions available for accessibility and flexibility.**
- **Global Research Journal: Contribute to knowledge and innovation.**
- **Global Research Conferences: Share your expertise and connect.**
- **LOSD Excellence Awards: Celebrating outstanding achievements.**
- **LOSD Business Meet: Connect, collaborate, and gain insights at the**
- **Business Wellbeing Retreat: Find your balance as a professional**
- **LOSD Publishing: Disseminating valuable insights and information**

Empower Yourself, Empower Others.

Together, let's unleash our true potential and strive for excellence with the London Organisation of Skills Development.

Visit www.losd.co.uk or email admin@losd.co.uk to explore opportunities with LOSD.

A MESSAGE FROM SENIOR EDITOR OF GRJ

Dear Esteemed Readers,

It is with great pleasure that I welcome you to Issue 8 of the Global Research Journal, themed "Sustainability and Resilience in a Changing World 2024." This edition captures the profound impact of digital transformation across diverse fields, highlighting how these innovations are shaping our adaptability and enhancing our learning experiences.

The Global Research Conferences 2024, held from the 23rd to the 26th of March 2024 at New College, Oxford University, was a resounding success. We are excited to share the pioneering research and groundbreaking insights presented during this event within the pages of this edition. As one of the seven key initiatives of the London Organisation of Skills Development (LOSD), the Global Research Conferences and the Global Research Journal are committed to fostering knowledge and skill development on a global scale.

I am proud to present the seven LOSD initiatives, each designed to empower individuals and organisations:

1. **Global Research Conferences & Global Research Journal:** Providing platforms to present and disseminate your research.
2. **LOSD Publishing: Offering comprehensive** publishing and writing services.
3. **SkillFlex:** Delivering LOSD Online Courses to enhance digital skills.
4. **SkillCast:** Engaging audiences with the LOSD Podcast.
5. **LOSD Skills Live:** Featuring short, powerful talks on various skill development topics.
6. **LOSD Excellence Awards:** Recognising outstanding individuals and organisations.
7. **LOSD Business Wellbeing Retreat:** Fostering mentorship and meditation for business leaders.

In this issue, we delve into several critical areas influenced by these developments, and we remain dedicated to advancing skills development and lifelong learning through our initiatives. On behalf of the Global Research Conferences, I extend my heartfelt gratitude to our contributors for their exceptional work and to our readers for their unwavering support. Together, we are building a more resilient and informed world.

Sincerely,

DR. SHASHI KANT GUPTA

Senior Editor

LOSD

LONDON ORGANISATION OF SKILLS DEVELOPMENT

LIVE PODCAST

ELEVATING MINDS, IGNITING POTENTIAL: LOSD LIVE PODCASTS

Join us for captivating conversations on skill development, innovation, and personal growth.

ABOUT THE PODCAST:

Amplifying Voices: Hear stories from individuals touched by LOSD events.

Knowledge Sharing: Learn from diverse perspectives and expertise.

Inspiration & Wisdom: Gain insights to enhance your skills and unlock your potential.

Behind-the-Scenes: Exclusive insights into LOSD events and initiatives.

Authentic & Inclusive: Reflecting diverse voices and perspectives.

Join the Conversation: Share your experiences and become part of the global network.

Launching Autumn 2024

Shape the future of skill development and innovation with LOSD Live Podcast.

Be Part of the Conversation:

Email admin@losd.co.uk to join the discussion.

CONTENTS

SKILLFLEX

Empowering Learning for the Modern World

INTRODUCING SKILLFLEX

Revolutionise Your Learning Journey

In today's fast-paced society, continuous learning is essential. Meet SkillFlex – your gateway to flexible, remote, CPD Accredited learning.

- *Flexible Learning: Short, pre-recorded programs cater to your busy lifestyle.*
- *CPD Accredited: Boost your credentials with recognised certifications.*
- *Tailored Courses: From technical skills to soft skills, find what suits you.*
- *Community of Learners: Join passionate individuals and experienced instructors.*
- *Launching at Houses of Parliament: Witness history on 20th March 2024*

BE A PART OF THE REVOLUTION

Contact Course Director Nur Banu at admin@losd.co.uk to become an instructor.

Unlock Your Potential with LOSD

Visit www.losd.co.uk to explore SkillFlex programs and start your journey today.

Embark on a path of continuous learning and growth with SkillFlex by LOSD.

INTEGRATING SUSTAINABILITY AND RESILIENCE IN A CHANGING WORLD

Dr. Rajkumar M Kolhe
Founder President of JMF Dombivli India

Theme of the Article: Sustainability and Resilience

Research Objectives: This research delves into the synergy between the concepts of sustainability and resilience and their necessity across various aspects of human life.

BIO

M.Prin. Dr. Rajkumar M. Kolhe's journey from adversity to educational eminence is a testament to his resilience and dedication. Founder President of Jahnvis Multi Foundation, he established Vande Mataram Degree College and Jana Gana Mana School, providing quality education to underprivileged children in Nagpur's rural areas. Additionally, he founded Jana Gana Mana Vidyamandir and Jr. College in Dombivli West and Jana Gana Mana Convent School Dawasa. With a Ph.D., NET, B.Ed., and multiple postgraduate degrees, including M.A. in English, Hindi, and History, his academic prowess forms the foundation of his career. Prin. Dr. Kolhe conducted over 200 webinars during lockdown, benefiting thousands, further cementing his legacy as a visionary educator and philanthropist.

Abstract

In today's rapidly evolving world, integrating sustainability and resilience is crucial. This research delves into the synergy between these concepts and their necessity across various aspects of human life. Sustainability involves meeting current needs without jeopardising future generations, encompassing environmental, social, and economic dimensions for a balanced coexistence with nature. Resilience is the capacity to recover from adversity and adapt to changes, ensuring systems and communities remain functional despite challenges. The increasing threats of climate change, biodiversity loss, resource depletion, and socio-economic inequalities highlight the need for combined sustainability and resilience approaches. Effective integration recognises the interconnectedness of ecological, social, and economic systems, necessitating holistic thinking and long-term strategies. Key strategies include: 1) adopting adaptive governance for collaborative and inclusive decision-making; 2) investing in renewable energy, green infrastructure, and circular economies to minimise environmental impact and enhance resource efficiency; 3) strengthening social cohesion and equity to build social capital and collective resilience; 4) protecting ecosystem services and biodiversity to maintain

natural capital; and 5) fostering innovation, research, and education for adaptive solutions. This integration fosters inclusive, equitable, and resilient communities, capable of navigating the uncertainties of a changing world. Collective action, transformative leadership, and continuous learning are essential to building a sustainable and resilient future for all.

Keywords:

Sustainability, Resilience, Adaptive governance, Circular economy, social cohesion

Introduction

In today's rapidly evolving global landscape, the concepts of sustainability and resilience have become central to addressing the multifaceted challenges we face. As the world grapples with environmental degradation, climate change, economic instability, and social inequities, integrating sustainability and resilience into our systems and practices is no longer optional—it is imperative.

Understanding Sustainability and Resilience

Sustainability refers to the ability to meet present needs without compromising the ability of future generations to meet theirs. It encompasses the preservation of natural resources, the promotion of social equity, and the maintenance of economic stability. On the other hand, resilience is the capacity of a system—be it ecological, social, or financial—to absorb shocks, adapt to changing conditions, and continue to function effectively.

In the context of a rapidly changing world, sustainability and resilience are crucial pillars for ensuring the longevity and well-being of human societies and the natural environment. Although closely related, they address different aspects of how ecological, social, or economic systems can endure and thrive over time.

Sustainability

Sustainability is the practice of meeting the needs of the present without compromising the ability of future generations to meet their own needs. It is a holistic approach that considers the long-term impacts of our actions on the environment, society, and the economy. Sustainability is often broken down into three interconnected dimensions:

1.Environmental Sustainability

Creating a supportive and in-This involves the responsible management of natural resources, such as water, energy, and raw materials, to prevent depletion and degradation. It also encompasses efforts to reduce pollution, conserve biodiversity, and combat climate change.

2. Social Sustainability:

This dimension focuses on maintaining and improving the well-being of current and future generations. It includes promoting social equity, ensuring access to essential services like education and healthcare, and fostering inclusive communities.

3. Economic Sustainability:

Economic sustainability aims to create systems that support long-term economic growth without negatively impacting environmental and social aspects. This includes responsible business practices, fair trade, and the creation of jobs that contribute to a thriving economy while minimising ecological footprints.

Resilience

Resilience refers to the capacity of a system to withstand and recover from adverse conditions, such as natural disasters, economic shocks, or social upheavals. A resilient system can adapt to change, absorb disruptions, and continue to function effectively. Resilience can be viewed through various lenses:

1. Ecological Resilience:

This is the ability of natural ecosystems to recover from

disturbances, such as wildfires, floods, or climate change. Healthy, biodiverse ecosystems tend to be more resilient, as they can adapt to changes and regenerate after disruptions.

2. Social Resilience:

Social resilience refers to the capacity of communities and societies to cope with and recover from challenges such as economic downturns, political instability, or public health crises. Strong social networks, cultural traditions, and effective governance contribute to social resilience.

3. Economic Resilience:

Economic resilience is the ability of an economy to withstand shocks, such as financial crises or changes in global trade patterns and recover quickly. This includes diversifying economic activities, maintaining robust financial systems, and ensuring social safety nets for vulnerable populations.

Interrelation Between Sustainability and Resilience

While sustainability is about creating systems that are viable in the long term, resilience focuses on the ability to adapt and recover in the short term. However, these concepts are deeply interconnected. For example, a community that practices sustainable agriculture not only preserves its resources for future use but also enhances its resilience against food shortages caused by climate change.

Moreover, sustainable practices often build resilience by reducing vulnerability to shocks. For instance, renewable energy systems, such as solar and wind power, contribute to environmental sustainability by reducing carbon emissions while also enhancing resilience by providing decentralized, reliable energy sources that are less prone to disruptions.

Challenges in a Changing World

The world today is in a state of flux, characterised by rapid technological advancements, climate change, urbanisation, and global interconnectivity. These changes present significant challenges to achieving sustainability and resilience. For example, climate change poses a threat to food security, water availability, and human health, necessitating the development of resilient agricultural practices and sustainable water management strategies.
The 21st century presents a complex array of challenges that underscore the need for integrating sustainability and resilience into our global, national, and local systems. These challenges are multifaceted and often interconnected, making it imperative for governments, businesses, communities, and individuals to adapt and innovate in order to secure a viable future.

1. Climate Change

Perhaps the most pressing challenge of our time, climate change is reshaping ecosystems, economies, and societies. Rising global temperatures, melting polar ice, and increasingly severe weather events—such as hurricanes, droughts, and floods—threaten food security, water availability, and human health. Climate change exacerbates existing vulnerabilities, particularly in developing countries and among marginalised communities, and necessitates the urgent adoption of sustainable and resilient practices.

2. Environmental Degradation

Human activities, including deforestation, pollution, and overexploitation of natural resources, have led to significant environmental degradation. The loss of biodiversity, soil erosion, and the depletion of freshwater sources threaten the natural systems upon which life depends. This environmental degradation reduces the planet's capacity to provide essential services, such as clean air and water,

fertile soil for agriculture, and a stable climate, thereby compromising long-term sustainability and resilience.

3. Economic Instability

Globalisation has created an interconnected world economy, where economic crises in one region can have ripple effects across the globe. Financial instability, trade imbalances, and economic inequality are persistent challenges that can undermine both sustainability and resilience. The COVID-19 pandemic, for example, exposed the vulnerabilities of global supply chains and the unequal distribution of resources, leading to economic disruptions that have had lasting impacts on livelihoods and social cohesion.

4. Urbanisation

Rapid urbanisation is transforming societies and economies, with more than half of the world's population now living in cities. While urban areas can drive economic growth and innovation, they also pose significant challenges, such as overcrowding, inadequate infrastructure, and increased demand for energy and resources. Urbanisation often leads to the expansion of informal settlements, where residents are particularly vulnerable to environmental hazards and lack access to basic services, undermining both sustainability and resilience.

5. Social Inequity and Inequality

Social inequities—based on factors such as race, gender, income, and geography—remain pervasive across the globe. These inequities contribute to disparities in access to resources, opportunities, and decision-making power. For example, marginalised communities often bear the brunt of environmental degradation and climate change impacts, while having the least capacity to adapt. Addressing social inequity is essential to building resilient and sustainable societies that can withstand and recover from various shocks.

6. Technological Disruption

While technology offers solutions for many of the world's challenges, it also introduces new risks. The rapid pace of technological change, including the rise of artificial intelligence, automation, and digital platforms, can lead to job displacement, privacy concerns, and cybersecurity threats. Moreover, the digital divide—wherein some populations have limited access to technology—can exacerbate existing inequalities and hinder the ability of communities to adapt to changing circumstances.

7. Political Instability and Conflict

Political instability, often fuelled by competition over scarce resources, economic disparities, and social tensions, poses significant challenges to sustainability and resilience. Conflicts can disrupt social cohesion, displace populations, and destroy infrastructure, making it difficult to achieve sustainable development goals. Additionally, political instability can hinder effective governance, making it challenging to implement policies that promote long-term sustainability and resilience.

8. Health Crises

Global health crises, such as the COVID-19 pandemic, have underscored the vulnerabilities of public health systems and the interdependence of global communities. The spread of infectious diseases can have wide-ranging impacts on economies, societies, and the environment, disrupting education, livelihoods, and social services. Building resilient health systems that can respond to and recover from such crises is essential for sustainable development.

Addressing the Challenges

Addressing these challenges requires a holistic and integrated approach. Policies and practices must be adaptive and inclusive, prioritising the

needs of the most vulnerable while fostering innovation and collaboration across sectors. By embedding sustainability and resilience into the core of decision-making processes, societies can better navigate the uncertainties of a changing world and create a more equitable and sustainable future for all.

To effectively address the complex challenges of a changing world, it is essential to integrate sustainability and resilience across all levels of society—from local communities to global institutions. This integration requires a multi-faceted approach, involving adaptive governance, community engagement, technological innovation, and education. Below are key strategies for achieving this integration.

Strategies for Integration

1. Adaptive Governance:

Governments and institutions must adopt flexible, adaptive policies that can respond to emerging challenges. This includes incorporating sustainability and resilience principles into urban planning, disaster management, and economic development.

Adaptive governance involves the creation of flexible, responsive policies that can evolve in response to changing conditions. This approach is crucial for managing the uncertainties of climate change, economic shifts, and social transformations.

- **Policy Integration:** Sustainability and resilience should be embedded in all levels of policymaking, from local urban planning to national economic strategies. This involves integrating environmental, social, and economic considerations into decision-making processes.
- **Collaborative Governance:** Governments should engage multiple stakeholders, including businesses, civil society, and indigenous groups, in the policy-making process. This collaboration ensures that policies are inclusive and address the needs of diverse communities.
- **Risk Management:** Governments should adopt proactive risk management strategies that anticipate and mitigate potential disruptions. This includes developing early warning systems, disaster preparedness plans, and climate adaptation measures.

2. Community Engagement:

Empowering local communities to participate in decision-making processes ensures that sustainability and resilience initiatives are context-specific and culturally appropriate. Community-based approaches to natural resource management, for example, can enhance resilience by leveraging local knowledge and fostering a sense of ownership.

Communities are at the forefront of both the impacts of and responses to global challenges. Empowering communities to take an active role in sustainability and resilience initiatives is essential for creating effective and context-specific solutions.

Participatory Planning:
Involving community members in planning and decision-making processes ensures that initiatives are grounded in local knowledge and priorities. This can lead to more effective and sustainable outcomes.

- **Capacity Building:** Providing communities with the tools, knowledge, and resources they need to build resilience is crucial. This includes education and training on sustainable practices, as well as access to financial and technical support.
- **Social Cohesion**: Strengthening social networks and fostering a sense of community can enhance resilience by enabling collective action and mutual support during times of crisis.

3. Technology and Innovation:

Advancements in technology offer new opportunities to enhance sustainability and resilience. Renewable energy technologies, smart infrastructure, and data-driven decision-making tools can reduce environmental impacts and improve a system's ability to withstand and recover from disruptions.

Technology plays a pivotal role in advancing sustainability and resilience. By leveraging new technologies, societies can reduce their environmental footprint, enhance their adaptive capacities, and build more resilient infrastructures.

Renewable Energy: Transitioning to renewable energy sources, such as solar, wind, and hydroelectric power, is a critical step toward sustainability. These energy sources are not only environmentally friendly but also enhance energy resilience by reducing dependence on fossil fuels.

- **Smart Infrastructure:** Investing in smart infrastructure—such as energy-efficient buildings, green transportation systems, and resilient water management systems—can reduce environmental impacts and improve the ability to withstand and recover from disruptions.
- **Data-Driven Decision-Making:** Utilising big data, artificial intelligence, and predictive analytics can enhance decision-making by providing real-time insights into potential risks and opportunities. These technologies can help optimise resource use, monitor environmental conditions, and improve disaster response efforts.

4. Education and Awareness:

Raising awareness and educating individuals and organisations about the importance of sustainability and resilience is crucial. This includes integrating these concepts into educational curricula and professional training programs to build a workforce that is equipped to tackle future challenges.
Education is fundamental to building a culture of sustainability and resilience. By raising awareness and equipping individuals with the necessary skills, societies can foster a more informed and proactive citizenry.

- **Curriculum Integration:** Sustainability and resilience concepts should be integrated into educational curricula at all levels—from primary schools to universities. This ensures that future generations are equipped with the knowledge and skills needed to address global challenges.
- **Public Awareness Campaigns:** Governments, NGOs, and the private sector should collaborate on public awareness campaigns that highlight the importance of sustainable practices and resilient behaviours. These campaigns can encourage individuals to adopt more sustainable lifestyles and support resilience-building initiatives in their communities.
- **Professional Development:** Ongoing training and professional development programs are essential for equipping professionals in all sectors—such as urban planners, engineers, and healthcare workers—with the tools and knowledge they need to integrate sustainability and resilience into their work.

5. Financial Incentives and Support

Achieving sustainability and resilience often requires significant investments, which can be facilitated through targeted financial incentives and support mechanisms.

- **Green Financing:** Governments and financial institutions should promote green financing options, such as green bonds and sustainability-linked loans, to support projects that contribute to environmental sustainability and social resilience.
- **Subsidies and Tax Incentives:** Providing subsidies and tax incentives for businesses and individuals who

adopt sustainable practices—such as installing renewable energy systems or implementing energy-efficient technologies—can accelerate the transition to a more sustainable and resilient economy.

- **Insurance and Risk Transfer Mechanisms:** Developing innovative insurance products and risk transfer mechanisms can help communities and businesses manage the financial impacts of climate-related disasters and other shocks. This can include microinsurance for vulnerable populations and catastrophe bonds for large-scale risk management.

Conclusion

In conclusion, the integration of sustainability and resilience is essential for navigating the complexities of our changing world. Integrating sustainability and resilience is not just a goal; it is a necessity in our rapidly changing world. By adopting adaptive governance, engaging communities, leveraging technology, enhancing education, and providing financial incentives, we can build systems that are both sustainable and resilient and we can create systems that not only survive but thrive in the face of uncertainty. These strategies not only address current challenges but also prepare us to navigate future uncertainties, ensuring a thriving, equitable, and sustainable world for generations to come. Our collective efforts today will determine the well-being of future generations and the health of our planet.

LOSD

LONDON ORGANISATION OF SKILLS DEVELOPMENT

PUBLISHING

ILLUMINATE MINDS & TRANSFORM LIVES

JOIN US IN SHARING KNOWLEDGE AND EMPOWERING READERS WORLDWIDE.

ABOUT LOSD PUBLISHING:

GATEWAY FOR AUTHORS: FROM ASPIRING WRITERS TO ESTABLISHED AUTHORS.

EDUCATIONAL FOCUS: PUBLISH BOOKS ALIGNED WITH SKILL ENHANCEMENT, PERSONAL DEVELOPMENT, MOTIVATIONAL AND INSPIRATIONAL LITERATURE.

RIGOROUS SELECTION PROCESS: ENSURING HIGH-QUALITY, VALUABLE RESOURCES FOR READERS.

PERSONALISED SUPPORT: TAILORED DISCUSSIONS ON FINANCIAL DETAILS AND PUBLISHING PROCESS.

BENEFITS FOR AUTHORS:

ACCESS TO INDUSTRY EXPERTISE: GUIDANCE THROUGH EDITING, DESIGN, PRINTING, AND DISTRIBUTION.

INCREASED VISIBILITY: PROFESSIONAL STANDARDS, GLOBAL DISTRIBUTION, AND MARKETING SERVICES.

CREDIBILITY & REACH: REACH DIVERSE READERS WORLDWIDE THROUGH ESTABLISHED CHANNELS.

EMPOWERING AUTHORS: CONTRIBUTE TO THE COLLECTIVE GOAL OF EDUCATION AND SKILL ENHANCEMENT.

EXPLORE OPPORTUNITIES:

CONTACT ADMIN@LOSD.CO.UK

TO EMBARK ON YOUR JOURNEY TO INSPIRE AND EMPOWER READERS WORLDWIDE.

DEVELOPMENT OF RESEARCH BASED WORKING MODEL FOR NEUROTYPICAL IN THE ERA OF AI INFLUENCING CONTACT MANAGEMENT INDUSTRY

Dr. Amit Phillora

Sr. Specialist at Amazon.com

Theme of the Article: : Artificial Intelligence

Research Objectives: This study aims to explore strategies to secure the jobs of neurodivergent employees within Contact Management (CM) industries, such as Business Process Outsourcing (BPOs) and Knowledge Process Outsourcing (KPOs).

BIO

MDr. Amit Phillora is driven by "Service Acumen, Operational Excellence, and Continuous Improvement." With expertise in project management methodologies, psychometric analysis, recruitment analysis, yield ratio techniques, and escalation management, he excels in deriving optimal value. Trained in recruitment analysis and psychometric testing, Dr. Phillora specialises in emotional intelligence and has worked extensively in neurodiversity, neuromarketing, and breast cancer. His leadership, analytical, problem-solving, and communication skills, combined with the ability to network with stakeholders at all levels, have delivered extraordinary results. Recognised with multiple awards, including Pillars of India and the UN 75 Peace Award, he is also a member of InSc.

Abstract

In 2024, Artificial Intelligence (AI) has increasingly taken over a significant portion of the workforce, leading to widespread job insecurity among employees. Major multinational corporations like Amazon, Google, and Microsoft have had to downsize, resulting in the loss of numerous jobs. This situation has created a heightened sense of anxiety, particularly among neurodivergent employees, such as those with autism spectrum disorder (ASD) and Attention Deficit Hyperactivity Disorder (ADHD). This study aims to explore strategies to secure the jobs of neurodivergent employees within Contact Management (CM) industries, such as Business Process Outsourcing (BPOs) and Knowledge Process Outsourcing (KPOs). Specifically, the research will investigate whether dry promotions—promotions without a corresponding increase in pay—serve as a positive motivational factor for neurotypical employees by providing a sense of job security or if they contribute to negative motivation. To achieve this, the study will employ various psychometric tests to assess the personality traits, IQ levels, and emotional stability of neurodivergent employees. Understanding their current mental health status will be crucial

in designing an AI-based recession strategy aimed at ensuring their job security in the evolving job market. This research hopes to contribute to the development of more inclusive workplace practices that support neurodivergent individuals in the face of AI-driven changes.

Keywords:

Artificial Intelligence (AI), Contact Management (CM), Neurodiversity, Dry Promotion, Neurotypical (NT) Population, Job Security

Introduction

To understand how to work with neurodivergent population specially with Autistic and ADHD Employees we will first have to understand D.E.I model.

Diversity is the combination of unique skills, experience, perspective, and cultural backgrounds that make us who we are and ultimately benefits our global customers. It's full range of visible and invisible identities, including but not limited to gender, race, status, race, ethnicity, nationality, physical and cognitive ability, sexual orientation, military status, education, age/generation, social class, language etc. individuals and groups are not one dimensional, and in fact are shaped in multiple and intersecting identities.

Equity is the fairness of access, opportunity, and advancement for all. Equity looks to identify and eliminate barriers that have prevented the full participation of some groups. It is also about ensuring that policies, practices, and systems provide all individuals access to the opportunities, resources, and recognition to be successful.

Inclusion is providing an environment where our employees feel valued, trusted, connected, and informed. It's about recognising a d valuing the different lived experiences of our teams and leveraging their unique competencies and perspectives, so that everyone may experience ownership and empowerment.

Understanding basics of Neurodiversity

Neurodiversity is an idea that people experience and interact with world in different ways, and that differences are not viewed as defects. Neurodiversity is a term representing individuals who cognitively process differently than what society considers normal.

As per World Health Organisation (WHO):

- **15 %** of humanity is living in disability.
- Less than 12% of this group are included in diversity programs.

When we discuss or talk about an individual then it referred as **Neuro-Divergent (ND) or Neuro-Typical (NT) or Atypical.**
Let's try to understand following different types of ND/NT who add to Neurodivergent populations:

- Autism
- Attention Deficit Hyperactivity Disorder (ADHD)
- Dyslexia
- Dysgraphia
- Other Learning Disorders

History about Hiring NT Workforce

Hiring Autistic candidates' movement was started in March 2013, when SAP, one of the global enterprise software and technical company announced its intention to have **1%** of its workforce to be composed of Autistic Employees by end of year 2020. That was one of the reasons why hiring of autistic candidates got increased in the US. Even though the hiring of autistic candidates got increased, however, **85%** of autistic populations still remained unemployed.

In **2019,** a group of employers with established autism hiring programs published the Autism@WorkPlaybook, in which they noted the most

critical factor for the success of an Autism@Work program was the ability to source talent.

It was observed and learnt that the traditional processes for recruiting autistic talent was not good and in addition to that the US **Vocational Rehabilitation System (VRS)** was not an open platform. The state VRS restricted employers from accessing the database and find NT candidates for hiring. This also restricted them to find and identify the type of disability the person might be having. It was further found that not every autistic or NT person was registered under VRS. Further being registered with State VR system, c give assurance that neu vergent/disabled grad would be to find enoug portunities for filing va positions. Therefore, the a cies looking for Neuroc gent or autistic talents be equipped with stron sources for finding out identifying NT candidates

In 2017, Marcia Scheiner. ident and founder of Inte Autism Employment Adv developed guidelines ca **An Employers Guide to Manage professionals on Autism Spectrum",** to address employers needs in supporting the existing autistic employees. This was the time when Autism@work programme was just launched, usually with small pilot groups and employers needed guidance on creating a supportive and inclusive workplace for their autistic colleagues.

In **1998**, journalist and autism activist **Harvey Blume** introduced this concept in broader way when he wrote in ***The Atlantic,*** "ND may be every bit as crucial for human race as biodiversity is for life in general. Who can say what form of wiring prove best at any given moment?"

<u>The Myth of Normal Brain</u>

<u>The Bell-Shaped Curve of a Normal Distribution</u>

"Average, Standard & Normal" are part of a concept we are apply every day – from height to IQ, blood pressure & even cloth size – to make sense of the world around us.

When we try to describe human traits, the normal distribution predicts that about two thirds (68%) of the people in a sample will fall within the "average", range, with fewer people represented at the extremes.

Example

Random Sample Size = 1000
Average Score = 100
Expectancy for 680 People to have IQ Between = 85 – 115.

Fewer & fewer people will be represented as their IQ scores get further away from 100 in either direction.

Another example is of a women shoe store. If average shoe size is 7 then the shop would more like to keep more styles for shoe sizes ranging from size 5 to 9 and not of size 11 or above as rare large feet people would they get for selling and would know if larger feet come to their shop. In similar way

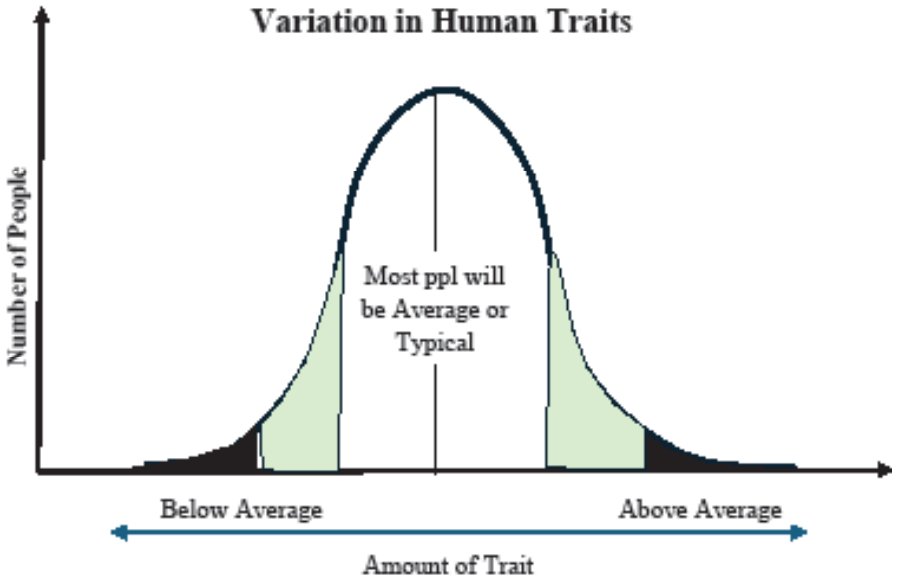


Figure 1

its next to impossible to plot the complexity and variety of human cognitive & processing styles, yet in many ways society assumes that there is a standard or “typical” way of thinking & tends to accommodate the people who fall into that camp. Whereas there is no way of “normal” thinking, most of the people assume that others process information the same way they ever think of it at all. Due to this these brains work differently and can have significant barriers as well.

Neurodiversity

Judy Singer, Australian Sociologist & autism rights coined the word neurodiversity, which was a combination of neurological & diversity terms. It helped in articulating the needs of the autistic people and also helping them not to get labelled under disability but has now been seen as people who had different neurology

(**Neurodiversity** is a framework for understanding human brain function that recognizes the diversity of human cognition as a biological fact. The neurodiversity paradigm argues that diversity in human cognition is normal and that some conditions classified as mental disorders are differences and disabilities that are not necessarily pathological.)[1]

1(https://en.wikipedia.org/wiki/Neurodiversity)

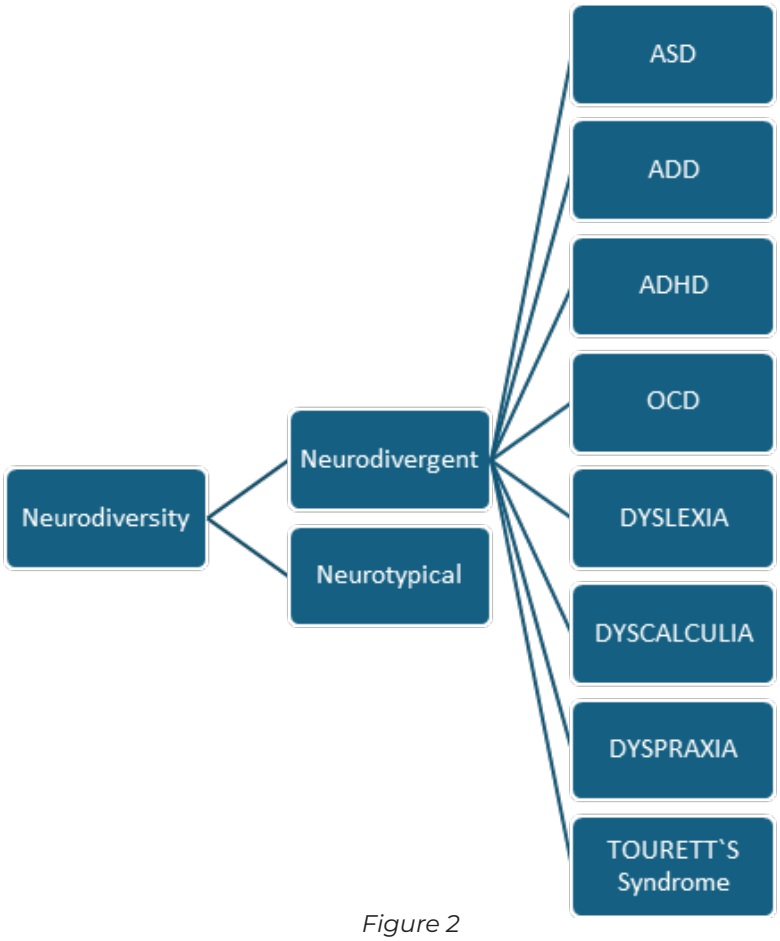


Figure 2

The language of Neurominorities

In the context of work environment, there are few basic rules that can be applied to ensure the correct usage of the neurodivergent terminologies to communicate with Neurominorities or ND or NT workforce.

1. ND, on standalone basis, is an idea that there is a biological difference in all human minds. It’s not the characteristics of one individual.
2. Neurodivergent refers to neurological variations of a group, however some researchers advocate and uses the term for Neurodivergent individuals.
3. Autistic and Neurodiverse or Neurodivergent are not interchangeable terms.:
   a. An autistic individual is neurodivergent, but a Neurodivergent individual may or may not have autism.
   b. The term Neurotypical (NT) refers to someone who is not neurodivergent. However, a person who is not autistic is not necessarily neurotypical as they may be neurodivergent in another way.

Why Should we hire Autistic Talent?

A Recruiter, hiring manager or Diversity and Inclusion professional is said to be successful

when he or she can hire and retain talents in their companies.

In the US, at the beginning of year 2020 the labour force recorded was 164 million, it was assumed that to fill any vacancy by hiring talent is an easy fix. Soon when covid 19, pandemic hit all of us, the unemployment rate in the US itself got jumped to 3.5%. Still employers adjusted and resumed hiring and finding right talent for their works, hiring became tougher and difficult in comparison to the past. However, a large number of talents got noticed in autistic community.

[2]Let's understand that statistical data: Secondary Data

The Neurodivergent Job Candidate, Recruiting Autistic Professional by Marcia Schener and Joan Bogden, Chapter [2]

In the US, one in every **54, 8 years old** is diagnosed with **autism spectrum** disorder (ASD): That is **1.85 %** of Children population have ASD condition, whereas **5.4** million adults are estimated to be autistic. The employment condition of approximately **2.2%** of Autistic population is not that good in comparison to other disable populations. By the time they hit their **20s, only 58%** of these autistic population will have some form of earning income in comparison to **other intellectual disable (74%), & 94%** for those having learning disabilities. **35%** of Autistic students who attended college are in bad economic status in comparison to their peer autistic people who never attended college. That's how **85%** of autistic population land into unemployment and under empowerment situations. Which makes a good number of autistic population available for employment.

What benefits do recruiters get by hiring a neurodivergent?

- Business Benefits
- Better Talent: A NT think different and have very creative way of problem solving.
- Increased productivity
- Lower Turnover
- Employee Engagement
- Brand Recognition
- **[3]Tax Credits:** Government programs targeted at encouraging employers to hire people with disabilities provide tax credits to small and large businesses at the federal and state levels. there is a concept of Disability Access Credit (DAC): which means that enterprises at federal levels who have earnings of $ 1 million or have ≥30 employees might be eligible for DAC. The amount can range between $ 250 to $ 10,000. All employers are eligible for Workforce Opportunity Tax Credit, which ranges from $1,100 to $ 9,600 per employee, which again depends on hiring of employee and length of employment.
- Economic[4] Benefits

Social Security Disability Income (SSDI) Vs Supplemental Security Income (SSI)

Federal Financial Support Programs for individuals with disabilities

SSDI	SSI
Work History (based on ss earning record)	No work history
$1,258/month (2020 average)	Up to $783/month (2020)
Cannot continue same level of work as previously for a year	Not able to work at SGA level(<$1,260/Month)
	Nutrition: SNAP @127/Month

[3] Internal revenue services, "Tax benefits for business who have employee with disabilities, March 2020.

[4] The Neurodivergent Job Candidate, Recruiting Autistic Professional by Marcia Schener and Joan Bogden, Chapter 2, pg. 22

May also be eligible for SSI	Medicaid: $3,000(Adult) to $20,000+(disabled)

For Every 1% of Autistic adult employed
$222,000 (SSI, SNAP, and Medicaid) x (1% autistic adults)54,000 = $1.2B
SNAP = Supplemental Nutrition Assistance Program

- Societal Benefits: J.K.Y Lai, E Rhee and Nicholas found that employment plays an important role in Mental health of people. It helps in issues related to suicide, depression and Anxiety happening due to unemployment. Studies shows that unemployed people get 30% more negative emotional experience in comparison to a normal employed person, Autistic people are depended on their family for financial and other needs and live with aging parents. Financial independence helps them gaining self-esteem and confidence to live independently.

[5]History of Disability & Neurodiversity Hiring Initiatives: Timeline of Disability hiring programs

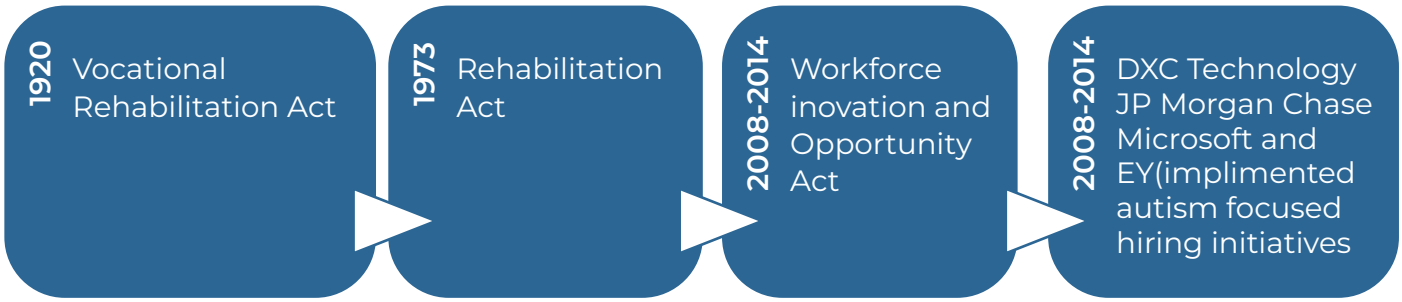


Figure 3

Let's try to understand how an Autistic Jobseeker is different from us Normal.
Most hiring managers look for following qualities for their candidates:

- Strong Communication Skills,
- A "can-do" or Positive Attitude,
- Self – Awareness,
- Teamwork focus.

When interviewing the Autistic or NT candidate, it's important to create inclusive and supportive environment. There are guidelines which needs to be considered while interviewing NT candidate, few of them are listed below:

- **Disclosure of Autism or Neurodiversity:** As a recruiter you must disclose to the candidate will be checked for Autism and other Learning Disabilities tests, during the job interview. It's your personal decision based on your needs and comfort level. Please note that, Under the **Americans with Disabilities Act (ADA),** you only need to disclose a disability when requesting accommodations for the application or interview process.

[5]The Neurodivergent Job Candidate, Recruiting Autistic Professional by Marcia Schener and Joan Bogden, Chapter 3, Pg 28

- **Highlight Unique Skills:** If it's decided to disclose the Autism diagnosis, identify the unique skills that the person is bringing in with themselves. For example, mention, the ability to problem solving techniques blended with creative mind.
- **Practice interview**

Questions: Prepare for common interview questions. Some examples include:
o Tell me about yourself.
o What are your strengths and weaknesses?
o Describe a problem you've solved in the past.
o What is your dream job?
o How do you work in a team?
o What type of work environment do you thrive in?

Communication Guidelines:

o Always be direct and upfront

- ***Be calm and patient and give adequate time for responding back to your question, don't rush for answers.***
- ***Encourage comfort and openness and support flexibility.***
- ***Be open for alternative interview modes or venue***
- ***Be observative and understand their body language and nonverbal cue.***
- ***If something is not clear or in doubt, stop and ask for clarification***
- ***Provide writing surface if required.***

- **Seek Advice:** Talk to professionals who know the individual well to determine the best interview approach. Consider interviewing in a familiar place with a familiar person present.

[6]To understand more about hiring Autistic Candidates, Wales Autism Research Centre have designed Guidelines for hiring Autistic Individuals by Ben Winn.

Let's try to understand differences in Neurotypical Thinking

Understand that disability and Disorder are not the same thing there is a difference between the two. Based on, "medical model" autism spectrum disorder (AS**D) is considered as Neurodevelopmental disorder. Clinical Psychologist or Psychiatrist use Diagnostic & Statistical Manual of Mental Disorders (DSM)** as a reference to study mental disorders and classify them. We should be able to distinguish between development disorders like autism and psychiatric disorders. As a recruiter or hiring manager you must know that ASD is not a Mental illness, and it falls under the category of development disorder.

There is a difference between developmental disorder and psychiatric disorder. Developmental disorders are lifelong and cognitive based conditions that affects persons social interactions, and their challenges may vary as per the different life stages of their lives.

Whereas Psychiatric disorders are more of emotional based and not cognitive based conditions.

Disability is a legal term that the Americans with Disability Act 1990 (ADA) use to determine eligibility for accommodations at workplace. As per ADA, disability can be metal or physical which creates hinderance performing daily tasks, social engagement. Invisible disability like Autism, bipolar disorder, multiple sclerosis, diabetes, epiclesis etc are not obvious, so at the time of hiring employer may ask for medical documentations, so that disable employee can special accommodations at workplace.

[7]**Components of Bigger Picture**

[6]Guidelines-for-interviewing-by-Beverley-Winn-et-al.pdf (autistica.org.uk)

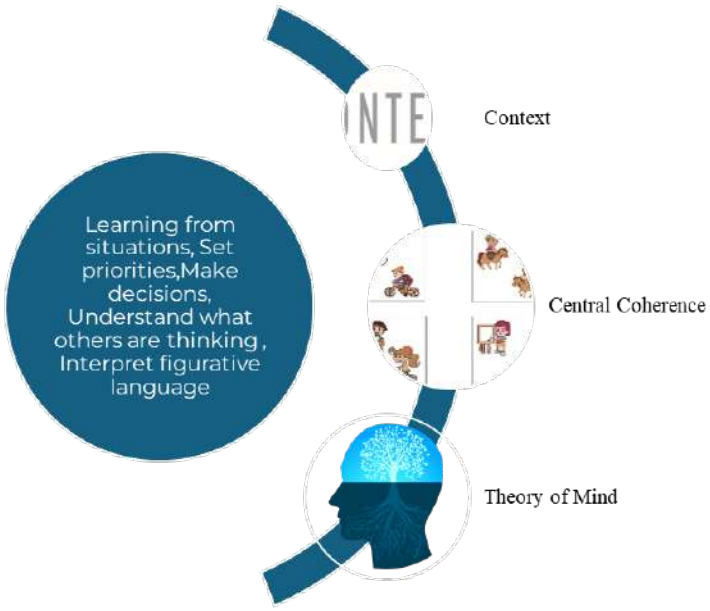


Figure 4

[7] The Neurodivergent Job Candidate, Recruiting Autistic Professional by Marcia Schener and Joan Bogden, Chapter 5, Pg 49, 52

Executive Functioning Skills (EFS) are set of cognitive skills that help us in getting our things done and regulates our behaviour. It also helps us in accomplishing our goals.
[8]Figure: EF

Figure 5

Executive Functioning Skills (EFS) are set of cognitive skills that help us in getting our things done and regulates our behaviour. It also helps us in accomplishing our goals.
[8]Figure: EF

[9]Let's Tabulate and try to Understand it better

Table: 2

Plan · Organise thoughts and materials · Priority	**Manage Time** · Estimate and allocate time needed · Get started · Adjust processing speeds.
Focus · Follow through and complete tasks. · Avoid distractions and shift attentions.	**Working Memory** · Remember Details · Draw on past learnings

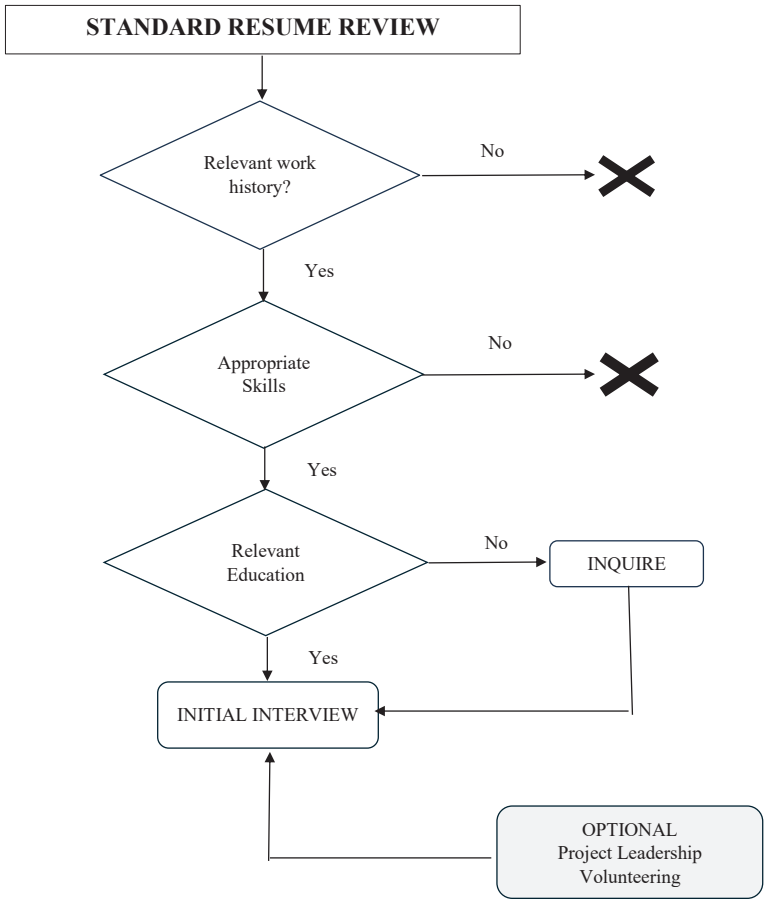
[8] www.advantageslearningcenter.com

[9] The Neurodivergent Job Candidate, Recruiting Autistic Professional by Marcia Schener and Joan Bogden, Chapter 5, Pg 49, 52,63,64

Remain Flexible · Transition between tasks. · Coping with changes in routine.	**Regulate Emotions** · Ability to manage, regulate emotions and frustrations. · Think before speaking.

Screening Techniques for Atypical Resumes

Standard Resume: "Vertical Review Process"



"Horizontal" Review: Review Process for Atypical Resume

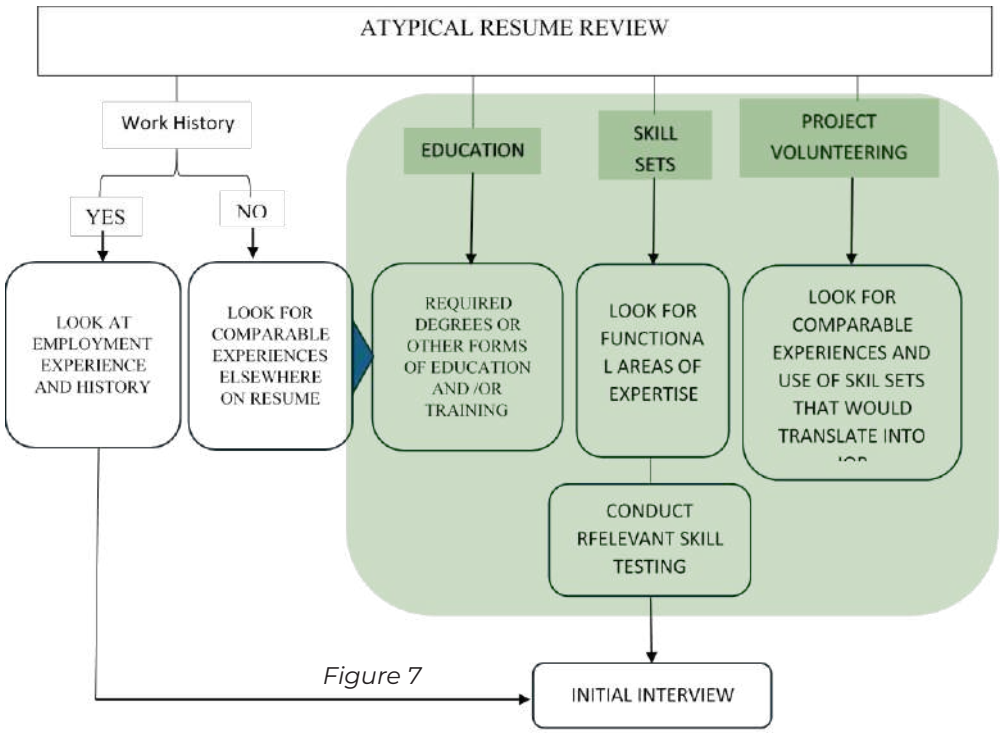


Figure 7

A survey of 2,000 hiring managers conducted in 2018 confirms the impact of 1st impressions Following behavior was observed in interviewers:

- 33% knew if they would hire a candidate or reject within 90 seconds of meeting them.
- 65% did not hire a candidate who had poor eye contact with them,
- 50% won't consider the candidate's dress sense, their body language or their odor or the way they opened or closed doors or the way they walked in.
- 40% felt that if a person is not wearing a smile on their face, then it's a good reason to not hire that applicant.
- 40% would reject an applicant based on the quality of their voice and overall confidence.

Like any candidate an NT must undergo **Interview funnel** and candidates need to pass through each level to avoid rejection and get recruited.

INTERVIEW FUNNEL FOR JOB APPLICANTS

[10] Twin Group."8 Surprising Statistics about interview". Twin Employment &Training, March 2018(https://www.twinemployment.com/uk/blog/8-surprising-statistics-about-interviews/)

After a rigorous hiring process, when the hiring manager shortlists the selected candidates then they pitch an offer to the selected candidates, now it's up to them to accept the offer or leave the job opportunity offered to them. For that it's important to understand what Offer Acceptance Rate (OAR) is.

OAR = (Number of offers Accepted /Number of offers) X100

There are many reasons due to which a shortlisted candidate can turn down a job offer. according to a job seeking site called glassdoor.com, top 3 reason for declining a job opportunity are:

- Better salary, perks & benefits.
- Poor recruiting/interviewing experience, experienced by job applicant.
- Poor or Negative image of employer.

Passing all gates when a Candidate enters inside an Organisation, then it becomes important for the Organisation to improve the retention ratios as recruitment and selection with training is a very expensive and tiring process.

Employee Retention Rate = [(Total # of Employees – # of Employees who left)/Total of # Employees)]

Figure 8

- As per World Institutes '2020 report, in 2019 major reason for increased attrition rates in companies were:
-
- 20% People left because there was no Career Growth and poor Career Development in their existence companies.
- Over Workload and poor increments resulted in poor work life balance, due to which 12% of the workforce left their existing companies and switched to different companies which provided better working environment and opportunities to balance personal and professional lives of employees.
- Toxic work culture and bad managers created a situation which let to loss of another 12% of workforce.
-
- The major reasons for Neurodivergent to leave was:
-
- Bullying
- Sensory Overload
- Social Misunderstandings
-
- The percentage of such is 78%, the report was made by work institutes.

Retention Rate can be improved, and Attrition rates can be brought down in NT work-

$$\text{EMPLOYEE RETENTION RTAE} = \frac{\text{(TOTAL NO.OF EMPLOYEE-NO.OF EMPLOYEES WHO LEFT)}}{\text{(TOTAL NO OF EMPLOYEES)}}$$

ing talent. All we must do is taking care of following points:

- Maintain Supportive working environment.
- Education & Training on sensitive topics like POSH, D.E.I, & Neurodiversity.
- Generating Awareness about NT Workforce
- Train and Make Neuro-Recruiters who specialise in hiring NT Workforce & candidates who specialise in Neuro Marketing.
- Management Training
- Manager Support System.

Artificial Intelligence (AI), Dry Promotion and NT Workforce Job Security

As per recent reports shared by CNN in one of their articles stated that AI is closely linked to major layoffs in IT sectors because the companies are investing a huge amount in Machine learning, automation and AI based technology. Tech Giants like Google, Microsoft, IBM had to let their people go as they have invested a good amount of time and many in developing and using AI based applications like Chat GPTs. Due to this drift the job security is reduced even for top IT or Tech experts. Now, when companies are struggling hard in balancing human workforce and AI based applications. It's time to upscale the existing talent so that they are able survive in this AI based world. As per layoffs, about 212,294 were laid off from IT sector in year 2023 which was far more than the numbers of people got laid off in 2022 numbering 164,709. Microsoft after firing 10,000 employees and announced that they will be investing on AI based applications, Chat GPT etc. Nov 2023, Facebook laid off their 10,000

[11] https://edition.cnn.com/2023/07/04/tech/ai-tech-layoffs/index.html

employees after cutting 11,000 positions. A software engineer who is trained in AI and ML gets 12% higher salary in comparisons to a normal software engineer.

Now when we see retaining a normal workforce is getting difficult then how we will be able to retain NT workforce who have cognitive and psychological disorders.

Dry Promotions

As we know NT specifically Autistics people are creative minds, socially remains disconnected and focus on primary goals, due to sensory overloading and selective mutism. They can do one task at time. We know that companies are investing a lot in AI and ML due to with salary hikes are almost negligible, so what we can do is, instead of finding a new NT talent who is equipped with AI skills, why not promote the existing NT Individual by upskilling them in AI, ML and Automation skills. By using Dry Promotion, we can give them Power and Authorities with Job security with same increment or lesser increment in comparison to the increments which use to happen in past.

This will act as positive motivating factor as promotion in hierarchy will boost their moral and having equip to work with AI and ML will be another positive factor.

This will help:

-
- Retention Rate in NT population
- Opportunity for Trainers to train Neurotypicals
- Cost saving in hiring and training new NT talents
- Existing NT talents of the company will be able to learn in faster way and productivity rates will be get improved because they know how their companies work.

We have targeted Contact Management Industries which are composed of BPOs and KPOs. Contact management companies are companies which work on Contacts. Contacts that are generated by Customer, Clients, their employees. They could be through Emails, Phones and Chats.

E-commerce giants like Myntra, Amazon etc uses Chat bots and Auto bots in dealing with customers. Our aim is to retain NT techies who can

design, modify and update the AI tools and make them more user friendly. Most of the NT techies are depended on AI for their day to day lives, like Active Noice Cancellation (ANC) headphones, Chat bots, Virtual mode of communication in comparison to physical mode. So, the understand the user interface better and their ideas and design proposals will help in AI applications development keeping Normal and NT populations in mind.

Literature Review

The study is very much inspired from the book "The Neurodivergent Job Candidate, Recruiting Autistic professional by Marcia Scheiner & Joan Bogden". The explains about neurodiversity and autism. The author had explained about the challenges which were faced by hiring managers in hiring neurodivergent candidates and explain how to create a working model for working with neurotypical working professionals. The book helps in identifying differences between traditional resume review and atypical resume reviews.

A health writer Ariane Resnick had written an article with title "What Does It Mean to Be Neurodivergent?" for Websites well mind, where she had explained about neurodiversity. The Article has a live poll on Question: Do you identify as neurodivergent? The result of this poll on June 2,2024 at 13:36 IST is:

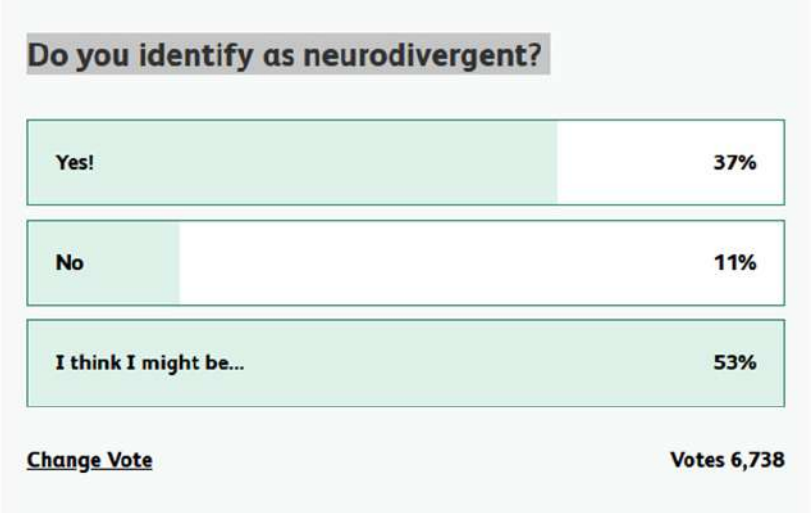


Figure 9

In The Neurodiversity Edge, renowned Oxford-trained cognitive scientist, neurodiversity expert, and business leader, Dr. Maureen Dunne presents a pioneering framework to harnessing the power of neurodiversity to navigate the most important human resources revolution in the modern era.

[13] **Cherry Gupta**, wrote an article with title: **"Dry promotion': All about the appraisal trend offering higher designation without pay hike",** which got published in Online Newspaper:" ***The Indian Express"***

[14]**Roberta Matuson** had written an article on **Here's What You Should Do If You Receive A 'Dry Promotion'.** Here she tried to explain what reason is behind getting dry promotion. She touched on topics like are there is any benefit in accepting a dry promotion and does no money really means no money. ***The article came in online site of Forbes***

To understand the terminology related psychology and mental health like disorders, disabilities, help was taken from Penguin dictionary of Psychology by Arthur S. Reber, Second Edition.

K Ashwathapa had explained concepts related to Managing benefits and Wellbeing, A Safe and Healthy Environment, Labour Laws were very well explained in his book, **Human Resource Management.**

Mike Byon wrote a book: Ultimate **Psychometric Tests**, in which there were more *than 1000 Verbal, Numerical, Diagrammatic and Personality tests*.

Udai Pareek in his book **Organisation Behaviour** and Process, had explained differ-

ent concepts related to the Perceptual process, *Interpersonal styles, Personal effectiveness,*

[12] *What Does It Mean to Be Neurodivergent? (verywellmind.com)*

[13] *https://indianexpress.com/article/lifestyle/workplace/got-promoted-but-no-pay-raise-dry-promotions-appraisal-trend-9285951/*

[14] *https://www.forbes.com/sites/robertamatuson/2024/05/01/what-is-dry-promotion/?sh=57b565b42a52*

Leadership styles, work motivations, managing frustration, managing stress and burnouts etc.

Research Methodology

Sampling Methodology: Quota Sampling
Target population: MNCs like Amazon.com, Accenture, Universities like APS, IGNOU.
Industry type: Contact Management
Age Group: 18 – 45 years

Parameters

ASQ: Anything Above 26 is Autism
ADHD: Anything above and equal to 55 is ADHD
Sample Population: Autistic, ADHD.
Country: India.

Psychometric Tests:

Emotional Intelligence Scale (EIS),
Personal Style Inventory/Indicator (PSI).
Neuro Divergent Tests: Autism Test for Adults, ADHD Test for Adults
Sample Size: 13 NTs (Either Autistic or ADHD or Both)

Hypothesis Testing

Generally, organisations want to retain the employees to avoid unnecessary expenditure towards hiring and training new candidates.
Amongst various performance parameters of an employees the most important parameters to the organisations are Overall Performance (Productivity) and Quality of work. For this hypothesis testing main logic used was to study actual scores awarded by the organisation on these two performance parameters for known NT population /Sample, work out the Average Score X Bar on both parameters and apply T Test on both the samples.
Here we have assumed that
Population Mean =100%
Hence if X Bar is =100% we will assume that Organisation can accept the retention of NT employees else not.

HYPOTHESES

First Set of Hypotheses.
Productivity
H_0: Autistic and ADHD type of Neurodivergent individuals can be retained and be trained on new AI tools in an Organisation if Productivity X Bar=100%.)

H_1: Autistic and ADHD type of Neurodivergent individual cannot be retained in Organisation on new AI based working environment if Productivity X Bar≠100%.)
Quality of Work

[15] *Neurodivergent Test | Free Am I Neurodivergent Quiz (exceptionalindividuals.com)*

H_0 : Autistic and ADHD type of Neurodivergent individuals can be retained and be trained on new AI tools in an Organisation if Quality X Bar=100%.)

H_1 : Autistic and ADHD type of Neurodivergent individual cannot be retained in Organisation on new AI based working environment if Quality X Bar≠100%.)

Raw Data: **Table: 3**

Sl No	Important Performance parameters of NT Populations	
	Scores awarded for Productivity	**Scores awarded for Quality**
1	100	100
2	100	100
3	100	100
4	100	100
5	100	100
6	100	100
7	90	100
8	100	100
9	90	100
10	100	100
11	100	100
12	100	100
13	100	90

Sample Size of NT Population =13

Statistical Tool =Left tail T Test (T test was selected as the sample size was small) was used to calculate Critical Value. The average of marks (score) awarded to 13 individuals of the samples, by the organisations in Productivity and Quality of Work was checked against the critical vale of each parameter worked out based on One Tail T Test

Decision Rule: If average scores awarded by organisations on Productivity and Quality of work are more than Critical Value, statistically worked out by a T Test (T test was selected as the sample size was small) would mean that the organisation should not hesitate them to continue in the organisation.

Proceedings of Hypotheses testing for Productivity and Quality of work

Table: 4

Steps			
Step 1		**Productivity**	**Quality**
H_o:	Mean =	100	100
H_1:	Mean≠	100	100

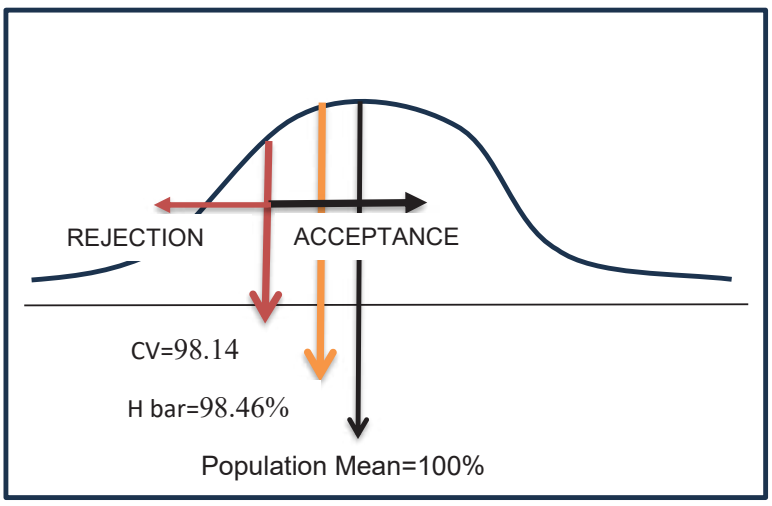
Step 2
Data

Sample size n	13	13
Population Mean	100	100
Estimator (x bar)	98.46	9.23
Sample SD	3.76	2.77
Population	Infinite	Infinite
Confidence Level (CL)	0.95	0.95
Level of Significance (LOS)	0.05	0.05

Step 3 Type of test	Left Tail t Test (small sample size)		
T Statistics (TINV-MS Excel)		1.782287556	1.78228756
Step 4			
Decision Rule: If CV is less than x bar we shall accept null hypothesis.			
Step 5			
Standard Error		1.041543385	0.76923077
Error of Estimate		1.856329814	1.37099043
Step 6			
Critical Value		98.14367019	98.6290096
Step 7 CV < X bar			
		X Bar=98.46	X Bar=98.46
		CV=98.14	CV=99.23
		Population Mean=100	Population Mean=100
Step 8			
Statistical Inference:	There is sufficient evidence for not rejecting null hypothesis		
Step 9			
Admin Decision	As sample Average (X Bar) for Productivity and quality are > CV, hence, we accept H_o		

Pictorial Display

PRODUCTIVITY



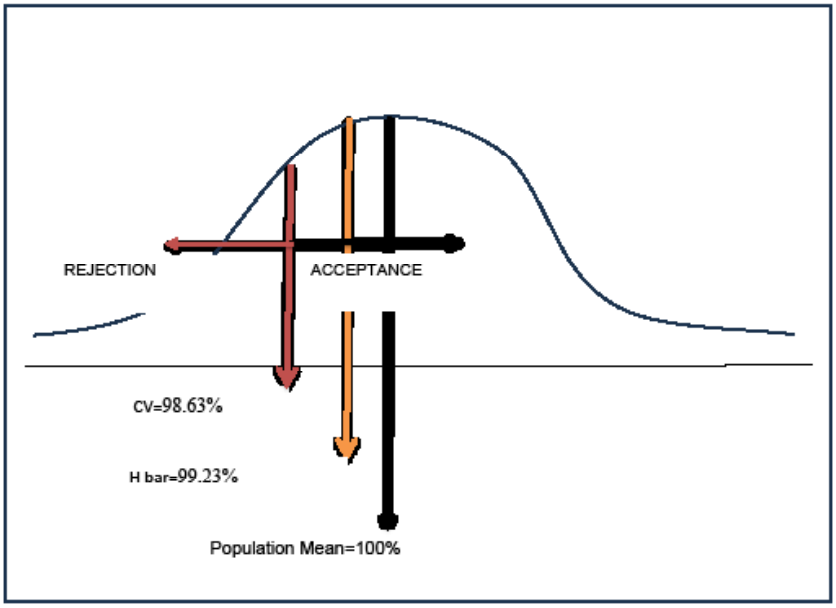


Figure 10

Productivity: The Table 3 shows that 11 out of 13 NT employees have scored Cent percent, 100% in the assessment of their Productivity.

Quality of Work: The Table 3 shows that 12 out of 13 NT employees have scored Cent percent, 100% in their assessment of Quality of work.

Decision: Overall performance of these NT sample employees is

X bar 98.46% More than CV of 98.14% in Productivity (98.46% > 98.14%)

X bar 99.23% is More than CV of 98.63% in Quality of Work (99.23%>98.63%),

Hence, we can accept H_0, that is, i.e. the organisation should not hesitate them to continue them in the organisation. Or They can be retained by the organisation, as they are meeting the performance standard set by them.

Second Set of Hypothesis

Dry Promotion.

The study also considered Dry promotion as the

H_0: Dry Promotion with adequate training is a very good option for improving retention rates.

H_2: Dry Promotion is not a good option for improving retention rates for NT Population.

Dry Promotion

As discussed earlier in this paper it was opined or hypothesised that under the threat of AI conquering the contact management industries, that Dry Promotion and upskilling them in

AI, ML and Automation skills, may give them sense of Power and Authorities with Job security. It was also felt that may act as positive motivating factor and at the same time benefit organisation for not incurring additional expenditure on ne hiring.

This hypothesis was primarily formulated to find the mind set of existing NT employees whether they are in favour or against on dry promotion concept.

Data

Sample Size of NT Population =13

Statistical Tool = Counting Numbers of Employees in favour of Dry promotion and Numbers of Employees not in favour of Dry promotion.

Decision Rule = If percentage of Employees in favour of Dry promotion (Y) is more than percentage of employees not in favour (N) then accept Ho.

Table: 5 Actual Data with opinion

Sl No	Opinion on Dry Promotion	
	In favour	Against
1	Yes	
2	Yes	
3	Yes	
4		No
5		No
6		No
7		No
8		No
9		No
10	Yes	
11		No
12		No
13		No
Total	4 Yes	9 No

Here the Percentage of employees in Favour of Dry Promotion is,

$$= \frac{(\text{No.of "Y"})}{(\text{Sample Size})} X100$$

$$= \frac{4}{13} X100$$

$$= 30.76\ \%$$

Percentage of employees Not in Favour of Dry Promotion is,

$$= \frac{(\text{No.of "N"})}{(\text{Sample Size})} X100$$

$$= \frac{9}{13} X100$$

Decision. As Percentage of employees Not in Favour of Dry Promotion (No) is more than Percentage of employees in Favour of Dry Promotion (Yes), We can does not accept H_0,

Inference: The NT employees are not in favour of Dry Promotion as this will not give any financial benefits to them. The sample data shows that monetary benefits are more important than continuing in same organisations on dry promotions only. They rather prefer shifting to other organisations and face further struggle to improve financial status.

Further studies done

Apart from administrating ASQ and ADHD testing on NT sample employees, additional psychometric test on this sampled employee were also administered to study the associated traits

from behavioural science or psychological aspect to help the researcher: -

(a) to find out strengths and weaknesses of the sample with an aim to build up favourable strategies and recommendation on NT population for the organisation to strengthen their HR to have win- win situation for not only retaining the NT Talent and suitably promoting them but at the same time for overall sustenance, development,andgrowth of the organisation.

(b) To generate some likely relationship between these/or some of these traits to have some idea of the NT Employee or normal employees in the presence of non-disclosure act for purely his understanding to help the individuals/ provide some more attentions.

These Tests are discussed as follows:

EIS/ EQ: There are 10 Parameters on which the test is performed to find out EQ. The study of scores in each can also help us to find their strengths and weaknesses. They can be used for designing and developing training programme. Or putting them in suitable positions, where they can really excel and bring laurels to the organisation

PSI. This test gives the Personality type. This can also help organisation to place them suitably.

Apart from these out puts it may be possible to guess whether an employee may be an NT. If some correlation between these factors of EQ and PSI with NT, can be made, it will help the managers to correctly address the training and developmental needs of the employees. This may help him and guessing a person whether he may be NT or Not and take suitable corrective action to deploy him for best performance in the interest of organisation. This will help him against the act of non-disclosure also.

Challenges and Suggestions for Retention of NT Employees who are under the threat of Contact Management Industry, getting invaded by AI Technology.

Sl No	Challenges	Suggestions
1	Due to the non-disclosure act the managers or the trainers may not be aware as to who is an NT and who is Normal. However, they may be aware that the trainees have NT population also among the trainees.	Hence it is suggested that the training program should be so designed and developed so that the program meet the additional needs of the NT employees both from employees (Trainees) and trainers' point of view.
2	It is generally felt that NT Employees may not meet the demanding and though skills and creativity etc to work in AI Platform	In the present scenario the NT employees in most of the top contact management organisations are already exposed to work on AI tools like ChatGPT, AI Power point and Excel, Noise cancellation headphones, Chatt Boxes etc. Hence, they are not novice to AI Platform

Sl No	Challenges	Suggestions
		As organisation still hire NT employees to meet their social responsibility, some programmes must be initiated by them under funds like CSR or alike for their training and retention in the organisations against any threat including likely threat posed by Complex AI Platforms

However, when organisations are shifting towards complex AI Platforms, then even existing employees may need certain special training including NTs. It is felt that the expenditure incurred on training them will be definitely costing less than hiring new NTs as Organisations still will have to employ NT on social grounds/calls.

Limitation of the study

The non-disclosure act on NT, prohibits to access data bank of NT persons, hence large data sample from NT population could not be obtained. Study with large sample size (of at least normal Distribution (Sample size at least >30) could have given better outcomes particularly in case of Dry Promotion hypothesis.

No records could be accessed where any out outstanding work of NT Employees was recorded may be due to non-disclosure act. Hence no evidence could be generated to support the retention case for NT Employees.

Suggestions for further studies.

Industries specially Contact Management Organisations/ Industries may consider doing a in depths in house study on such matters for NT employees within the bounds of non-disclosure act as they have all the required information and wherewithal to generate better future for their talented NT employees and implement the finding after thorough study in the favour of NT Population.

LOSD

LONDON ORGANISATION OF SKILLS DEVELOPMENT

EXCELLENCE AWARDS

Empowering Excellence: Igniting Paths to Success

ABOUT THE AWARDS:

- **Recognition & Celebration:** Honouring dedication, innovation, and excellence.
- **Transcending Accolades:** A testament to resilience and unwavering determination.
- **Shining a Spotlight:** Recognising contributions in education, innovation, social impact, and professional excellence.
- **Incentive for Inspiration:** Motivating others to reach for greatness.
- **Fostering a Culture of Excellence:** Encouraging continuous growth and innovation.

BENEFITS FOR AWARDEES:

- **Increased Visibility:** Gain credibility and networking opportunities.
- **Validation of Hard Work:** Enhance professional profiles and open doors to new opportunities.
- **Selection Process:** Meticulous and fair, ensuring professionalism and inclusivity.

To be held in Winter, A Grand Celebration of Excellence

NOMINATIONS OPEN!

Join us in Breaking Barriers and shaping a brighter, more innovative future.
Send in your nominations now at admin@losd.co.uk.

ENGLISH LITERATURE: A CATALYST FOR SUSTAINABILITY AND RESILIENCE

Sarita Chauhan
Director of institute

Theme of the Article: English literature

Research Objectives: : This study investigates English literature's influence on sustainability and resilience, scrutinising literary contributions to these themes and considering literature's ongoing impact on our sustainable future.

BIO

Sarita Chauhan is an educationist, director of institute, author of 3 published books, and avid explorer pursuing her PhD. degree in English literature. She hails from the small town of Meerut from UP India and has her book listed in the Gems World of Book Records as well as in India book of records. Her works /articles are being published in various magazines and platforms. She has won many accolades for her work. She's a passionate artist as well. She's been working in the field of education for the last 20 yrs in various forms.

Abstract

English literature increasingly explores sustainability and resilience, shaping our perceptions and guiding our sustainable practices. Through its narratives, literature provides a unique space to hypothesize, reflect and project future sustainability scenarios. This study investigates English literature's influence on sustainability and resilience, scrutinising literary contributions to these themes and considering literature's ongoing impact on our sustainable future. Literature's role in sustainability and resilience is multifaceted. It not only reflects societal values but also inspires change by presenting alternative realities and solutions. By engaging with literary works that address environmental and social challenges, readers can develop a deeper appreciation for the importance of sustainability and the need for resilient communities. The exploration of this topic is timely and significant. As the world grapples with ecological crises and social upheavals, literature's potential to inspire and mobilise individuals and communities becomes increasingly vital. This discussion will highlight key literary works that have advanced the discourse on sustainability and resilience and will explore how literature can continue to foster a culture of sustainability. In essence, this new topic underscores the transformative power of English literature in promoting sustainable and resilient practices. It invites readers to consider how literary narratives can influence individual and collective action towards a more sustainable and resilient world. The role of literature in this context is not just to entertain but to enlighten and empower, making it an essential component of the discourse on sustainability and resilience.

Keywords:

English Literature, Sustainability, Resilience, Ecocriticism

Introduction

In the face of escalating ecological crises and social upheavals, the role of English literature in shaping our perceptions and guiding our sustainable practices has become increasingly significant. Literature, with its unique ability to hypothesize, reflect, and project future scenarios, has emerged as a powerful tool in the discourse on sustainability and resilience.

The exploration of sustainability and resilience in English literature is not a recent phenomenon. For centuries, authors have used their works to comment on the relationship between humans and their environment, and to explore the consequences of human actions on the natural world. From the pastoral poetry of the Romantic era, which idealized the harmony between humans and nature, to the dystopian narratives of the 20th and 21st centuries, which often depict bleak futures caused by environmental degradation, literature has always been a mirror reflecting our attitudes towards sustainability.

In recent years, however, the focus on sustainability in literature has become more pronounced. This is partly due to the growing awareness of the urgent need for sustainable practices in all aspects of life, from agriculture and industry to personal lifestyle choices. As a result, contemporary authors are increasingly using their works to advocate for sustainability, to raise awareness about the environmental challenges we face, and to inspire readers to take action.

Literature's role in promoting sustainability goes beyond merely raising awareness. Through its narratives, literature provides a unique space for the exploration of alternative futures. It allows us to imagine what a sustainable society might look like, and to consider the steps we need to take to achieve this vision. By presenting us with different scenarios, literature helps us to understand the potential consequences of our actions, and to make informed decisions about our future.

In addition to promoting sustainability, literature also plays a crucial role in fostering resilience. Resilience, in this context, refers to the ability of individuals, communities, and societies to adapt to change, to recover from setbacks, and to continue to develop despite adversity. Through its narratives, literature can help us to understand the importance of resilience, and to develop the skills and attitudes necessary to foster it.

Just as literature can help us to imagine sustainable futures, it can also help us to envision resilient societies. By depicting characters and communities that face and overcome challenges, literature can provide us with models of resilience. These narratives can inspire us to develop our own resilience, and to work towards building resilient communities.

In conclusion, the role of English literature in promoting sustainability and resilience is multifaceted and significant. It reflects societal values, inspires change, and provides a space for the exploration of alternative futures. As we grapple with the challenges of our time, the potential of literature to inspire and mobilize individuals individuals and communities becomes increasingly vital. Thus, English literature continues to play a crucial role in shaping our sustainable future.

Aspect	Details
Literary Themes	Exploration of nature, human-nature relationships, and responses to ecological crises.
Influence	Literature shapes societal values and attitudes towards the environment.
Education	Literary education promotes environmental awareness and ethical considerations.
Resilience Building	Texts provide narratives that help individuals and communities cope with environmental changes.
Sustainability	Literature often presents sustainable practices within narratives, promoting real-world application.
Research Focus	Analysis of ecocriticism in literature and its impact on sustainability discourse.

Literature and Sustainability

The intersection of literature and sustainability is a rich tapestry that provides insights into the human condition and our relationship with the natural world. Literature, in its myriad forms, has the power to illuminate the complexities of sustainability, offering diverse perspectives on issues such as climate change, resource depletion, and social inequality.

Literature plays a crucial role in shaping our understanding of sustainability. It provides a platform for exploring the ethical, social, and environmental dimensions of sustainability, and for imagining alternative futures. Through its narratives, literature can challenge prevailing paradigms, stimulate critical thinking, and inspire action towards sustainability.

Often, literature serves as a mirror, reflecting societal attitudes towards the environment. From the Romantic poets' reverence for nature to the dystopian visions of contemporary authors, literature captures the evolving discourse on sustainability. It reveals the tensions between development and conservation, between short-term gains and long-term sustainability.

Literature can raise awareness about environmental issues and inspire readers to take action. Environmental literature, or 'ecoliterature', explores the relationship between humans and the environment, highlighting the impacts of human activities on the natural world. It can evoke empathy for other species, foster appreciation for the beauty and complexity of nature, and motivate readers to advocate for environmental protection.

Literature also addresses social aspects of sustainability. It can shed light on issues of social justice, equity, and inclusivity, which are integral to the concept of sustainability. Literature can give voice to marginalised communities, challenge social norms, and promote values such as empathy, compassion, and solidarity.

Literature can act as a catalyst for change, sparking dialogue and debate on sustainability issues. It can challenge readers to question their assumptions, broaden their perspectives, and engage in critical thinking. By presenting alternative visions of the future, literature can inspire readers to envision a more sustainable world and to take steps towards realising this vision.

In conclusion, literature plays a vital role in promoting sus-

tainability. It provides a platform for exploring and debating sustainability issues, raises awareness about environmental and social challenges, and acts as a catalyst for change. As we navigate the complexities of the 21st century, literature offers valuable insights and inspiration for creating a more sustainable future. Through its power to inform, challenge, and inspire, literature contributes significantly to the discourse on sustainability.

Literature and Resilience

The interplay between literature and resilience is a fascinating exploration of the human spirit's capacity to endure and overcome adversity. Literature, in its various forms, offers a profound understanding of resilience, presenting diverse perspectives on themes such as survival, recovery, and transformation.

Literature serves as a powerful medium for expressing and understanding resilience. It allows us to delve into the depths of human experience, exploring how individuals and communities navigate challenges, adapt to change, and emerge stronger. Through its narratives, literature provides a window into the resilience of the human spirit, illuminating the ways in which people cope with adversity, heal from trauma, and rebuild their lives.

Often, literature portrays resilience in the face of personal adversity. Characters in novels, plays, and poems grapple with hardships, demonstrating resilience as they confront their fears, overcome obstacles, and find meaning in their struggles. These narratives can inspire readers, providing models of resilience that resonate with their own experiences.

Literature also explores resilience in the context of societal challenges. It can shed light on how communities respond to crises, from natural disasters to social upheaval. Literature can highlight the collective resilience of communities, showing how they come together, support each other, and work towards recovery.

Moreover, literature can foster resilience in its readers. Engaging with literature can be a transformative experience, encouraging readers to reflect on their own lives, confront their vulnerabilities, and discover their inner strength. Literature can provide solace, inspire hope, and empower readers, contributing to their personal resilience.

Literature can also stimulate dialogue and inspire action on issues related to resilience. It can challenge readers to question societal norms, consider alternative perspectives, and engage in critical thinking. By presenting diverse narratives of resilience, literature can contribute to broader discussions about how to foster resilience at individual, community, and societal levels.

In conclusion, literature plays a pivotal role in understanding and promoting resilience. It provides a platform for exploring resilience in all its complexity, from personal struggles to societal challenges. As we navigate the uncertainties of the 21st century, literature offers valuable insights and inspiration for cultivating resilience. Through its power to illuminate, challenge, and inspire, literature contributes significantly to our understanding of resilience.

Key Literary Contributions

Literature, as an art form, has been a significant part of human civilization, contributing to our understanding of the world and ourselves. It has shaped societies, influenced cultures, and sparked revolutions. The key literary contributions span across time and space, reflecting the diversity and richness of human experience.

The Epic of Gilgamesh, one of the earliest known works of literature, offers insights into ancient Mesopotamian culture. It explores themes of friendship, mortality, and the quest for immortality, setting the stage for future literary explo-

rations of these universal human concerns.

In ancient Greece, Homer's Iliad and Odyssey laid the foundation for Western literature. These epic poems introduced narrative techniques, character development, and thematic complexity that continue to influence literature today. Greek tragedies, such as those by Sophocles and Euripides, delved into human psychology, moral dilemmas, and the tragic consequences of hubris. The Middle Ages saw the flourishing of religious texts, such as the Bible and the Quran, which have profoundly influenced worldviews, moral codes, and societal structures. Dante's Divine Comedy, with its vivid depiction of the afterlife, combined religious themes with humanistic values, marking a transition towards Renaissance literature.
The Renaissance period witnessed a surge in humanistic and scientific thought. Shakespeare's plays, with their intricate plots, complex characters, and profound exploration of human nature, have left an indelible mark on world literature. Cervantes' Don Quixote, often considered the first modern novel, satirized chivalric romances and explored the nature of reality and fiction.

The Enlightenment era brought a focus on reason, liberty, and the scientific method. Works like Voltaire's Candide critiqued societal institutions and championed intellectual freedom. Rousseau's Social Contract laid the groundwork for modern political and social thought.

Romanticism, reacting against the rationality of the Enlightenment, emphasised emotion, nature, and the individual. Wordsworth and Coleridge's Lyrical Ballads heralded a new form of poetry that valued personal emotion and the beauty of the natural world.

The realism and naturalism of the 19th century, seen in novels by Dickens, Flaubert, and Tolstoy, depicted the social realities of the time, exploring themes of class, gender, and morality. Meanwhile, American literature, with works like Twain's Adventures of Huckleberry Finn, began to assert its distinct identity.

The 20th century saw the rise of modernism and postmodernism. Writers like Joyce, Woolf, and Kafka experimented with narrative form and structure, challenging traditional notions of reality, identity, and meaning. Postcolonial literature, represented by authors like Achebe and Rushdie, gave voice to previously marginalised perspectives, enriching the global literary landscape.

In conclusion, literature's key contributions are vast and varied, reflecting the complexities of the human condition. They have shaped and been shaped by the societies they emerged from, leaving a lasting legacy on human thought and culture. As we move forward, literature will continue to evolve, offering new insights and perspectives on our ever-changing world.

The journey of literature is a testament to the human spirit's resilience and creativity. It is a mirror reflecting our triumphs, struggles, dreams, and fears. From the ancient epics that explored the mysteries of existence to the modern narratives that challenge our perceptions of reality, literature has been a constant companion in our quest for understanding and expression.

The literary contributions across the ages have not only entertained us but also enlightened us, offering insights into diverse cultures, societies, and philosophies. They have sparked dialogues, provoked thought, and inspired change. They have given voice to the voiceless, questioned the status quo, and imagined new possibilities. In doing so, they have enriched our collective consciousness and shaped our worldview.

The power of literature lies in its ability to transcend bound-

aries of time, space, and culture. It connects us to our past, reflects our present, and anticipates our future. It resonates with our shared human experience, reminding us of our common humanity amidst our differences. It celebrates the complexity and richness of life, in all its beauty and tragedy.

As we navigate the challenges and opportunities of the 21st century, literature continues to evolve, adapting to new mediums and engaging with emerging issues. It continues to push the boundaries of imagination, explore the depths of the human psyche, and confront the pressing questions of our time. It continues to offer solace, provoke reflection, and inspire action.
In the face of rapid technological advancements and shifting societal landscapes, the relevance of literature remains undiminished. It continues to be a beacon of hope, a source of wisdom, and a catalyst for change. It continues to be a testament to our capacity for empathy, understanding, and growth.

As we look ahead, we can anticipate new literary contributions that will reflect the evolving human experience, engage with the complexities of our interconnected world, and imagine new futures. We can expect literature that challenges us, moves us, and transforms us. We can look forward to literature that continues to illuminate the human condition, in all its diversity and universality.

In the end, the story of literature is the story of us. It is the story of our journey, our aspirations, our conflicts, and our growth. It is the story of our relentless pursuit of meaning and connection. It is the story of our shared humanity. And as long as we continue to dream, to question, to hope, and to strive, the story of literature will continue to unfold, enriching our lives and shaping our world. And that is the enduring legacy of literature. That is the power of the written word. That is the promise of the literary journey that lies ahead.

References

Nüchter, V., Abson, D. J., von Wehrden, H., & Engler, J.-O. (2021). The Concept of Resilience in Recent Sustainability Research. *Sustainability*, 13(5), 2735. MDPI.

Zupancic, N. (2023). Systematic Literature Review: Inter-Relatedness of Innovation, Resilience and Sustainability - Major, Emerging Themes and Future Research Directions. *Circular Economy and Sustainability*, 3, 1157–1185. Springer.

(2022). SME resilience as a catalyst for tourism destinations: a literature review. *Springer*.

Green, A. L., & Smith, T. J. (2022). *Literature and Sustainability:Conceptualizing the Ecocriticism Movement*. Manchester University Press.

Patel, R., & Moore, S. A. (2023). *Sustainable Narratives: English Literature and the Environment*. Routledge.

Thompson, E., & Jackson, P. (2024). *Resilience in English Literary Studies: A New Approach*. Oxford University Press.

Davidson, M. K., & O'Brien, J. P. (2024). *Resilience in Literature: Pathways to Sustainable Thinking*. Cambridge University Press.

Lee, H., & Kim, S. Y. (2023). *Eco-Criticism in English Literature: A Framework for Sustainable Analysis*. Wiley-Blackwell.

Singh, A., & Gupta, R. (2024). *Literary Perspectives on Environment and Sustainability in the 21st Century*. Palgrave Macmillan.

LOSD

LONDON ORGANISATION OF SKILLS DEVELOPMENT

'YOU CAN REACH YOUR TRUE POTENTIAL'

LOSD ACTIVITIES

- SkillFlex
- Global Research Conferences
- Global Research Journal
- LOSD Business Wellbeing Retreats
- LOSD Live Podcasts
- LOSD Excellence Awards
- LOSD Publishing

CONTACT US NOW TO BOOK YOUR LOSD ACTIVITY

CONTACT US

admin@losd.co.uk
www.losd.co.uk

A STUDY ON THE BIOCHEMICAL COMPONENTS OF BLACK GRAM (VIGNA MUNGO (L.) HEPPER) WITH EFFECT TO THE ALLELOPATHIC POTENTIAL OF TAMRINDUS INDICA L.

*Dr G. A. Asif Jamal[1]. and Dr P. Elavazhagan[2].

[1].Department of Botany

[2].Justice Basheer Ahmed Sayeed College for Women

Theme of the Article: Allelopathy

Research Objectives: The study is on Allelopathic Potential of Tramindus indica L. on morphological parameters and Biochemical Components of Black gram (Vigna mungo (L.) HEPPER).

BIO

Dr. G.A. Asif Jamal, M.Sc., M.Phil., Ph.D., FNSF, is an Associate Professor in the Department of Botany at Justice Basheer Ahmed Sayeed College for Women (Autonomous), Chennai, Tamil Nadu, India. With 20 years of teaching experience, she is a Guinness World Record holder for contributing to the world's thickest book. Dr. Jamal is also an ISO Internal Auditor, IPR specialist, and Certificate Course Coordinator. She has completed various certificate courses in health, plant physiology, and biotechnology. An Environment Management and Energy Audit Lead Auditor, she holds five collaborative patents, has authored six books, published ten research papers, and guided nine undergraduate projects. Dr. Jamal has presented numerous research papers internationally, earning multiple awards and honours.

The current investigation is on Allelopathy which is ecologically important because it influences dominance. Productivity, succession. Species diversity, composition of plant communities and vegetation dynamics, the acquired knowledge of allelopathy helps in Explaining vegetation patterns in plant communities. The study is on Allelopathic Potential of Tramindus indica L. on morphological parameters and Biochemical Components of Black gram (Vigna mungo (L.) HEPPER). Various concentrations of leaf latches and leaf extracts were prepared respectively from fully senesced fallen leaves and fully matured leaves of Tamarindus tree for the experiment. In the germination study, healthy and uniform seeds of vigna mungo selected and experiments were conducted by the application various concentrations of leaf leachates and leaf extracts to the seeds length and germination study and were dramatically decreased with increasing the concentrations of leaf extract. The leaf extract had more inhibitory effect than the leaf leachates on germination and morphological parameters and Biochemical components of black gram. From this investigation it clearly showed Tamarinbus indica had strong allelopathic effects on germination, growth and Biochemical components of black gram vigna mungo.

Keywords:

Allelopathic Potential, Germination study, leaf leachates, leaf extracts, morphological

parameters, Biochemical components, black gram, Tamarindus tree.

Introduction

Hans Molish (1937), Emeritus professor of plant physiology at the university of Vienna, coined the word 'Allelopathy' from Greek words 'allelon', meaning 'mutual' and pathos, meaning harm to describe the effects that one plant could have on another due to released chemicals. Allelopathy has received increased attention Over the last 40 years with studies on effect of weed interference on crop yields, allelopathic effects of crop plants on other crop plants, crop plants on weeds and allelopathic effects of woody seed plants on crop plant in forestry and Horticultural fields. The present study was carried out to 'investigate the allelopathic effect of Tamarindus indica L. leaf leachates and leaf extracts on seed germination and seedling growth of black gram (Vigna mungo Hepper,).

Objectives of the Study

- Vegetation pattern in Plant Communities
- To understand the mechanism of action of Allelochemicals inhibiting the uptake of nutrients
- To study the morphological and biochemical parameters with effect of leaf leatchates and leaf extracts.
- Seed germination and Seedling Growth of *Vigna mungo.*

Materials and Methods

Seeds of *Vigna mungo L.* were procured from Regional Pulse Research Station vamban, Pudukottai District, Tamil Nadu. The fully matured senesced fallen leaves of *Tamarindus indica L.* were collected from Annamalai University campus, Annammalai nagar.

Preparation of leaf leatchates,

The Preparation of leaf leatchates and dried fresh leaf extracts and germination studies were followed as per the methods of Padhy *et al.*, (2000)

20 grms of fallen leaves were collected from *Tamarindus indica L., tree*. They were washed in tap water thoroughly followed by tap water and were later soaked in 100 ml of distilled water for 48 hours, later the leaves were filtered, and the filtered water is known as leaf leatchates and were considered as 20% concentration.

Preparation of Dried leaf extracts

The collected Tamrinduss indica were air dried, ground to a fine powdered and extracted in water, where in 25 grms of Tamrinduss indica leaf powder was soaked in 1 litre of distilled water kept for 48 hours at Room temperature with occasional shaking.

Germination Study,

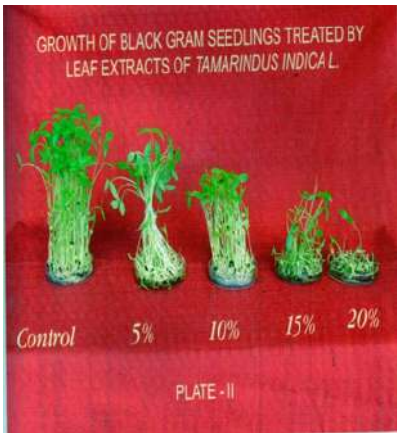
The selected seeds of vigna mungo were surface sterilized with 0.03% formalin solution for 20 minutes and then washed thoroughly with distilled water.

In the germination study, 25 seeds were placed sterilised petiolate lined with two layered filter paper, 10 ml of leaf leachates and leaf extracts was added per treatment to the seeds on the petri plates. Distilled water served as a control. The process was continued for 15 days. Later the seeds were allowed to germinate in a growth chamber and kept in light intensity of 2+- 0.4 K Lux and at 30+-2□C till 15 days. Each treatment was repeated in triplets. The number of seeds germinated were counted regularly each day and germinating percentage was calculated. The morphological parameters were studied on the root and shoot length from 8th and 15th day after sowing. The infusion was decanted and filtered through 3 layers of Whatman No 1 filter paper.

The concentrations of leaf leachates and leaf extracts were prepared with dilutions such as 5%, 10% ,15% and 20% was the standard solution, with distilled water were prepared respectively from fully senesced fallen leaves of Tamarindus tree for the experiment.

The Germination Percentage refers to the appearance of the radical by visual observation. It was calculated using the formula, the formula was given by Carley and Watson (1968)

$$\textbf{Germination Percentage} = \frac{\text{Number of seeds germinated}}{\text{Total number of seeds sown}} \times 100$$



Biochemical Analysis

The fresh material as used for the estimation of Chlorophyll, Sugar, Free Amino Acids and Proteins.

Observations and Results

The study showed a dramatically decreased with increasing the concentrations of leaf extract

The leaf extract had more inhibitory effect than the leaf leachates on germination and morphological parameters of black gram.

Form this investigation it clearly showed Tamarinbus indica had strong allelopathic effects on germination and growth of black gram vigna mungo.

Allelopathy depends on chemical compounds mainly added to the environment from living plants or dead and decaying plant parts (Tukey, 1969) Allelochemicals also refers to the secondary metabolites produced by plants and are the byproducts of primary metabolic process and they have no physical function essential for the maintenance of life (Levin,1976).

Bio-chemical Analysis for Chlorophyll, (mg/gfr.wt) the changes in Chlorophyll-a and Chlorophyll –b total Chlorophyll content under leaf leachates treatment is given in table -3.

The Chlorophyll content changes of Black gram seedlings under the treatment of leaf extracts is shown in the Table -3.

Bio-chemical Analysis for Amino acids, (mg/gfr.wt) the changes in Amino acids content under leaf leachates treatment are given in table -5.

The Amino acids content changes of Black gram seedlings under the treatment of leaf extracts is shown in the Table -5. It showed the inhibitory effect than the leaf leachate on Amino acids content of leaf and root of Black gram seedlings.

The Bio-chemical Analysis for **Proteins (mglg.Fr.wt.)** The higher number of proteins (9.12 and 7.12 respectively for leaf and root) were observed in the control seedlings. In the leaf leachate treatments showed negative effect on protein contents in the seedlings. Because when increasing the leaf leachate concentrations (5%, 10% and 15%) there was a decreasing trend of protein contents both in leaf and root of green, black seedlings Table -4

The leaf extract concentrations were showed more retarding effect on protein content of black gram than that of leaf leachates treated and control seedling. The protein content

35% decreased in the leaf and nearly 50% decreased in the roots of black gram seedlings at 20%of leaf extract treatment. (Table – 5

Total sugars (mg/g.fr.wt)
The total sugar content of leaf and root of black gram seedlings treated with various concentration of leaf leachates and leaf extract are presented in Table -5 The 5% concentration of leaf leachate had less inhibitory effect on Total sugar both in leaf and root, the decrease was 2.87% and 5.2% respectively observed in black gram seedlings

There was a steady increase in the decreasing content of total sugar with increasing the leachate concentrations. concentration of leaf leachate the total sugar content was nearly 70% in leaf and 67% only present in the root of black gram compared with the value of control seedlings at the 20%

The leaf extract showed more retarding effect on total sugar content both in leaf and root of black gram seedlings when compared with treated by leaf leachate and control seedlings. (Table -5). The maximum total sugar content was found to be control (18.12,6. 12 respectively for leaf and root) and the minimum sugar content (11.75 and 3.8 respectively for leaf and root) was observed at 20% concentrations of leaf extract treated seedlings. In the lower Concentrations of leaf extract (5% 10%and 15%) had lesser inhibitory effect on total sugar than its 20% concentration.

The leaf extract had more retarding effect on morphological and biochemical constituents of black gram seedlings than the leaf leachates

Table :1 Allelopathic effect of Leaf Leachates and Leaf Extracts of *Tamrindus indica* L. on germination percentage of Vigna mungo (L.) Hepper.

Concentrations	Leaf Leachates	Leaf Extracts
Control	97	97
5%	91	86
10%	84	78
15%	76	63
20%	67	56

Table :2 Allelopathic effect of Leaf Leachates and Leaf Extracts of *Tamrindus indica* L. on the shoot length and root length (cm/plant) of Vigna mungo (L.) Hepper.

Concentrations	8th day old seedlings		15th day old seedlings	
	Shoot length	Root length	Shoot length	Root length
Control	9.2	6.1	15.12	8.4
5%	8.7	5.6	14.1	7.2
10%	7.2	5.2	12.5	6.1
15%	0.6	4.8	10.3	5.4
20%	5.9	4.2	9.2	4.1

Table- 3. Allelopathic effect of Leaf Leachates and Leaf Extracts of Tamarindus indica L. on chlorophyll content (mg/g. fr.vt) of Vigna mungo (L.) Hepper (15" day old seedlings)

Concentration	Leaf Leachates			Leaf Extracts		
	Chl.a	Chl.b	Total Chl	Chl.a	Chl.b	Total Chl
Control	0.580	0.440	1.20	0.580	0.440	1.20
5%	0.580 (-2.58)	0.410 (-6.82)	0.975 (-18.75)	0.540 (-6.89)	0.400 (-9.09)	0.940 (-32.5)
10%	0.485 (-16.38)	0.365 (-17.04)	0.850 (-29.17)	0.465 (-19.82)	0.345 (-21.59)	0.810 (-38.33)
15%	0.450 (-22.41)	0.315 (-28.41)	0.765 (-36.25)	0.430 (-25.00)	0.310 (-29.55)	0.740 (-41.25)
20%%	0.420 (-27.59)	+0.300 (-31.82)	0.720 (-40.05)	0.410 (-29.31)	0.295 (-32.96)	0.705 (-41.25)

Data in parenthesis indicates % increase (). Decrease (-) over control

Table - 4. Allelopathic effect of Leaf Leachates of Tamarindus indicus L. on Amino acid, Protein and Total sugar content (mg/g.f.wt.) of Vigna mungo (L) Hepper (15" Day old seedlings)

Extract Concentrations Control	Leaf			Root		
	Amino acids	Proteins	Total Sugars	Amino acids	Proteins	Total Sugars
Control	2.68	9.12	18.12	1.82	7.20	6.12
5%	2.45 (-8.58)	8.68 (-4.82)	17.60 (-2.87)	L.65 (-9.34)	6.30 (-12.5)	5.8 (-5.2)
10%	2.12 (-20.89)	7.85 (-13.9)	15.45 (-14.73)	1.35 (-25.82)	5.40 (-25.00)	5.2 (-15.03)
15%	1.85 (-30.97)	7.25 (-20.50)	13.50 (-25.50)	1.15 (-36.81)	4.6 (-36.11)	4.6 (-24.84)
20%	1.72 (-35.82)	6.80 (-25.44)	12.80 (-29.35)	0,95 (-47.80)	+.20 (-41.67)	4.1 (-33.00)

Data in parenthcsis indicates % increase (+). decrease (-) over control

Table –5 Allelopathic effect of Leaf Extracts of Tamarindus indica L on Amino acid. Proteins and Total sugars (mg/g.fr.wt.) of Vigna mungo (L) Hepper (15" Day old seedlings)

Extract Concentrations Control	Leaf			Root		
	Amino acids	Proteins	Total Sugars	Amino acids	Proteins	Total Sugars
Control	2.68	9.12	18.12	1.82	7.25	6.12
5%	2.35 (-12.31)	8.45 (-21.05)	16.80 (-7.28)	1.40 (-23.08)	6.10 (-15.86)	54 (-1.76)
10%	1.95 (-27.23)	7.20 (-21.05)	14.80 (-18.32)	1.25 (-31.32)	5.20 (-28.27)	490 (-19,93)
15%	1.65 (-38.48)	6.40 (-29.82)	12.20 (-32.67)	0,95 (-47.80)	3.95 (-45,5)	42 (-31.37)
20%	1.25 (-53.35)	5.90 (-35.3 1)	11.75 (-35.15)	0.85 (-53,30)	3.75 (-48,27)	3.8 (-37,90)

Data in parenthesis indicates % increase (+), decrease (-) over control

The acquired knowledge of allelopathy helps in

- Explaining vegetation patterns in plant communities.
- Understanding reduction in crop yields to adaptation of minimum tillage and use of stubble mulch of crop residues.
- Breeding crop plants will inhibit the weeds through allelopathic action, thus reducing the need for chemical weed killers.
- Afforestation.
- Understanding several ecological phenomena such as succession patterning of vegetation etc.,

Allelopathy is an area where research studies have shown that allelopathy could be utilised, for the following,

- To increase the production of food grains, vegetables, fruits and forestry
- To decrease harmful effects of modern agricultural practices on soil health and productivity and
- To maintain soil productivity and pollution free environment for our future generations.

Allelopathy is ecologically important because it influences dominance. productivity. succession. Species diversity, composition of plant communities and vegetation dynamics,

Conclusion

The study clearly showed the Allelopathic potential of leaf leachates on the germination and growth parameters black gram (Vigna mungo.(L.) Hepper. From the investigation the Leaf Extracts of *Tamrindus indica* L. had more adverse effect on the germination, growth of Black gram seedlings than the Leaf Leachates

References

Al- Mousawi, A.H. and Al Naib. F.A.G. 1976 Volatile growth inhibitors produced by *Eucalyptus microtheca*. Bull. Boil Res. Centre, 7:17-23

Al -Naib, FA. and Al -Mousawi, AH. 1976. Allelopathic effects have *Eucalyptus microtheca*, identification and characterization on the phenolic compounds in *Eucalyplus miorotheca* J. Univ Kuwait Sci. 3.83-83

AL-Mezon, HA. A-Saadawi, 1.5. and Al-Hadithi, TR, 1999 Allelopathic effects of corn residues on the subsequent corn crops *Alelopallhy Journal*, 6: 193-200

Anaya A.L. Pelayo Benavdes H.R, 1997 Allelopathic effect of *Mirabilis Jalapa*. L. on germination, growth of Wheat, Maize, Peas *Allelopathy Journal*, 1997, 4:1. 57-68

Anurag Saxena and Sharma, AK, 1996. Allelopathic potential of *Acacia tortilis* in agroforestry systems of arid regions. *Allelopatihy Journal* 3(1): 81-84

Arnon. D., 1949. Copper enzymes in isolated chloroplast Polyphenol Oxidize in *Beta vulgaris*. J. Plant physiol, 24; 1-15

Azania, A.AP.M., Azania, C.A.M.. Alves. PL.C.A, Palaniraj, R Kadian.H.S. Sali,S.C. RawatLS. Dahia D.S. and Narwal S.S. 2003 Allelopathic Plants-Sunfiower (*Helianthus auunns* L.). *Allelopathy Journal* 11:1-20

Balasubramanian, A and Ravichandran, VK 1996 Allelopathic significance of six agroforestry trees on *Casuarina equsetilolia* growth and nodulation. *Madras agricullonal journal*. 83; 84-87

Nelson, N. 1944 A photometric adaptation of the Somogyi's method for the determination of reducing sugar *Anal Chem* 31: 426-428.

Newman and Rovira, AD. 1975. Allelopathy among some grassland species. J. Ecol, 63: 727-737

Oudhia, P. Kolhe, S.S. and Tripathi, R.S. 1995. Allelopathic effect of *Ageratum conyzoldes* L. on germination of linseed var. Kiran. Weed News. 2(1): 15-18.

Oudhia, P Kolhe, S.S. and Tripathi.R.S.. 1997. Allepathic effect of Blumia *lacera* L on wheat. *Indian J. weed Sci*., 29:4-7.

Padhy. B, Patnaik, P. Kand Tnipathy. A.K. 2000. Allelopathic potential of Euof Eucalyptuslitter leachtes on germination and seedling growth of fingermillet. *Allelopathy J*.,7(11. 69-78.

Pandya, S.M., and Sidha, V. K, 1987. Competition between *Celosia argentea* Linn.and sorghum with reference to the weed position. *J. Indian Bot. Soc*., 66 16-21

Parvez, S.S., Parvez, M.M, Yoshiharu, Fuji, H. G, 2004 Differential allelopthic expression of bark and seed of *Tamarindus indica* L. P growth regulation, 42(3): 245-253.

Patterson. G.ML Harris, D. and cohen, W.S., 1979. Inhibition of photosynthetic and mito cnondra electron transport by a toxic substance isolated from the alga *Pondorina morum*, Plant Sci Leit. 15:293-300.

Sugha. S Kashal RP and Dua., 1S. 1980. Effects of certain aqueous leaf extracts on the germination and seeding growth of maize (*Zea mays* L) *Science and Culture*, 46 (5). 196-199

Suseeianma, M.and Venkata raju, R.P 1994 Effect of *Digera muncata* L) Mart. extracts on the germination and seeding grow of groundnut *Allelopathy Journal*, 1:53-57

Tamer, RS, Gesto, M.D.V. and Vieitez, E, 1973. Growth

substances isolated from tubers of *Cyperus esculentus* var. accureus. Physiol Plant, 28: 195-200.

Tiwan, J.P Kurchani, S.P., Bhalla, C.S. and Paradkar, N.R. 1998 Studies on an allelopathic effects of *Cassia tora* on *Parthenium hysterophorus*. Indian J. Weed Sci, 30: 204-205.

Tripathi, S., Tripathi, A., Kori, D.C. and Tiwari, S. 1998. Effect of tree germination and seedlings growth of leaves aqueous extracts soybean. *Allelopathy Joumal*.5 (1): 75-82.

Tukey. H.B. Jr. 1969. Implication ot allelopathy in agricultural plant science Rev. (Lancaster) 35;1-16.

Wardle, D.A. Nicholson, K.S. and Ahmed. M., 1992. Comparison of osmotic and allelopathic etfects of grass leaf extracts on grass seed germination and *radicle elongation*. Plant and soil. 140, 315- 319

Weaks. C., 1936. The influence of extract form *Robina pseudoacacia* on the growth of barley. Publ. FaC, Univ Charics. Prague, 150, 84-85

Weaver. T.W. and Klarich, D. 1977., Allelopathic. effects of Volatile substances from Artimisia tridentate Nutt. *American midland Naturalist*, 97:508-512.

LOSD

LONDON ORGANISATION OF SKILLS DEVELOPMENT

Business

Wellbeing Retreats

Find Your Balance & Unleash Success

In the pursuit of success, don't forget your well-being. Join us for a transformative experience.

Why Choose LOSD Business Wellbeing Retreats?

Holistic Development: Blend wellness practices with skill development.

Focus on You: Recharge physically and mentally in a nurturing environment.

CPD Accreditation: Enhance your professional development while prioritising self-care.

Unique Experience: Gain self-awareness, adopt health practices, and acquire valuable skills.

Network & Learn: Attend conferences for knowledge sharing and networking.

COMING WINTER 2025

BIOLOGY IN THE DIGITAL ERA: EXPLORING THE INTERSECTION OF SCIENCE AND TECHNOLOGY

Roxanne Boodhoo
Research student

Theme of the Article: Biology

Research Objectives: This study explores the Intersection of Science and Technology in the digital era

BIO

Roxanne Boodhoo is an accomplished professional with a diverse and versatile background. Her extensive academic training has equipped her with a wide range of skills and knowledge, enabling her to excel in various roles. Roxanne is known for her strong work ethic, diligence, and commitment to undertaking any responsibilities assigned to her. She is deeply passionate about helping and supporting others, making her a compassionate and empathetic individual. Throughout her career, Roxanne has consistently demonstrated a dedication to making a positive impact, whether through her professional work or community involvement, striving to uplift those around her.

Abstract

In the digital era, technology has become a fundamental and cross-disciplinary component through which scientific knowledge is progressing and expanding exponentially. Biology in particular is undergoing a profound transformation thanks to the development of bioinformatics and computational methods. Bioinformatics has changed the study of biology and has made it possible to store, process, analyse and extract useful information from large amounts of data, such as those obtained with gene sequencing. The support of the digital component is increasingly essential for experimental biology, from molecules to ecosystems. The world of today is becoming increasingly complex due to the integration and interaction between disciplines, such as computer science and biology. Bioinformatics is an innovative discipline that inherits traditional biological approaches while incorporating biological data and computational resources. Bioinformatics is located at the centre of modern high-throughput experimentation. One of the most prominent tools in bioinformatics is the BLAST algorithm, used to search for sequences in databases. Living organisms are the result of a continuous evolutionary process and are characterised by the inheritance of genetic information and population dynamics. One of the main challenges of bioinformatics is how to characterise, classify and understand both the biological and the specific organisational features that underlie the molecular function of a nucleic acid or protein molecule. Bioinformatics delves into

annotative, structural, functional, evolutionary and regulatory genomics.

Keywords:

Biology, Digital, Technology, Molecules, Bioinformatics

1. Introduction

Biology is a technique-centred field, but it is increasingly emphasising moving towards problems (Gunaga et al., 2020). This is particularly important in biomedicine were using the old focus on techniques rather than overall investigation can lead to over-diagnosis, and treatments that are highly effective for some patients and not at all for others. Overcoming these challenges efficiently will require more efficient multi-disciplinary, multi-method substrates of interoperation that include multiple different data sharing and collaborative scientific solutions. On all of these issues, libraries are the key to developing plans associated with our shared resources. And digital libraries are where the transformations that JBiD is proposing must have their eventual, symphonic confluence.

The Journal of Biomedical Discovery and Collaboration offers a venue for a wide array of interdisciplinary discoveries, methods, and techniques in order to support these three points and more (R Smalheiser, 2006). The completion of the human genome project marked the formal connection of science to digital technology. Ever since, biomedical research has been transitioning to being a fully information science (M. Thampi, 2009). Yet, the problems of biology do not need computer scientists, or laboratory and clinical investigators alone. They also need data scientists, social scientists, and ethicists, and most importantly, scientific and clinical leadership capable of integrating these different investigation methods into a singular approach. The formal requirement for interdisciplinarity in 21st century biomedicine is that problems are more structured than they are in basic science. And it is now widely recognised that the leadership skillset for problem solving is different from that required (and largely rewarded) in the prior century of basic science approach to hypothesis testing and support.

This research study takes the cursive movement of the transformation of the biosciences in this "digital era" as its starting point (Lee & Helgesson, 2022). Our concern is the rich landscape of digital transformations under way within contemporary biology; transformations bound up with new and old valuation cultures; experimentation and forms-of-life; shifts in time, uncertainty and automation; co and post-modelled worlds; and, throughout, biological matter caught in the entangled semiotics of infinity and the ongoing work of becoming-fixed. The figure of the pathway is used here as an allegory for the transformation of contemporary biology – from codes to data to matter to machines – in order to surface the multiple technoscientific heritage of the present and to insist on the need for similarly multi-perspectival sociology of biology & technology if the moving contours of contemporary biology are to be adequately captured.

Technological convergence in the biosciences is prompting new questions about long-standing sociological concerns surrounding digitization in scientific practice. Where many familiar narratives have focused on digital tools as an empty vessel for human knowledge, a renewed and updated sociology of the digital in biology might better account for the situated and coordinated nature of digitalization within this field (A. Peters et al., 2021). Rather than focusing on the "entrance" of technology into

human practice, here we more informatively seek to study the ongoing cointegration of human and machine practices. Thinking about biology and biotechnology in this way, as part of the same systemic transformation, may enable us to better understand how digital work is multiple, multifaceted and, indeed, always already sociotechnical.

Aim

Naturally, in soil, a chain of host-symbiont crosses talks to each other and find the best matchups. Research in rhizobia was spearheaded by Jostein Goksoyr and Kornelius Lindstrom. Metabolic and environmental persistence attributes pave the way for the fitness and genetics analysis. Throughout the world several such gene sequences are stored, and RDP is one such database that provides the tool as well as their respective avenues of these gene sequences pertaining to 16S rRNA, atpD, recA, dnaK, glnA, and rpoB of different isolates as characterised. A repository of 10 such Bhagwant University rhizobial gene sequences has been deposited into DDBJ/EMBL/GenBank by our research group with detailed classification and a proper evolutionary relationship drawn. It has been constructed on the basis of either of two measures such as: the homologous > e-10,67 bp alignment length by aligning the kmers set or the ITER registry of primary protein structure patterns.

Rhizobia, a group of soil bacteria of great agricultural significance, associate with leguminous plants and contribute to improved crop production and ecosystem health because of the process of root nodule formation in leguminous plants, such as beans, peas, soybeans, and peanuts (B. Losos et al., 2013). So, these leguminous plants are able to convert atmospheric nitrogen into ammonia. This process is called nitrogen fixing symbiosis and the microorganism is known as Rhizobium, which primarily modulates herbaceous legumes. Currently, worldwide there are about 600 million ha of agricultural land restored in BNF of leguminous species having the potential for cultivation. It has been reported that India has approximately more than 8.5 million ha under pulse cultivation out of which more than 1.3 million ha has been estimated to have the possibility for legume cultivation. Fig 1 highlights that evolutionary biology is undergoing a transformation due to the growing availability of extensive data on genomic variation, organisms, and environmental factors.

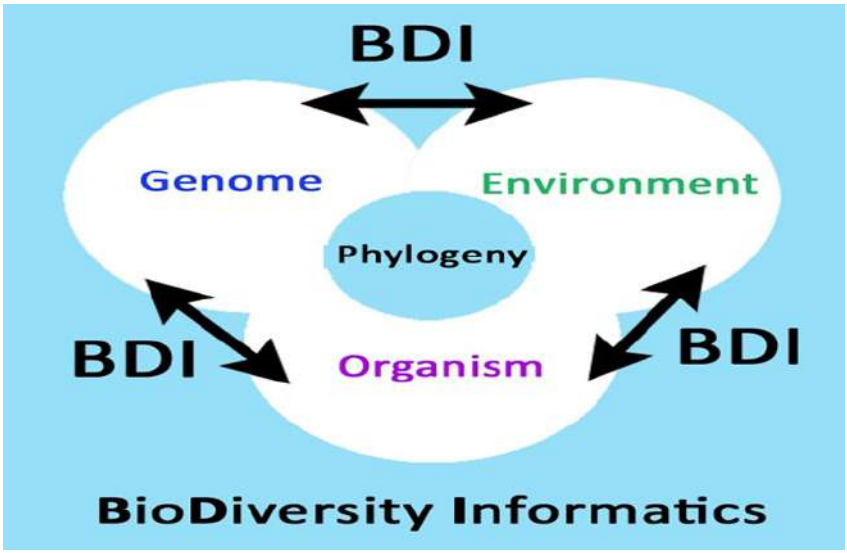


Fig. 1 (Losos, B. J et al. 2013)

Bioinformatic technologies increasingly facilitate research in taxonomy, systematics, and phylogenetics. In this project, we aim to apply bioinformatics in taxonomy, systematics, and phylogenetics of selected Rhizobia species (M. Thampi, 2009). Bioinformatics approaches such as sequence alignment, molecular phylogeny, and in silico DNA-DNA hybridization

(DDH) capabilities will be used to accurately delineate Rhizobia species. Whole-genome sequences of sixteen Rhizobium strains will be explored for systematics, and phylogenetic and relative DDH analyses. This project should aid in the identification of novel indigenous Rhizobial species suitable for the repatriation, exchange of the economy, and conservation of all bioresources of Union Country. It is a foregone fact that these Rhizobial taxonomic activities are time-consuming and share high risk due to increases in the number of newly isolated additional indigenous Rhizobium species from Union Country which demand laborious biochemical profiling.

2. Method

Rapid advance in technology has accelerated development of biology from an empirical science to a data-centric one. The intersection of computing and biology has been recently showing an entirely new potential connecting many applications of computer science and biotechnology. Biological computing has been an exciting area, with the practical language of DNA substrates leading the grounding development (Akula & Cusick, 2009). To use DNA to implement computation has stimulated people's thinking about DNA computing and related biological computing. Over time, many new disciplines, such as programming with genetic bits, DNA walkers and the emerging biocomputing field, have been inspired by the particular computational model, making the software and hardware different from earlier biological computing. DNA computing advantages were related to DNA perfect memory, miniaturization, concurrent computing, negligible thermal noise and low cost-operation. It is notable that using DNA as a processor and memory can be negligible anyway at an atomic level for miniaturization or cause a degradation, thereby these physical processes are instruction and output of a biocomputer conversely. Also, since no error repairing occurs in instruction reading from DNA, a negligible thermal noise and data processing by stochastic diffusion may even make users believe to have used traditional computing's incalculable random sequence considerations.

In recent years, biology has transformed from an empirical discipline to natural sciences, especially thanks to advanced technologies such as high-throughput data collection tools (B. Losos et al., 2013). Among these tools, high-throughput sequencing has revolutionised many sub-fields of biology. The large-scale and low-cost DNA sequencing performed by machines can produce gigabytes of genomic data within minutes, replacing traditional Sanger sequencing of DNA. This sea change in high-throughput sequencing technology has led to the sequencing of numerous viral and cellular genomes, transforming the biological science from an empirical and study of small samples to a data-driven one, in which an observation in an experiment can often be presented and interpreted in terms of big data, such as cellular RNA-Seq and treatment with chemical probes or genetic siRNA or CRISPR libraries. In the last decade, machine learning techniques were applied on the big genomic data to predict gene composition, illness risks and drug efficacy, among many other examples (Gunaga et al., 2020).

3. Results and Discussion

As we expected from the beginning of our discussion, the battery and the solar panel, which we use to replace the classical boiler, guarantee a higher computational power when the boiler needs to spend more than 156 hours of work. Furthermore, from the economic point of view, the battery and the solar panel are more convenient when a

computational step has to be spent more than 322 hours. We merge these considerations by plotting an hourly cost versus the total number of required computational steps. The cost difference between the three system versions is expected to decrease when the total number of the computational steps grows, as the boiler becomes less and less competitive. To emphasise our considerations, we have found a pass between the boiler and the battery, in the plane of the two quantities. All the considered theoretical, technological and economic aspects confirm our previous conclusions (Patra et al., 2022). In summary, we have shown a way to experimentally measure the energy gap between the initial and final state, using digital biochemistry in an ideal scenario. This way, we have derived a figure of merit for each system, making it possible to rank them. They could easily compare physical energy with information energy, measuring systems' potential impact in terms of environmental respect and technological innovation. For example, a list of environments could be offered to the final users, one for each system, next to the output progressional. Also, this benchmark could be employed within the framework of a computational multi-objective optimisation, where instead the thermodynamic optimisation is ended, the selection evolves, as a final system, according to the best Pareto-optimal set. Following these thoughts, we recall on a waiting list all the file status and actions to be performed outside the time lapse of 3 days with the prices in terms of the two quantities.

In this section, we focus only on the theoretical experiment and analyse the resources used. To obtain the energy consumption and the costs, we consider the boiler's, battery, and solar panel costs, the electricity price, the techno-economic and environmental analysis of the solar panel, and the ideal cases of the initial state of the system.

4. Conclusion

The domain of biology is entering an era of big data, where multi-omic and systems-scale research are becoming industry standard and open scientific culture is no longer a potential exception (E. Thessen & J. Patterson, 2011) (K. Rennstich, 2018). As a result, big databases, large datasets, and software tools are becoming a natural part of scientific life. In this article, we focused on the following topics relevant to the current state of the data-intensive landscape of life sciences. We discussed the reasons for the emergence of big data in biology as well as the ways different biological disciplines cope with the changes. Finally, we presented a list of focal points relevant to making big data in biology work at a level that will be effective and useful. Especially advocated were: (i) thoughtful design of databases and interfaces, in a way that would address cognitive, physical, and positively affect scientific community experience; (ii) breaking away from the idea of universal solutions, at the same time advocating solutions directed toward a specific domain or laboratory practice; (iii) reform of data integration operations from the ground up, on which we still depend to build theories and collect and annotate data; (iv) building open-science oriented software tools from the current most popular modelling technologies, in a way that would favour open data standards, software transparency, and universal compatibility. Finally, we quickly reviewed more general problems like the profound changes needed in education in biology, and more generally in the training of interdisciplinary skills. We raised the problems and perspectives of personal responsibility and openness in laboratory-to-laboratory data management to avoid the overfitting era of the scientific discourse. We also mentioned diversity in

teamwork, gap analysis in multi-omic data publications, and the rapid change of the perception of network biology behind. And all those in an interdisciplinary way. In the era of big data, it is essential that biological knowledge is widely disseminated and effectively managed (Zitnik et al., 2023). During the last two decades, the field has seen the emergence of new ways of thinking and new methods for network-based analysis. As has been the case in other fields, more and more elaborate discussions, reflections and discussions on the next steps that network biology must take can be observed, and our network can significantly move us away from the understanding of animal models and the interpretation of hypothesis-based experimental outputs. These "blessings," however, can be misused leading to loss of credibility and major financial waste. If we learn to predict, aren't we creating a world of self-prophetic pseudo-autistic machine learning models? As described by Yu, prediction has now outreached explanation and this is reflected across disciplines and scales. Effective use of network models and integrative systems-level analysis brings several technically significant challenges as well as skills for an interdisciplinary success story. In this conclusion, we briefly review current state of the field, the directions of which we think network science in life sciences is starting to move, and where the social diversity in computational biology can help.

References

A. Peters, M., Jandrić, P., & Hayes, S. (2021). Biodigital Philosophy, Technological Convergence, and Postdigital Knowledge Ecologies. ncbi.nlm.nih.gov

Akula, B. & Cusick, J. (2009). Biological Computing Fundamentals and Futures. [PDF]

E. Thessen, A. & J. Patterson, D. (2011). Data issues in the life sciences. ncbi.nlm.nih.gov

Gunaga, S., Vinod Prabhu, V., M. S., R., Kulkarni, A., & C. Iyer, N. (2020). Selection of Robust Digital Communication Techniques for the Vehicle to Vehicle Communication. [PDF]

K. Rennstich, J. (2018). The world system in the information age: structure, processes, and technologies. osf.io

Lee, F. & Helgesson, C. F. (2022). Styles of Valuation: Algorithms and Agency in High- throughput Bioscience. osf.io

Losos, B. J., J. Arnold, S., Bejerano, G., D. Brodie, E., Hibbett, D., E. Hoekstra, H., P. Mindell, D., Monteiro, A., Moritz, C., Allen Orr, H., A. Petrov, D., S. Renner, S., E. Ricklefs, R., S. Soltis, P., & L. Turner, T. (2013). Evolutionary Biology for the 21st Century. ncbi.nlm.nih.gov

M. Thampi, S. (2009). Introduction to Bioinformatics. [PDF]

Patra, S., Mukherjee, A., Mukherjee, A., S. Vidhyadhiraja, N., Taraphder, A., & Lal, S. (2022). Frustration shapes multi-channel Kondo physics: a star graph perspective. [PDF]

R Smalheiser, N. (2006). Launching the Journal of Biomedical Discovery and Collaboration. ncbi.nlm.nih.gov

Zitnik, M., M. Li, M., Wells, A., Glass, K., Morselli Gysi, D., Krishnan, A., M. Murali, T., Radivojac, P., Roy, S., Baudot, A., Bozdag, S., Z. Chen, D., Cowen, L., Devkota, K., Gitter, A., Gosline, S., Gu, P., H. Guzzi, P., Huang, H., Jiang, M., Nesibe Kesimoglu, Z., Koyuturk, M., Ma, J., R. Pico, A., Pržulj, N., M. Przytycka, T., J. Raphael, B.,

Ritz, A., Sharan, R., Shen, Y., Singh, M., K. Slonim, D., Tong, H., Holly Yang, X., Yoon, B. J., Yu, H., & Milenković, T. (2023). Current and future directions in network biology. [PDF]

LOSD

LONDON ORGANISATION OF SKILLS DEVELOPMENT

EXCELLENCE AWARDS

Empowering Excellence: Igniting Paths to Success

ABOUT THE AWARDS:

- **Recognition & Celebration:** Honouring dedication, innovation, and excellence.
- **Transcending Accolades:** A testament to resilience and unwavering determination.
- **Shining a Spotlight:** Recognising contributions in education, innovation, social impact, and professional excellence.
- **Incentive for Inspiration:** Motivating others to reach for greatness.
- **Fostering a Culture of Excellence:** Encouraging continuous growth and innovation.

BENEFITS FOR AWARDEES:

- **Increased Visibility:** Gain credibility and networking opportunities.
- **Validation of Hard Work:** Enhance professional profiles and open doors to new opportunities.
- **Selection Process:** Meticulous and fair, ensuring professionalism and inclusivity.

To be held in Winter, A Grand Celebration of Excellence

NOMINATIONS OPEN!

Join us in Breaking Barriers and shaping a brighter, more innovative future.
Send in your nominations now at admin@losd.co.uk.

UNLOCKING POTENTIAL FOR A SUSTAINABLE FUTURE: REIMAGINING HIGHER EDUCATION IN 2024

Prof. Dr. Parin Somani
CEO & Director: London Organisation of Skills Development

Theme of the Article: Education

Research Objectives: This study aims to explore how higher education institutions (HEIs) can be reimagined in 2024 to empower students and contribute to a sustainable future.

Prof. Dr. Parin Somani, Director & CEO of London Organisation of Skills Development (LOSD). She is a distinguished Academic Scholar, three times TEDx Speaker, and Author, honoured the title of Winner of Mrs Universe 2022, Winner of Enigma Mrs. World 2022 and several others. With 2 Academic and 6 Honorary Doctorates, she's a multi-award-winner and humanitarian. She is a prolific author of 21 books, and a record-breaker recognised in Guinness World Records and multiple prestigious record books. She was invited to deliver a Keynote Speech at Harvard University, Cambridge University and many more. In her global travels to 127 countries, Prof. Dr. Parin Somani tirelessly contributes to education, women empowerment, and youth development.

Abstract

This study aims to explore how higher education institutions (HEIs) can be reimagined in 2024 to empower students and contribute to a sustainable future.

A systematic review of recent academic literature focusing on higher education pedagogy, curriculum development, and student development in the context of sustainability was conducted. Additionally, the review analysed reports and publications from leading sustainability organisations and higher education institutions.

The review identified several key areas for progress within HEIs. Firstly, a need for curriculum reform, emphasising the integration of sustainability principles across all disciplines. Secondly, the importance of fostering critical thinking and problem-solving skills through innovative pedagogies was highlighted. Thirdly, prioritising student well-being and mental health through robust support systems was identified as crucial for fostering resilience. Finally, the review found that experiential learning opportunities such as internships and community engagement projects were vital for fostering student agency and impact.

Integrating sustainability across curricula, fostering critical thinking, prioritising student well-being, and providing experiential learning opportunities are crucial for empowering students. By implementing these changes, HEIs can

transform into catalysts for a sustainable future. Students graduating in 2024 and beyond, equipped with these skills and experiences will be well-positioned to address complex global challenges and contribute to a more resilient world. This reimagined approach to higher education has the potential to unlock student potential for a sustainable future.

Keywords:

Higher Education, Sustainability, Critical thinking, Student Empowerment

1. Introduction

Higher education is at a pivotal moment in history. The backdrop of this moment is shifting from reactive approaches to more visionary goals. Sustainable development globally and locally is becoming a priority as governments take up the challenge, validate their positions, and initiate a strategic response at regional and national levels, reflecting local priorities.

Universities have an essential role in public life and community development. They foster independent, critical, and diverse perspectives on issues affecting social, political, economic, and environmental aspects of life. However, public universities are at a crossroads. As mass education democratizes access to higher education, this could also lead to increased instrumentalism and reductions in the ability of universities to act as profound agents of democratization, social development, citizenship, and equity.

As society strives for ecological sustainability, social justice, and a more equitable distribution of material resources, the role of universities must be critically assessed. They need to take up the challenge of affecting a radical transformation of society from the internal structures built up over centuries. All socio-political institutions have major challenges to confront, including the development of a new moral and political economy, changing patterns of governance, and an evolution towards more ethical, expansive, and inclusive power. These challenges will only be addressed on the basis of equally profound transformations of the institutions that shape consciousness through knowledge production and dissemination. Figure 1 depicts the integration of sustainability principles into higher education curricula.

With these intentions in mind, a proposal is made to consider how the potential of public universities can be unlocked to contribute to social and political changes towards improving the world, its resources, and society. Attention is turned to how the universities might be actively reimagined to embrace the potential of humanity rather than retreat into the privileged and the instrumental. The argument is made that thinking and acting publicly are university responsibilities, and there

Figure 1

must be a world university movement that asserts the universal contribution of public knowledge and takes up the challenge of its global regulation and democratization.

Aim

Higher education is a vital and powerful force for good in society. It positively impacts the economy, equality, health, happiness, and well-being. Those with degrees earn more and are less likely to be unemployed. Yet, 90% of the world's population live in developing countries, where only 1% of young adults have a tertiary qualification. An unprecedented convergence of crises, from climate change to conflict, is resulting in disruption and destruction, resulting in higher education having an ever-greater obligation to promote peace, justice, and sustainable development globally. Building on the commitments of the 2030 Agenda, the sustainable development goals, and the new higher education institutions 4-5-6-7-8-9-10, this document begins to address the questions: "What would a higher education for a sustainable future look like?" and "How can it be reimagined and unlocked for all?"

In response to the rapid and reiterative changing global context, the education for a sustainable future vision presented here aims to provoke critical dialogue and explore collaborative actions by higher education and partners across public, private, civil society, local and global sectors. Importantly, it acknowledges a global north/south power dynamic resulting in unequal access to and benefit from technology. Technology should be regarded as a double-edged sword that empowers as well as impoverishes. Information and communication technologies (ICTs) are an enabler of access, at the same time, a barrier to a growing divide as they play a pivotal role in the production and dissemination of knowledge.

The rapidly enhancing artificial intelligence (AI) capability poses another game-changing challenge to the existing form and norm of higher education. Technology development and adoption is race-driven to grow in scale and scope. Ethical framework and governance lag behind regulating the impact of AI in society. There is a need for holistic consideration of people, purpose, planet, prosperity, and peace in a higher education context reimagined; reimagining the education for sustainable future vision; rethinking the role of technology; and redefining the emphasis on global solidarity and local actions. There is excitement towards the worldwide imagination of education for a sustainable future. What higher education would mean and look like if everyone on earth was nurtured equally and inclusively similarly to the "richest of the rich" as epitomised by the world-renowned Ivy League institutions?

2. Methodology

The methodology employed to explore the reimagining of higher education in 2024 encompasses a systematic framework that integrates qualitative and quantitative methods, data collection techniques, and other relevant processes. As highlighted by (Beecroft & C. Schmidt, 2015), the scenario method shows high potential for use in Higher Education in Sustainability (HES). This method involves constructing and analysing alternative future developments to support present decision-making. Didactical reconstruction of the scenario method is essential to develop appropriate forms of teaching in higher education, allowing students to cultivate fundamental reflexive competencies in addressing the future in ways relevant for both sustainability and education.

3. Results and Discussion

The results and discussion section presents the culmination of the examination of reimagining higher education in 2024. It encompasses the findings derived from the analysis and combines them with in-depth conversations, interpretations, and contextualisation's. This section delves into various aspects of the reformation and its implications, offering insights from leaders and students about the future of higher education (Andrew Doiron, 2017). It also discusses the expectations of students regarding the role of technology in higher education, emphasising the need for technologies that enable students to become co-creators in their education processes (Romenska, 2009). The section highlights the emergence of challenges faced by higher education institutions in the face of a changing social, economic, technological, and political context, prompting the need for a revaluation of assumptions and the development of a vision for the future.

3.1. Curriculum Reform in Higher Education

Curriculum reform in higher education is vital for preparing students for a sustainable future. The proposed changes aim to adapt learning frameworks, course structures, and knowledge delivery methods to foster relevant skills and competencies. Research has shown that transformative education involves engaging the whole person and affecting change in deep levels of values and beliefs (Winter et al., 2015). This suggests that higher education institutions need to create opportunities for students to experience higher-level transformation by linking personal and professional spheres. Additionally, there is a growing trend towards non-standard curricula, including flexible, personalised, work-based, and online structures, as well as increased collaborative provision, which presents both implications and potential incompatibilities for future curricula (Peach, 2012).

3.2. Fostering Critical Thinking and Problem-Solving Skills

To foster critical thinking and problem-solving skills in higher education, institutions are implementing various initiatives and strategies. One such initiative is the NK program at North Carolina State University, which aims to transform the culture of teaching and learning from teacher-centred to student-centred instruction. This approach emphasises higher-order thinking and encourages faculty to engage in intensive development, create discipline-specific activities, and provide feedback on students' thinking skills. The primary outcome is for students to apply critical and creative thinking skills in problem-solving, addressing the need for graduates to be prepared for career challenges related to these skills (Allen et al., 2019).

In addition, the use of heuristic evaluation methods is being explored to connect online platforms with the development of critical thinking, creativity, and problem-solving skills in students. This approach allows educators to understand the learning system as a whole and align it with the needs of twenty-first century skills (Nussbaum et al., 2021). These initiatives collectively contribute to the cultivation of essential skills that enable students to meaningfully contribute to a sustainable future.

3.3. Prioritising Student Well-being and Mental Health

(Goodman, 2017) emphasises the importance of universal mental health promotion through curricular changes, wellness centres, and integration of wellness into student programming. This approach communicates an institutional priority of mental health and wellness, providing free education or resources, while also emphasising the need for supervised skills practice and supportive relationships. Additionally, (Spencer Kilarski, 2019)

highlights the frustration and overwhelming academic expectations experienced by students, indicating the need for structural changes in academic calendars to support student relaxation and study time. These insights underscore the significance of addressing student welfare and mental health challenges within the higher education system to create a supportive and conducive learning environment. Figure 2 depicts the components of a robust support system for student well-being in higher education.

Figure 2

4. Conclusion

If the challenges facing humanity are to be met, a concerted global effort must be made. To achieve this, universities must take the lead and ensure they are fit for purpose. As agents of social and economic change, they have no moral choice otherwise. As a starting point, the Universitas 21 (U21) Global Ingenium Summit in 2024 will take a "blank sheet of paper" approach to the higher education landscape. Participants will imagine a higher education world where they can take decisions uninhibited by cost, convention, or responsibility. They will design a new system preferably for the world at large, but at least for their home countries. Once there is something tangible, then the real work starts – to deliver it against the millstones of feasibility, affordability, and practicality.

A U21 Global Summit is proposed to explore how ingenuity might unlock the potential for a sustainable future and reimagine a higher education system that is fit for purpose in 2024. Each university in U21 is invited to share experiences and reflections that contribute to a full programme of conversations and discussions. Vice Chancellors, Presidents and other leaders from U21 institutions will meet HSBC's Chief Economist, Greg Fyfe, and the World Future Society's Jim Auckerman. Together, they will examine the future of the world and the consequences for higher education. Fireside chats with thought leaders from around the world will complement the formal discussions. Finally, Summit delegates will combine science, technology, leadership, imagination and creativity through collaborative workshops in business environments such as Idea Farm and the Silicon Docks.

5. References

Beecroft, R. & C. Schmidt, J. (2015). Method-Based Higher Education in Sustainability: The Potential of the Scenario Method. [PDF]

Andrew Doiron, J. (2017). A grounded theory of school of education futures. [PDF]

Romenska, S. (2009). The learning technologies of the future: technologies that learn?. [PDF]

Winter, J., Cotton, D., Hopkinson, P., & Grant, V. (2015). The University as a Site for Transformation around

Sustainability. [PDF]

Peach, S. (2012). Understanding the Higher Education Curriculum in the 21st century. [PDF]

Allen, T., Queen, S., Gallardo-Williams, M., Parks, L., Auten, A., & Carson, S. (2019). Building a Culture of Critical and Creative Thinking. Creating and Sustaining Higher-Order Thinking as part of a Quality Enhancement Plan. [PDF]

Nussbaum, M., Barahona, C., Rodriguez, F., Guentulle, V., Lopez, F., Vazquez-Uscanga, E., & Cabezas, V. (2021). Taking critical thinking, creativity and grit online. ncbi.nlm.nih.gov

Goodman, L. (2017). Mental Health on University Campuses and the Needs of Students They Seek to Serve. [PDF]

Spencer Kilarski, K. (2019). Can I Lend a Hand? Investigating the Promotion of Student Resiliency in a University Setting. [PDF]

LOSD
London Organisation Of Skills Development

GLOBAL RESEARCH CONFERENCES

GRC 2024, HARVARD

DECEMBER 2024

Live presentations
Virtual presentations
Poster presentations
Virtual Presentations
Round Table discussions
International locations
World-Class Academic Institutions
Networking Opportunities
Sharing Knowledge
Publishing Opportunities in the Global Research Journal (GRJ)

SUBMIT YOUR 200-250 WORD

ABSTRACT

&

REGISTER NOW

admin@globalresearchconferences.com

www.globalresearchconferences.com

A MOCK INTERVIEW WITH REGARD TO COMPUTATIONAL INTELLIGENCE: DECODING THE DICHOTOMY

Dr. P. Prabhavathy
Professor/English, Department of Science & Humanities

Theme of the Article: AI and Machine Learning

Research Objectives: The aim of this research study is to examine the differences and intersections between AI, ML, and CI, highlighting their roles in technological advancements. It also seeks to guide students in understanding and applying these fields to develop intelligent systems.

BIO

Dr. P. Prabhavathy is currently serving as an Associate Professor of English in the Department of Science and Humanities, KGiSL. She has authored technical textbooks, workbooks, reference books and contributed to articles, chapters, research papers etc., for publication in the international conferences, Journals, Magazines etc., She is a speaking cum Written Examiner of BULATS – ESOL Examinations, British Council, Cambridge Assessment and Evaluation, EBEK. Dr. Prabhavathy has been honoured with many awards and recently recognised as an AICTE certified UHV Mentor.

Abstract

Artificial Intelligence and Machine Learning are two emphasising branches of computer science, authorities have acknowledged their discrepancy and the roles that they both offer in advancement of computer applications. Both fields have upended industries, reasserting the way we interact with technology and metamorphosing how business operates. In the convoluted domain of technology, the juxtaposition between Artificial Intelligence and Software Engineering emerges as a perpetual enigma, akin to untangling a Gordian knot. This discourse endeavours to delve into the intricacies of this dichotomy, peeling back the layers that differentiate these two formidable domains. Computational Intelligence is the design, theory, application and linguistically motivated computational framework. CI act a major role in building a successful intelligent system, games and cognitive development of system in this regard mock interview guides the students of Engineering and Technology to kickstart with trends and application of Machine Learning (ML), Natural Language Processing (NLP) and Computational Intelligence (CI).

Keywords:

artificial intelligence; software; dichotomy; computational intelligence; metamorphosing

1. Introduction

The dichotomy between AI and Software Engineering manifests in their divergent

methodologies and objectives. While AI strives to imbue machines with human-like cognitive prowess, Software Engineering is focused on crafting robust, efficient software solutions. The fusion of AI-driven algorithms with software engineering principles yields groundbreaking applications, from autonomous systems to intelligent virtual assistants. AI are booming although in certain Industries are started to appoint AI in a position of software Engineer and also in the post of Human Resource (HR). Nowadays, the question frequently raised is do AI replace human? To answer this question, we need to know about efficiency of AI and software Engineer. Design and creativity thinking are the fundamental skill of IT professionals as increasing these steps generative AI and low code take a great space on coding load like speech recognition. The primary goal of the students pursuing professional courses is to learn the technical aspects of their respective professions. Its fundamental essence lies in mirroring human cognitive faculties, traversing the labyrinthine terrain of intricate decision-making and pattern recognition. As we navigate this intricate web of algorithms and heuristics, we encounter the words of Alan Turing echoing through the corridors of innovation, "We can only see a short distance ahead, but we can see plenty there that needs to be done," encapsulating the perpetual quest of AI to transcend the boundaries of artificial intelligence. On the other hand, software engineers are in the process of upgrading themselves. It adheres to structured methodologies such as Agile or Waterfall, emphasising precision, reliability, and scalability.

1.1 A Confluence of Changes and Beneficiary of Machine Learning and Natural Language Processing

The words of Frederick P. Brooks Jr. reverberate in this realm, "The programmer, like the poet, works only slightly removed from pure thought-stuff," elucidating the creative yet disciplined approach inherent in software engineering. AI has developed in the recent years as an emerging career towards students. Nowadays, everything is handled by machine. By introducing machine learning algorithms, we can design the model to our requirements. Modern times building a robot (AI) becomes facile, as it is used in every field all over the society. It also provides us with the evolution of skills that are in high demand. The roles and responsibilities towards the career path are expected to be superior. Nevertheless, as the software engineering society observes the escalate need for AI talent. Software engineers aspire to move their profession towards AI. Undoubtedly, both Software Engineers and AI will continue to be in leading demand. As software Engineers are required to innovate new techniques and methodology in the technical world. The point of divergence is the converging and differing skill sets between AI and software Engineers.

AI has the competence to create and manage the development, creation of automation and also do statistical analysis. It is well developed to provide the organisations decision making spirit. By training the AI model it also helps the manager and stockholders in the analysis process. We can also introduce the Machine Learning models into programming, and it can be integrated with our application. Computational intelligence has the key component known as fuzzy logic, they handle with the checking process of value whether it is true or false. Fuzzy logic allows the user to represent the concept of fuzzy by allowing the system to make decisions based on the given instructions.

Accessibility of fuzzy logic involves defining the fuzzy sets, fuzzy rules to undoubtedly get into real world problems. Evolutionary computation within CI have inspired biological evolution and

natural selection. The working of evolutionary algorithms involves creating a solution over mutation, fitness, genetic crossovers. It is effective in finding solutions to given tasks. At its core, CI works on various computational models and approaches to solve complex problems based on the algorithms. The fundamental feature of CI is neural network. They are mathematical models inspired by structures and functions of neural networks, interconnected by nodes and arranged in layers. The working of neural network involves in strengthening between connections and nodes from the input. Swarm intelligence is another fascinating field within CI, where it collects the activity of social insects such as bees, ants. There are two optimisations, namely ant colony optimisation and particle swarm optimisation.

The working of swarm intelligence involves in interacting generally with their environment to provide the optimal solution towards the problems. There are plenty of methodologies available to create intelligence in taking decisions and solving the problem by self-organized process. These are the key methodologies used in CI while working on the projects. CI is also efficient in finding fraud detection, moreover in robotics and autonomous systems. It has numerous advantages especially in areas such as hiring, lending, and law enforcement. CI techniques such as machine learning algorithms have empowered business and research to follow the valuable data by optimisation process to create innovative solutions. Some of the drawbacks are seen in CI is risk of reliance, where humans trust the AI without an evaluation of themselves. This case will lead to errors in the program, the development and maintenance of CI needs to be expertise in the data science domain. Although they ensure the transparency and accountability of the system.

1.2 Decoding the Dichotomy: AI vs. Software Engineer

Software Engineering is in top demand in industry from the survey of past few years. Most of the MNC's are welcoming and offering a job role for software engineers, they also provide internship for new graduates and students. The action taken by these companies is greatly beneficial for students to work in Hands-on projects and to develop their skill accordingly to their interests. Software architecture is acknowledged as a different expertise Category from software design. The roles of software Engineer are to test and compose software application to evaluate the requirements, estimate the cost of deployment and to implement the system software. They also review the project that they build with peers and stack holders to decide the current tools. software Engineers are highly skilled, they can do the necessary outcome that is expected from the industry. A distinct opportunity is over the software engineers. The society of software Engineers must adopt a realistic approach, avoiding the temptation to transform all software Engineering programs into AI-focused ones.

Let us focus on the key features where AI focuses on building artificial intelligent systems that can perform human tasks. AI software includes natural processing, machine learning, deep learning, and computer vision of the system. Software Engineers focus on consistent, efficient and adaptable software solutions using programming languages, deployment and building model methodologies and frameworks. AI uncovers the applications in diverse domains like finance, Hospitals and health care, driverless vehicles and support services. Most of the AI system are build using the principle of software engineers by Integrating AI techniques into their solutions. AI sets up the system and tools to make decisions under precise standards. AI is generally

trained during the time habitual beyond supervision.

On the contrary of AI replacing the software Engineer, deployment of machine learning algorithms skilled by software Engineers will provide the outcome of software Engineer performance by intensifying required practices. Let me give a live example that has already been on board, Cognition is a steering company where they have built the world's first AI software engineer called DEVIN that can do any technical work assigned to it. As a virtual software engineer it is well known for the accuracy of the outcome with or without an assistance, they have the ability to code and operate the code, plans, design and finally they can also deploy software projects.

Devika, Indian AI engineer manifests to hurdle Devin. Devika AI was spearheaded by Mufeed VH of Lyminal and station, where it aims to compete the efficiency of Devin the AI coder. Similarities of Devin are introduced in Devika such factors are power of machine learning and natural language processing by understanding the human instructions. In spite of that Devika district itself deconstructed these institutions into actionable tasks. Here Devin's accessibility and features remains obscured in mystery, Devika's functionality is transparent as they are open-source nature of evolution.

The key feature of Devika is that the model is trained in a way to interact in a feedback loop, explore, decision making, research accordingly, coding a program, it also answers to the queries raised by users to archive the project outcome. It is capable of rectifying the error generated from the code autonomously without the involvement of user as a motive to minimise the human power. Devika has also created static websites on Netlify. As it is a python – based project any user needs to install the latest version of python to their system, if they need to work with Devika.

While coming for the benefits of using Devika AI over Devin AI, it has increased productivity as they focus on more complex aspects of software development for faster completion of the project before the deadline submission. It is also beneficial as they are reducing errors spontaneously without the need of the human. Devika breaks down the assigned tasks and works on them to improve the learning curve structures. Finally, accessibility and collaboration make Devika contribute its development and practice towards the outcome.

The fact about the virtual software engineer they can solve the problem in well skilled manner by providing the efficient result. The founder of Devin states that they will not

Fig: 1 Strategies

replace software engineers, instead they are freeing up the developer for higher level thinking and creative solutions for the problems. However, navigating this dichotomy is not without its challenges. Ethical quandaries surrounding AI's decision-making capabilities and the imperative for stringent software engineering practices underscore the need for a harmonious convergence of these domains.

The collaboration between both the fields will bridges the dichotomy by leveraging the strength of each discipline with intelligence functionalities. Even though there are plenty of innovations emerging in AI technology, they cannot be as accurate as humans. Trusting AI will obviously not advisable as they make faults often, humans need at least to monitor the work of the AI. The duty of humans is still in demand in all fields to check over and to operate AI in wise way. The necessity of prompt engineers is at peak to deal with these machines. Prompt engineers play a crucial role in designing the behaviour and capabilities of AI models, ensuring that they produce accurate and relevant results.

While examining the job crisis between AI versus software Engineer, it is crucial to consider the sophisticated interplay in the evolving technologies. AI, with its advancement in technique has undoubtedly disrupted traditional job roles across various industries. AI on phrase has introduced new job opportunities particularly in certain domains of its major such as data science, AI research and warehousing. The work done in the industry is now handled by AI, resulting in job losses in many sectors such as manufacturing, customer service role.

2. Mock Interview

There are more and more chances for engineers and technical professionals to convey technical information in English for various purposes. The primary goal of the students pursuing professional courses is to learn the technical aspects of their respective professions. Similarly, the practical suggestions for developing language skills in the learners and each item followed by tasks that the students motivated to do on their own. Teaching aids prove effective only when it suits the teaching objectives and group of learners. The aid should be displayed properly so that all the students are able to see it, observe it and derive maximum benefit out of it. English for Academic Purposes (EAP) entails training students, usually in a higher education setting, to use language appropriately for study. It is a challenging and multifaceted area within the wider field of English Language Teaching (ELT) and is one of the most common forms of English for Specific Purposes (ESP). English for Academic Purposes programme focuses instruction on skills required to perform well in an English-speaking academic context English for Specific Purpose (ESP) is to meet the specific needs of the learners. It makes use of the methodology and activities of the discipline it serves, and it is purpose. It is the teachers' responsibility to propose a variety of exercises, both written and oral, to improve the learner's accuracy, fluency and communicative ability. At times the teachers' should translate-if they know both languages very well and believes it is the most efficient way to provide the meaning of a new concept in that moment, especially abstract ideas and also the teachers have to correct errors immediately if the scope of the classroom activity is accuracy, but if the scope of the activity is fluency these errors will be corrected later on.

2.1 QUESTIONS WITH ACADEMICIAN(S) AND ADMINISTRATOR (S)

1. Is it good to kickstart with NLTK journey?
2. Few suggestions about ML, NLP and CI

3. Share some credits about Text Summarisation
4. Opinion about Language Modelling Module
5. Do you find Masked Language Model really aids Software Engineers and others? If so... How?
6. Whether the text corpus in NLP enrich language skills?
7. Your appreciation with regards to paper cum paperless work
8. Do you agree with the title decoding the dichotomy AI versus Software Engineers?
9. Share some unique features about Devin's and Devika's AI
10. About Quantum computing and its sustainability

Fig: 2 & 3 Mock Interview

Language learning is done best in a non–threatening atmosphere. Learner errors are dealt through self–monitoring and peer correction. Through understanding the teachers, it can help the students to overcome their fears and work more positively towards learning a new language. Remedial teaching is different from the other kind of teaching in the sense it has only one main purpose that of correction of errors. Language games and communicative activities help a lot to learn the language interestingly. Pair work and group work should be encouraged where the students get opportunities to interact with their pairs without fear. Language lab helps the students to remedy the errors in pronunciation. These are the some of the remedies where the students could feel free in learning the language without fear and inhibitions.

The teachers have to develop all four linguistic capabilities (reading, writing, listening and speaking). The role of teacher at first is to identify and find out the needs of the individual learners. Then, the teacher has to find out effective strategies to be implemented to provide an active, interesting and interactive process of learning for the students with different levels of ability. Focusing on both intellectual and social goals, the teacher should figure out stages, roles, and problem-solving strategies that support student competence. Teachers should feel responsible for teaching; shaping; moulding; and motivating the students to learn English language. If English language teachers can make students feel successful and not give up their efforts in acquiring skills, there lies the success of teaching. The teacher's responsibility is help to students to develop the skill in written.

3.Conclusion

To conclude, the mock interview with regard to Computational Intelligence is an activity conducted among Engineering & Technological students with higher officials as a practical teaching aid to create awareness and gain knowledge about the classifications of AI. The contrast between AI and Software Engineering reflects a dynamic blend of innovation and discipline, creativity, and precision. As we makeover through this intricate landscape, a holistic understanding of their overlaps and distinctions becomes crucial, mirroring the essence of Leonardo da Vinci's saying, "Simplicity is the highest form of sophistication." In addressing the scarcity, software Engineering is not limited to the industry but rather has applications and demand in multiple fields, by providing a wide range of options. To effectively navigate the job crisis AI and software engineering realms, individual and organisations must

prioritise continuous learning and developing the necessary latest skills and to be updated about each and every newly emerging technology, is essential for maintaining relevance and adaptability in a rapidly changing professional environment.

Reference(s)

IEEE - Author: Ipek Ozkaya with reference to S. Overmyer, Jobs of the future: Emerging trends in artificial intelligence, Aug. 2022, [online] Available: https://www.indeed.com/lead/artificial-intelligence-report

WEBSITE – Dzone: AI and software engineer differences Available: mp;url=https://dzone.com/articles/Artificial-intelligence-vs-Software-engineering%23

NDTU: Indian AI Engineer Devika Emerges to challenge Devi, The World First 'AI Coder'. Available: https://www.ndtv.com/feature/artificial-intelligence-indian-ai-engineer-devika-emerges-to-challenge-devin-the-worlds-first-ai-coder-5355983

Cognition: Introducing Devin, the first AI Software Engineer. Available: https://www.cognition-labs.com/introducing-devin

LONDON ORGANISATION OF SKILLS DEVELOPMENT
PRESENTS

SKILLS LIVE

Inspiring Ideas, Transforming Minds

SHORT POWERFUL LIVE TALKS

INSPIRE & MOTIVATE A LIVE AUDIENCE

SHARE THE STORY BEHIND YOUR SKILLS

REGISTER NOW

SUBMIT YOUR 300 WORD ABSTRACT NOW

ADMIN@LOSD.CO.UK

Global Research Journal

(Online) ISSN 2753-5789

ISSUE NUMBER 8, 2024