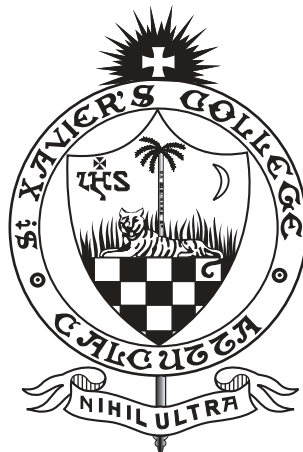


Volume. XII, JANUARY 2023

MAGIS – Xaverian Journal of Education

(An Interdisciplinary Journal)



St. Xavier's College (Autonomous)

Department of Education

MAGIS – Xaverian Journal of Education

Published by

*Department of Education
St. Xavier's College (Autonomous)
30, Mother Teresa Sarani
Kolkata – 700016
West Bengal, India*

*Disclaimer: The opinion expressed in the articles
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Price: Rs 150/-

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Printed by

PATEL PRINTERS

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MESSAGE

As we enter into the New Year with a sense of deep gratitude for all the blessings that we have received, I take this opportunity to present to our readers **Magis 2023**, the Research Journal of the Department of Education.

Magis 2023 consists of a plethora of topics selected from various fields of knowledge. It attempts to address some of the critical concerns about our educational system.

I look forward to this academic journey as we continue to develop each issue of **Magis** to its optimum potential. It is our hope that **Magis 2023** brings for its authors special recognition for the work they publish. May it be a suitable platform for emerging interdisciplinary subjects, and to facilitate communication amongst a variety of disciplines.

Magis 2023 embodies within it layers of meaning. It invites us in the Ignatian tradition to experience the beauty of the Divine in all things. The concept of **Magis** is central to Ignatian spirituality.

It is the earnest endeavour of all who have worked tirelessly for the timely publication of this interdisciplinary research journal, to widen the horizons of research and the vistas of knowledge.

The quality of this journal will make its presence felt through its impact on the community. The journal is a worthy testimony of hard work, discipline, knowledge and expertise. It is the collaborative effort of many who have painstakingly given of their best, to be able to publish this journal.

I would like to commend the efforts of the Editorial Board and the team of faculty members who have contributed to the timely publication of this Research Journal.

Hearty Congratulations to the Department of Education!

May God bless each one of you!

Rev. Dr. Dominic Savio, S.J.

Principal

St. Xavier's College (Autonomous)

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The Vice-Principal
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MESSAGE

Magis 2023 is a product of hard work, perseverance and dedication to research and scholarship. This journal is a collaborative effort of many people. Magis 2023 aims to increase social awareness of its readers. Furthermore, it is directed towards forming agents of change who in turn are able to take responsible action on educational and ethical concerns.

On behalf of the Department of Education, I thank Fr. Principal, Rev. Dr. Dominic Savio, S.J. for his continuous support and encouragement.

Sincere thanks to the Editorial Team and faculty members for their commitment and dedication to research work.

I would like to gratefully acknowledge all the authors and researchers who have added quality to our journal through their meaningful contribution.

Dr. Charlotte Simpson-Veigas
Vice-Principal
Department of Education
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EDITORIAL

Magis, the Journal of the Department of Education, St. Xavier's College (Autonomous), Kolkata is committed to the pursuit of excellence in the field of research. It focuses upon critical reflections on a variety of educational issues.

In the paper entitled "Traditions and Circulation of Science in Antiquity: Comparing India with Greece", Somaditya Banerjee attempts to examine a non-Eurocentric origin of modern science. He further emphasizes the circulation, correlation and transfer of scientific ideas between India and Greece.

Dr. Ayan Chandra in his paper entitled "Some Alternative Optimality Criteria in Newsboy Problem", has considered some procedures under a classical newsboy setup. The optimality criteria have also been worked out under a more realistic framework where the supply is not same as the order quantity but is a random fraction of the order quantity.

Dr. Atish Prosad Mondal, in the paper entitled, "NCC As General Elective Credit Course-A New Initiative", argues in favour of adopting NCC as a General Elective Credit Course (GECC) under the CBCS across all universities in the country for the purpose of nation building. He further states that NCC is the largest youth organisation of the country consisting of more than fourteen lakh cadets in strength. It is a tri-service organisation comprising of the Army, Navy and Air Force, engaged in grooming the youth of the country into disciplined and patriotic citizens.

Aniruddha Banerji and Pia Ghoshal, in their paper entitled "Some Issues of Forest Management and Sustainable Development with Specific Reference to India" State that Sustainable Development Goals were adopted by various countries so that future development trajectories can be better devised by the international community. The authors focus on environmental sustainability as reflected by Goal No. 15.

Tinni Goswami, in her paper entitled, "Situating Geriatric Care in Colonial Bengal: An overview based on Vernacular Literature", highlights how elderly people were treated in colonial Bengal and that the historians who worked on public health in colonial Bengal ignored the concept of Geriatric Care. The paper intends to revisit geriatric care of the time and has made a comparison with the present situation to reveal its historic relevance.

Ranjana Banerjee, in her study on "The Changing Face of Women Entrepreneurship: From Traditional to Modernization", explains that in the era of globalization and modernization, change is taking place at a phenomenal rate. A striking feature of this change is the emergence of various classes of entrepreneurs including women who have made a significant entry making themselves visible in the field of business. This in turn is contributing to a changing mind set of family members who have overcome their attitude of non-acceptance and prohibition of women participation, to acceptance of women in economic roles as entrepreneur.

Neeta Dang, in her study on "Merit in Contemplation", attempts to explore the sensibilities of under-graduate students towards certain aspects of education and life. The author states that the



positive role of Education as suggested by Great Educators and Thinkers of Education and furthermore expressed by students of the present times must be emphasized upon.

Zaid Al Baset, in the essay entitled “National Education Policy (NEP) 2020 and Queer Inclusivity in India,” emphasizes upon the National Education Policy 2020 as its point of departure, in order to raise questions with regard to ideas of inclusivity that the document projects, from the lens of queer and trans individuals. It provides a critical commentary on the exclusion of sexual identities and queer subjects from the NEP 2020 and states that such an omission does not correspond to the legal achievements of the queer movement in India. The essay comments upon the implications of inclusivity in the context of Education and its accompanying components of pedagogy, curriculum and the classroom.

Ananya Konwar, Anondi Mandal, Rukaiya Gheewala, Sneha Das and Jaydip Ghosh, in the paper entitled “Antibacterial Therapy of Bacteriophage: Yesterday, Today and Tomorrow”, highlight the rapidly advancing field of phage therapy. The authors cite case studies which use personalized bacteriophage therapy for treatment of diseases caused by extensively drug-resistant organisms. The paper further reflects upon the challenges that lie ahead as the world experiences a paradigm shift away from the reliance on antibiotics. Furthermore, the paper provides a holistic approach to the global acceptance of bacteriophage therapy for treatment of resistant bacterial infection.

Shalabh Agarwal, in the article entitled “Mindset to be a technically adequate teacher”, emphasizes and elaborates upon the role and mindset of teachers to embrace technology and facilitate education in more effective ways. The author contends that although the role of information and communication technology (ICT) in education has significantly increased, but resistance to technology by teachers worldwide remains at an all-time high. The author is of the conviction that a resilient mindset of teachers, open to learning new technical skills in a digital age will help address this resistance and usher in a new era of learning holistically. Furthermore, the author states that with the advent of the opportunities offered by the Internet, Instructional designers and Educational technologies can transform education and make it easily available for all.

Indrani Karar and Soma Dutta in their paper entitled “A review study on bridging the gender digital divide and promoting women empowerment through ICT” provides an overview of gender digital divide. The authors state that women can be empowered by Information and Communication Technology, thus bridging the digital divide and issues pertaining to gender and discrimination as a consequence of it .

Sharadia Dey in the paper entitled “Role of Youth in Safeguarding Mother Earth”, emphasizes the importance of Environmental education for the youth in order to assist them in understanding environmental issues by providing knowledge of physical, chemical, social, and biological processes. This in turn will enhance their knowledge and awareness of environmental laws, rights and duties. This education and awareness will help in alleviating or at least reducing further environmental degradation, caused by Frequent and intense storms, drought, heat waves, warming oceans, melting glaciers and rising sea levels and other global environmental challenges for human beings in the 21st century. Environment Education for the youth will be useful for ecological restoration and help human beings to live in peace and harmony on Planet Earth.



Priyanka Dey explains in her essay on “Post Pandemic Health Communication: An Educational Dogma”, that the present world demands intercommunication. The emerging challenge is the authentic and rapid dissemination of critical health-related information. The present world demands interconnectedness and openness in the comprehension of global and intercultural issues in the field of health communication. The emerging challenge is the authentic and rapid dissemination of health-related information. The essay argues that prioritization in health management and harnessing the potential of digital integration provides aspiring jobseekers to engage themselves in both part-time and full-time commitments, leading to a revolutionary quantum leap in the post-pandemic human society.

Mousumi Boral in her paper entitled, “Ethical Knowledge for Social Sustainability: The Vision of National Education Policy 2020”, explains that the National Education Policy (NEP) 2020 has stressed that the process of inculcating a democratic value system should be initiated during the school days. Effective parenting, value-oriented schooling and normative social interactions will remove or at least reduce the tendencies of deviated personalities and juvenile delinquencies.

Arup Kumar Mitra, Suhana Sultana, Tanni Datta, Aishani Dhali, Abhipsa Kundu, Tamanna Sultana, in their paper entitled “Phenotypic characterization of dengue virus isolates in mice model differentiates dengue fever and dengue haemorrhagic fever from dengue shock syndrome: A short review”, explains that Dengue virus infection, which is a common arthropod-borne viral disease in humans, and is spread by the bite of infected *Aedes* mosquitoes. Belonging to the family *Flaviviridae*, Dengue virus (DV) causes dengue fever (DF) and dengue haemorrhagic fever/dengue shock syndrome. A large proportion of the human population is at risk of contracting this disease with host genetics playing a crucial role as a risk factor.

Nandita Chaudhuri has explained in “Dimensions of Early Indian Psychological concepts in Caraka SaAhitâ and SuúrutaSaAhitâ”, about the voluminous treatises of the Caraka SaAhitâ and the Suúruta SaAhitâ that contain the classic doctrines of Âyurveda, are regarded as the oldest Sanskrit medical texts. They show instances of the understanding of the psychological impact on medical treatment and medical thinking of the time. Furthermore, they bear clear testimony to the fact that psychological ideas, and this is revealed were well known among the medical fraternity and is revealed through the two medical compendiums. The mental aspect of a patient should be taken into consideration as the cause of a physical illness or disease that may exist in the mind.

In the paper entitled “Making of the Patron- Babur and Humayun – Their History, Culture & Family Background, Difficulties, Attitudes and Achievement”, Samir Isha states that the Mughals were largely Turkish by race, ‘Sufiistic -Sunnis’, by faith and Persian by culture. The study has examined the celebrated ‘house of Timur’ painting in the British Museum from printed reproductions. In the paper an attempt has been made to elaborately discuss as to how this large unconventional illustration is fully reflective of a deft combination of overwhelming Safavid features and Mughal naturalism evident in the robust and bold pigmentation.

– The Editorial Board



MAGIS – Xaverian Journal of Education

VOLUME – XII. JANUARY 2023

Contents

- 1. Traditions and Circulation of Science in Antiquity: Comparing India with Greece** 13
— Dr. Somaditya Banerjee
- 2. Some Alternative Optimality Criteria in Newsboy Problem** 23
— Dr. Ayan Chandra
- 3. NCC As General Elective Credit Course-A New Initiative** 42
— Dr. Atish Prosad Mondal
- 4. Some Issues of Forest Management and Sustainable Development with Specific Reference to India** 48
— Dr. Aniruddha Banerji¹ and Dr. Pia Ghoshal²
- 5. Situating Geriatric Care in Colonial Bengal: An Overview based on Vernacular Literature** 58
— Dr. Tinni Goswami
- 6. The Changing Face Of Women Entrepreneurship: From Traditional To Modernization** 63
— Dr. Ranjana Banerjee
- 7. Merit in Contemplation** 73
— Dr. Neeta Dang
- 8. National Education Policy (NEP) 2020 and Queer Inclusivity in India** 79
— Dr. Zaid Al Baset
- 9. Antibacterial Therapy Of Bacteriophage : Yesterday, Today and Tomorrow** 86
— Ananya Konwar¹, Anondi Mandal¹, Rukaiya Gheewala¹, Sneha Das¹, Jaydip Ghosh²
- 10. Mindset To Be A Technically Adequate Teacher** 96
— Prof. Shalabh Agarwal



11.	A Review Study On Bridging The Gender Digital Divide And Promoting Women Empowerment Through ICT	102
	— 1. Dr. Indrani Karar* 2. Dr. Soma Dutta	
12.	Role of Youth in Safeguarding Mother Earth	110
	— Dr. Sharadia Dey	
13.	Post-Pandemic Health Communication : An Educational Dogma	113
	— Dr. Priyanka De	
14.	Ethical Knowledge For Social Sustainability : The Vision Of National Education Policy 2020	126
	— Dr. Mousumi Boral	
15.	Phenotypic characterization of dengue virus isolates in mice model differentiates dengue fever and dengue haemorrhagic fever from dengue shock syndrome: A short review	136
	— Suhana Sultana ^a , Tanni Datta ^b , Aishani Dhali ^b , Abhipsa Kundu ^b , Tamanna Sultana ^b , Arup Kumar Mitra ^a	
16.	Dimensions Of Early Indian Psychological Concepts In CARAKA SAMHITA And SUŚRUTA SAMHITA	140
	— Dr. Nandita Chaudhuri	
17.	Making of the Patron- Babur & Humayun – Their History, Culture & Family Background, Difficulties, Attitudes and Achievement	152
	— Dr. Samir Isha	



Traditions and Circulation of Science in Antiquity: Comparing India with Greece

Dr. Somaditya Banerjee

Associate Professor

Austin Peay State University

Abstract :

This paper compares scientific traditions during antiquity in India with that of Greece and reexamines the claim by few historians of science that science started in Greece. This article argues that scientific knowledge in India display certain characteristics in cosmology, astrology and mathematics which predated the scientific traditions in Greece. Hence, this study is an attempt to examine a non-Eurocentric origin of modern science, while highlighting the circulation, correlation and transfer of scientific ideas between India and Greece.

Keywords: Science, Community, Greece, Hymns, Vedas.

Introduction

There is a popular thesis within the history of science community (Lloyd, 1970) that “science” began with the Greeks. This paper reexamines that thesis by considering several scientific traditions in India, that predated that of the Greeks. Several sources also reveal correlations between Indian and Greek science because of the circulation of science in antiquity. Furthermore, there might have been contacts between India and Greece which further led to a transfer and circulation of ideas. However, an independent origin and development of science in India and Greece seems to be the emerging conclusion from this study.

Chronology

The earliest traces of Indian civilization dates back to 40000 B.C. which are preserved as rock paintings and reveal a development in art (Cunningham, 1971). Further archaeological records show an unbroken tradition in the Harappan civilization to about 8000 B.C. in Mehrgarh (Cunningham, 1971). The earliest textual source is the *Rigveda*, which is a compilation of hymns



and is characterized by several astronomical questions encoded in the hymns. The discovery that Sarasvati, the most preeminent river of the Rigvedic times dried up due to tectonic movements around 3100 B.C. supports the view that the *Rigveda* is prior to 3100 B.C. However, as the Indus script has still not been deciphered, one can only speculate about the earliest Indian writing. Moreover, knowledge was passed on from a *guru* to his disciple, verbally or by example. Verbal sources make it harder for historians to delve deeper in the past and hence this aggravates the problems of locating the eras for the Indian epics.

By analyzing the Vedic sources, it is seen that there were four periods in the development of ancient Indian science. The first period can be classified under the *Rig Vedas*. This period included mostly astronomy, like the motion of the sun, moon, stars and planet periods. The second period included the *Brahmanas* (2000-1000 B.C.) (Kak, 2000). In this period, astronomy was represented by altars which were geometrically constructed. The *Brahmanas* mostly reveal non-uniform motion of the sun and moon, intercalation of the lunar year and a primitive version of the epicycle theory. The *Vedanga Jyotisa* of Lagadha belongs to this period and deals mostly with Vedic rites and the times they were performed. The third period includes the *Early Siddhantas* and *Early Puranas* (1000 B.C.—500 A.D.). The main sources for this period are the *Sulbasutras*, the *Mahabharata* and the *Surya Siddhanta*.

The *Siddhantas* show the sighrocca and mandocca cycles which indicate the motion of the planets going around the sun, which, in turn was going around earth. There were eighteen early *Siddhantas* composed by eighteen sages who include Surya, Pitamaha, Vyasa, Vasistha, Atri, Parasara, Kasyapa, Narada, Gargi, Marici, Manu, Angiras, Romaka, Paulisa, Cyavana, Yavana, Bhrgu and Saunaka (Kak, 2000). The fifth period is characterized by Aryabhata (ca. 476 A.D.) and is called the classical Siddhantic period. The *Romaka* and *Paulisa Siddhanta* of the fourth period were included later in the book *Pancasiddhantika* (the five astronomical canons) by Varahamira (ca. 505 A.D.) (Kak, 2000). Owing to the names Romaka and Paulisa, it was assumed that *Pancasiddhantika* mostly represents Greek thought, although, there was no conclusive evidence to support it.

However, one can speculate that the astronomy and the mathematical symmetries which were present in the *Rigveda* and the *Brahmanas*, could have traveled to the West specifically by the Kulli culture (ca. 2800 B.C.) or when Phoenician seamen established commercial links with India (ca. 10th century B.C.) or through Ionian philosophers in the 5th century BC. or when Alexander invaded India in 326 B.C (Sedlar, 1980). It is important to note that the first two periods as stated above are well before the existence of any scientific culture in Greece.



Academic History

Studies in ancient Indian science, specifically the astronomical texts showed that the Indian methods were very different than those implemented in other civilizations. The French astronomer Jean Sylvain Bailly in his book *Traite de l'Astronomie Indienne et Orientale* in 1787 described the methods of the *Surya Siddhanta*(SS) and was influenced by the latter. Bailly also applauded the elegance and simplicity of the SS and concluded that astronomy had originated in India and was later transmitted to the Greeks. On the contrary, John Bentley in 1799 in the *Asiatic Researches* suggested that the parameters of the SS were correct for 1091 A.D. However, Bentley's study was negated by S.N. Sen in the *Indian Journal of History of Science* who said that Bentley had forgotten to notice that SS had been revised later using some corrections (Sen, 1985). In 1860, Ebenezer Burgess, the translator of SS, claimed that Indians were the original discoverers of the lunar and solar divisions of the zodiac, the primitive theory of epicycles, astrology and names of the planets after gods (Burgess, 1989).

Though interest in studying ancient Indian science continued in the following decades after 1860, there were several difficulties involved. The unfamiliar structure of the luni-solar system was one major impediment in further study. In the 1960s there were myths like the Vedic invasions of India around 1500 B.C., which hindered further progress (Leach, 1990). Thereafter, David Pingree, argued that Indians were seemingly not interested in science and lacked the tradition of observational astronomy until the medieval times (Pingree, 1978). Pingree further claimed that the astronomical dates of the *Rigveda* and the *Brahmanas* were untrustworthy and the astronomical references in the texts were later interpolations.

The notion that India did not have a tradition of observational astronomy was refuted by Roger Billard in a study dating 1971 (Billard, 1971). Billard showed that the parameters used in the various siddhantas belonged to the period in which they were created, opposing the argument that they were transmitted from Mesopotamia or Greece. Later Van der Waerden reviewed the ongoing controversy in a 1980 paper titled *Two Treatises on Indian Astronomy* where he evaluated the views of Billard and Pingree and remarked:

Billard's methods are sound, and his results shed new light on the chronology of Indian astronomical treatises and the accuracy of the underlying observations. We have also seen that Pingree's chronology is wrong in several cases. In one case his error amounts to 500 years. (van der Waerden, 1980)

Van der Waerden's remark is important as it begs the overarching point of having a sound chronology, but, also the context in which one can examine the Indian cosmology.



Defining a context: Indian cosmology

The books on the Vedas reveal a three-fold and somewhat recursive world view. The universe is seen as three regions of earth, space and sky. This is analogous to a human's body—especially when compared to the breadth (*prana*) and the mind. The events in the heavens (sky), on earth and in the *prana* are conceptualized as correlated. The universe is infinite and goes through cycles of creation and destruction. This latter view is part of the astronomical framework. The Puranas reveal a lifetime of the universe as about 8.64 billion years, although there are larger cycles as well (Kak, 1987). An important concept is that of the *Brahman*—the one who can transcend all oppositions. It is also seen by the doctrine of Kanada (from the sage Kanad ca. 600 BC) that there are nine classes of substances. They include ether, space, and time which are continuous; four elementary substances called earth, air, water and fire that are atomic and two kinds of mind, one that is omnipresent and another which is the individual. The systems of Samkhya and Vedanta reveal a dichotomy between subject and object. The conscious subject is distinct from the material object (reality), but at times can control its evolution. This atomic doctrine predates that of Leucippus and his student Democritus (ca. 5th century BC) of Abdera (Lloyd, 1970). There is no conclusive evidence of whether Leucippus was affected by Kanad's doctrine. However, the possibility of an indirect contact between two distant regions cannot be ruled out.

A notable feature in the *Brahmanas* and *Puranas* is that space and time need not flow at the same rate for different observers. This is a remarkable find, because we know from Einstein's special theory of relativity (1905) the phenomenon of 'length contraction' by which there is a decrease in the length of objects traveling at relativistic speeds (comparable to 186,000 miles per second which is the speed of light) and 'time dilation' by which clocks moving at relativistic speeds run slower. Whether the *Brahmanas* had a mathematical formalism (like that of Einstein) to account for this feature is unclear, but the bare existence of the idea shows the ingenuity of scientific ideas in that period outside Europe. The nature of the human mind and its capacity is very elegantly described in the Vedic books, especially by Patanjali (ca. 200 B.C.) in his *Yoga-sutras* (a book of aphorisms). Moreover, the idea of complementarity was at the basis of the classification of Indian philosophic tradition similar to the ideas of complementarity found amongst early Greek philosophers.

Mathematics and Astronomy

In the field of mathematics, we see that there were several advances in arithmetic which included a binary number system used by Pingala (ca. 450 B.C.) to represent Vedic meters. This may have been the basis for the later invention of the sign for zero and its first use as a number by Brahmagupta



in his *Brahmasphutasiddhanta* (The Opening of the Universe) in 628 A.D. (Kak, 2000). Although Gottfried Leibnitz in the 17th century invented the modern binary system, the existence of Pingala's ideas highlights the scientific knowledge in his times.

The *Rigveda* and the *Satapatha Brahmana* reveal that the five planets were associated with a God and a defining color (Kak, 2003). The *Brahmana* also talks about thirty-four lights which could be correlated with the twenty-seven nakshatras (stars), the five planets, the sun and the moon. The moon was the fastest moving of all the heavenly bodies and it was compared to the one who fertilizes the other heavenly bodies with which it came into contact. The *Rigveda* also speaks about the five bulls of heaven, which can be identified as the five planets. Mercury was seen as having a yellow color and was viewed as the son of the moon by Tara, the wife of Jupiter. Venus was ascribed as white and was the son of Bhrgu and the priest of the demons. Mars was ascribed red and the son of the earth or Shiva. Jupiter was viewed as having a yellow color and was the son of Angiras and the priest of the gods. Saturn was ascribed black and was described as the lord of the planets, lord of seven satellites and the one which moved slowly. The *Jaiminigrhyasutra* gave a correlation between the planets and the Vedic gods. The sun was Shiva; the moon was Uma (Shiva's wife); Mars was Skanda the son of Shiva; Mercury was Vishnu; Jupiter was the Brahman (symbolizing the entire Universe); Venus was Indra; Saturn was Yama (the god of death).

The *Rigveda* also reveals that Vishnu was the younger brother of Indra (the creator) who was often identified with the sun (Kak, 2003). An important feature of Vishnu was his three steps by which he could quantify the universe. The first two steps were visible to mortals and the third step was considered the highest and transcended all mortals. It was later explained that Vishnu performed this step by his reincarnation as the Vamana (a dwarf) the pygmy. This could explain Vishnu's identification as the planet Mercury. The three steps could also be reinterpreted as the three synodic periods of Mercury at 118 days a period, which equaled the 354 lunar days. The *Pancavimsa Brahmana* (ca. 1900 BC) shows that Mercury was also named as Budha which happens to be the third day (Wednesday) of the week in the Indian calendar (Kak, 2003). Budha is also spoken of in relation to a 61 day rite in an altar. Taking three such rites would amount to 183 days, which equaled the days devoted to the heavens as also seen as the three steps of Vishnu by which he covered the heavens. Furthermore, this seems to be in resonance with the logic that numbers involved in the altars reflected the dichotomy between the inner self and the outer cosmos. Venus, as described in the Vedas is in terms of the twin Asvins, the morning and evening star. This is significant because Homer later personified Venus as Hesperus and Phosporus. The Vedic thinking seems to be in alignment



with Homer's trajectory of thought, which can be interpreted as another correlation between India and Greek thought.

Aryabhata

The Siddhantic astronomy displayed that there was an independent tradition of astronomy in India. The major astronomer in this form of astronomy was Aryabhata (ca. 476 AD) who had a keen interest in mathematics. His works include *Aryabhatiya* which is a mathematical treatise and *Aryabhata Siddhanta* which was a book on astronomy dealing with the size of the universe. Aryabhata defined a *yojana* (a unit of distance) to be $8000nr$, where nr is the height of a man (Kak, 2000). This made his *yojana* to be about 7.5 miles which is significant as *Aryabhatiya* stated that the orbit of the sun is 2887666.8 *yojanas* and that of the sky is 12474720576000 *yojanas* (Kak, 2000). The orbit of the sky was 4.32×10^6 greater than the orbit of the sun. The diameters of the earth, the sun and the moon were taken as 1050, 4410 and 315 *yojanas*. Along with this the earth-sun distance and the earth-moon distance was taken to be 459585 and 34377 *yojanas*. It is interesting to see that these distances are in the correct proportion related to their assumed sizes, given that the distances are about 108 times the corresponding diameters.

Aryabhata was influential in South India and used geometry to great effect in his study of the heavenly bodies. He also did some foundational work on the rotation of earth and on the heliocentric nature of the universe. Thurston in *Early Astronomy* remarks:

Not only did Aryabhatiya believe that the earth rotates, but there are glimmerings in his system (and other similar Indian systems) of a possible underlying theory in which the earth (and the planets) orbits the sun, rather than orbiting the earth... The significant evidence comes from the inner planets: the period of the sikhrocca is the time taken by the planet to orbit the sun (Thurston, 1994).

Moreover, heliocentric thoughts are also seen in the Visnu Purana, with the following statement:

The sun is stationed for all time, in the middle of the day... The rising and the setting of the sun being perpetually opposite to each other, people speak of the rising of the sun where they see it; and, when the sun disappears, there, to them, is his setting. Of the sun, which is always in one and the same place, there is neither setting nor rising (Thurston, 1994).

This statement from the Visnu Purana shows the seeming connections with the modern Heliocentric model whereby the Sun is stationary and the Earth is in motion. The Heliocentric model was discovered during the scientific revolution in Europe during the seventeenth and eighteenth centuries.



Greek Cosmology and Correlations

The Greek cosmology has several similarities with that of India. The world as seen by Empedocles (ca. 445 BC) is a balance of equal but opposing forces like love and strife. Empedocles further believed that the universe goes through cycles of creation and destruction, which is very similar to that in India. However, the speculations of Empedocles were not associated with specific numbers involving the great cycles, as in India. Empedocles believed the cosmos to be egg-shaped just as in the *Satapatha Brahmana*. He identified matter to be constituted of four elements: earth, water, fire, air originating from the properties of hotness and dryness. Combinations of these properties gave rise to the four elements.

Furthermore, Plato conceptualized his world being ordered by a transcending Craftsman or *demiourgos* (demiurge). Plato had a mathematical construction of elements in which he identified earth, fire, air and water as a cube, tetrahedron, octahedron and icosahedron. However, Plato's fifth solid, the dodecahedron which was his model for the universe was similar to the representation of the Vedic altar as the universe. Moreover, Plato's mystic ideas and poetic language have a lot of similarities with the Upanishads (ca. 1000 BC). The simile of the cave in the *Republic* is a pictorial representation of the Indian doctrine of *maya* (illusion), where the idea of *maya* is replaced by that of appearance. Plato's order of precedence of philosopher, warrior and artisan can be compared to the caste system in India which included the *ksatriyas* (warriors), the *vaisyas* (workers) and the *sudras* (artisans). The metaphor of the charioteer in the *Phaedrus* resembles in the *Katha Upanishad* (Lomperis, 1984). The Upanishads and Plato both emphasized the importance of contemplation and seemed to reject the senses (empirical knowledge) as a source of reality. In the *Republic*, Plato remarks:

Men who have neither wisdom nor virtue and are absorbed by the lust of senses are pulled downwards and never succeed in reaching the real higher world...they stuff themselves with whatever is not real, and the part of themselves which thus is filled, does not afford them any kind of benefit (Lomperis, 1984).

In the *Katha Upanishad* we find a similar thought :

The immature pursue outward pleasures; they are caught in the far-flung snares of death.
But the wise, knowing the immortality to be permanent do not pray for anything here amidst what are transitory (Abhedananda, 1967).

Plato's conception of the mind (*Nous*) as a link between man and his creator has a similarity with the *Atman* in the Vedanta. Both *Atman* and *Nous* are imperishable and eternal. Furthermore,



Plato's idea, that the main purpose of knowledge and philosophy are purifying the human soul and setting it free from the cycles of birth and death has resonances with those in the Upanishads. Although the concept of immortality of the soul is pre-Platonic and can be linked with the Orphics and the Pythagoreans, the idea of reincarnation can be traced back to the Pythagoreans who first introduced it. It also seems from the opinion of Herodotus (5th century, BC) that the Greeks learned about the transmigration of souls in Egypt. However, the Egyptians understood the latter concept very differently than that in India or Greece. Hence it is unlikely that this idea came to Egypt from India. As India's interaction with Egypt is an understudied area of research, once cannot rule out the possibility of Indian ideas going to Greece through the Egyptian route.

For example Pythagorus seems to have traveled very often, especially when he went into exile from Samos. Alexander Polyhistor (ca. 78 BC) claims that Pythagorus visited India in the 6th century BC (Sedlar, 1980). However, the Greeks were aware that transmigration of souls was on outside tradition. The Pythagoreans based their ideas on five elements and vegetarianism which also appear to have Indian origin. Moreover, the Pythagorus Theorem is described in the *Sulba Sutras* (ca. 800 BC) and is particularly used in the construction of Vedic altars. It is significant within the Greeks that the Milesian philosophers ushered in the practice of rational criticism and debate and rejected supernatural explanations of natural phenomena. Most notable in the period was Thales (ca. 585 BC) who was considered as the first philosopher-scientist. Thales lived in the city of Miletus in Ionia and was of Phoenecian descent. He traveled extensively and went to Egypt where he learnt geometry. Ionia is geographically significant as it was one Asia Minor's western shore and was part of the Greek world which was closest to India. Furthermore, Anaximander's (ca. 555 BC) conception of the growth of the world from the "Boundless" greatly resonated with the Upanishadic philosophers of his times. However, it remains to be seen whether there was contact between the people in Ionia and India. Moreover, the Greek naturalists used *pneuma* as the vital force which had an all pervading influence. This is similar to *prana* which represented breadth or the life sustaining force of the body and universe. This parallel and other discussed earlier in this paper shows similar yet independent ideas existing in both India and Greece.

Conclusion

There are similarities and differences in the evolution of science during antiquity in India and Greece. The analysis of astronomy as unfolded in the Vedic altars is evidence which show the presence of an independent scientific tradition in India. The popular thesis amongst Western historians of science that scientific knowledge began first in Greece is debatable. It is clear that a scientific culture existed in India much before than that in Greece. There are also several examples in mathematics



in India during antiquity and ideas about time and space have modern day resonances. The trigger to explain the non-uniformity in the motion of the heavenly bodies as seen in India might have diffused later to the Greeks, when the latter tried to answer same questions using similar methods. As Sebhokht (ca. 600 AD) a Syrian priest-astronomer remarked:

I shall not speak of the knowledge of the Indians, of their subtle discoveries in the science of astronomy, discoveries even more ingenious than those of the Greeks and Babylonians, of their method of calculation which no word can praise strongly enough, I mean the system using 9 symbols. If these things were known to the people who think that they alone have mastered the sciences because they speak Greek, they would perhaps be convinced though a little late in the day that other folk, not only Greeks, but men of different tongue, know something as well as they (Jaggi, 1986).

It is therefore the work of the academic to figure out the truth in Sebhokht's statement and show that the tradition and circulation of science in antiquity was a complex phenomenon with myriad sides. Comparing India with Greece reveals that the scientific traditions existed in India independent of that in Greece. However the focus on India gives a non-Eurocentric view to the nature of the evolution of science in antiquity.

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Some Alternative Optimality Criteria in Newsboy Problem

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Abstract

Classical Newsboy problem consists in deriving the optimal order quantity by minimizing the expected total cost. However, there may be situations, where instead of mean minimizing solution, some other optimality criteria may prove to be more appropriate. In any particular situation one may want to control the variability of the total cost and hence may obtain a standard deviation minimizing solution. In the same way, one may find out penalized mean or coefficient of variation minimizing solutions. In some other situation one may want to safeguard against the total cost. In such situations, one may obtain the optimal order quantity by minimizing the modal cost or the probability that total cost exceeds a specified high value. In this paper we have considered the above procedures under a classical newsboy setup. Further the above optimality criteria have also been worked out under a more realistic framework where the supply is not same as the order quantity, but is a random fraction of the order quantity. The last two approaches considered above call for the explicit derivation of the total cost which have also been worked out.

Key Words: Classical Newsboy Problem, Cost Distribution, Penalized Mean, Modal Cost, Exceedance Probability, Random Supply

1. Introduction

Let us consider the classical newsboy problem where a newspaper vendor starts his day with 'q' newspapers in his hand. The demand being random, at the end of the day the vendor may face a shortage or may be left with some excess newspapers in his hand. Accordingly, he has to incur either shortage cost or excess cost.

The classical solution consists in determining the optimal order quantity by minimizing the expected total cost. In this paper, we shall consider a few other alternative methods of determining the optimal order quantity. These are as follows:

- (i) If the standard deviation of the cost distribution is large enough, then the minimization



of the expected cost alone may not lead to a satisfactory result as the actual cost incurred in any particular situation may be much higher than the expected cost. In this situation, one may obtain the optimal order quantity by minimizing the standard deviation of the total cost.

- (ii) Because of the reason stated in the previous point, one may as well, alternatively obtain the optimal order quantity by minimizing the co-efficient of variation of the total cost.
- (iii) One may as well find out the optimal order quantity by minimizing the standard deviation penalized mean of the total cost. In other words, here the optimal order quantity is found out by minimizing the sum of expectation and k times the standard deviation of the total cost, k being a suitably chosen constant.
- (iv) Here we have obtained the optimal order quantity by minimizing the modal cost in order to ensure that the maximum possible cost is kept at its minimum level. This is, in principal is similar to the minimax criteria.
- (v) Another approach may be to safeguard against the cost. Hence, one may like to determine the optimal order quantity by minimizing the probability that the total cost exceeds a specified high value.

The above methods can also be applied in a more realistic situation when the actual supply (S) is a random fraction of the order quantity. More specifically, $S = f \cdot q$ where f is the random fraction. In some situations the supply distribution has been considered to vary uniformly around the order quantity.

2. Supply is same as the order quantity

THE MODEL

Let X : Demand.

Y_q : Total Cost.

q : Order Quantity.

c_1 : Shortage Cost.

c_2 : Excess Cost.

Therefore,

$$Y_q = \begin{cases} c_1(X - q) & \text{if } X > q \\ c_2(q - X) & \text{if } X < q \end{cases}$$

The probability density functions of X and Y will be denoted by $f(x)$ and $g(y)$ respectively.



Under this setup, the Expected Total Cost is given by

$$E[Y_q] = c_1 \int_q^{\infty} (x - q)f(x)dx + c_2 \int_0^q (q - x)f(x)dx$$

2.1. Mean Minimizing (Classical) Solutions:

Exponential Distribution:

Here we take $f(x) = \lambda e^{-\lambda x}; x > 0, \lambda > 0$.

Then,

$$\begin{aligned} E[Y_q] &= c_1 \int_q^{\infty} (x - q)\lambda e^{-\lambda x} dx + c_2 \int_0^q (q - x)\lambda e^{-\lambda x} dx \\ &= c_1 \frac{e^{-\lambda q}}{\lambda} + c_2 \left\{ q - \frac{1}{\lambda} + \frac{e^{-\lambda q}}{\lambda} \right\} \end{aligned}$$

The classical solution consists in obtaining the optimal value of q , say q_{opt} , by minimizing the expected total cost. In this situation,

$$q_{opt} = -\frac{1}{\lambda} \ln \frac{c_2}{c_1 + c_2}.$$

The corresponding expected total cost is then given by

$$E[Y_{q_{opt}}] = c_1 \frac{e^{-\lambda q_{opt}}}{\lambda} + c_2 \left\{ q_{opt} - \frac{1}{\lambda} + \frac{e^{-\lambda q_{opt}}}{\lambda} \right\}$$

Beta (2,1) distribution:

Here $f(x) = 2x, 0 < x < 1$.

$$\begin{aligned} \text{Then, } E[Y_q] &= c_1 \int_q^1 (x - q)2x dx + c_2 \int_0^q (q - x)2x dx \\ &= 2c_1 \left\{ \frac{1}{3} - \frac{q}{2} + \frac{q^3}{6} \right\} + 2c_2 \frac{q^3}{6}. \end{aligned}$$

$$\text{Therefore, } q_{opt} = \sqrt{\frac{c_1}{c_1 + c_2}}.$$

The corresponding Expected total cost is given by

$$E[Y_{q_{opt}}] = 2c_1 \left\{ \frac{1}{3} - \frac{q_{opt}}{2} + \frac{q_{opt}^3}{6} \right\} + 2c_2 \frac{q_{opt}^3}{6}.$$

Beta (1,2) distribution:

Here $f(x) = 2(1 - x), 0 < x < 1$.



Then,

$$\begin{aligned} E[Y_q] &= c_1 \int_q^1 (x-q)2(1-x)dx + c_2 \int_0^q (q-x)2(1-x)dx \\ &= (c_1 + c_2)q^2 - (c_1 + c_2)\frac{q^3}{3} + \frac{c_1}{3} - c_1q \end{aligned}$$

Therefore, $q_{opt} = 1 \pm \sqrt{1 - \frac{c_1}{(c_1+c_2)}}$

The corresponding Expected total cost is given by

$$E[Y_{q_{opt}}] = 2c_1 \left\{ \frac{1}{6} - \frac{q_{opt}}{2} + \frac{q_{opt}^2}{2} - \frac{q_{opt}^3}{6} \right\} + 2c_2 \left\{ \frac{q_{opt}^2}{2} - \frac{q_{opt}^3}{6} \right\}.$$

2.2 THE ALTERNATIVE METHODS

2.2.1 Minimization of the Standard Deviation of Total Cost

Exponential Distribution

In this case,

$$\begin{aligned} E[Y_q^2] &= c_1^2 \int_q^\infty (x-q)^2 \lambda e^{-\lambda x} dx + c_2^2 \int_0^q (q-x)^2 \lambda e^{-\lambda x} dx \\ &= c_1^2 \frac{2e^{-\lambda q}}{\lambda^2} + c_2^2 \left\{ q^2 - \frac{2q}{\lambda} + \frac{2}{\lambda^2} - \frac{2e^{-\lambda q}}{\lambda^2} \right\} \end{aligned}$$

Therefore, $Var[Y_q] = E[Y_q^2] - \{E[Y_q]\}^2$

$$\begin{aligned} &= e^{-\lambda q} \left\{ \frac{2c_1^2}{\lambda^2} + \frac{2c_1c_2}{\lambda^2} \right\} - e^{-2\lambda q} \left\{ \frac{c_1^2}{\lambda^2} + \frac{c_2^2}{\lambda^2} + \frac{2c_1c_2}{\lambda^2} \right\} - qe^{-\lambda q} \left\{ \frac{2c_2^2}{\lambda^2} + \right. \\ &\quad \left. \frac{2c_1c_2}{\lambda^2} \right\} + \frac{c_2^2}{\lambda^2} \end{aligned}$$

Beta (2,1) Distribution

Here, $E[Y_q^2] = 2c_1^2 \left(\frac{1}{4} - \frac{2q}{3} + \frac{q^2}{2} - \frac{q^4}{12} \right) + c_2^2 \frac{q^4}{6}.$

Therefore, $Var[Y_q] = \frac{1}{18} (-3(-1+q)^3(3+q)c_1^2 + 3q^4c_2^2 - 2((2-3q+q^3)c_1 + q^3c_2)^2)$

Beta (1,2) Distribution

Here, $E[Y_q^2] = 2c_1^2 \left(\frac{1}{12} - \frac{q}{3} + \frac{q^2}{2} - \frac{q^3}{3} + \frac{q^4}{12} \right) + 2c_2^2 \left(\frac{q^3}{3} - \frac{q^4}{12} \right).$



Therefore,

$$\text{Var}[Y_q] = \frac{1}{18} (3(-1+q)^4 c_1^2 - 3(-4+q)q^3 c_2^2 - 2((-1+q)^3 c_1 + (-3+q)q^2 c_2)^2)$$

The optimal value of q , say q_1 , may now be obtained for all the above demand distributions by minimizing $SD[Y_q]$ for specified values of c_1 and c_2 . The corresponding optimal expected total cost will be denoted by Y_{q1} .

2.2.2 Minimization of the Co-efficient of Variation of the Total Cost

Here the optimal value of q , say q_2 will be obtained by minimizing

$$c.v. [Y_q] = \frac{SD[Y_q]}{E[Y_q]}.$$

The corresponding optimal expected total cost will be denoted by Y_{q2} .

2.2.3 Here the optimal value of q , say q_3 will be obtained by minimizing

$$S(q) = E[Y_q] + k SD[Y_q],$$

k being a suitably chosen constant.

Exponential Distribution

$$\text{Here } S(q) = c_1 \frac{e^{-\lambda q}}{\lambda} + c_2 \left\{ q - \frac{1}{\lambda} + \frac{e^{-\lambda q}}{\lambda} \right\} + k \left\{ e^{-\lambda q} \left\{ \frac{2c_1^2}{\lambda^2} + \frac{2c_1 c_2}{\lambda^2} \right\} - e^{-2\lambda q} \left\{ \frac{c_1^2}{\lambda^2} + \frac{c_2^2}{\lambda^2} + \frac{2c_1 c_2}{\lambda^2} \right\} - q e^{-\lambda q} \left\{ \frac{2c_2^2}{\lambda^2} + \frac{2c_1 c_2}{\lambda^2} \right\} + \frac{c_2^2}{\lambda^2} \right\}^{\frac{1}{2}}.$$

The corresponding optimal expected total cost will be denoted by Y_{q3} .

Beta (2,1) Distribution

$$\text{Here } S(q) = 2c_1 \left\{ \frac{1}{3} - \frac{q}{2} + \frac{q^3}{6} \right\} + 2c_2 \frac{q^3}{6} + k \left\{ \frac{1}{18} \left(-3(-1+q)^3(3+q)c_1^2 + 3q^4 c_2^2 - 2((2-3q+q^3)c_1 + q^3 c_2)^2 \right) \right\}^{\frac{1}{2}}.$$

The corresponding optimal expected total cost will be denoted by Y_{q3} .

Beta (1,2) Distribution

$$\text{Here } S(q) = 2c_1 \left\{ \frac{1}{6} - \frac{q}{2} + \frac{q^2}{2} - \frac{q^3}{6} \right\} + 2c_2 \left\{ \frac{q^2}{2} - \frac{q^3}{6} \right\} + k \left\{ \frac{1}{18} (3(-1+q)^4 c_1^2 - 3(-4+q)q^3 c_2^2 - 2((-1+q)^3 c_1 + (-3+q)q^2 c_2)^2) \right\}^{\frac{1}{2}}$$

The corresponding optimal expected total cost will be denoted by Y_{q3} .



2.2.4. Minimization of the mode of the total cost

Let $f(x)$ be the PDF of the demand distribution and $F(x)$ be the corresponding CDF. The CDF of the cost (Y) distribution is then given by

$$H_q(y) = F\left(q + \frac{y}{c_1}\right) - F\left(q - \frac{y}{c_2}\right).$$

Having obtained the CDF $H_q(y)$ and hence the PDF $h_q(y)$ of Y , we first obtain the mode of Y by solving the equation $h_q'(y) = 0$. Suppose a solution to this equation is $y_0(q)$. The optimal order quantity may then be obtained by minimizing $y_0(q)$ with respect to q . It may be pointed out that this method can be used in a wide range of situations apart from the cases when the demand has an exponential family of distributions or has a PDF which is not differentiable twice.

We take the PDF of demand distribution as $f(x) = 3x^2, 0 < x < 1$.

The CDF of Y is given as,

$$\begin{aligned} F(y) &= P(Y \leq y) \\ &= (1 - q^3) \left\{ \left(q + \frac{y}{c_1} \right)^3 - q^3 \right\} + q^3 \{ q^3 - (q - \frac{y}{c_2})^3 \} \end{aligned}$$

Consequently, the PDF of Y is obtained as

$$f(y) = (1 - q^3) \left\{ \frac{3}{c_1} \left(q + \frac{y}{c_1} \right)^2 \right\} + q^3 \left\{ \frac{3}{c_2} \left(q - \frac{y}{c_2} \right)^2 \right\}$$

The mode of Y is then obtained as below :

$$\begin{aligned} \frac{df(y)}{dy} &= 0 \\ \Rightarrow \frac{d}{dy} \left\{ \left(\frac{3}{c_1} \right) (1 - q^3) \left(q + \frac{y}{c_1} \right)^2 + \left(\frac{3q^3}{c_2} \right) \left(q - \frac{y}{c_2} \right)^2 \right\} &= 0 \\ \Rightarrow \frac{6(1-q^3)(q+\frac{y}{c_1})}{c_1^2} - \frac{6q^3(q-\frac{y}{c_2})}{c_2^2} &= 0 \\ \Rightarrow \frac{6q(1-q^3)}{c_1^2} + \frac{6y(1-q^3)}{c_1^3} &= \frac{6q^4}{c_2^2} - \frac{6yq^3}{c_2^3} \\ \Rightarrow y \left\{ \frac{6(1-q^3)}{c_1^3} + \frac{6q^3}{c_2^3} \right\} &= \left\{ \frac{6q^4}{c_2^2} - \frac{6q(1-q^3)}{c_1^2} \right\} \\ \Rightarrow y &= \frac{\left\{ \frac{q^4}{c_2^2} - \frac{q(1-q^3)}{c_1^2} \right\}}{\left\{ \frac{(1-q^3)}{c_1^3} + \frac{q^3}{c_2^3} \right\}}. \end{aligned}$$



Thus, the mode of Y is given by

$$M_0 = \frac{\left\{ \frac{q^4}{c_2^2} - \frac{q(1-q^3)}{c_1^2} \right\}}{\left\{ \frac{(1-q^3)}{c_1^3} + \frac{q^3}{c_2^3} \right\}} = \frac{q^4 \left(\frac{1}{c_1^2} + \frac{1}{c_2^2} \right) - \frac{q}{c_1^2}}{q^3 \left(\frac{1}{c_2^3} - \frac{1}{c_1^3} \right) + \frac{1}{c_1^3}}.$$

It may clearly be seen that the mode does not exist for $c_1 = c_2$.

Now, to minimize mode, we differentiate M_0 with respect to q and equate it to zero.

Differentiating M_0 with respect to q , we get:

$$\frac{d[M_0]}{dq} = \frac{\left[q^3 \left(\frac{1}{c_2^3} - \frac{1}{c_1^3} \right) + \frac{1}{c_1^3} \right] \left[4q^3 \left(\frac{1}{c_1^2} + \frac{1}{c_2^2} \right) - \frac{1}{c_1^2} \right] - \left[q^4 \left(\frac{1}{c_1^2} + \frac{1}{c_2^2} \right) - \frac{q}{c_1^2} \right] \left[3q^2 \left(\frac{1}{c_2^3} - \frac{1}{c_1^3} \right) \right]}{\left[q^3 \left(\frac{1}{c_2^3} - \frac{1}{c_1^3} \right) + \frac{1}{c_1^3} \right]^2}$$

Now, $\frac{d[M_0]}{dq} = 0$ gives

$$4q^6 \left(\frac{1}{c_2^3} - \frac{1}{c_1^3} \right) \left(\frac{1}{c_1^2} + \frac{1}{c_2^2} \right) + q^3 \left[\left\{ \left(\frac{1}{c_1^2} + \frac{1}{c_2^2} \right) \frac{4}{c_1^3} \right\} - \left\{ \frac{1}{c_1^2} \left(\frac{1}{c_2^3} - \frac{1}{c_1^3} \right) \right\} \right] - \frac{1}{c_1^5} \\ - 3q^6 \left[\left(\frac{1}{c_2^3} - \frac{1}{c_1^3} \right) \left(\frac{1}{c_1^2} + \frac{1}{c_2^2} \right) \right] + q^3 \left[\frac{3}{c_1^2} \left(\frac{1}{c_2^3} - \frac{1}{c_1^3} \right) \right] = 0$$

$$\text{or, } q^6 \left(\frac{1}{c_2^3} - \frac{1}{c_1^3} \right) \left(\frac{1}{c_1^2} + \frac{1}{c_2^2} \right) + q^3 \left(\frac{2}{c_1^5} + \frac{2}{c_1^2 c_2^3} + \frac{4}{c_1^3 c_2^2} \right) - \frac{1}{c_1^5} = 0.$$

For varying values of C_1 and C_2 , we obtain the value of q (say, q_4) for which M_0 is minimized.

Let us now take the PDF of demand distribution as

$$f(x) = 3(1-x)^2, 0 < x < 1.$$

The CDF of Y is given by,

$$F(y) = (1-q)^3 \left[(1-q)^3 - \left\{ (1-q) - \frac{y}{c_1} \right\}^3 \right] + \\ \{ 1 - (1-q)^3 \} \left[\left\{ (1-q) + \frac{y}{c_2} \right\}^3 - (1-q)^3 \right]$$

Consequently, the PDF of Y is obtained as

$$f(y) = z^3 \left\{ \frac{3}{c_2} \left(z - \frac{y}{c_2} \right)^2 \right\} + (1-z^3) \left\{ \frac{3}{c_1} \left(z + \frac{y}{c_1} \right)^2 \right\}, z = 1-q.$$

The mode of Y is then obtained as below:

$$M_0 = \frac{\left\{ \frac{z^4}{c_2^2} - \frac{z(1-z^3)}{c_1^2} \right\}}{\left\{ \frac{(1-z^3)}{c_1^3} + \frac{z^3}{c_2^3} \right\}} = \frac{(1-q)^4 \left(\frac{1}{c_1^2} + \frac{1}{c_2^2} \right) - \frac{(1-q)}{c_1^2}}{(1-q)^3 \left(\frac{1}{c_2^3} - \frac{1}{c_1^3} \right) + \frac{1}{c_1^3}}$$



Here also, it may be seen that the mode does not exist for $c_1 = c_2$.

$$\text{Now, } \frac{d[M_0]}{dq} = 0$$

For varying values of C_1 and C_2 , we obtain the value of q (say, q_1) for which M_0 is minimized.

$$\begin{aligned} \Rightarrow 4z^6 \left(\frac{1}{c_2^3} - \frac{1}{c_1^3} \right) \left(\frac{1}{c_1^2} + \frac{1}{c_2^2} \right) + z^3 \left[\left\{ \left(\frac{1}{c_1^2} + \frac{1}{c_2^2} \right) \frac{4}{c_1^3} \right\} - \left\{ \frac{1}{c_1^2} \left(\frac{1}{c_2^3} - \frac{1}{c_1^3} \right) \right\} \right] - \frac{1}{c_1^5} \\ - 3z^6 \left[\left(\frac{1}{c_2^3} - \frac{1}{c_1^3} \right) \left(\frac{1}{c_1^2} + \frac{1}{c_2^2} \right) \right] + z^3 \left[\frac{3}{c_1^2} \left(\frac{1}{c_2^3} - \frac{1}{c_1^3} \right) \right] = 0 \\ \Rightarrow z^6 \left(\frac{1}{c_2^3} - \frac{1}{c_1^3} \right) \left(\frac{1}{c_1^2} + \frac{1}{c_2^2} \right) + z^3 \left(\frac{2}{c_1^5} + \frac{2}{c_1^2 c_2^3} + \frac{4}{c_1^3 c_2^2} \right) - \frac{1}{c_1^5} = 0 \end{aligned}$$

2.2.5 Minimization of the probability that the total cost exceeds a specified value

For $f(x)$, the PDF of the demand distribution, we first obtain, $H_q(y)$, the CDF of the cost distribution. For a specified y , we obtain 'q' by minimizing $\bar{H}_q(y) = P\{Y > y\}$.

Here we take $f(x) = 12x(1-x)^2$, $0 < x < 1$.

The CDF of the cost distribution is then given by

$$\begin{aligned} H_q(y) &= F\left(q + \frac{y}{c_1}\right) - F\left(q - \frac{y}{c_2}\right) \\ &= \frac{12(c_1+c_2)(-1+q)^2 q y}{c_1 c_2} - \frac{6(c_1^2-c_2^2)(1-4q+3q^2)y^2}{c_1^2 c_2^2} + \frac{4(c_1^3+c_2^3)(-2+3q)y^3}{c_1^3 c_2^3} + \left(\frac{3}{c_1^4} - \frac{3}{c_2^4}\right)y^4. \end{aligned}$$

Then,

$$\begin{aligned} \frac{d}{dq} \bar{H}_q(y) &= \\ &= -\frac{36(c_1+c_2)q^2 y}{c_1 c_2} + \frac{12(c_1+c_2)q y (4c_1 c_2 + 3c_1 y - 3c_2 y)}{c_1^2 c_2^2} - \frac{12y(c_1^2 c_2^3 - 2c_1 c_2^3 y + c_2^3 y^2 + c_1^3 (c_2 + y)^2)}{c_1^3 c_2^3}. \end{aligned}$$

For a given y , by solving $\frac{d}{dq} \bar{H}_q(y) = 0$, one can find 'q'. We shall denote this by q_5 .



2.3 SOME NUMERICAL EXAMPLES

2.3.1 Exponential Demand

Model Parameters				Optimal Criteria							
λ	c_1	c_2	k	3.2.1 Classical		3.2.2.1 SD		3.2.2.2 CV		3.2.2.3 Penalized Mean	
				EOQ	Cost	EOQ	Cost	EOQ	Cost	EOQ	Cost
0.1	1	2	1	4.05	8.10	8.75	10.01	2.4	8.40	5.86	8.42
			2							6.78	8.79
	1	0.5	1	10.98	5.49	28.3	10.03	6.7	6.02	16.57	6.15
			2							19.5	6.88
0.05	1	2	1	8.11	16.22	17.5	20.01	4.8	16.80	11.72	16.83
			2							13.57	17.58
	1	0.5	1	21.97	10.99	56.5	76.56	13.3	12.08	33.13	12.29
			2							39.00	13.77

2.3.2 Beta (2,1) Demand

Model Parameters			Optimal Criteria							
c_1	c_2	k	3.2.1		3.2.2.1		3.2.2.2		3.2.2.3	
			EOQ	Cost	EOQ	Cost	EOQ	Cost	EOQ	Cost
1	2	1	0.577	0.282	0.455	0.306	0.785	0.365	1.139	1.0053
		2							1.093	0.8800
1	0.5	1	0.816	0.122	0.757	0.343	0.917	0.135	1.087	0.2222
		2							1.053	0.1980

2.3.3 Beta (1,2) Demand

Model Parameters			Optimal Criteria							
c_1	c_2	k	3.2.1		3.2.2.1		3.2.2.2		3.2.2.3	
			EOQ	Cost	EOQ	Cost	EOQ	Cost	EOQ	Cost
1	2	1	0.184	0.245	0.241	0.252	0.629	0.330	0.412	0.361
		2							0.577	0.563
1	0.5	1	0.423	0.140	0.545	0.153	1.158	0.410	0.491	0.145
		2							0.510	0.147



2.3.4 Minimization of the mode of the total cost

B(3,1) Distribution

c_1	c_2	q_4
1	2	0.58
1	0.5	0.93

B(1,3) Distribution

c_1	c_2	q_4
1	2	0.69
1	0.5	1.03

2.3.5 Minimization of the probability that the total cost exceeds a specified value

It may be observed that, for $C_1 = 1, C_2 = 2$, the mean minimizing EOQ and the corresponding cost come as 0.29 and 0.22 respectively. Hence, we have chosen the value of 'y' around this cost.

For $C_1 = 1, C_2 = 2, y = 0.22$, we have $q = 0.29$.

For $C_1 = 1, C_2 = 2, y = 0.32$, we have $q = 0.28$.

For $C_1 = 1, C_2 = 2, y = 0.12$, we have $q = 0.31$.

It may be observed that, for $C_1 = 1, C_2 = 0.5$, the mean minimizing EOQ and the corresponding cost come as 0.49 and 0.11 respectively. Hence, we have chosen the value of 'y' around this cost.

For $C_1 = 1, C_2 = 0.5, y = 0.11$, we have $q = 0.40$.

For $C_1 = 1, C_2 = 0.5, y = 0.21$, we have $q = 0.49$.

For $C_1 = 1, C_2 = 0.5, y = 0.01$, we have $q = 0.34$.

It may be observed that, for $C_1 = 1, C_2 = 1$, the mean minimizing EOQ and the corresponding cost come as 0.39 and 0.17 respectively. Hence, we have chosen the value of 'y' around this cost.

For $C_1 = 1, C_2 = 1, y = 0.17$, we have $q = 0.35$.

For $C_1 = 1, C_2 = 1, y = 0.27$, we have $q = 0.37$.

For $C_1 = 1, C_2 = 1, y = 0.07$, we have $q = 0.34$.



3. Supply is a random, depending on the order quantity.

THE MODEL

Let X : Demand.

Y_q : Total Cost.

q : Order Quantity.

c_1 : Shortage Cost.

c_2 : Excess Cost.

S : Supply

Therefore,

$$Y_q = \begin{cases} c_1(X - S) & \text{if } X > S \\ c_2(S - X) & \text{if } X < S \end{cases}$$

The probability density functions of X and Y will be denoted by $f(x)$ and $g(y)$ respectively.

We assume $f \sim B(m, n)$. We take $m = 2$, $n = 1$.

The p.d.f. of 'f' is then given by $h(s) = \frac{2s}{q^2}, 0 < s < q$.

3.1 THE METHODS

3.1.1 Minimization of the Standard Deviation of Total Cost

Exponential Distribution

In this case,

$$\begin{aligned} E[Y_q^2] &= c_1^2 \int_0^q \int_s^\infty (x - s)^2 \lambda e^{-\lambda x} \frac{2s}{q^2} dx ds + c_2^2 \int_0^q \int_0^s (s - x)^2 \lambda e^{-\lambda x} \frac{2s}{q^2} dx ds \\ &= \frac{4c_1^2(1 - e^{-q\lambda}(1 + q\lambda))}{q^2\lambda^4} + \frac{c_2^2 e^{-q\lambda}(24(1 + q\lambda) + e^{q\lambda}(-24 + q^2\lambda^2(12 + q\lambda(-8 + 3q\lambda))))}{6q^2\lambda^4} \end{aligned}$$

Therefore,

$$\begin{aligned} Var[Y_q] &= E[Y_q^2] - \{E[Y_q]\}^2 \\ &= \frac{4c_1^2(1 - e^{-q\lambda}(1 + q\lambda))}{q^2\lambda^4} + \frac{c_2^2 e^{-q\lambda}(24(1 + q\lambda) + e^{q\lambda}(-24 + q^2\lambda^2(12 + q\lambda(-8 + 3q\lambda))))}{6q^2\lambda^4} - \\ &\quad \left(\frac{2}{q^2\lambda^3} (1 - e^{-\lambda q})(c_1 + c_2) - \frac{2e^{-\lambda q}}{q\lambda^2} (c_1 + c_2) + \frac{2c_2q}{3} - c_2 \right)^2. \end{aligned}$$

Beta (2,1) Distribution

$$\text{Here, } E[Y_q^2] = \frac{c_2^2 q^4}{18} - \frac{1}{18} c_1^2 (-9 + 16q - 9q^2 + q^4).$$



Therefore,

$$Var[Y_q] = \frac{c_2^2 q^4}{18} - \frac{1}{18} c_1^2 (-9 + 16q - 9q^2 + q^4) - \left(\frac{2c_2 q^3}{15} + \frac{2}{15} c_1 (5 - 5q + q^3) \right)^2$$

Beta (1,2) Distribution

Here, $E[Y_q^2] = \frac{1}{630} c_2^2 (35 - 12q) q^4 + \frac{1}{630} c_1^2 (63 + q(-140 + 105q - 35q^3 + 12q^4)).$

Therefore,

$$Var[Y_q] = \frac{1}{630} c_2^2 (35 - 12q) q^4 + \frac{1}{630} c_1^2 (63 + q(-140 + 105q - 35q^3 + 12q^4)) - \left(\frac{1}{90} c_2 (12 - 5q) q^3 + \frac{1}{90} c_1 (15 - 20q + 12q^3 - 5q^4) \right)^2$$

Here also, the optimal value of q , say q_1 , may now be obtained by minimizing $SD[Y_q]$ for specified values of c_1 and c_2 . The corresponding optimal expected total cost will be denoted by Y_{q1} .

3.1.2. Minimization of the Co-efficient of Variation of the Total Cost

Here the optimal value of q , say q_2 will be obtained by minimizing

$$c. v. [Y_q] = \frac{SD[Y_q]}{E[Y_q]}.$$

The corresponding optimal expected total cost will be denoted by Y_{q2} .

3.1.3. Here the optimal value of q , say q_3 will be obtained by minimizing

$$S(q) = E[Y_q] + k SD[Y_q],$$

k being a suitably chosen constant.

3.1.4. Minimization of the mode of the total cost

In this case the CDF of the cost distribution is given by

$$H_q(y) = \int_0^q \left\{ F\left(s + \frac{y}{c_1}\right) - F\left(s - \frac{y}{c_2}\right) \right\} g(s) ds$$

We shall here assume that the supply varies around the order quantity following a Rectangular distribution i.e. $S \sim R(q - a, q + a)$. Thus,

$$f_s(s) = \begin{cases} \frac{1}{2a} & \text{if } q - a < s < q + a \\ 0 & \text{otherwise} \end{cases}$$



Here we shall consider the demand to follow a Beta distribution with parameters 3 and 1 i.e. $X \sim B(3, 1)$.

Thus,
$$f_X(x) = \begin{cases} 3x^2 & \text{if } 0 < x < 1 \\ 0 & \text{otherwise} \end{cases}$$

Now,

$$\begin{aligned} P(X < S + K) &= \int_{q-a}^{q+a} \int_0^{s+k} f(x) f_S(s) dx ds \\ &= \frac{3}{2a} \int_{q-a}^{q+a} \int_0^{s+k} x^2 dx ds \\ &= \frac{1}{2a} \int_{q-a}^{q+a} [x^3]_0^{s+k} ds \\ &= \frac{1}{2a} \int_{q-a}^{q+a} (s+k)^3 ds \\ &= \frac{1}{8a} [(s+k)^4]_{q-a}^{q+a} \\ &= (q+k)^3 + a^2(q+k) \end{aligned}$$

The CDF of Y is given by,

$$\begin{aligned} F_Y(y) &= \left\{ q^3 + a^2q - \left(q - \frac{y}{c_2} \right)^3 - a^2 \left(q - \frac{y}{c_2} \right) \right\} (q^3 + a^2q) \\ &+ \left\{ \left(q + \frac{y}{c_1} \right)^3 + a^2 \left(q + \frac{y}{c_2} \right) - q^3 - a^2q \right\} (1 - q^3 - a^2q) \\ &= y^3 \left[\left(\frac{1}{c_2^3} - \frac{1}{c_1^3} \right) (q^3 + a^2q) + \frac{1}{c_1^3} \right] + 3qy^2 \left[\frac{1}{c_1^2} - \left(\frac{1}{c_1^2} + \frac{1}{c_2^2} \right) (q^3 + a^2q) \right] \\ &+ y(3q^2 + a^2) \left[\frac{1}{c_1} + \left(\frac{1}{c_2} - \frac{1}{c_1} \right) (q^3 + a^2q) \right] \end{aligned}$$



Hence, the PDF of Y is given by

$$f_Y(y) = 3y^2 \left[\left(\frac{1}{c_2^3} - \frac{1}{c_1^3} \right) (q^3 + a^2q) + \frac{1}{c_1^3} \right] + 6qy \left[\frac{1}{c_1^2} - \left(\frac{1}{c_1^2} + \frac{1}{c_2^2} \right) (q^3 + a^2q) \right] \\ + (3q^2 + a^2) \left[\frac{1}{c_1} + \left(\frac{1}{c_2} - \frac{1}{c_1} \right) (q^3 + a^2q) \right]$$

Here the mode is obtained as

$$M_0 = \frac{(q^4 + a^2q^2) \left(\frac{1}{c_1^2} + \frac{1}{c_2^2} \right) - \frac{q}{c_1^2}}{\left(\frac{1}{c_2^3} - \frac{1}{c_1^3} \right) (q^3 + a^2q) + \frac{1}{c_1^3}}$$

Here also, it can be seen that the mode does not exist for $c_1 = c_2$.

Now by solving the equation we get $\frac{dM_0}{dq} = 0$ we get

$$M_0 \left[\left(\frac{1}{c_2^3} - \frac{1}{c_1^3} \right) (3q^2 + a^2) \right] = (4q^3 + 2a^2q) \left(\frac{1}{c_1^2} + \frac{1}{c_2^2} \right) - \frac{1}{c_1^2} \\ \text{or, } \frac{(q^4 + a^2q^2) \left(\frac{1}{c_1^2} + \frac{1}{c_2^2} \right) - \frac{q}{c_1^2}}{\left(\frac{1}{c_2^3} - \frac{1}{c_1^3} \right) (q^3 + a^2q) + \frac{1}{c_1^3}} = \frac{(4q^3 + 2a^2q) \left(\frac{1}{c_1^2} + \frac{1}{c_2^2} \right) - \frac{1}{c_1^2}}{\left(\frac{1}{c_2^3} - \frac{1}{c_1^3} \right) (3q^2 + a^2)}$$

For varying values of C_1 , C_2 and a we obtain the value of q (q_4) for which the mode of Y is minimized.

Let us now consider demand to follow a Beta distribution with parameters 1 and 3 i.e. $X \sim B(1, 3)$.

Thus, $f_X(x) = \begin{cases} 3(1-x)^2, & \text{if } 0 < x < 1 \\ 0, & \text{otherwise} \end{cases}$

Now,

$$P(X < S + k) = \int_{q-a}^{q+a} \int_0^{s+k} f(x) f_S(s) ds dx \\ = \frac{3}{2a} \int_{q-a}^{q+a} \int_0^{s+k} (1-x)^2 ds dx \\ = \frac{3}{2a} \int_{q-a}^{q+a} \left[\frac{(1-x)^3}{3} \right]_{s+k}^0 ds \\ = \frac{1}{2a} \int_{q-a}^{q+a} \{1 - (1-s-k)^3\} ds$$



$$= 1 + \frac{1}{8a} [(s+k-1)^4]_{q-a}^{q+a}$$

$$= 1 + \frac{1}{8a} [(q-1+a+k)^4 - (q-1-a+k)^4]$$

Let $z=q-1$.

$$P(X < S+k) = 1 + \frac{1}{8a} [(z+a+k)^4 - (z-a+k)^4]$$

$$= 1 + (z+k)^3 + a^2(z+k)$$

The CDF of Y is given by,

$$F_y(y) = \left\{ z^3 + a^2 z - \left(z - \frac{y}{c_2} \right)^3 - a^2 \left(z - \frac{y}{c_2} \right) \right\} (1 + z^3 + a^2 z)$$

$$- \left\{ \left(z + \frac{y}{c_1} \right)^3 + a^2 \left(z + \frac{y}{c_1} \right) - z^3 - a^2 z \right\} (z^3 + a^2 z)$$

$$= y^3 \left[\left(\frac{1}{c_2^3} - \frac{1}{c_1^3} \right) (z^3 + a^2 z) + \frac{1}{c_1^3} \right] - 3zy^2 \left[\frac{1}{c_2^2} + \left(\frac{1}{c_1^2} + \frac{1}{c_2^2} \right) (z^3 + a^2 z) \right]$$

$$+ y(3z^2 + a^2) \left[\frac{1}{c_2} + \left(\frac{1}{c_2} - \frac{1}{c_1} \right) (z^3 + a^2 z) \right]$$

Hence, the PDF of Y is

$$f_y(y) = 3y^2 \left[\left(\frac{1}{c_2^3} - \frac{1}{c_1^3} \right) (z^3 + a^2 z) + \frac{1}{c_2^3} \right] - 6zy \left[\frac{1}{c_2^2} + \left(\frac{1}{c_1^2} + \frac{1}{c_2^2} \right) (z^3 + a^2 z) \right]$$

$$+ (3z^2 + a^2) \left[\frac{1}{c_2} + \left(\frac{1}{c_2} - \frac{1}{c_1} \right) (z^3 + a^2 z) \right]$$

Here the mode is obtained as

$$M_0 = \frac{(z^4 + a^2 z^2) \left(\frac{1}{c_1^2} + \frac{1}{c_2^2} \right) + \frac{z}{c_2^2}}{\left(\frac{1}{c_2^3} - \frac{1}{c_1^3} \right) (z^3 + a^2 z) + \frac{1}{c_2^3}}, z=q-1.$$

Solving $\frac{dM_0}{dq} = 0$ we get



$$M_0 \left[\left(\frac{1}{C_2^3} - \frac{1}{C_1^3} \right) (3z^2 + a^2) \right] = (4z^3 + 2a^2z) \left(\frac{1}{C_1^2} + \frac{1}{C_2^2} \right) + \frac{1}{C_2^2}$$

$$\text{or, } \frac{(z^4 + a^2z^2) \left(\frac{1}{C_1^2} + \frac{1}{C_2^2} \right) + \frac{z}{C_2^2}}{\left(\frac{1}{C_2^3} - \frac{1}{C_1^3} \right) (3z^2 + a^2) + \frac{1}{C_2^2}} = \frac{(4z^3 + 2a^2z) \left(\frac{1}{C_1^2} + \frac{1}{C_2^2} \right) + \frac{1}{C_2^2}}{\left(\frac{1}{C_2^3} - \frac{1}{C_1^3} \right) (3z^2 + a^2)}$$

For varying values of c_1 , c_2 and a we may now obtain the value of q (q_4).

3.1.5 Minimization of the probability that the total cost exceeds a specified value

Keeping the demand distribution unaltered, here we take the PDF of the Supply distribution as

$$g(s) = \frac{1}{q}, \frac{q}{2} < s < \frac{3q}{2}.$$

Consequently,

$$H_q(y) = \frac{(c_1+c_2)q(12-26q+15q^2)y}{c_1c_2} + \left(\frac{-6+24q-19.5}{c_2^2} + \frac{6-24q+19.5q^2}{c_1^2} \right) y^2 + \frac{(c_1^3+c_2^3)(-8+12q)y^3}{c_1^3c_2^3} + \left(\frac{3}{c_1^4} - \frac{3}{c_2^4} \right) y^4.$$

Then,

$$\frac{d}{dq} \bar{H}_q(y) = qy \left(-\frac{52}{c_1} + \frac{-52.c_2 - 39y}{c_2^2} + \frac{39y}{c_1^2} \right) + q^2 \left(\frac{45.y}{c_1} + \frac{45.y}{c_2} \right) + y \left(\frac{12}{c_1} - \frac{24.y}{c_1^2} + \frac{12.y^2}{c_1^3} + \frac{12.c_2^2 + 24.c_2y + 12.y^2}{c_2^3} \right)$$

Solving the equation $\frac{d}{dq} \bar{H}_q(y) = 0$ one can now obtain the value of 'q' (denoted by q_5).

Here we consider supply to be a fraction of the order quantity q and take

$$g(s) = \frac{2s}{q^2}, 0 < s < q.$$

Hence,

$$H_q(y) = \frac{4(c_1+c_2)q(10-15q+6q^2)y}{5c_1c_2} - \frac{(c_1^2-c_2^2)(6-16q+9q^2)y^2}{c_1^2c_2^2} + \frac{8(c_1^3+c_2^3)(-1+q)y^3}{c_1^3c_2^3} + \left(\frac{3}{c_1^4} - \frac{3}{c_2^4} \right) y^4.$$

Then, $\frac{d}{dq} \bar{H}_q(y)$

$$= -\frac{72(c_1+c_2)q^2y}{5c_1c_2} + \frac{6(c_1+c_2)qy(4c_1c_2+3c_1y-3c_2y)}{c_1^2c_2^2} - \frac{8y(c_1^2c_2^3-2c_1c_2^3y+c_2^3y^2+c_1^3(c_2+y)^2)}{c_1^3c_2^3}$$



Here also, solving $\frac{d}{dq} \bar{H}_q(y) = 0$, the value of q (q_5) may be worked out.

3.2 SOME NUMERICAL EXAMPLES

3.2.1 Exponential Demand

Model Parameters				Optimal Criteria					
λ	c_1	c_2	k	3.2.2.1 SD		3.2.2.2 CV		3.2.2.3 Penalized Mean	
				EOQ	Cost	EOQ	Cost	EOQ	Cost
0.1	1	2	1	10.75	14.03	4.1	11.40	6.92	9.15
			2					7.82	9.19
0.05	1	0.5	1	31.30	15.08	8.2	8.32	18.51	8.27
			2					21.22	8.34
	1	2	1	22.5	26.01	6.5	19.01	12.97	17.44
			2					15.72	19.03
	1	0.5	1	59.2	79.26	15.3	14.04	35.93	14.67
			2					41.22	15.33

3.2.2 Beta (2,1) Demand

Model Parameters			Optimal Criteria					
c_1	c_2	k	3.2.2.1		3.2.2.2		3.2.2.3	
			EOQ	Cost	EOQ	Cost	EOQ	Cost
1	2	1	0.638	0.501	0.905	0.552	1.544	1.453
		2					1.172	1.002
1	0.5	1	0.812	0.607	1.241	0.389	1.847	0.319
		2					1.902	0.216



3.2.3 Beta (1,2) Demand

Model Parameters			Optimal Criteria					
c_1	c_2	k	3.2.2.1		3.2.2.2		3.2.2.3	
			EOQ	Cost	EOQ	Cost	EOQ	Cost
1	2	1	0.321	0.352	0.851	0.511	0.607	0.519
		2					0.703	0.668
1	0.5	1	0.651	0.311	1.981	0.496	0.802	0.382
		2					0.916	0.462

3.2.4 Minimization of the mode of the total cost

B(3,1) Distribution

c_1	c_2	q_4
1	2	0.19
1	0.5	0.28

B(1,3) Distribution

c_1	c_2	q_4
1	2	0.41
1	0.5	0.58

3.2.5 Minimization of the probability that the total cost exceeds a specified value

3.5.1 Here for $C_1 = 1$, $C_2 = 2$, the mean minimizing EOQ and the corresponding cost come out as 0.27 and 0.23 respectively. We have chosen the value of 'y' around this cost.

For $C_1 = 1$, $C_2 = 2$, $y = 0.23$, we have $q = 0.28$.

For $C_1 = 1$, $C_2 = 2$, $y = 0.33$, we have $q = 0.27$.

For $C_1 = 1$, $C_2 = 2$, $y = 0.13$, we have $q = 0.29$.

For $C_1 = 1$, $C_2 = 0.5$, the mean minimizing EOQ and the corresponding cost come out as 0.46 and 0.14 respectively. We have chosen the value of 'y' around this cost.

For $C_1 = 1$, $C_2 = 0.5$, $y = 0.14$, we have $q = 0.41$.

For $C_1 = 1$, $C_2 = 0.5$, $y = 0.24$, we have $q = 0.53$.

For $C_1 = 1$, $C_2 = 0.5$, $y = 0.04$, we have $q = 0.34$.

For $C_1 = 1$, $C_2 = 1$, the mean minimizing EOQ and the corresponding cost come out as 0.36 and 0.18 respectively. We have chosen the value of 'y' around this cost.



For $C_1 = 1, C_2 = 1, y = 0.18$, we have $q = 0.34$.

For $C_1 = 1, C_2 = 1, y = 0.28$, we have $q = 0.36$.

For $C_1 = 1, C_2 = 1, y = 0.08$, we have $q = 0.32$.

3.5.2

In this case, for $C_1 = 1, C_2 = 2$, the mean minimizing EOQ and the corresponding cost come out as 0.38 and 0.24 respectively. We have chosen the value of 'y' around this cost.

For $C_1 = 1, C_2 = 2, y = 0.24$, we have $q = 0.40$.

For $C_1 = 1, C_2 = 2, y = 0.34$, we have $q = 0.39$.

For $C_1 = 1, C_2 = 2, y = 0.14$, we have $q = 0.42$.

For $C_1 = 1, C_2 = 0.5$, the mean minimizing EOQ and the corresponding cost come out as 0.66 and 0.15 respectively. We have chosen the value of 'y' around this cost.

For $C_1 = 1, C_2 = 0.5, y = 0.15$, we have $q = 0.61$.

For $C_1 = 1, C_2 = 0.5, y = 0.25$, we have $q = 0.78$.

For $C_1 = 1, C_2 = 0.5, y = 0.05$, we have $q = 0.50$.

For $C_1 = 1, C_2 = 1$, the mean minimizing EOQ and the corresponding cost come out as 0.52 and 0.19 respectively. We have chosen the value of 'y' around this cost.

For $C_1 = 1, C_2 = 1, y = 0.19$, we have $q = 0.49$.

For $C_1 = 1, C_2 = 1, y = 0.29$, we have $q = 0.53$.

For $C_1 = 1, C_2 = 1, y = 0.09$, we have $q = 0.47$.

4. Conclusion

Although in classical newsboy problem, in general, the only optimality criterion followed is "mean minimization", it has been shown that this criterion is not sufficient in all situations. Further, the optimality criterion one fixes should depend on the objective under consideration. Thus, the optimality criteria discussed in this paper should be applied keeping in view of the objective and the practical field of application of the model.

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NCC As General Elective Credit Course-A New Initiative

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Abstract:

The paper is an attempt to study the formation of the National Cadet Corps (NCC) under an Act of Parliament in the year 1948 was perhaps the finest event for the educated youth of India. NCC is the largest youth organisation of the country consisting of more than fourteen lakh cadets in strength. It is a tri-service organisation comprising of the Army, Navy and Air Force, engaged in grooming the youth of the country into disciplined and patriotic citizens. It is open to educated boys and girls of schools and colleges of the country, and is playing an active role to induct eligible cadets into the armed forces. The paper argues in favour of adopting NCC as General Elective Credit Course (GECC) under the CBCS across all universities in the country for the purpose of nation building.

Key Words: National Cadet Corps (NCC); Educated Youth; Tri-Service Organisation; Nation Building

Introduction

The formation of the National Cadet Corps (NCC) under an Act of Parliament in the year 1948 was perhaps the finest event for the educated youth of India. NCC is the largest youth organisation of the country consisting of more than fourteen lakh cadets in strength. It is a tri-service organisation comprising of the Army, Navy and Air Force, engaged in grooming the youth of the country into disciplined and patriotic citizens. It is open to educated boys and girls of schools and colleges of the country, and is playing an active role to induct eligible cadets into the armed forces. The organization is divided into 17¹ directorates with a network of 96 Group Headquarters, 814 NCC units (NCC Battalions) covering 4,829² colleges and 12,545 schools. The NCC was initially



controlled by the Army wing of the defence services but in 1950³ Air wing was added to the organization followed by the Naval wing in 1952. In 1949 the Girls Division had been brought in to give equal opportunity to school and college going girls of the nation and finally in 2005 the concept of mixed NCC units had been introduced where both boys and girls of senior division started being enrolled together in schools and colleges. Due to the set back in the 1962 war against China, the parliament moved a resolution to train college boys compulsorily through NCC which had been enforced from 1964-67⁴. At present joining NCC as a cadet is voluntary in nature.

The Organisation

The functioning of NCC and its funding is a dual responsibility of the central government and the respective state government where NCC is active. The central government provides training facilities, man power from the defence forces, 50-100% sharing of camp expenditure and other infrastructural support. The state government makes necessary arrangements to spare teachers/professors and students of the educational institutions for training and other NCC activities, providing ANOs' honorarium and cadet allowances, TA, DA, Rank pay etc. The state government is also responsible for providing training areas and to establish NCC offices and to provide man power to run those offices within the state. In order to ensure smooth functioning of the NCC as an organization, various advisory committees like Central Advisory Committee and State Advisory Committee have been constituted under the provision of section 42⁵ of the NCC Act. These committees formulate policies and guidelines from time to time which are to be followed by the organization for effective functioning. In the last 74 years NCC as an organisation has been transformed significantly from a supply line of manpower to Indian Army to a vibrant youth force of patriotic, motivated and responsible citizens. At present the focus of NCC is to inculcate sense of national integrity, leadership qualities, fellow feeling, environmental and social awareness amongst the cadets and enable them to grow as a good human being.

Background of Proposing NCC as General Elective Subject in the Academic Arena

NCC is currently treated as an extra-curricular activity in majority of schools and colleges in India. This has some very apparent disadvantages for both the student and the Govt. The National Education Policy 2020 (NEP-2020) has proposed to remove the hard separation between extra-curricular, co-curricular and curricular activities⁶ and offer all such activities as credit courses under Choice Based Credit System (CBCS). Further, Sec 11.8⁷ of NEP mandates all Higher



Education Institutes to include credit-based courses and projects in the areas of community engagement and service. Hence, as an imperative, NCC will now need to be shifted from extra-curricular activity to curricular activity and preferably be offered as an elective subject or an elective credit course. Ministry of Human Resource Development, Government of India and UGC had issued circulars in 2013⁸ for introduction of NCC as elective subject on voluntary basis. However as in 2015, of the 10,397 schools and 5,511 colleges having NCC, only 17 schools and 12 autonomous colleges and another 42 non-autonomous colleges had responded in some way. Post this limited response, the UGC once again issued a circular in 2016⁹ prompting NCC to be taken up as an elective subject by Universities. However, the proposal found few takers owing to inadequate follow-up by stakeholders, i.e., Ministry of Defence, Ministry of Education, UGC, DGNCC, NCC Directorates and state education departments and lack of understanding among universities to design NCC as credit course. A few educational institutes to include Jammu University, Mumbai University, Vidyasagar University and Ranchi College currently offer NCC as an elective subject but they reflect wide variations in their offerings in terms of type of course, credit score, syllabus, duration etc. Thus, both the intent and the implementation effort has been fairly fragmented. After the introduction of NEP 2020 the idea of introducing NCC as General Elective subject has been coined again and All India Council for Technical Education (AICTE) in its circular no. AICTE/P & AP/NCC-GE/CIRCULAR/2021 DATED 26.04.2021 has addressed all Directors/ Principals of AICTE approved institutions to offer NCC as General Elective Credit course as per the guidelines of NEP 2020.

Director General of NCC's (DGNCC) Initiative

The proposal to offer NCC as General Elective subject has been originally mooted by the DGNCC way back in 2013 and series of correspondence have been exchanged between DGNCC, UGC, Ministry of Defence and Ministry of Higher Education, Government of India.¹⁰

NCC as an organisation is constantly forcing the governments and higher educational bodies to include NCC in the direct field of academic studies and to transform it from extra-curricular activities to co-curricular activity. DGNCC has framed a study committee vide letter No. 17101/BOO/DGNCC/Trg A dated 18 December 2020. The committee has strongly recommended to introduce NCC as General Elective Credit Course in colleges under CBCS in commensurate with the guidelines of NEP 2020. The important recommendations of the committee are:

- a) It is proposed to introduce NCC as a “General Elective Credit Course” in colleges across India under the Choice Based Credit System, in line with NEP 2020 with the objective of



harnessing the full potential of NCC's capacity in youth development and enlarging the student base taking up NCC training in the country.

- b) The existing UGC policy permits offering NCC as elective course on voluntary basis by HEIs. The UGC guidelines on CBCS extends requisite academic freedom to universities to offer NCC as a credit course if they wish. Universities/Institutes may evolve a system/policy about Extra-Curricular Activities/General Interest and Hobby Courses/Sports/NCC/NSS/Vocational courses/related courses on their own.
- c) NCC can be introduced as a 'Generic Elective Credit Course' of 24 credits score over six semesters in three years in all undergraduate courses (bachelor's Degree). The course design summary is as follows:

Semester	Credits Allocated				Remarks
Theory		Practical	Camp	Total	
Sem - I	2	1		3	Credits of 1st Camp merged with 3rd Sem
Sem - II	2	1		3	
Sem - III	1	1	4	6	
Sem - IV	2	1		3	
Sem - V	1	1	4	6	Credits of 2nd Camp merged with 5th Sem
Sem-VI	2	1		3	
Total	10	6	8	24	Twenty-Four Credits

- d) In Phase 1, NCC Credit Course should be offered only by those colleges which already have NCC sub-units and extended only to students enrolled as NCC cadets. In Phase 2, any Central University across India may be permitted to offer NCC as a purely academic credit course, subject to meeting certain criteria of faculty, hiring requisite trained staff and providing necessary infrastructure as governed by DGNCC.
- e) Introduction of NCC as Credit Course can facilitate partial realization of the felt need to expose a much larger community of student population of India to minimal military training and security consciousness at a fractional cost to the State as compared to achieving the same outcome through creation of full-fledged additional NCC units.



- f) It will be a three years course to be spread in six semester and consisting of 300 periods.¹¹

Benefits of this Proposal

1. Along with 'B' and 'C' certificate cadet will get academic credits for NCC training.
2. Cadet will be able to avail the incentives given by government.
3. In academics of cadets one subject will be reduced as NCC will become elective subject.
4. Cadet will get additional weightage for several state government jobs.
5. Cadet will be able to avail all other benefits of joining NCC.

Conclusion

The proposal is definitely a timely measure to be adopted as a policy prescription in commensuration with the implementation of NEP 2020 in our country. As per the news published in the Hindustan Times dated 6th June 2021, already 91 universities¹² have adopted NCC as General Elective Credit Course (GECC) under the CBCS. The highest number of universities offering NCC as GECC (42) are in Tamil Nadu, Puducherry and Andaman & Nicobar combined, followed by Jammu & Kashmir. It is hoped, that in no time other universities will adopt this proposal for the purpose of nation building.

End Notes & References :

- ¹ Nccindia.nic.in last visited 11.12.2022
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- ³ Chettri R S (2006) Grooming Tomorrows Leaders, Lower Publishers Pvt Ltd pg 3
- ⁴ Ibid pg 34
- ⁵ Nccindia.nic.in/ NCC Act
- ⁶ NEP 2020 Section 4.9 pg 13
- ⁷ Ibid pg 37
- ⁸ DO No M.11018/13/2012-CDN DATED FEBRUARY 13 2013.
- ⁹ DO No.F.14-25/2016(CPP-II) DATED 11TH NOVEMBER 2016
- ¹⁰ DGNCC'S LETTER No. 4145/Elec Sub/DGNCC/Trg A dated 7th October 2013



INSTITUTIONAL TRAINING SYLLABUS COMMON SUBJECTS

Sl No.	Subject	Period (1 hour each)		Total
		Lectures/tutorials	Practical	
1	NCC general	06	-	06
2	National integration	04	-	04
3	Drill	-	45	45
4	Weapon training	-	25	25
5	Personality development	25	-	25
6	Leadership	12	-	12
7	Disaster management	13	-	13
8	Social service & community development	08	39	47
9	Health and hygiene	-	10	10
10	Adventure	01	-	01
11	Environmental awareness & conservation	03	-	03
12	Obstacle training	-	09	09
13	General awareness	04	-	04
14	Border & coastal areas	06	-	06
TOTAL COMMON SUBJECTS		82	128	210
SPECIALIZED SUBJECTS(ARMY)				
1	Armed forces	09	-	09
2	Map reading-	24	24	
3	Communications	03	03	06
4	Infantry weapons	03	03	06
5	Field crafts & battle crafts	-	22	22
6	Military history	23	-	23
TOTAL SPECIALIZED SUBJECTS		38	52	90
GRAND TOTAL HOURS		120(08 CR)	180(06 CR)	300

¹² www.hindustantimes.com/india-news dated 6th June 2021



Some Issues of Forest Management and Sustainable Development with Specific Reference to India

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Abstract

Sustainable Development Goals were adopted by various countries so that future development trajectories can be better devised by the international community. This paper focusses on the environmental sustainability as reflected by Goal No. 15. In India, forests are diverse in nature and are represented by 16 different types. India has a substantial forest cover across its hill districts, megacities and tribal areas with 40% of total geographical area in hill districts, 10.21% of total geographical area in Indian mega cities and a substantial proportion of tribal regions covered by forests in 2021. Forests are major revenue earners also if viewed from the perspective of tourism. Considering the situation in India, it has been found that from 2001 to 2021, India has lost 2.07 Mha of tree cover (equivalent to 5.3% decrease in tree cover since 2000). This paper emphasizes the need of community participation in the Indian economy to progress in the achievement of Goal 15 of SDG30. In this respect, the longstanding relationship between local communities and forest resources can be utilized and is expected to play a major role in the Indian perspective of forest management.

Keywords: Sustainable Development, Forests, SDG, Indian Perspective, Forest Management

Introduction

Sustainable Development Goals were adopted by various countries so that the future development trajectories can be better devised by the international community. In the early phases of policy making, the focus area used to hover around some major macro variables where the other interrelated variables were taken to be improving as a result of trickledown impact. However,



there has been a paradigm shift from this concept and complex and multifaceted development perspectives have taken the centre stage from the 1970s onwards. Recently, the SDGs play a vital role in devising policies and bringing in the forefront our duties and obligations in maintaining sustainable development. Thus, previously neglected variables are being brought into the forefront, recognizing their high interrelationships in development of countries. These are reflected in the seventeen goals of SDG 2030, which encompass the need to address the issues of poverty, hunger, good health and wellbeing, quality education, gender equality, clean water and sanitation, affordable and clean energy, decent work and economic growth, industry innovation and infrastructure, reduced inequalities, sustainable cities and communities, responsible consumption and production, climate action, life on land and below water, peace and partnerships(<https://sdgs.un.org/goals>).

Sustainable development is defined as development that addresses the needs of the present without compromising the ability of the future generation to cater to their needs. Enhancement of living conditions of all generations is the basic guiding principle here (Kadekodi, 2001). This paper focusses on the environmental sustainability as reflected by Goal No. 15 which aims to “protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss”(<https://sdgs.un.org/topics/forests>). Forests play a crucial role in reducing the risks of and devastations caused by natural disasters like floods, droughts and landslides. Globally, forests mitigate climate change by contributing to the balance of atmospheric oxygen, carbon dioxide and humidity, by carbon sequestration and through protection of watersheds which supply nearly 75% of available freshwater(Chapman & Reiss, 2012; Kormondy, 2017). Forests support diverse arrays of flora and fauna and approximately 1.6 billion people (including many indigenous cultures) depend on forests for their livelihood(<https://sdgs.un.org/topics/forests>). Thus, investing in forests and forestry also involves investing in people, their livelihoods and their welfare. Here we discuss the importance of forests as a representation of environmental sustainability, provider of livelihoods and potential provider of tourism facilities with respect to the Indian economy.

Types of Forests in India

Forests are complex ecosystems consisting mainly of trees with woody stems having a mature stand height exceeding 2m and usually with overlapping crowns. Depending on the tree species present, forests can be of several different types like evergreen tropical rain forests, deciduous forests, subtropical pine forests and dry alpine scrub(Kormondy, 2017; Saha and Mazumdar, 2017). Apart from trees (which dominate the forest ecosystem) forests also include other diverse types of flora like shrubs, herbs, climbers, ferns and mosses. Taking temperature, rainfall and plant diversity into account, Indian forests have been classified by Champion and Seth (1968) into sixteen major types. These include(Champion and Seth, 1968; Saha and Mazumdar, 2017):



- 1) Tropical wet evergreen forests are present in the Western Ghats, North Eastern parts of India (like Assam, Arunachal Pradesh) and the Andaman and Nicobar islands. These forests occur in regions with high rainfall and are composed of tall trees with dense foliage forming a thick canopy. Ferns and epiphytes grow abundantly in these forests. Tropical forests exhibit the greatest biodiversity among all forest types.
- 2) Tropical semi-evergreen forests are often found in regions adjacent to tropical wet evergreen forests and are composed of a mixture of tall evergreen and deciduous trees.
- 3) Tropical moist deciduous forests are composed of a variety of deciduous trees and grow in areas with around 200-250 cm mean annual rainfall. These forests have multilayered canopies and bamboos often grow in clumps. They are found in a variety of regions including the foothills of the Himalayas, Assam, Uttar Pradesh, Madhya Pradesh, Maharashtra, West Bengal, Kerala and Karnataka.
- 4) Littoral and swamp forests are found along the coastal regions around the deltas of many of the major rivers of India. They are composed of evergreen and mangrove trees. The mangrove forests of the Sundarbans fall into this category.
- 5) Tropical dry deciduous forests are found in areas with mean annual rainfall between 80-120 cm and are composed mainly of deciduous trees of medium height forming a lighter canopy. They are found in regions like Uttar Pradesh, Madhya Pradesh, Maharashtra, Rajasthan, Orissa, Tamil Nadu and Karnataka.
- 6) Tropical thorn forests are present in semi-arid regions with high summer temperatures and are largely composed of xerophytic thorny scrub. They are found over much of Rajasthan and in regions like Haryana and northern Gujarat.
- 7) Tropical dry evergreen forests are found in certain regions of South India and are composed of broad-leaved and thorny evergreen trees.
- 8) Sub-tropical broad-leaved hill forests occur on the lower slopes of the Himalayas and in the hill ranges like the Nilgiris and the Khasi in states like Assam, Maharashtra, Madhya Pradesh, West Bengal and Tamil Nadu.
- 9) Sub-tropical pine forests are found at altitudes between 900 – 1,700m in the western and central Himalayas and are composed of various species of pine trees.
- 10) Sub-tropical dry evergreen forests are found mainly in the Himalayan foothills in Jammu and Kashmir and in Punjab. They are composed of small leaved evergreen trees.
- 11) Montane wet temperate forests are found at altitudes between 1,800 – 3,000 m in areas of comparatively high rainfall (> 150 cm). These forests are composed of broad-leaved



evergreen trees with thick canopies and are found in the Himalayas and in the Nilgiri hills. Rhododendron trees are common in these forests.

- 12) Himalayan moist temperate forests are found between altitudes of 1,500 – 3,000 m in the central and western Himalayas in regions with rainfall > 100 cm. These forests are composed of broad-leaved evergreen trees.
- 13) Himalayan dry temperate forests are found at the higher altitudes of the Himalayas where rainfall is lower. These are comprised of both broad-leaved evergreen trees and conifers.
- 14) Subalpine forests are found in the Himalayas at altitudes of 3,000 – 3,500 m and grow in regions with low temperatures and precipitation.
- 15) Moist alpine scrub is found throughout the Himalaya, above the tree line to altitudes of 5,500m (i.e., just below the snowline). These forests are composed of shrubs and trees with short height.
- 16) Dry alpine scrub is present in regions of the Himalayas below the snowline with annual rainfall < 40 cm. The vegetation is mainly open xerophytic scrub.

After discussing the types of the forests in India, we shall study the extent of land covered by forests in various regions of India. This is important as it shows that both the Indian government and the community at large need to play positive roles in preserving the forests in order to move forward towards attainment of Goal 15 of SDG 30.

Forest Cover in the Indian Economy and its Importance

The following tables show that India has a substantial forest cover across its hill districts, megacities and tribal areas. It is found that 40% of total geographical area in Indian hill districts and 10.21% of total geographical area in Indian mega cities are covered by forests in 2021. A substantial portion of tribal regions is also covered by forests. As discussed in the previous section, forests in India are heterogeneous in nature and vary across states. Thus, along with a government initiative to protect the forests, a local action plan encompassing the beneficiaries who benefit from the produce of such forests is very important. Otherwise, as forests are a form of common property resource, there is a possibility of over exploitation of its produce which can be unsustainable in the long run.



States/UT	No. of Hill Districts	Geographical Area	Very Dense Forest	Moderately Dense Forest	Open Forest	Total	% of Geographical Area
Arunachal Pradesh	16	83743	21058	30176	15197	66431	79.33
Assam	3	19295	981	5473	6446	12900	66.86
Himachal Pradesh	12	55673	3163	7100	5180	15443	27.73
Jammu & Kashmir	22	54624	4155	8117	9115	21387	39.15
Karnataka	6	48353	3940	15364	4554	23858	49.34
Kerala	10	29552	1549	7212	8197	16958	57.38
Ladakh	2	168055	2	512	1758	2272	1.35
Maharashtra	7	69905	320	7223	8303	15846	22.67
Manipur	9	22327	905	6228	9465	16598	74.34
Meghalaya	7	22429	560	9160	7326	17046	76
Mizoram	8	21081	157	5715	11948	17820	84.53
Nagaland	11	16579	1272	4449	6530	12251	73.9
Sikkim	4	7096	1102	1551	688	3341	47.08
Tamil Nadu	5	19384	1439	2679	2458	6576	33.92
Tripura	4	10486	647	5212	1863	7722	73.64
Uttarakhand	13	53483	5055	12768	6482	24305	45.44
West Bengal	1	3149	721	682	947	2350	74.62
India	140	704771	47026	129621	106457	283104	40.17

Source: Ministry of Environment & Forests, Govt. of India. (Obtained from <https://www.indiastat.com/>)

Table 1: Selected State-wise Forest Cover in Hill Districts of India in 2021 (Area in Sq. Km.)

States/UT	Cities	Area as per Digitized Boundary	Very Dense Forest	Moderately Dense Forest	Open Forest	Total Forest Cover	% of Total Forest Area	Scrub
Delhi	Delhi	1540.63	6.74	56.34	131.15	194.24	12.61	0.45
Gujarat	Ahmedabad	455.32	0	1.59	7.82	9.41	2.07	4.85
Karnataka	Bengaluru	1307.35	0	12.66	76.36	89.02	6.81	14.87
Maharashtra	Mumbai	435.91	0	51.13	59.65	110.77	25.41	0
Tamil Nadu	Chennai	430.07	0	7.66	15.04	22.7	5.28	1.77
Telangana	Hyderabad	634.18	0	17.68	64.13	81.81	12.9	29.96
West Bengal	Kolkata	186.55	0	0.1	1.67	1.77	0.95	0
India		4990.01	6.74	147.16	355.82	509.72	10.21	51.9

Source: Ministry of Environment & Forests, Govt. of India. (Obtained from <https://www.indiastat.com/>)

Table 2: Selected State-wise Forest Cover in Mega Cities of India in 2021 (Area in Sq. Km.)



States/UT	Number of Tribal Districts	Geographical Area	RFA/ GW Digital Area	Cover Inside RFA/ GW				Forest Cover Outside RFA/ GW Total
				Very Dence	Moderately Dence	Open Forest	Total Area	
Delhi	1540.63	6.74	56.34	131.15	194.24	12.61	0.45	
Andaman & Nicobar Islands	3	8249	6829	5409	546	253	6208	536
Andhra Pradesh	5	44849	13297	1525	4624	2730	8879	3719
Arunachal Pradesh	16	83743	63838	19637	27171	11872	58680	7751
Assam	19	49489	9888	1486	2676	2395	6557	5602
Chhattisgarh	11	92645	35955	4805	16913	6832	28550	11517
Dadra and Nagar Haveli and Daman and Diu	2	563	202	0	69.38	90.64	160.02	58.16
Gujarat	9	49885	7718	303	2303	2437	5043	1814
Himachal Pradesh	3	26764	3143	751	913	585	2249	1008
Jharkhand	17	58677	11658	828	3244	3517	7589	9932
Karnataka	5	26054	6612	1965	2977	698	5640	7968
Kerala ⁹	27207	8755	1364	3877	1919	7160	8351	
Lakshadweep	1	30	-	0	0	0	0	27.1
Madhya Pradesh	24	152132	51919	5715	19075	14585	39375	7987
Maharashtra	12	144233	41590	7138	10301	8785	26224	4224
Manipur	9	22327	17542	895	5743	8195	14833	1765
Meghalaya	7	22429	17563	512	7652	6634	14798	2248
Mizoram	8	21081	20663	156	5624	11776	17556	264
Nagaland	11	16579	10633	1169	3203	4256	8628	3623
Odisha	12	86091	24685	3925	8690	7114	19729	14832
Rajasthan	5	29601	9016	0	2066	2468	4534	725
Sikkim ⁴	7096	5414	832	879	343	2054	1287	
Tamil Nadu	6	25607	5342	797	2318	1402	4517	1168
Telangana	3	42217	16933	1144	6736	4229	12109	1242
Tripura	4	10486	5838	407	3886	1140	5433	2289
Uttar Pradesh	1	7680	1191	752	118	89	959	313
West Bengal	12	69403	13095	2610	2366	2063	7039	7542
India	218	1125117	392106	64125	143970.38	106407.64	314503.02	1077993

Source: Ministry of Environment & Forests, Govt. of India. (Obtained from <https://www.indiastat.com/>)
RFA/ GW: Recorded Forest Area/ Green Wash

Table 3: Selected State-wise Forest Cover in Tribal Districts of India in 2021 (Area in Sq. Km.)

Agenda 21 of SDG30 mentions the need to “improve human, technical and professional skills, as well as expertise and capabilities to effectively formulate and implement policies, plans, programmes, research and projects on management, conservation and sustainable development of all types of forests and forest-based resources, and forest lands inclusive, as well as other areas from which forest benefits can be derived. Forests are the most biologically-diverse ecosystems on land,



home to more than 80% of the terrestrial species of animals, plants and insects. They also provide shelter, jobs and security for forest-dependent communities”.(<https://sdgs.un.org/goals>)

Forests as a Potential Revenue Earner

Preservation, maintenance, and development of forest areas require a substantial amount of revenue. It should not be expected that the local community action is enough to protect forests. Thus, tourism in the forest areas should be encouraged in order to generate revenue. The potential for generating revenue from tourism in forests across states can be calculated by using the Travel Cost Method (TCM). TCM can be utilized for estimation of economic use values with respect to natural resources that are used for tourism or recreational purposes. TCM can be calculated by estimating the economic benefits/ costs associated with changes in costs of accessing a recreational site, addition or elimination of a recreational site and changes in the quality of environment of a recreational site.

The emphasis of the travel cost method is that people spend time, travel cost expenses and other expenses to visit a site for recreational purpose. Thus, peoples’ willingness to pay to visit the site can provide an idea about the valuation of a recreational site. This is similar to the estimation of individuals’ willingness to pay for a marketable good on the basis of quantity demanded at various prices(https://www.ecosystemvaluation.org/travel_costs.htm). The method involves using travel cost as a proxy for the value of visiting outdoor recreational sites (Banerjee, 2001). This method can be used to determine the most popular destinations as revealed by the willingness to pay of the tourists. These can be promoted by the State Governments to generate additional revenue. Moreover, potential new forested areas can be developed and promoted for the purpose of tourism, after estimating a potential valuation of the same.

The Need for Protection of Forests with Specific Reference to India

A healthy biodiversity is essential to serve as a natural sink and also for providing resources like food, medicinal herbs and shelter. However, global biodiversity has been profoundly and adversely affected by various human activities. According to a report by United Nations, approximately 40,000 species are listed to be at risk of extinction over the forthcoming years and 10 million hectares of forest are being destroyed annually. It has also been observed that more than 50% of important biodiversity areas remain unprotected(<https://unstats.un.org/sdgs/report/2022/Goal-15/>). Though the COVID 19 pandemic had created havoc with respect to lives and livelihoods, it had a positive impact on environmental quality and resource base due to reduced economic activities. There was a potential for the economy’s recovery measures to be integrated with biodiversity issues, during the period of recovery. However, recovery measures largely neglected the issue of sustainable development and viable development perspective. The forested areas of the world still



continue to decline, although the rates of decline are slightly lower rate than in the previous decades. Between 2000 and 2020, the proportion of forested areas fell from 31.9% of total land area to 31.2%; this represents a loss of nearly 100/ million hectares. Almost 90% of global deforestation is caused by agricultural expansion; this includes 49.6% from expansion for cropland and 38.5% from livestock grazing. Species are disappearing from our planet at a rate unprecedented in human history.

The IUCN Red List of Threatened Species, the most comprehensive source of data regarding the global status of plant and animal species estimates that more than 42,100 species are threatened with extinction; this represents around 28% of all species subjected to assessment. The species in danger of extinction include 28% of all mammalian species, 21% of all reptilian species, 13% of birds and 34% of conifer trees(<https://www.iucnredlist.org/>). However, there are wide variations in various regions of the world both in the rates of degradation and in the overall risks of extinction with certain regions at greater risk. Unsustainability of agricultural practices, over exploitation of wild species and anthropogenic activities such as logging are the principal drivers of these declines. Key actions such as a transition to sustainable agriculture, transformation of land management and reversing loss of habitats are urgently required to conserve and sustainably use biodiversity.

Considering the situation in India, it has been found that from 2001 to 2021, India has lost 2.07Mha of tree cover, which is equivalent to 5.3% decrease in tree cover since 2000. From 2001 to 2021, 2.8% of tree cover has been lost due to the dominant drivers of loss i.e urbanization, shifting agriculture, forestry and commodity driven deforestation which resulted in deforestation. In India, four regions (Assam, Mizoram, Nagaland and Arunachal Pradesh) account for 50% of all tree cover lost between 2001 and 2021. In India, Assam has lost the most tree cover at 287 kha compared to a national average of 59.0kha in 2021(<https://www.globalforestwatch.org>).

Conclusion: The Need for Community Based Forest Management

As shown in the above sections, India has substantial forest cover some of which has been lost over the years. It is of urgent need to consider the steps that can be taken to sustainably protect this type of biodiversity. This would facilitate livelihoods of the dependant population, using them for revenue generation, and maintain its assimilative capacity. To enable the prevention of degradation of ecosystems, several countries are taking up policies to sustainably manage their forests, protect critical biodiverse sites, and implementing national conservationist policies. One such strategy is community based forest management.

Community based forest management (CBFM) comprises of communities or smallholders being involved in the management of forests and agro forests they own and the management, by communities, of state-owned forests. Communitybased forest enterprises (CBFE) consist of



smallholder and communityscale economic or collective enterprises based on forest products (wood and non-wood based) and provision of ecosystem services, including ecotourism(Molnar et al., 2011). Thus, CBFEs include enterprises which involve both the formal and informal sectors and also small holding enterprises of the economy. CBFM and CBFE are therefore local in nature and vary according to the region where they are located and depending on by whom they are operated.

Damodaran (1998) has pointed out the inadequacies of conservation strategies in the Indian economy prevalent in the 1970s and 1980s which was based on “untouched wilderness”. The longstanding relationship between local communities and forest resources has led to the concept of community based conservation being revived over the last few decades. As observed by Poffenberger (1990) approximately 1 lakh forest officers may be insufficient to monitor the activities of approximately 3,000 lakh forest dependant rural population and their livestock. He also observed (in 1996) that policing by the forest department may not be a solution to the problem of forest degradation which will require exploration of alternative approaches of forest management. However, the success of such programmes will depend on careful designing, close monitoring and effective evaluation (following implementation) in order to measure their progress with respect to the stated objectives (Singh & Hedge, 2004). Thus, they have emphasized on the community based forest management strategies. There have been some success stories in various pockets in India; however, attempts need to be made to make the impact of such programmes more significant. As such programmes encompass socio-economic and environmental fabrics of a society, it can be highly complicated and the government along with the local authorities should play a pro-active role in their implementation so that India can progress in an effective manner in achieving the Goal 15 of SGD 2030.

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Situating Geriatric Care in Colonial Bengal: An Overview based on Vernacular Literature

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Abstract :

This paper highlights how elderly people used to be treated in colonial Bengal. The historians who worked on public health in colonial Bengal perhaps ignored the above mentioned theme. Therefore we need to explore the facts to have a better understanding of public health in general where the role of the colonial government was sedentary. The care for the elderly people was considered to be a private affair in colonial Bengal guided by socio-religious norms. This history perhaps has no official records and chiefly based on literature in vernacular. This paper intends to revisit geriatric care at that time and has made a comparison with the present situation to reveal its historic relevance.

Keywords: Bengal, Colonial Period, Geriatric Care, Vernacular Literature, *Antarjali Yatra*

Introduction

The concept of geriatric care is not that much popular in India as majority of us do not have time for our aged and ailing parents due to our busy lifestyle. The socio-economic background also matters in this case as poor people hardly have any proper access to the health care services and the government hospitals or dispensaries are not that much equipped with the facilities intended for the elderly people.

The very idea of geriatric care or elderly care is a matter of compassionate delicacy where the humane approach is primarily required. It is important to assess, understand and provide the needs of the elderly people either at your home or amongst your relatives and neighbors so that they never feel secluded, isolated or marginalized. A smiling face with a lot of patience and empathy



is the best medicine for an old person or for someone who is stable otherwise but vulnerable for death at any time.

I would like to emphasize geriatric care in colonial Bengal where I am mainly focusing on the literature review as the reports of the British government on health were silent on this matter. The administrators barely had an idea on geriatric care and how could the same be recognized as a part of health policies. Therefore my research methodology is mostly empirical in case of my understanding of the colonial period.

It may be noted that, in colonial times taking care of the elderly people was a private affair portraying family values and relationships and also highlighting existing social norms. Here we can make a room for gender centric approaches where the position of an elderly woman in the family was supposed to be based on her socio-economic conditions.

Locating geriatric care in vernacular literature –an attempt to revisit the past

I would like to begin the discussion with the example of Indirthakuran from *Pather Pachali* by Bibhutibhushan Bandopadhyay, the timeless novel written in 1920's.¹ The not so pleasant relationship between the aged widow relative indirthakuran and Sarbojaya, the wife of Harihar, reflects the position of widow women in the family where she was always an unwanted guest. Indirthakuran was a kulinwidow and was aware of her helplessness and consoled herself by uttering the words of a poem from her childhood in the novel-

Lathijhyta payer tol

*Bhatpathortabuker bol*²

That means there is nothing like hunger which could shatter you even in such an extreme situation where nobody shows empathy or sympathy! Aged Indir seldom received proper care and attention from her extended family members and she died alone at the middle of the road perhaps without a single drop of water! Bandopadhyay was aware of the fact that how caste in rural Bengal in his times used to dominate the lives of people. When Indir was dying the villagers other than Brahmins were hesitant to give her water which was also essentially *gangajol* or water from Ganges.³

The Bengali widows young or old in colonial times mostly were compelled to stay at Kashi and had to live an abandoned life. The family members hardly visited these ladies and they used to suffer from immense financial crisis. Kalyani Dutta in her book in vernacular, '*Pinjare Bosia*' or '*In the Cage*' gave a realistic vivid description of the aged Bengali widows of Kashi.⁴ In '*Baidhabbyo*



Kahini I', as mentioned in '*Pinjore Bosia*', we get the reference of Indumati, a widow who was born in 1875 and spent her life mostly in Kashi where she died in the widow ward of a hospital run by a Hindu minority institution. She had to beg for her livelihood and was homeless.⁵

Though we don't get much references of geriatric care in colonial period but it is for sure that aged but non-widowed women used to enjoy much better position in the family. In a number of writings by the women of colonial Bengal on how to become an ideal wife, they mentioned their duties and responsibilities towards their in-laws. Though the relationship with the mother-in-law was not always cordial as documented which might be considered as a constraint to the geriatric care at that time. Srimoti Satyabati Devi wrote in an article in vernacular in '*Bamabodhini Partika*', the journal for women in the Bengali year 1305 that most of the times the daughter –in –laws if they are educated feel hesitant to cooperate and sometimes they torture the mother –in laws when they become old as a sign of punishment or revenge.⁶

From another article, which was published in the same journal we come to know that hospital care was not common and majority of the aged people had to die at their respective places in the presence of the relatives. Srimoti Saratsashi Dutta wrote in '*Bamabodhini*' about her mother Apurba Sundori Ghosh, who was a humble lady throughout her life. In her last days she was bedridden because of diabetes and the medical practitioners failed to save her life and she breathed her last at home.⁷ The women mostly wrote on their household duties, very few wrote on the sufferings of the aged people and death and perhaps none on the issue of taking care of the elderly people.

There was an interesting article published in the Bengali journal, '*Probasi*' in the Bengali year 1346 where the author Sri Hemlota Devi wrote about her father –in –law. Her father –in-law was always good to her and had fatherly affection till the last date of his life.⁸ Perhaps this article helps us to understand the bonding with the elderly people in the family, which is the essence of the geriatric care.

Though we don't get much reference of geriatric care in colonial Bengal but we have ample references of *antarjalijatra*. In Kolkata, in Kashi Mitra Ghat Street, at the bank of the river Ganges, an old house exists which is under the list of grade 1 heritage of the Calcutta Corporation. The said house is known as moribundhouse which was established in 1883. The elderly people who were dying either from cholera or tuberculosis used to stay here to spend their last days of life. They had to experience *antarjalijatra*, where the lower part of the body starting from the naval was to be drowned in the water of Ganges. They had to perform this particular Hindu ritual till they breathed their last. This *antarjalijatra* was a process which used to get continued for



more than 2-3 days or even longer as nobody would have an idea when the dying aged person would finally bade adieu to the living world.⁹

During this yatra the rituals of *shardh* or last rites had to be also performed to make the process complete. Perhaps this was the geriatric care what the elderly people used to receive at the time of their final moments. Kamal Kumar Majumdar in his epic novel '*Antarjali yatra*'¹⁰ gave a detailed description of this custom which was later filmed by director Goutam Ghosh who won the national award for the same.¹¹ Nobody knows when this particular custom begins. From '*Nadia Kahini*' we come to know that it was an age old custom that could be traced back to 600 years ago or even before.¹² In colonial Calcutta there were two other moribund houses and the literary meaning of moribund is a dying person.

It was written in 1825 in *Samachar Darpan*, the vernacular newspaper, to increase the number of moribund houses in Calcutta at least to 40 to 50 on the bank of the river Ganges so that the dying people would get their last resort. It may be noted that antarjalayatras were such a harsh ritual where the dying person if at all he or she was in senses had no consent.¹³ As for example, Alokasundari, the mother of Dwarkanath Tagore, was forcibly sent for *antarjalayatras* even in the absence of her son. The dying old lady vehemently protested as she knew Dwarkanath was against this but her voice was unheard.¹⁴ We need to research more on this direction so that we could reveal new facts which are hitherto unexplored till date.

Conclusion

In the conclusion I might say, it is difficult to make a comparison between the colonial and the post-colonial periods with regard to geriatric care as the nature of data is not the same and the research approach is also different. After independence, unlike the developed states abroad, India does not have compulsory health insurance for the elderly people. There are training schemes for geriatric care givers, but the implementation is not that much pertinent. The geriatric care as provided by the old age homes subject to financial wellbeing and in our state not all of us are in a position to afford old age homes.

Many elderly couples or a single elderly person used to stay alone and be assisted by hired attendants. The geriatric care service sector is giving employment to the youth of India by giving them training for a certain period. But the quality of that training is not always satisfactory. We need more humane approach in this regard as the elderly people irrespective of their socio-economic background seek support to have a better life. Fortunately the custom of *antarjalayatras* has forever disappeared but the loneliness of the elderly people especially when they are counting their last



days and waiting to meet their children who are mostly out of station for work purpose might be more painful than the *antarjaliyatra*.

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The Changing Face Of Women Entrepreneurship : From Traditional To Modernization

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Abstract :

In the progressive world rapid change of human activity in multiple spheres is becoming evident be it in any profession and/ or vocation. Moving away from traditional ideologies and into modernization and presently in the era of globalization, the pace of changes has doubled. The results of manifold changes are tangible and apparent and a striking feature is the emergence of various classes of entrepreneurs including women who have made a significant entry making themselves visible in the field of business. This is contributing to the growth for sustained economic development and socio – economic progress. Visibility of women in specific male dominated terrains is an outcome of social transformation, spread of higher education, women friendly legislations, conscious awareness, and most importantly the changing mind set of family members who have changed their attitude from prohibition to acceptance of women in economic roles as entrepreneurs. Higher education has achieved in making women gain self confidence to explore unknown territories. They are now organizing themselves in groups to initiate, organize and operate business enterprise in rural and urban sectors. With time, the rise of women enrollment in higher and technical education, they are becoming competent to enter in the non – traditional business area shaping up as a self reliant women force. The suppressed entrepreneurial potential of women has changed with time with awareness of the role and status of economic society. Strong desire to overcome challenges and establish themselves with knowledge, training and skills, is a major reason for women in business. (250)

Keywords: Entrepreneurship, Social Transformation, Self Reliance, Higher Education Impact, Skill Development Training.

Introduction

Women are to be considered as an integral part of our society; however age old patriarchal norms have compelled them to stand behind the male members as an outcome of male chauvinism persisting



across the globe. Stereotypical roles of women as sophisticated, dependent, and professionally incapable human beings has negated the fact that women can also be competent.

This has led to an in equilibrium in the world today. Women also have the potential to play a central role in the development of society and have been disregarded on the grounds of inequality and dominance of the male gender throughout different domains like employment, medical, workforce, household, agriculture, education and training facilities. Women have been largely overlooked in professional life as patriarchy has nurtured solely the domestic role of women. For centuries, women have been devoid of quality higher education with limited access to productive spheres resulting in financial dependence on men of the family. This further has accelerated male members to dominate the female counterpart and make all decisions for them.

Women's development has been considered the key to the overall sustainable development of a nation. A woman who plays a role by frequently interacting and actively adjusting herself with socio-economic, financial and support spheres in society is called a woman entrepreneur who acknowledges moving apart to meet her necessities and to become monetarily autonomous. A powerful urge to accomplish something positive is an inbuilt nature of women, who are equipped for contributing qualities in both family and public activity. Women have the potential and the assurance to set up, maintain and regulate their undertakings in an orderly way

Indian Perspectives of Women Entrepreneur : During the last three decades, Indian women have entered the field of entrepreneurship in increasing numbers. With the emergence and growth of their businesses, they have contributed to the Indian economy having entered many industries and sectors. Many of the earlier obstacles to their success are removed in the present times, yet some remain. Further, there has been much progress in the training and development of women entrepreneurs within public policy and academic programs. With the setting in of globalization, Indian women are transforming their traditional image of subordination and making efforts to emerge as potential entrepreneurs. The benefits of higher education is finding its best expression in empowering women to engage themselves in nontraditional business sectors thereby making a breakthrough in the stereotypical women assigned roles. It is heartening to witness the presence of modern women coming forth to the business arena with ideas to start small and medium enterprises.

Presence of women heads and employees are promoting the idea of leadership building capacities which is a latent unexplored potential in women. Today world over, women have taken a centre stage as manager of established as well as in the entrepreneurial ventures they have created on their own. The creative yet undisclosed powers of women have changed over time by the growing awareness of the role and status of economic society helping them to set foot in a primarily male



dominated region. Government's initiation of supportive mechanisms through policy schedules providing financial availability and training of women in the adoption of multifarious skills has enabled them to enter into the realm of business and entrepreneurial activities. They are willing to be inspired by role models and learn from the experiences of other women in business. Fortified with knowledge, women are successful not only in law, science, medical, aeronautics and space exploration, in police and defense services, but making their presence felt even in business and industry. They have proved that they are equally capable of conducting themselves when compared to men in efficiency and hard work provided they are given scope. Women entrepreneur alludes similarly to somebody who has begun a one-woman business, to somebody who is ahead in a privately-run company or association or, to somebody who is an investor in a public organization which she runs.

The emerging scenario of Indian women entrepreneurs

This is a dynamic world and it is changing at a greater speed. Liberalization has further accelerated the pace of changes and has contributed to the emergence of various classes of women entrepreneurs. This is a boon for sustained economic development and social progress. Social transformation has taken place through the spread of higher education, pro-women legislations, spurting awareness, urbanization, and family support. In former days, for women there were 3Ks- Kitchen, Kids and Knitting followed with the 3ps – powder, papad and pickles. Now the scenario is completely changed and replaced by 4Ps, they are Electricity, Electronic, Energy and Engineering. Indian women are becoming increasingly visible and successful in all spheres of economic activities. Women are not only involved in business activities for their survival but are also satisfying their urge of creativity and skill. Their numbers in education, politics, self-employment, profession etc are facilitating women's entry into traditionally men dominated areas

Why Indian Women Undertake Entrepreneurship

There are several factors that contribute to women Entrepreneurship

1. Indian women are becoming more empowered in the present times. Progressive legislations are being drafted to offer them more opportunities at various levels.
2. Relatively high involvement in necessary entrepreneurship indicates that self-employment is used as a way to circumvent institutional and cultural constraints with respect to female employment, as well as a way to provide supplemental family income.
3. The smaller amount of financial capital requirement and higher proportion of available bank loans positively correlates the level of female entrepreneurship to economic conditions.



- 4 An increased level of education has played a crucial role in initiating the process of entrepreneurship. It is not only the illiterate, that are starting the businesses but also with education & skills are exploiting profit opportunities.
5. Knowledge and adaptability of the economy led to a major reason for women in business.

The Push and Pull Factor of Women's Entrepreneurial behavior

The push concept dwells in the idea where women are compelled to take charge of their economy unprepared in an effort to sustain themselves. Social systems have cultured women to live a life of dependence for their existence, however there are situations when she has to push herself to become an earning member. These may include the death of the sole bread winner in her family, an unforeseen fall in family income owing to health issues or loss of job or even a permanent inadequacy in income of the family. Against these, the pull factors have emerged much stronger to counter the push factors. Women's Liberation ideology along with the concept of equity parallel with equality, the new woman has realized the need of self reliance, self recognition and to respect their inborn capacities. A strong desire to prove their merit in the patriarchal society and to achieve an important social status has become ever so evident. The long standing suppression and subsequent suffering has compelled them amongst other needs to break free from the shackles of subordination through self earning for economic independence.

They are now utilizing their free time to educate themselves in skilled and in semi skilled work which can be done from home too. Women have made their mark initially in small scale and thereafter in big scale business as they are looking for new challenges and opportunities for self-fulfillment and to make an estimation of their talents. Coupled with this there is a strong pull to prove their determination in innovative and competitive jobs, and most importantly it is their chance to experiment their dexterity of managing the time and balance their family responsibilities and their business lives, willingly joining the family business and taking it to new dimensions is the modern trend. A woman entrepreneur is the one who is constantly reshaping herself to emerge as a confident, creative and innovative woman desiring economic independence, individually and simultaneously making a conscious effort to create employment opportunities for other women folk. The society the state and the area to which she belongs influence the setting up of entrepreneurship based on the support and the facilities that she receives.

Noticeable Entrepreneurial Traits of Women Entrepreneurs:

What features have helped women to become entrepreneurs? Are they very unique? The most significant trait observed in women which has facilitated entry and thereafter sustenance is her



inbuilt capacity to imagine varying original ideas in this competitive market when initiating business start ups. True to their soft skill attributes and resilience to stress, women have made extensive relationship building at different levels to examine the present conditions and identify the entrepreneurial opportunities. Urban women entrepreneurs are in association with knowledgeable people and contacting organizations and approaching for support and services.

Putting up with hardship supported with a spirit of sacrifice makes women toil for the best to happen. From the girl child stage of life and in marriage, it is the women who shoulder immense laborious work. This capacity tuned with imaginative ideas has come to a fair play in building an enterprise. The pull factor has resulted in an attitude of persistence leading to the translation and fulfillment of their dreams. To achieve this, persistent effort in approaching governments, banks and financial institutions braving adverse circumstances is their methodology. The desire refers to the willingness to take risk which can often boomerang resulting in a complete disaster more specifically financial. However, accustomed to failure and withstanding stress, they are not deterred from going ahead even in the face of failure. In their effort to prove, they are renewed with the energy and ability to commence with the planning, estimating and calculating. Profits are the rewards of risks. Enterprising women are daring to which may or may not have been calculated. Today women are displaying a challenging attitude where the questions of either survival or failure are on equal footing

Generally, women view their businesses as a cooperative network of relationships rather than as a distinct profit-generating entity. This network extends beyond the business into the entrepreneur's relationships with her family and the community. Certain cross-cultural studies on women entrepreneurs have reported that their management styles emphasize open communication and participative decision-making, and their business goals reflect a concern for the community in which the business operates. With struggles faced overtime by the entrepreneurs, they are now being recognized as the innovators and innovating new things to compete with others.

Presence of positive influences

The presence and success stories of women entrepreneurs in the same footing as men, are serving as role models to the upcoming ones who are making consistent effort in the face of socio cultural turbulence and their tremendous desire to strive against all odds is commendable. Education has opened up new vistas feeding their ambition to make a mark in society. Professional education and training along with women friendly governmental policies, utilization of various schemes, availability of bank loans have accelerated their intrinsic motive capable enough to face male competitors to move ahead. With time, with the initial capital returns, she proceeds to make autonomous investment however minimalistic it may be.



Types of Entrepreneurship

Educated women in the urban communities have set their foot in different types of entrepreneurship and have become trend setters in organized and in unorganized sectors.

- Education has impacted the affluent entrepreneurs who are the daughters and wives of wealthy businessmen. They have the financial liquidity and the necessary resources to start a new enterprise and take business risks.
- Those who are products of a quality higher education capable of initiating new trends in the entrepreneurship.
- Partnership business ventures where capital and labor are shared in proportions.
- Following them are those coming from the Pull Factor where urban educated women with or without work experience who are ready to take the risk of a new enterprise with the help of financial institutions and commercial banks. To them, it is a challenge to be financially independent.
- Those who belong to the push factor category are compelled to take up business activity in the face of being financially handicapped. Rural uneducated women choose a business that is within their resources and have that much knowledge to keep it going not requiring special skills. Their primary focus is to earn that much which will ensure the sustenance of their families using available resources around them

Challenges Faced by Women Entrepreneurs in India

1. The never ending domestic responsibility of looking after offspring and aged parents simultaneously remains with women irrespective of their educational standing. Society expects them to be able to do both which is a stressful factor to women.
2. Women are very critical about their capacities thus lacking in self confidence. Estimation of their performance is often under rated by themselves which makes them unsure of taking up business matters.
5. In the face of Inclusion as a social policy, discrimination of women at work still exists, especially related to wages.
6. One of the major obstacles faced by women entrepreneurs have been that they are not taken seriously. Even though women have achieved credibility as competent entrepreneurs in areas such as retail, personal services and business services, perceptions that women-owned businesses are less successful, credit worthy & innovative continues to be a barrier.



7. Lack of Visibility as Strategic Leaders: Changing the perceptions about the likely success of women-owned businesses depends on increasing women's visibility in leadership positions in publicly traded companies within the greater business community.
8. Difficulty in gaining appropriate assistance and information needed either at the initial stages or to take the business to the next level of growth.
9. Women operating family businesses face issues related to personal identity, role conflict, loyalties, family relationships, and attitudes towards authority. Family businesses owned by women are forced to rely on internal resources of funding rather than outside sources.

Essential Requirements of Women Entrepreneurs in India

1. More and better access to finance/credit is mentioned very frequently. Give a woman 1000 rupees and she can start a business. Give her another 1000 rupees and she will be able to feed not only her family, but her employees as well.
2. Access to business support and information, including better integration of business services
3. Training on business issues and related issues
4. Better access to local and foreign markets
5. Day care centers & nurseries for children as supportive measures to be set up
6. Positive image building and change in mentality amongst women, whereby women see themselves as capable achievers and build up self confidence.
7. Breaking through traditional patterns and structures that inhibit women's advancement
8. Role modeling of women in non-traditional business sectors to break through traditional views on men and women's sectors.
9. More involvement and participation in legislation and decision-making processes
10. Removing of any legislation, which impedes women's free engagement
11. Awareness raising at the governmental as well as private level truly and really create entrepreneurial opportunities and not just programs that stay on paper.
12. Women need to have access to men dominated networks and encouraged to take decisions about their successors in business
13. Women must be taken seriously by bankers and financiers when applying for loans. Due respect to their ability of utilizing funds to generate business must be respected.



Some prominent faces of Indian Women in Entrepreneurship

Apart from the established Kiran Majumdar Shaw, Naina Lal Kidwai etc, present Indian society has seen the coming of age of women entrepreneurs in diverse business engagements.

- A) Women in the Sunderbans area of Bengal have built up their corpus of Rs 2 lakhs by taking up stitching and selling their own products in the likes of face masks, jute bags, door mats etc and are respected for their dignified sustenance through self reliance
- B) Anika Agarwal, Co founder UpsideAI, uses machine learning to make investment decisions based on stocks and market conditions
- C) Ashvija Vijayendra overcame self doubt and with confidence started her Pink Tech Solution in Gauhati, a soft ware company
- D) Divya Goenka started the Pink Moon, a plus size fashion brand for women realizing that mainstream fashion designers ignored this segment of consumers who also had a desire to dress well.
- E) Ankur Dahiya co founder and CEO of Rozanna, set up an e commerce platform for rural India which has reached over 4 lakhs household in a small town in Haryana
- F) Aarti Ramakrishnan, braving huge antagonism encroaching into the male domain is the co founder and COO of Crayton Data, a data analytics company that has made waves in sectors like banking, fintech, and retail
- G) Zarine Screwvala co founder of Swades Foundation adopted villages in Maharashtra teaching women over digital platform in sessions on topics like nutrition for women and children, sustainable livelihood opportunities and capacity building for self help groups
- H) Rashi Agarwal, Co Founder of Zipp Electric in her effort to fight to keep climate healthy, evolved the making of electric vehicles to transform the delivery system

Steps needed to be Initiated for Women Entrepreneurial Development in India

- Conducting gender analysis for all entrepreneurial support programmers
- Gathering data on women and men entrepreneurs
- Using targeted approaches for priority categories in order to provide additional “push” to women entrepreneurs to the next level of growth
- Examining differential impacts of governmental policies, programmes and actions



- Promoting development of demand-led support for women entrepreneurs
- Promoting more flexible and innovative financial products by banks
- Policies, laws and overall regulatory environment needs to be promoted in such a way that woman entrepreneurs see the advantages of and benefits that come with compliance.
- Reviewing impact of existing and new instruments on women entrepreneurs
- Identifying those instruments that act as barriers to expansion and growth
- Taking account of the social and cultural contexts affecting policy implementation and redress inequalities and abnormalities
- Making use of IT and associations so as to minimize the administrative burdens on women entrepreneurs
- Holding regular consultations with key factors like women entrepreneurs, women entrepreneurs' associations, financial institutions, etc, to review progress and identify new bottlenecks
- Providing incentives for expansion and growth after removing barriers and disincentives
- Encouraging and rewarding dynamic representative associations of women entrepreneurs
- Profiling the economic and social contributors among women entrepreneurs to the national economy
- Promoting and rewarding programmes that serve women entrepreneurs
- Ensuring synergies between (a) women related ministry (b) economic ministry (c) welfare & social development ministry in the government.

Conclusion

Women's entrepreneurship is increasingly important for creating new jobs and contributing to the social and economic growth of their societies, yet the interplay and nuances of women's entrepreneurship and culture are currently understudied. In this paper, empirical ideas that delve into different aspects of the dynamic interaction between gender and culture in shaping women's entrepreneurship have been presented. It provides framework for women's entrepreneurship and culture research to organize the empirical research herein into interconnected themes: gender role expectations and identities, societal cultural dimensions, and the entrepreneurial environment. This paper is an important step in integrating research on women's entrepreneurship and culture and further exploring these dynamic and complex interactions, in different economic and societal systems



and across geographies.

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Merit in Contemplation

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Abstract

This writing is an attempt to explore the sensibilities of under-graduate students towards certain aspects of education and life. As educators, we have been doing what is needed and must continue to do what our great thinkers have suggested adding on wherever lacking without compromising on standards that already, exist. We must take heart and pride in the positive views about education as expressed by the present students. Not everything is bleak and distressful, as understood, at times.

Keywords: Under-graduate, Education, Knowledge, Understanding.

Introduction

Hearteningly, our system of education is aiming at a combination of physical adventurousness, mental adventurousness, a balanced mind, and an equable temper for a tight-rope walk. On the other hand, they are being provided with the right amount of confidence and courage to work in groups. Further, If teaching does not take place in vacuum and interaction with pupils has a long-term effect then education is far more than a list of achievements like reading, referencing, speaking a language and so on. Some educators are concerned with the over-all development of their pupils as persons. They also do think that this work cannot be assigned to other agencies. For them, education and self-realisation are connected. Thus, whether our students are ready to show initiative and willing to take a lead where they are most fitted to do so is a subtle business. This paper is an attempt to explore the suitability of education for the above purposes in our endeavours with our students.

The quality of any society tends to be dependent or upon the quality of those who play a leading part in creating and running it. An institution is a living force through living people or through those whose spirit, though they may be dead, lives on. Keeping this in view, I selected three dimensions for students to think and discuss – outlook towards life, development of cognition and nurturance by education as a discipline, or, in general.



In the attempt by students of the under-graduate classes to appreciate the role of education it was gladdening to take note of the fact that education has evolved their thinking in the last few years. They consider education as a never ending process and also seem to have acquired quite a number of ideas about their surroundings, they have learnt to trust or mistrust people, have realised the necessity of building a livelihood. They now know about different cultural settlements, can connect daily life experiences to what is studied in class, they are less susceptible to the influence of others, they are personally growing as individuals and would want to experiment with their passion. Digital education is helping to connect with the world, students can collaborate with others, there is increasing cultural awareness and worldliness among them. Education provides a space and the opportunity to meet like-minded individuals, they have learnt to manage time and build their skills. Development is seen, they can become better citizens and can get better paid jobs. They think they have the ability to change their future, make decisions, even in, critical situations with logical thinking. An educated person can tackle a situation. Education, they feel, would lead to an educated society and become the reason for the economic growth of a country. Education provides stability and financial security. Students are of the view that they have acquired knowledge in different spheres of life, have come to know what encourages them, and gives happiness. Values are needed in life to give and get respect. What they are today is the result of education and they are a better version of themselves. Fulfilment of life's goals and aims is possible and education distinguishes one from another. There are ups and downs and they face challenging circumstances but instead of shouting, abusing and resorting to violence an attempt is made to sit down and try to talk it out and vent out the pent up feelings. Education has helped them to develop their cognition. Education has led to an increased knowledge, understanding of different human behaviours, understanding of childhood and helps them to achieve things in life. They have understood education as a discipline, needs of the society and an individual, truth behind following certain norms, rules or regulations, history of education, women empowerment, community and ways of upliftment of the society economically. Education is a diverse discipline, multiple topics are there from various sources, contributing to their wholesome development, and education of all sorts will turn out to be useful. They have understood what goes behind building the system and are more informed about what needs to be done. They look at the bigger picture, think and view things more clearly and have a clear conscience. They have understood how different everyone's life and experiences are. The history and objectives of education are understood. One can be educated in any field – academics, cooking, dance, gardening and the like. Educated individuals behave in a civilized way, use conscience to make judgement and are wise in most situations. Education helps us to balance our cognitive abilities and thinking process. Education is the world for all to be successful in life. Without education in this generation no one would have proper employment. Youth need to be educated for they are our future. Education is a necessary need and right for all children from the



ages of 6-14 for their bright future. Education is life itself - it is to live correctly. It is the most important aspect of life, similar to the air we breathe or the water we drink. They have learnt to respect different religions, how to be a good citizen, their role towards the country, history of education, and problems faced by the world.

However these are just the viewpoints of about fifty pupils. Due to constraints of time, responses were gathered from another set of forty-eight pupils but could not be analysed, further.

Regarding outlook towards life their seriousness about a vocation has increased, they feel that trafficking should stop as a menace, there should be gender equality, their outlook varies with the situation, they look at things in a positive manner and the glass as half filled. If viewpoints do not match then arguments and conflict arise. There is an endeavour to overcome limitations every single day and they have learnt never to settle for less. They look for a silver lining in the clouds and try to be up to date. They possess a modern outlook, know the importance of understanding things and feel that they have the freedom to do whatever they want. They match each other in their outlook. They have abroad outlook, perception and views about things, people and objects. Education is a broad and dynamic discipline. They are better able to identify the problem. A study of education with history, sociology and psychology has led to a deeper understanding of other areas, as well. Education is a road to success, becoming rich, having a luxurious and a comfortable life. It has made them independent and technology savvy. They respect another person's outlook and understand as to why it is different. They are capable of independent thinking, and feel that one must be up-to-date with politics as a global issue. Their outlook has become more positive and they are prepared to face all the challenges of life. Their outlook towards life is optimistic. A student thinks whatever happens is already planned and will happen if supposed to. We have to be prepared for whatever happens, we need to be determined, active and responsible. 'Live and let live' should be the motto.

Towards the growth of cognitive abilities their view is that they have learnt to reason well, think before speaking, they take a broader view of the situation and know how to solve it. Information makes us a practical being, they have better control over their behaviour, there is expansion of knowledge, they build new knowledge upon previous ones, can make connections, they do approach tasks with enthusiasm and confidence. They fully understand abstract concepts, are aware of consequences and personal limitations, can develop new skills and hobbies. Education has nurtured the mind to acquire knowledge, skills and wisdom. They are able to think and reason and indulge in concrete operations, possibilities and facts may affect decision making. They are capable of formal logical thinking, abstract thought, can accept differing points of view, can follow the thought process another individual goes through. They can understand new ideas or questions about a certain topic. They can travel from concrete to formal thinking, learn to think in a complex way, use formal logical operations at home and at college. One has always been learning



something or the other in school and in college-new skills like needle and thread activities, home science, SUPW classes, socialising with others, intra and inter school and college activity, interacting with and supervising juniors, physical activities, P.T. classes, inter-department sports, art of defence, sleep and meditating which calms one and provides energy. Whatever we learn refines our cognition, education and cognition go hand in hand. Physical activities keep the mind healthy, improve memory, retention and have a positive effect on the body. Health is hampered if immersed in loneliness. It could trigger a cognitive decline. Meditation should be practised to slow the progress of age-related cognitive decline.

There should not be any complaints from certain quarters, if any, of a lack of purpose, determination and a sense of responsibility in education. Purposefulness and determination would definitely be an outcome in challenging situations during college life if they have found the courses worthwhile.

We must continue to ensure that as our graduates finish their studies they should be able to confront the antagonistic values outside. They are going to pioneer change in society. Society will also provide the youth opportunities to express their initiative and energy and the values they believe in. It is well recognised now that there should be physical training for all. It does not mean that character will be automatically trained.

Optimism is high

The institutions are friendly and the college society would not be responsible for their being idle and careless. They are being encouraged to live creatively, purposefully, willingly taking responsibilities which, in turn, will help those who belong to the community. They will be able to do real things that they want to do and, thus, become more genuine as individuals in their action. The current environment in education is where risks are taken, initiative is often exercised and purpose is high.

We have an example of how a disorganised and an impoverished British society could become active and interested in economic advantage because of the railways. Initiative and purpose are integrators and create both energy and discipline. If fear had affected us we would become aimless and full of apathy. This purposefulness brings together groups and cells which are enthusiastic and keen in exploring some particular field. The source of every live ideal is, ultimately, a human being.

There is no attempt to take the scholar out of the life around him and life around their members. An attempt is made to devise contemporary schemes for the training of the youth as what is there is too, narrow. The youth try to find a group and field – scope for initiative and the expression of his talents whether in writing organization, the investigation of problems, or physical action.

If there is no aim of life then the youth can do what is needed. Youth can teach elders to read and



write; help factories to complete the orders; plant trees; do post office work and help in the background work. The life of youth is important as a community as a whole. In fact, we have the responsibility of the adolescent who has left school and to relate the ideas and ideals of youth to the community as a whole. These services can grow but should not be looked upon as taking advantage of their age or to meet a temporary crisis. As mature individuals they can do real things. Young people need to be offered a chance to give concrete and actual help of a kind really within their powers. This would be an appeal to their better impulses and not to their self-interest. It would also be an appeal to their nascent sense of responsibility which all young people possess in the help they can give to the community.

A true sense of vocation comes from the belief that one is significant in the community. They can set up enterprises of their own for the benefit of the people in the district; a film society; a library; a poultry farm; a local newspaper; a market garden; a do-your-own shopping service for old people; and mind-your-baby for young mothers. The right leadership and the right sort of responsible encouragement from the community outside it would in time, become the “one thing” to play one’s part.

Specialization is the spending of one’s leisure hours and if this time is attuned to the heart and mind of the spender, may have an important part in developing character. The youth is subject to temporary enthusiasms but what is needed is harnessed enthusiasms.

Organising discussion groups for the young people and preserving a liberal spirit are also the options. This would increase their hospitality to life whereby they feel more sensitively to become responsible members of society. The hostels reveal to us that the 18 to 30 age-group has a demand for experience which keeps the spirit healthy and awake. Enormous opportunities can be provided for appreciating a rich lecture, well-planned towns, good films, good printing - and better standards in provision.

Between 21-30 years they can serve on Education Committees, local and national committees of the political parties and all this can be very much their concern. They cannot serve unless they have a stake in it. At the church a group of ten or twelve can be given its unity by a special purpose or a series of purposes – worship, the study of a particular problem or book, the service of some social cause, or activity which Christians have at heart - a greater place in life. This would enable them to get back into touch with themselves and live with heart and mind not working against each other. This would remove apathy and scepticism. The mind working alone without the heart can never arrive at any conclusion regarding human problems which really touch the vital issues involved. Men need a new assurance of the permanent meaning of “things” amid transience and change. They need to be saved from having to accept themselves as robots actuated by their instincts. Education must be concerned with the nourishment of the power and imaginative perception. We need not separate the intellect from the whole child. Understanding which is deep



in itself, redemptive and creative diagnosis and analysis can never be satisfying substitutes for it. A new acknowledgement that wonder and mystery are permanent parts of life and that the intellect cannot be divorced from feeling to explain things would be required.

Is the education system being utilised adequately? Is the school able to negate the disadvantages of family background, indifferent parents and apathetic pupils. The school should be linked with the democratic way of life – a national culture and a classless society rather than aiming at piecemeal development and sporadic innovation, the quality of individual and group life and relationships. There should be a concern for persons. We must underplay a persons reward and accentuate personal fulfilment. Neither individual achievement nor social ascription will confer rank or high status but is reserved for those who serve and suffer rather than for those who enjoy power or seek material riches. All this, of course, is utopian.

Teachers and academic institutions do have effect on their students and through them on their ordering of social affairs. It is a time of flux. One tends to clutch at straws – a wind of benign change. Social science courses at the university, training and technical colleges level, sociology and social psychology is a bridge between the older humanities (literature, history and philosophy) and the younger and more spectacularly successful natural sciences. Attractiveness and excitement of social science enables them to strive for self-understanding.

What we have in common is infinitely greater than the things which divide us.

There exist many and various kinds of human excellence. In our technological age we are in some danger of overlooking it. Academic achievement is the highest manifestation of intellectual worth for securing the stability and integrity of the community – Goodness of character is as important as mental ability – when apportioning praise, allocating status, and when distributing tangibles.

We need good men every bit as much as we need clever men in ordering our affairs. To train the citizens of integrity is, socially speaking, a wiser investment than cultivation of the ‘clever boy’ mentality.

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National Education Policy (NEP) 2020 and Queer Inclusivity in India

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Abstract:

This essay takes the National Education Policy 2020 as its point of departure to interrogate ideas of inclusivity that the document projects, from the lens of queer and trans individuals. It provides a critical commentary on the exclusion of sexual identities and queer subjects from the NEP 2020. It argues that such an omission does not correspond to the legal achievements of the queer movement in India. The essay goes further to imagine what queering the very idea of inclusivity may entail in the context of pedagogy, curriculum, and the classroom.

Keywords: National Education Policy (NEP) 2020, Queer, Queer inclusivity. Section 377.

In February 2022, Arvey Malhotra, a 15-year-old boy died by suicide. He left a note for his mother stating, 'This school has killed me. Especially Higher authorities... tell Ninna and Bade Papa about my sexuality and whatever happened with me. And please try to handle them. You're wonderful, strong, beautiful, and amazing' (Baral, 2022). Arvey had endured bullying in school on account of his effeminacy and sexuality. Homophobic labels like 'chakka' were used by his classmates who teased him since he was in grade 6. His mother who was a teacher in the same school had complained but no concrete action was taken then. In grade 9, Arvey was allegedly sexually assaulted in the school washroom by his bullies. His mental health deteriorated as a consequence of years of bullying and led to his untimely death. Arvey's mother has been fighting for justice since; demanding accountability from the school. Not much has been achieved. When the news broke, conversations about bullying of queer and trans children in educational institutions began. The need for gender sensitivity, respect for diversity, stricter rules against bullying and attempts to create a safe school environment was emphasised. These demands come to the fore in the aftermath of tragic events and the loss of queer lives but have rarely stimulated sustained education reforms in schools. This essay takes the National Education Policy 2020 as its point of departure to interrogate ideas of equity and inclusivity that it projects, from the lens of queer and trans individuals. It argues that attempts to be inclusive are incomplete if educational institutions



do not create safe spaces for non- heterosexual students. The essay goes further to imagine what queering the very idea of inclusivity may entail in the context of pedagogy, curriculum, and the classroom.

NEP 2020 and Inclusivity

Education in modern societies is inextricably linked to social development. It is a means to ensure multiple socially desirable ends including equality, freedom, economic opportunities, social mobility, national solidarity, and cultural cohesion (Sengupta 2022). It has also been demonstrated sociologically that education can be the site for the reproduction of extant social inequalities in societies. Class, caste, gender, racial and other social differences may be reiterated if not exacerbated in educational institutions. It becomes the task of the state to steer educational institutions towards positive outcomes by making quality education accessible to all irrespective of social differences and to promote non-discriminatory practices in them (Sengupta 2022). Universally accessible quality education has the potential to be the great leveller in society.

The National Education Policy 2020 (NEP henceforth) promulgated by the central government of India is an attempt to overhaul the education structure—from the schooling system to higher education in India, to make quality education accessible to all citizens and at all levels. At the outset the document acknowledges the necessity of quality education for India's ascent and growth in the global scenario. The policy links quality education with 'economic growth, social justice and equality, scientific advancement, national integration, and cultural preservation' (National Education Policy 2020, 3).

The NEP considers inclusive and equitable education essential to the establishment of an inclusive and equitable society. While it does not offer a detailed discussion on what inclusivity means, it proposes the bridging of social category gaps in terms of 'access, participation and learning outcomes' in education (24). The NEP acknowledges historical disparities and under representation of marginalized groups in education in India. It creates an umbrella category of Socio-Economically Disadvantaged Groups (SEDG) and suggests policies to ensure their inclusion. The SEDGs include groups marginalized on the basis of 1. Gender identities (women and transgenders), 2. Socio-cultural identities which includes Scheduled Caste, Scheduled Tribes, Other Backward Classes (OBCs) and minorities. 3. Geographical identities which refers to students from rural areas, small towns and aspirational districts. 4. Disabilities including learning disabilities and 5. Socio-economic conditions such as poverty, low income, migration, trafficking, child beggary and so on and so forth (24). The NEP states that the SEDGs demonstrate considerable decline in enrolment from grade 1 to 12 and are poorly represented in higher education in India. To remedy this the NEP suggests a range of policy measures to enhance accessibility, participation and educational outcomes of SEDGs. It discusses factors that mar the educational endeavours of specific SEDGs and offers means to alleviate them such as targeted scholarships, incentive to parents to ensure children's



attendance in schools, transport facilities and so forth (24-28). For instance, in the context of gender identities, the NEP remarks on the intersectional nature of gender disadvantage; that women constitute half of all SEDGs and experience various barriers to quality education. It advocates the establishment of a 'Gender Inclusion Fund' for female and transgender students (26). In context of higher education institutions the NEP emphasizes the sensitization of faculty, students and counsellor on gender identity issues and the inclusion of such issues in the curricula (42).

The NEP is quick to recognize that policy measures, improvements in educational infrastructure and use of technology are necessary but not sufficient tools for an inclusive education. It contends that a change in education culture through adequate sensitization of all participants in the education system – teachers, administrators, counsellors and students, on notions of inclusivity, dignity, respect and privacy of person, is required for inclusion and equity (28). The NEP states that,

‘the school curriculum will include, early on, material on human values such as respect for all persons, empathy, tolerance, human rights, gender equality, non-violence, global citizenship, inclusion, and equity. It would also include more detailed knowledge of various cultures, religions, languages, gender identities, etc. to sensitize and develop respect for diversity. (28)

The NEP suggests similar measures in its discussion on inclusivity and equity in higher educational institutions in India.

One rather conspicuous omission in the SEDGs are sexual identities. While the document does mention transgender students alongside its discussion on female inclusion without dwelling into the specificities and challenges that transgender inclusion may entail, there is no allusion to non-heterosexual identities such as gay, lesbians, bisexuals and so forth. This omission appears problematic after over two decades of the queer movement in India and its achievements. A project of inclusion and equity that closets sexual identities and fails to address the exclusion that individuals face on account of their sexuality is incomplete and blatantly heteronormative. Heteronormativity can be defined as a system of discourses, norms, structures, practices and relationships that produce heterosexuality as natural (Robinson, 2016), normal and universal. It results in the erasure and invisibility of non-heterosexuals, justifies their discrimination and exclusion in social institutions (Robinson, 2016) and promotes homophobic cultures. Even if one were to give the NEP the benefit of doubt and adopt the line of argument that it does mention transgender in reference to gender identities, the collapse of sexual identities and gender identities is a common error that casual heteronormativity performs and such a performance is exclusionary and discriminatory. Feminists have painstakingly pointed out how a conflation of sexuality with gender erases multiple subjectivities and identifications (see Sedgwick, 2008).

Queer subjects and the Law in India

Presently, the term queer which literally means ‘strange’ or ‘unusual’ is employed to represent



non-normative sexual and gender identities. Historically, the term was used pejoratively to refer to effeminate men or men associated with same-sex sexual behaviour. The word was reclaimed in the 1990s in academic and activist circles which offered a more radical critique of sexual politics and sexuality based movements (Jagose, 1996). While it is beyond the scope of this essay to detail these critiques, it is important to note that sexuality based movements are a fecund site for the proliferation of terminologies to address sexual identities, practices and expressions. Prior to the global ubiquity of the word queer, alternate sexualities were denoted by the acronym LGBT (lesbian, Gay, Bisexual and Transgender). The acronym LGBT has expanded to LGBTQIA+ and therefore now includes queer identifying individuals, intersexed persons and asexual persons. The symbol '+' is a gesture towards inclusivity and implies the inexhaustible possibilities of gender and sexual identifications. The word queer may thus be used to encapsulate the plurality, diversity and fluidity entailed in gender and sexual subjectivities. The word is also used in social theory to connote a non-identitarian approach whose implications I will explore in the next section in the context of inclusive education.

The movement for sexuality rights in India began with the need to address the vulnerabilities of MSMs (men who have sex with men) to HIV/AIDs. From its onset, the major thrust of the movement has been legal reform which centred around Section 377 of the Indian Penal Code. Section 377 is an anti-sodomy law instituted during the British colonial rule. While it does not explicitly mention homosexuality, it criminalizes 'carnal intercourse against the order of nature' which refers to oral and anal sex (Gupta, 2006). The law has seldom been used for persecution of consensual homosexuality however it constituted a veritable threat and source of harassment and oppression for queer individuals living in India (Gupta, 2006). It also dampened efforts at HIV prevention since the presence of such a law closeted same-sex relationships between men in India.

In July 2009, following the concerted efforts of the Naz foundation, the lawyer's collective and a coalition of non-governmental organizations (Voices against Section 377), the law was read down by the High court of Delhi to exclude consensual sexual relationship between adults of the same sex/gender. In 2013, the law was reinstated by the Supreme Court of India on the presumption of constitutionality and the notion that the law affected only a 'miniscule minority' (Sheikh & Narrain, 2013). Subsequently, a curative petition was filed in 2016 and in September 2018, a 5-judge constitutional bench of the Supreme Court decriminalized consensual homosexuality in India.

The judgement is far-reaching in scope and intends to remedy the historical wrongs meted out to the queer community. It establishes sexual orientation as intrinsic and fundamental to one's identity and regards homosexuality as a natural phenomenon. It extends the right to equality enshrined in the Constitution to queer individuals. The word 'sex' in Article 15 (Right against Discrimination) is interpreted to include sexual orientation. The judgement upholds the right of LGBTQ persons to express their sexual inclination without fear of criminal persecution or discrimination, to navigate



public spaces freely and to even display affection towards their partners in public within the bounds of decency (Al Baset, 2018). The judgement also interprets the right to sexual health as physical, mental and social well-being of LGBT individuals. It recognizes the need for understanding issues of sexuality in educational institutions and the workplace to foster equality, non-discrimination and respect for human rights. There is a clear endorsement of constitutional morality over populist or majority perceptions in safeguarding the rights of sexual minorities (Al Baset, 2018).

In a similar vein, The Transgender Person (Protection of Rights) Act, 2019 advocates inclusive education for transgenders. It defines inclusive education as 'a system of education wherein transgender students learn together with other students without fear of discrimination, neglect, harassment or intimidation and the system of teaching and learning is suitably adapted to meet the learning needs of such students' (The Gazette of India, 3). The Act prohibits denial, discontinuation and unfair treatment of transgender students in educational institutions. It also extends similar safeguards at the workplace. The 2019 Act has been considered a watered down version of the landmark NALSA judgement of 2014 which had mandated the recognition of third gender persons as 'socially and educationally backwards classes of India' who were entitled to reservations in educational institutions and public employment. Despite its many failings including the denial of self-determination to transgenders (see Ram Mohan 2020), the Act's welfarist provisions for transgenders in the context of inclusive education is apparent.

The queer movement in India, apart from its legal success, has played an important role in rendering visible the struggles of the LGBTQIA+ community in various social institutions, and education is no exception. It is in this context that the omission of queer subjects in the NEP 2020 becomes rather glaring and the mention of transgender students twice in the document appears insubstantial.

Queering pedagogy, curriculum and the classroom

The legal provisions outlined in the previous section make inclusion of queer individuals in the educational structure of India imperative. Papia Sengupta(2022) contends that inclusion necessarily involves two levels — 1. Inclusion as 'getting in' and 2. Inclusion as 'getting in as equals'. Inclusion as 'getting in' implies formal inclusion in the system, as becoming a part of the whole. Sengupta finds such forms of inclusion unidimensional in so far as it demands that those included conform to norms and values of the system without challenging the hegemonic status quo. Such an inclusion is merely accommodative and does not foster equality. In the context of education, this would entail merely adding marginal students to the structure without efforts to foster substantive equality, to incorporate their culture and ensuring respect and dignity. Additionally, 'getting in' may simply mean rehearsing the dominant values of the system in order to achieve success. Inclusion as 'getting in as equals' implies being 'included with equal rights to unfold, question, and challenge the inbuilt but hidden discriminations within institutions and systems.' Inclusion which empowers individuals to identify and challenge discrimination has the potential to transform an unequal society to an



egalitarian one. In the context of education this entails empowering students to resist and voice their dissent against discriminatory practices, violence and oppression built into the system.

Getting queer students in as equals is a challenging task in a heteronormative environment. To be queer is to be vulnerable to stigma, bullying, physical, mental, verbal and sexual abuse. Queer inclusivity must begin by attempts to question the compulsory heterosexuality (see Riche 2009) of educational structures. This requires enormous investment in consciousness raising — a preliminary feminist principle of creating critical awareness to foster social change — of all stake holders in the educational system – administrators, teachers, students and even parents. The robust mentoring system that the NEP envisages must be founded on principles that acknowledge, accept and respect the diversity of sexual and gender identities. This is easier said than done given patriarchal culture socialize individuals to be misogynistic, homophobic and transphobic. Getting queer students into the system first demands undoing one's own complicity in the reproduction of heteronormative environments – to not assume and take for granted the normalcy and alleged supremacy of heterosexuality.

Queer inclusivity must flow from the avowal of the non-identitarian approach that queer theory advocates. In this sense, the term queer militates against fixed essences and our stable understanding of identity. Binary thinking which reduces gender and sexual identities to man/woman, homosexual/heterosexual emerge from particular alignments of gender, sex and sexuality, which in actual practice is multiple and complex, even confounding. Projects of queer inclusivity must adhere to the understanding that straight jacketing of identity is the central problem and expecting identity coherence produces hierarchy and exclusions.

What would queering pedagogy, curriculum and the classroom entail? A queer pedagogy, according to Susanne Luhmann(2009) must exceed the incorporation of queer content in the curricula and teaching strategies that make this content more palatable to students. While incorporating modules on gender sensitivity, sexual difference and positive representation of queer subjects is necessary, it must also focus on social relationships in the learning process and on queer critiques of identity based knowledges. What is required is challenging the power dynamics between the dominant sexuality (heterosexuality) and all other forms of sexual and gender identifications in order to create a safe space for sexual difference and dissidence to flourish. The classroom must be a safe space for students self- making projects without fear of censure or harassment. It means that queer teachers need not be closeted and required to perform heterosexuality but may use their experiences and struggles for consciousness raising. It means sex and sexuality will not be taboo topics of discussion in the classroom. It would mean recognizing diversity on an equal footing. It means we will learn to respect a boy's choice to express himself in feminine ways without stigma. Such a classroom, as difficult as it may sound, will not kill some like Arvey, it will empower him.



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Antibacterial Therapy Of Bacteriophage : Yesterday, Today and Tomorrow

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Abstract :

Worldwide increase in multidrug-resistant (MDR) organisms present a significant problem for the clinical management of infection. Due to a significant rise in the prevalence of bacterial antibiotic resistance and a dearth of novel antibiotics, a considerable increase in the therapeutic usage of phages has been seen during the past ten years. Phage therapy, a technique for treating bacterial illnesses, makes use of bacteriophages, viruses that are specifically designed to eradicate bacteria, including types that are resistant to antibiotics. Since they only function on particular hosts, they can also be referred to as narrow-spectrum antibiotics. In phage therapy, obligate lytic phages are primarily used to destroy the bacterial hosts that they are intended for while leaving human cells unharmed and minimizing the wider impact on commensal bacteria that is frequently caused by antibiotic use. During the period of 1917-1930, fall out of bacteriophage therapy was mainly due to improper purification and storage of bacteriophages. The researchers were unaware about the high specificity of bacteriophages. So, antibiotics which had a wide host range were preferred. The advancement of technology helps the sequencing of the phages enabling the determination of its specificity for the bacteria. In order to increase the efficacy of bacteriophage therapy, phages can be combined with antibiotics and enzymes to target the biofilms produced by bacteria which were making them resistant to phages. Another emerging approach could be the genetic modification of temperate phages to make them lytic in nature for destruction of the bacterium. This paper aims to highlight the rapidly advancing field of phage therapy by citing a few case studies which use personalized bacteriophage therapy for treatment of diseases caused by extensively drug-resistant organisms. It also looks into the challenges that lie ahead as the world shifts away from complete reliance on antibiotics. Overall, this paper provides a comprehensive approach to the global acceptance of bacteriophage therapy for treatment of resistant bacterial infection.

Keywords: Multidrug-Resistant Organisms (MDR), Phage Therapy, Phage Cocktail, Specificity of Phages, Lytic Cycle



Introduction

In the last decade a steep increase in the therapeutic use of phages have been seen, which has resulted due to an increase in the prevalence of antibiotic resistance of bacteria, coupled with an insufficient number of new antibiotics. Phage Therapy is a cutting-edge technique for treating bacterial infections that make use of bacteriophages which are viruses that are specifically developed to eradicate bacteria including types that are resistant to antibiotics. Thus, they can also be considered as narrow-spectrum antibiotics since they act on specific hosts. Biotechnological advances have further increased the potential of phage therapeutics by including novel strategies that use bioengineered phages and purified phage lytic proteins. Bacteriophages are anticipated to be useful therapeutic agents for infections that are difficult to treat, and a substantial body of basic knowledge and some successful case reports support this expectation.

History of phage therapy

The lysis of bacteria by a minuscule germ known as a bacteriophage was first discovered in 1917 by Felix d' Herelle, a microbiologist at the Pasteur Institute in Paris. In 1919, d' Herelle and several hospital interns injected a mixture of phages to a 12-year-old boy who was suffering from severe dysentery to ensure that the phages in the cells were secure. The experiment was successful as the boy recovered completely just within a few days after a single dose. The study and testing of phages continued even in the 1920's and 30's due to their capability of treating bacterial infections. In the United States of America, a pharmaceutical company named Eli Lilly produced phages for human use in order to treat a wide range of bacterial infections like respiratory infections and wounds. However, they did not function well at that time, as the researchers did not have sufficient information about the selectiveness of bacteriophages, thereby not storing them or purifying them properly. Poland occupies a notable and significant position in the field of phage research. The Hirsfeld Institute of Immunology and Experimental Therapy in Wroclaw, which opened its Phage Therapy Unit in 2005, was the first facility of its kind in Europe, and it has since become a model for other facilities throughout the globe dealing with the problem of widespread antibiotic resistance. Also, a researcher named Karin Carlson of Uppsala University has contributed in the field of common techniques and methodological approaches for use of bacteriophages. Her work mainly centered around T4 bacteriophages. With the discovery of antibiotics (Penicillin), the use of phage therapy was declining as the antibiotics have a much wider host range capable of killing a wide range of bacterial species at the same time.

Current status of phage therapy:

While most clinical trials have failed to provide unequivocal evidence of the efficacy of phage therapy, the number of case studies in which phage therapy was successfully used to treat life-



threatening infections is increasing. This paper, therefore provides an overview of some case studies on use of personalized phage therapy listed below.

1. Personalized bacteriophage therapy against heterogenous *Klebsiella pneumoniae* in treating Urinary Tract Infection

Multi-drug resistant (MDR) organisms are increasing worldwide and one of the major areas of concern is the increasing antibiotic resistance among *Enterobacteriaceae* like *Klebsiella pneumoniae* (*K. pneumoniae*). *K. pneumoniae* is responsible for causing UTIs, bloodstream infections and sepsis. It can also cause infections in people with weak immunity and in those who have previously undergone surgeries.

The MDR *K. pneumoniae* Infection and Pathophysiology of the Patient

In this case, researchers attempted to treat a 66-year-old man with MDR *K. pneumoniae* induced multifocal urinary tract infection. *pneumoniae* using tailored bacteriophage therapy. Earlier, his cancerous bladder had been partially excised. After about four years from the time of his surgery, he had developed urinary tract infection caused by MDR *K. pneumoniae* and had been suffering from it for over a dozen years. Later, it was seen that none of the antibiotics or their combination which had worked *in vitro* against the isolates obtained from the patient was working to eradicate the pathogen. Infection by *K. pneumoniae* appeared immediately after drug withdrawal. The bladder mucosa was hyperemic and showed local ulceration and pseudo-membrane attachment. Thus, he was admitted to the hospital to receive bacteriophage treatment.

Materials and Methods

- Bacterial isolates were made from the urine and renal pelvis effusion samples taken from the patient. 21 strains of *K. pneumoniae* were obtained. Isolates were identified at the species level and their clonal relationship was obtained.
- Bacteriophage studies were carried out and they were screened from collections that were obtained from various environmental samples. Bacteriophage lytic activity was screened. The bacteriophages that showed strong broad spectrum antibacterial activity against the isolates were chosen for the therapy.
- A total of five bacteriophages were selected for the treatment from the Podoviridae and the Myoviridae family. No virulence genes or antibiotic resistant genes were found in their genomes.

Results and Discussion

In this case, *K. pneumoniae* strains had colonized the renal pelvis as well as the bladder before



the phage treatment was started. Bacteriophage therapy needed to be conducted four times to completely cure the infection.

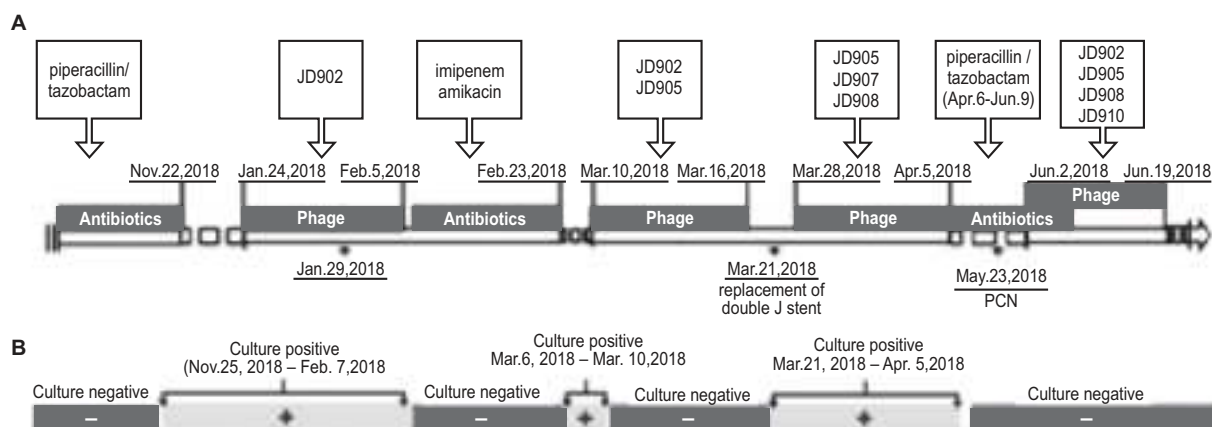


Figure 1

Reference: Qin, J., Wu, N., Bao, J., et al. Heterogeneous *Klebsiella pneumoniae* Co-infections Complicate Personalized Bacteriophage Therapy. *Front. Cell. Infect. Microbiol.*, 2021 Sec. Clinical Microbiology.

In the **first** phage therapy, lytic phage was chosen according to the isolates obtained from the patient's urine. 'Double J' stents were placed between the pelvis and bladder to dredge the connection between them so that the phage is able to irrigate to the pelvis during the process. However, despite the therapy, the urine as well as renal pelvis cultures were positive. Some of the strains from the urine culture were even found to be resistant to the phage used. The picture alongside shows the timeline of treatment.

- During the **second** therapy, a cocktail of phage lytic to all the previous isolates was administered via bladder irrigation. His urine culture, which was initially negative, became positive again after replacing the 'Double J' stent.
- A bacteriophage cocktail lytic to all previous isolates was administered via bladder irrigation for the **third** therapy. However, the results were still positive. Thus, phage therapy was halted for some time during which antibiotic treatment was conducted.

The isolates from the renal pelvis and the bladder were later discovered to be different clones. Even when phage cocktails were used, phage-resistant isolates were still found in the patient's urine which could be due to the presence of minor resistant populations or mutations. From the renal pelvis culture, it was evident that *K. pneumoniae* had colonized the kidney and the phages were not able to reach it via bladder irrigation because of which these bacteria were being released continuously into the bladder. To remove the pathogens from both the kidney and the bladder, irrigation needed to be done via both the renal pelvis as well as the bladder.

- Thus, after conducting a PCN (with permission from the patient) prior to the **fourth** phage



therapy, a bacteriophage cocktail consisting of phages lytic to all the previous isolates was irrigated via the pelvis and then via the bladder. Along with this, antibiotic treatment was also conducted to eradicate subpopulations of phage-resistant variants that are frequently overlooked.

After 10 days of this therapy, the patient recovered with obvious improvements and a smooth bladder mucosa. The infection did not recur even after two months. Thus, the eventual clearance of *K. pneumoniae* was due to the combined effects of phage therapy and antibiotics.

2. Personalized bacteriophage therapy to treat pan drug-resistant spinal *Pseudomonas aeruginosa* infection

Bone and joint infections (BJI) are one of the most difficult-to-treat bacterial infection, especially in the era of antibiotic resistance. Natural viruses called lytic bacteriophages can destroy specific bacteria by concentrating on their biofilms.

In December 2017, a multidrug-resistant *P. aeruginosa* infection caused catheter-related bacteremia in a 74-year-old melanoma patient. He received colistin and meropenem over the course of 11 days, and he responded favorably to treatment. He first experienced back pain in the summer of 2018 and spondylodiscitis with a spinal abscess in December of that same year. Aspiration demonstrated avibactam, tazobactam, and colistin-resistant *P. aeruginosa* in culture, which is highly resistant to all antibiotics. He was given colistin and rifampin once daily in the hospital, and as soon as he experienced acute, mild kidney injury, the antibiotics were quickly discontinued. For the treatment of complex BJI with considerable pain, the patient was admitted to a referral facility. He needed an ongoing opioid injection because he was bedridden. Phage therapy, which was already being utilized in the facility, was planned as salvage therapy because no active antibiotic was available for the treatment. In order to quickly build a customized three-phage cocktail for the patient, three distinct lytic phages that were active on the patient's initial *P. aeruginosa* isolate were discovered, produced independently, and administered to the patient.

Methods and materials

The three *P. aeruginosa* phages in this instance were created utilizing host strains of the bacterium. Phages and the matching bacterial host strains were combined at the predicted multiplicity of infection and then plated on APS-LB agar, which was incubated overnight at 37°C. The plates' top layer was removed and centrifuged. Endotoxins were removed from obtained supernatants using filtering and purification. The phage's pH levels ranged from 7.29 to 7.35.



Results and Discussion

The whole genome sequencing of this strain revealed many acquired genes responsible for the strain's high level of antibiotic resistance. Colistin (colistimethate sodium) was administered intravenously even though the strain had developed resistance to this antibiotic in order to see if it may work in combination with cefiderocol. Phages were also added intravenously over a period of three hours every day for 21 days because the cultures showed *P. aeruginosa* to be persistent. The patient underwent this treatment and developed recurrent *Clostridium difficile* infection and gall stone migration-related abdominal pain. No possibly harmful phage therapy-related side effect was observed. Cefiderocol and colistin antibiotics were withdrawn after three months. The patient was pain-free while walking over the follow-up period of 21 months, and there were no implant loosening or clinical symptoms of infection.

Phage therapy for BJI patients has received little attention in the literature, particularly for those who have spinal infections brought on by *P. aeruginosa* that is antibiotic resistant. Some patients were treated by academic institutions and others by commercial businesses using phages that were being developed due to the dearth or lack of action of phages in development. Even though it is challenging to precisely pinpoint the relative contributions of phages and antibiotics in the improvement of the patient in the current case study, we believe that personalized phage therapy is a potential adjuvant treatment for complex BJI, in particular due to pan drug-resistant *P. aeruginosa*.

3. Personalized bacteriophage therapy against Carbapenem-resistant *Acinetobacter baumannii* in treating Lung Infection in a patient with Chronic Obstructive Pulmonary Disease

Antibiotic overuse in clinical practice has aided in the global spread of bacterial pathogens that are multidrug resistant. This paper provides a case of an 88-year-old Chinese man who contracted Hospital Acquired Pneumonia (HAP) resulting from Carbapenem Resistance *Acinetobacter baumannii* (CRAB). Over the course of 16 days, the patient received continuous nebulization of a customised lytic pathogen-specific single-phage preparation conjunction with polymyxin E and tigecycline. The procedure almost cleared the microorganism and improved the patient's clinical condition and lung performance. Clinics have a significant problem from infections brought on by carbapenem-resistant *Acinetobacter baumannii* where bloodstream infections and hospital-acquired pneumonia are the two most prevalent CRAB infections that are frequently linked to incredibly high fatality rates. CRAB was identified by the World Health Organization (WHO) as the pathogen with the highest critical priority and these pathogens are a class of bacteria that are most dangerous to human health. New approaches to overcome CRAB infections is highly needed.



There have been efforts made to create bacteriophage as a substitute in the management of CRAB infections. In personalised therapy, phage therapy has been employed, and multiple cases of CRAB-caused illnesses being successfully treated have been documented. To the best of knowledge, no cases of lung infections caused by CRAB that were successfully treated with phage therapy have yet been documented. This paper therefore discusses the clinical observations with phage therapy of an 88-year-old Chinese man with CRAB lung infection.

Patient's Clinical History:

An 86-year-old Chinese man with an aggravation of chronic obstructive lung disease (COPD) was hospitalised in June 2018. A long history of type-2 diabetes was noted in the patient's medical history. The patient spent the last two years in the hospital and experienced recurring lung infection episodes that were brought on by the frequent usage of mechanical ventilation. In April 2019, the patient was revived after a cardiac arrest, but had trouble weaning off from mechanical ventilation.

The patient displayed symptoms of a lung infection in May 2020. The patient's health worsened after approximately a month of various bouts of antibiotic therapy. It's significant to note that in June 2020, the CRAB-positive result of this patient's bronchoalveolar lavage fluid (BALF) culture caught the notice. With the exception of tigecycline and polymyxin E, all tested medications failed to kill the CRAB strains. These details suggested that this CRAB strain was most likely what caused the lung infection. However, the amount of tigecycline in the lung is frequently not very high. Additionally, the patient had diminished renal function, and polymyxin E has a high rate of nephrotoxicity. These details demonstrated that these two antibiotics were no longer the most effective option for the treatment. There have been numerous instances of the successful management of infections brought on by CRAB that were multidrug-resistant (MDR) bacteria which was treated by phage therapy. Hence, phage therapy was started in accordance with the hospital's ethics.

Phage Therapy:

Due to the patient's health suddenly getting worse, tigecycline was administered intravenously twice daily for six days prior to the phage therapy. With the exception of the first two doses, which were administered once daily, the patient began receiving the customized phage preparation by nebulization every 12 hours. The amount of phage that was administered was raised gradually. During the first five days of the phage therapy, tigecycline was supplied intravenously twice daily, and for the next five days, IU polymyxin E was inhaled twice daily. Within the next six days, all antibiotic therapy was stopped. Phage treatment was administered for a total of 16 days. The lung's bacterial and phage titers were observed by gathering BALF samples, and the profile of



the inflammatory factor was kept track of by drawing blood. Phage fragments were identified in the BALF one hour after the start of the treatment, and the phage titter gradually increased in 15 of the patients with BALF and a relatively high phage titter. This finding was in line with the fact that there was phage administration dosage on days 2 and 3 following phage therapy. However, it is conceivable that fitness trade-offs may have been related to phage resistance. Surprisingly, a culture of BALF did not produce any CRAB for the first time on the seventh day of the phage therapy. From that point on all cultures from the patient's sputum/BALF were negative for CRAB, with the exception of one culture of BALF on the 15th day of the phage therapy that was positive for CRAB.

4. A Case Study in India

A few undergraduates from Acharya Narendra Dev College in Govindpuri, South Delhi, Ritam Das, Saroj Chaudhary, and Ritu Arora visited some of the dirtiest areas of the city and gathered soil samples from the drains, sewage, and even areas where people spit, from which bacteriophages were separated. Together with their professor Urmi Bajpai, Kalakoti, Das, Chaudhary, and Arora are researching those bacteriophages in an effort to identify a treatment for tuberculosis (TB).

According to Gopal Nath, the head of the Microbiology department at the Institute of Medical Sciences at BHU, bacteriophages can be used to treat chronic wounds that are resistant to regular medical care because the bacterium can develop resistance to antibiotics. He therefore utilized a combination of efficient customized bacteriophages to combat this.

Dr. Dang's Lab and Vitalis Therapy recently launched India's first phage therapy project, bringing diagnostic bacteriophage sensitivity testing to the country. People suffering from bacterial diseases with the help of this initiative can get bacteriophage testing done locally in India, giving access to phage therapy at the Eliava Phage Therapy Center at Georgia.

The Future of Phage Therapy

Microorganisms will inevitably develop resistance against antibiotics eventually as a result of genetic mutations and horizontal gene transfer. However, antibiotic misuse exacerbates the situation. To prevent it, new methods are needed to combat these pathogens. Bacteriophage therapy is one of them. These can be applied in several microbiomes to mitigate the growth of microbes and can also prevent the spread of antibiotic resistance in them.

Emerging Approaches

The working of phages to combat bacterial infections can be improved in some ways by combining it with other agents. Some of the combinations are:



- Synergistic effect of bacteriophage and antibiotics
- Phages can also be used in combination with certain enzymes
- The modification of phage genomes is also being explored to improve phage therapy outcomes. Several studies have swapped receptor-binding protein genes between phages of different families, successfully exchanging the host range of the phage.
- Phages can also be engineered to deliver specific cargo to enhance the phage antimicrobial activity. For example, enzymes such as dispersin B and lactonase have been engineered into phage T7 to increase the phage activity against biofilms.
- Another approach could be genetically modifying temperate phages to become exclusively lytic. This has been accomplished by deletion of the genomic module responsible for the establishment of lysogeny. Overall, engineering approaches can potentially improve the antimicrobial properties of phages and create innovative strategies for fighting bacterial infections.

Conclusion

With the emergence of multidrug resistance and the slowing manufacture of new chemical antibiotics, the field of bacteriophage therapy is expanding quickly and has not yet been demonstrated to be useful in treating bacterial illnesses that are resistant to antibiotics. Phage therapy may have several drawbacks, such as a) changes to the phage receptor(s), which may reduce the effectiveness of the therapy, and b) unintended immunological reactions. As discussed in numerous reviews and perspectives, there are a number of potential benefits to using phages as antibacterial therapeutics. These benefits include: a) the ease with which a new phage that is active against a resistant bacterial strain can be selected because phages are so common and simple to isolate. An international action plan is required to make phage therapy available everywhere since infectious diseases know no boundaries. This obviously calls for active international cooperation to address logistical and regulatory issues, as well as between doctors and scientists to close the knowledge gap and promote advancements in the field.

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Mindset To Be A Technically Adequate Teacher

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Abstract:

Technology is a powerful tool that can support and transform education in many ways, from making it easier for teachers to create instructional materials to enabling new ways for people to learn and work together. With the worldwide reach of the Internet and the ubiquity of smart devices that can connect to it, a new age of anytime anywhere education is dawning. It will be up to instructional designers and educational technologies to make the most of the opportunities provided by technology to change education so that effective and efficient education is available to everyone everywhere. The role of information and communication technology (ICT) in education has significantly increased, but resistance to technology by teachers worldwide remains high. Teachers appear to consider a rich set of factors in initial acceptance of technology in their teaching but concentrate on fundamental determinants (e.g. apparent usefulness and perceived ease of use) in their continued acceptance. This article focuses on the role and mindset of teachers to embrace technology to facilitate education.

Key Words: Technology, Mindset, Education, Software, Teaching.

Introduction

Technology has impacted almost every aspect of life today, and education is no exception. However, in some ways, education seems much the same as it has been for many years. The teacher lectures from a podium at the front of the room while the students sit in rows and listen. Some of the students have books open in front of them and appear to be following along. A few look bored. Some are talking to their neighbours. Classrooms today do not look much different, though you might find modern students looking at their laptops, tablets, or smart phones instead of books (though probably open to social media). A pessimist would say that technology has done nothing to change education.

However, in many ways, technology has profoundly changed education. For one, technology has greatly expanded access to education. In the past, books were the only access to educational material. Individuals had to travel to centers of learning to get education. Today, massive amounts



of information (books, audio, images, videos) are available at one's fingertips through the Internet, and opportunities for formal learning are available online worldwide through MOOCs, podcasts, traditional online degree programs, and more. Access to learning opportunities today is unprecedented in scope because of technology.



*Source: uwplatt.edu – Laurentius de Voltolina –
Illustration of the classroom in 14th century*

Technology has also begun to change the roles of teachers and learners. In the traditional classroom, such as what we see depicted in de Voltolina's illustration, the teacher is the primary source of information, and the learners passively receive it. This model of the teacher as the "sage on the stage" has been in education for a long time, and it is still very much in evidence today. However, because of the access to information and educational opportunity that technology has enabled, in many classrooms today we see the teacher's role shifting to

the "guide on the side" as students take more responsibility for their own learning using technology to gather relevant information. Schools and universities across the country are beginning to redesign learning spaces to enable this new model of education, foster more interaction and small group work, and use technology as an enabler.

- Technology in the classroom provides teachers with more tools to support students.
In addition to resources like textbooks and worksheets, technology equips educators with various tools to help students develop a better understanding of the material.
Because students learn in unique ways, incorporating more learning methods increases the likelihood that all of your students will grasp the concepts you teach.
- Technology accommodates a variety of learning methods.
Whether students learn best through lectures, reading, examples, or video, technology allows teachers to accommodate every learning style.

Students can learn via online videos, audiobooks, interactive online games, and more, all at their own pace. And because online content is easily updated, you and your students can immediately access the most recent information.

What Is a Mindset ?

Mindset is a set of beliefs that shape how you make sense of the world and yourself. It influences how you think, feel, and behave in any given situation. It means that what you believe about yourself impacts your success or failure.



According to Stanford psychologist Carol Dweck, your beliefs play a pivotal role in what you want and whether you achieve it. Dweck has found that it is your mindset that plays a significant role in determining achievement and success.

Mindsets can influence how people behave in a wide range of situations in life. For example, as people encounter different situations, their mind triggers a specific mindset that then directly impacts their behavior in that situation.

Fixed vs. Growth Mindsets

According to Dweck, there are two basic mindsets: fixed and growth. If you have a fixed mindset, you believe your abilities are fixed traits and therefore can't be changed. You may also believe that your talent and intelligence alone lead to success, and effort is not required.

On the other side, if you have a growth mindset, you believe that your talents and abilities can be developed over time through effort and persistence. People with this mindset don't necessarily believe that everyone can become Einstein or Mozart just because they try. They do, however, believe that everyone can get smarter or more talented if they work at it.

Here are some fixed vs. growth mindset examples:

Fixed Mindset	Growth Mindset
Either I am good at it or I am not.	I can learn to do anything I want.
That is just who I am. I can't change it.	I am a constantly evolving work in progress.
If you have to work hard, you don't have the ability.	The more you challenge yourself, the smarter you become.
If I do not try, then I will not fail.	I only fail when I stop trying.
That job position is totally out of my league.	That job position looks challenging. Let me apply for it.

Why some teachers resist technology?

Some tech-savvy teachers encounter resistance from their colleagues who are not so keen to adopt new technologies, and it is observed that, if more teachers were more open to new tools then the administration would probably get it for them.

Moreover, some teachers would love to have a specific device or software for a particular class that they are teaching, but because other educators do not know or do not want to understand the benefits or the possibilities of that particular type of tool, they down-vote it or simply reject investing in them.

Another problem is related to lack of training and workshops. The teachers must be trained to properly use technology and make them understand how to effectively use these solutions



to enhance their lesson plans. As a result, the hardware and applications do not get used and get forgotten.

Some teachers have expressed their fear of not being able to control what learners do on their screens. They also think that if technology is introduced students would not be interested in the teacher and the content itself. Also, some teachers feel that they would not use technology in the classroom because of lack of confidence using the devices and tools.

Change your mindset

Digital is as much about people as it is about technology. It mainly focuses on being able to incorporate technology into their daily roles and extracting value from it. The digital learning environment requires teachers to re-think their place, their role, and the needs of students when Information and Communication



Technology (ICT) supports the delivery of content. The teachers possibly will have to unlearn old beliefs, practices and habits, and learn and relearn the skills, beliefs, and values.

In order to embrace technology, recognize and change your fixed mindset in order to reflect with a growth mindset.

As you approach a challenge and hit a setback there may be a conflict between the fixed and growth mindset.

The fixed mindset says	The growth mindset answers
Are you sure you can do it? May be you don't have the talent.	I am not sure I can do it now, but I think I can learn to with time and effort.
What if you fail you'll be a failure.	Most successful people had failures along the way.
If you don't try, you can protect yourself and keep your dignity.	If I do not try, I automatically fail. Where's the dignity in that?
This would have been easy if you really had talent.	That is so wrong. Cricket was not easy for Sachin Tendulkar and Science was not easy for Sir J C Bose. They had a passion and put in lots of effort for their achievements.
It is not your responsibility. You stick to your methods.	If I do not take responsibility, I can not fix it. However difficult it is, let me learn the most of it.



So as you face challenges, setbacks, and criticism, listen to the growth mindset voice and take actions accordingly. Practice hearing both voices, and practice acting on the growth mindset. As a result you need to:

- Take on the challenge wholeheartedly
- Learn from your setbacks and try again
- Hear the criticism and act on it
- See how you can make it work for you.
- Ask questions freely. It helps to reinforce learning.

Always be ready to learn from those who have expertise in education technology. There is always a technology enthusiast who already knows technology in depth, and in case there is not, it is always better to learn together.

On the other hand, maybe you know a trick or two one of your peers completely ignores. By showing them the ropes you will be helping the professional development of not just yourself but also your whole learning community. A better understanding of online classroom software benefits not only the teachers but also the students, as their engagement is less often disrupted by the occasional troubleshooting.

All points of view, positive or negative, should be taken into consideration by you and your colleagues, as they represent avenues to grow and further improve the learning ecosystem. There may be issues you have noticed that no one else has, and by pointing them out you might be helping everyone out in the long run.

There are two different things. The first one is “learning technology” (based on psychological and social-psychological research) which helps to choose contents and goals to design teaching methods and environments for learning. All of this is needed so that students can have better achievements. The other is “delivery technology,” which is necessary for providing an efficient and time-adjusted approach to teaching methods and learning environments. They are both essential but very different regarding their contribution to education. “Delivery technology” impacts costs and access to teaching and information. “Learning technology” allows having an impact on students’ achievements.

You must understand the relationship between technology and learning because, today, that is an everyday thing. Everything that we see or hear comes from some technology. It has an impact on nature and the quality of learning. Teaching and learning, through technology, are changing the way students find out things and equip themselves with skills and strategies for thinking about how to reorganize their time, assignments, etc. All of that significantly improves their performance.



Conclusion:

Technology is not a substitute to a teacher. The truth is that technology will merely give the teachers another tool - a better tool, with which to teach their students. It takes work on the teacher's side and an understanding of how to properly use the education in the classroom. Blended learning takes elements from traditional education and blends them with software tools, encouraging teachers to use technology in the classroom. By taking advantage of recent advances in education technology we can create a more engaging and efficient educational system. Even though education technology may be a new phenomenon for many teachers, younger people are more tech-savvy and the software may resemble applications they use in their daily lives. However all the teachers need to embrace technology based teaching as there is a paradigm shift in the modern trends in education. Teachers need to have a Growth based progressive mindset rather than having a fixed mindset to embrace technology as it has become a part of our everyday life.

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A Review Study On Bridging The Gender Digital Divide And Promoting Women Empowerment Through ICT

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Abstract :

“Digital Divide” is the term that refers to the differences in resources and capabilities to access effective utilization of Information and Communication Technology (ICT) for development that exists among countries, regions, sectors and socio-economic groups. The characteristic of digital divide is low levels of access to technologies. The factors that challenge the sound access of ICT infrastructure in developing countries like India are poverty, illiteracy, lack of computer literacy and language barriers. Gender issues play a significant role in the use of ICT. Some of the significant factors for gender digital divide in terms of accessing ICT are socio-economic status, isolation and inequality, linguistic barrier, stereotypical depiction and exploitation of women. A detailed study of newspapers, articles and internet sources is used to collect data. Secondary data are statistically justified where needed. This paper facilitates in bridging the gap of digital divide and gender issues. This paper provides an overview of gender digital divide, bridging the digital divide and gender issues by empowering women through ICT.

Key Words: Digital Divide, ICT, Gender Issues, Women Empowerment, Bridging

Introduction :

Information and Communication Technologies (ICTs) refers to various set of goods, applications and services that develop, process, disseminate and transform information. It is a powerful tool for creating economic and social development in context of employment opportunities, health-care delivery improvement and other services, and intensification of networking, participation and advocacy in society through ICT usage. The term ICTs comprise of computers, telecommunication technologies (telephones, mobile phones, radio, broadcasting and television) and networking

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technologies (the Internet). Globalization of information includes internet search, blogs, online multimedia resources, social media, wikis and services like e-government, e-health, e-banking, e-learning, e-commerce, e-voting, have contributed a new paradigm shift in communication, engagement in social and economical context. The use of ICT has changed the concept of social interaction, economic and business practices, political engagement, education, health, leisure and entertainment.

ICTs can be classified into two categories :

- Information and communication Infrastructure:
It signifies physical telecommunication systems and networks (cellular, broadcast, cable, satellite, postal) which are utilized through internet, voice, mail, radio and television.
- Information Technology:
It consists of information collection, storage, processing and presentation between hardware and software.

“Digital Divide” is the term that depicts the differences in resources and capabilities to access effective utilization of Information and Communication Technology (ICT) for development prevailing in and across countries, regions, sectors and socio-economic classes. In other words it is the gap that exists among individuals, households, corporate and geographic regions at various socio-economic sectors in respect to their ICT accessibility and usage of the Internet for a wide range of activities. In a developing country like India promotion of gender equality and women empowerment can be escalated and enhanced through ICT. The aim of the paper is to present the issues of gender equality related to ICT and empowering women economically, socially and politically. The paper depicts the need to address the gender digital divide, to bridge the inequalities through the effective use of ICT to promote gender equality and women empowerment.

Digital Divide and Gender Issues

Digital divide is characterized with low levels of access to technologies. The challenging factors for sound access of ICT infrastructure in developing countries like India are poverty, illiteracy, lack of computer literacy and language barriers.

Gender issues play a significant role in the use of ICT. Some of the significant factors for gender digital divide in terms of accessing ICT are as follows:

- Socio-economic status:
Socio-economic status affects the access and usage of the Internet. Persistence of the gender wide gap globally leads to relatively high price of access to Internet in many low- and middle-income countries like India. Dependence of women on male relatives economically



results in them having limited control over finances. Consequently, unequal division of paid and unpaid work affects the affordability of ICTs for women predominantly.

- Isolation and inequality:

Inadequate technological infrastructure and geographical isolation can affect both men and women in accessing ICTs. Women are subjugated by power of inequalities and socio-cultural norms. They are restricted to ICT usage in the countries marked with gender inequalities in terms of education, income, political power and cultural norms.

- Linguistic barrier:

Another major obstacle to the incessant use of available ICTs are lack of relevant content for women. Most of the information available in internet are in the English language which is not comprehended by billions of people especially women who fail to access information because of the language barrier. Exclusion of women from production of information signifies that their diversified thoughts, experiences and opinions are not well illustrated. Consequently stereotypical depiction of women in the media is established.

Stereotypical depiction and Exploitation of Women

The factors that impede access and use of internet for women are aggressive online environment portraying negative stereotypes, biased and conservative gender activities, harassment and hate speeches. Internet is a media used to mark violence and escalates sexual exploitation of women. Some mediums also advertise and market pornography and prostitution which may result into human trafficking and trolling for sexual purposes.

Review of Related Literature :

Cooper, J. (2006) has studied the digital divide on the basis of gender. The study shows that females are in an unfavorable stage in the context of perception about computers and the online learning system. Anxiety of learning through computer assisted software is more prominent among females than males.

Intel Corporation and Dalberg Global Development (2012) have surveyed gender gap in accessing internet in the developing countries. The study has shown that the internet penetration among women is lowest in India and 8.4 percent of the female population access the internet. 43% of the Indian female internet users access internet as “essential” on a daily basis whereas 59% among them are using internet for finding and applying for jobs. The non user Indian females are ignorant about the internet technology and with a belief that accessing internet would lead them to face opposition from family or partner.

Aker, J. *et al.* (2012) has investigated on return to educational investments and whether such investment can change the tenacity of educational objectives. The study depicts that easy information



technology can be utilized for effective educational results among rural population.

Zohu, M.(2014) has studied the gender differences among Chinese students for deriving information from the web. This paper depicts the gender difference in terms of effectiveness in web search levels where the male students are more actively participating in web search activities as compared to female students.

Soundari, M.H. (2016) has studied various ICT Initiatives for sustainable development of women from rural India, and he concluded that necessity for ICT initiatives is significant to establish dignity and rights of women. These require development on basic education, technical skills, and framing training for women; women's empowerment in content creation; opportunity for easy access and optimum use; and finally engendering of ICT policies. Presently it is a crucial time for policy change to reduce the ICT gender gap, significantly from the perspective of women at the grass root level.

The report of OECD (2016) with an objective of equal participation of women in the field of digital economy depicts the obstruction in accessing digital platforms and socio cultural norms that play a negative role in lowering the enrolment of women in the field of science, engineering and technology. It recommends the "leapfrog" opportunities for reducing the existing digital gender divide. Thus bridging the digital gender divide through accessing digital platforms, professional social networks, online market platforms, mobile phones, digital financial inclusion and empowering women in the era of digitization.

Bayeck, R. Y. et al.(2018) has studied the single gender grouping perception among students in Massive Open Online Course(MOOC). The study shows the difference in perception among male and female students in single gender group formation. Further the study reveals that gender and age plays an important role in online learning systems like MOOC.Bayeck15

Objectives of the Study :

1. To understand the empowerment of women through ICT access and use.
2. To examine the nature and conditions (socially, economically, culturally, psychologically) framing access and use of ICT for empowering women.
3. To trace the barriers and bottlenecks of access to ICT to promote gender equality.
4. To find the probable causes of gender inequalities

Methodology :

The present research work is a review-based study. In this study the data sources have been taken from published peer-reviewed scholarly articles, unpublished peer – reviewed and non-peer-reviewed articles, newspapers, relevant books, internet sources, journals, reference books and annual reports of organizations.



Salient Findings of the Study :

Root causes of the existence of digital gender barriers in accessing, controlling and using ICTs

- **Cultural and social limitations**
Accessing technology based education by women is coloured by cultural attitudes. Norms prevailing culturally and socially challenges mobility for women accessing telecentres or cybercafés. Internet access and usage by women is accelerating additional risks like cyber stalking, harassment in digital mode, and sex trafficking. Thus it is important to implement precautionary measures for restriction and eradication of online gender-biased violence.
- **Time and mobility restrictions**
Rural women have to perform various kind of household activities like fetching water, cooking food, looking after the children, washing clothes along with agricultural activities. The contribution of women in agriculture is often unpaid or considered as part of family responsibility. Domestic burden is an obstacle to the use of ICT's by many women.
- **Lack of adequate infrastructure**
In rural areas inadequate infrastructure such as installation of broadband facilities and cell phone tower prevents access to ICT. Women living in poor and remote areas often find the Internet particularly difficult to access because of limited connectivity. Public access facilities can offer an alternative solution; however, such facilities may only be available in locations that women find unsafe or inaccessible, or where social norms and safety concerns curtail freedom of movement. In some societies, women also experience difficulties in obtaining proof of identification which is required to open accounts or register SIM cards.
- **Financial constraints**
Generally income of women is less as compared to men. Women are less fond of buying any ICT device or for accessing any training programme. Though access to use of mobile phones have increased among women but the access is limited to the household. They often share the phone with other members of the family or with the community or they use it for a restricted period of time.
- **Literacy and education constraints**
There exist a strong correlation between poverty and illiteracy. Illiterate women neither can access ICT easily nor can be trained through ICT awareness programmes. Typing SMS and sending mobile phone messages is difficult for illiterate women, and internet browsing become difficult for such groups. Language plays a very crucial role in accessing ICTs. As most of the information over internet is in English, it limits the ICT access among rural literate women.



- Lack of effective digital policy

Different kinds of public initiatives aim at narrowing the digital gender gap. Introduction of fundamental technical skills and connectivity are some approaches implemented among the rural Indian women. Such projects or organizations work in private public partnership mode and in most of the cases are uncoordinated and democratically unorganized.

ESSENTIALS OF BRIDGING DIGITAL DIVIDE AND GENDER ISSUES FOR BUILDING AN INCLUSIVE DIGITAL FUTURE:

- Content development

By accessing ICT women and men can actively participate in various parts of production, processing and marketing. This requires appropriate content development in local languages which is easily comprehensible and it should be prepared from a reliable and trusted source. Compilation of information should fulfill the necessities of various groups of ICT users.

- Capacity development

Capacity development can be made at three different levels like individual level, organizational level and environment enabled level. These three levels have independent mode of working with others and hence can make a profound impact on capacity development. Strengthening of capacity development at the individual level results in change in behaviors, skill and attitudes. In this context separate learning opportunities for men and women is a useful tool through which the groups are brought together and which will enable them to exchange their thoughts and ideas. This measure will help both men and women to have their self as well as common moments of learning. This will provide free communication platforms for men and women to exchange their views, thoughts and ideas.

Capacity development at organizational level means ways to upgrade the overall function of the organization which includes changes in the system and processing of the organization. The training sessions of the organization need to encourage active participation of both men and women. To provide child care facilities during sessions will be an additional advantage for women participants.

Environment enabled level reflects the capabilities and capacity development between the individual and the organization. Enabling environment level focuses on the progress and behavior of individuals and organizations.

Gender and diversity

Gender issues consist of men-women relationship, their involvement and control over resources, division of labour, necessities and interests. The goal of access to ICT is to escalate the livelihood of mankind and to empower women in particular. Access to ICT will enable women to participate



actively in the decision making process, enhance the status of women and lead to advancement in their economic growth.

Accessing and active participation:

Active participation of women will be ensured according to their needs. For greater interests and active involvement activities are to be organized meticulously with daily records of tasks and routine works.

Increase in number of women's agencies:

Increase in number of women's agency will act like a common thread in bridging the digital gender divide. It will provide platforms for discussions and activities for different organizations NGOs and technology based companies to implement the applications of ICTs in the daily lives of female users.

Framing of real digital policy:

The objective of national digital policies are to decrease the gap of gender digital divide and thus promote access, adoption, improvement and affordability of digital technologies. The digital strategies should spread across the rural areas by expansion of networking and accessing of ICTs. The policies need to provide access, affordability and usage facilities to low-income groups. It should also escalate e-banking and mobile money facilities for women and at the same time ensure online safety.

Conclusion :

Technologies are constructed on a social basis and have various impacts on women and men. The capacity of women to explore the scope of the new ICT as tools for empowerment is restricted in various forms – infrastructure, connectivity costs, literacy in knowing computer and language skills. These constraints are exacerbated by gender-based determinants in different cases which particularly lead women to disadvantageous position. Digital transformation comprises of economics, digital societies, and accessing digital technologies have promoted the productivity of citizens and thus reducing the gender digital gap through equitable sharing of the digital transformation. For bridging the digital gender gap, national digital policies are to be framed for promoting e-banking, accessing internet in the rural areas, accessing smart phones, tablets and laptops and enhancing online safety.

There is a need to create more gender-diverse networks to pool talents, knowledge, money, and ideas. Professional women should be encouraged to develop networks around tech-transfer management, as a high-value profession for female scientists. Addressing the gender gap in decision-making positions may require a new generation of female technology transfer managers with business school background. To get more women involved in the process of technology transfer at every



level — from idea generation, through research and discovery, to patenting and licensing to new or established companies.

Technology is an important means of changing society and economy. People, who are away from the opportunities brought by ICTs and online services, will naturally face problems. The digital gender divide is considered as a new phenomenon in developing countries; therefore, there are many aspects that researchers from different disciplines can choose as the main subject for their future studies.

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Role of Youth in Safeguarding Mother Earth

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Abstract :

Frequent and intense storms, drought, heat waves, warming oceans, melting glaciers and rising sea levels are the global environmental challenges for human beings in the 21st century. For the protection of our living planet from further degradation and sustainability of our only home, everyone has to fulfill their responsibilities as global citizen. Youth are very important and dynamic segments of population. Environmental education provides opportunities for the young minds to be a part of real-world problems that transcend classroom walls. The youth can develop a strong force that can communicate to the masses and influence the people when they are gathered together by the power of unity. Environmental education for the youths assists in understanding the environmental issues by providing knowledge of physical, chemical, social, and biological processes and also make them aware of the environmental laws, rights and duties. This education and awareness will help in reducing further environmental degradation, useful for ecological restoration and help human beings to live in harmony with Mother Earth.

Keywords: Environmental Education; Youth; Environmental Degradation; Mother Earth

Introduction

Escalating environmental pollution and environmental degradation is of global concern. Mother Earth, our only home, is suffering. The oceans are filling with plastics and they are becoming more acidic. Changes in the patterns and amount of rainfall are affecting the water supply, water demand as well as water quality. Warmer temperature is increasing the frequency, intensity and duration of heat waves which is having detrimental impacts on human health, flora and fauna. Frequent and intense storms, drought, heat waves, warming oceans, melting glaciers and rising sea levels are destroying the biodiversity and ecosystems. Various anthropogenic activities are accelerating the speed of destruction of the planet. Climate change is now affecting every country on every continent. Tackling this environmental crisis is beyond the capacity of one individual, one institution or one government. So every human being of the world needs to be aware and needs to actively participate in protecting the global environment. Here lies the actual importance and necessity of Environmental Education (EE).



Environmental education connects us to the world around us, raises awareness of the contemporary environmental issues and helps us take actions to improve existing environmental problems. Knowledge and understanding of the environment, attitude of concern for the environment, awareness and sensitivity to the environment, skills to identify and help in solving environmental challenges and participation are the main components of environmental education. An understanding of the environment, its components and its physical, chemical and biological characteristics provides the knowledge, skill and analytical tools required for tackling the environmental challenges on a local, regional and global level. Environmental education enables the young minds to make connection and apply their knowledge in the real world and also learn to see the interconnectedness of social, ecological, cultural, scientific and political issues. Youth can take actions to address the environmental issues by reaching out to the community experts, volunteers and local facilities which can provide integrated and sustainable solutions of the present environmental crisis. It encourages environmental stewardship which helps in development of skills for addressing the environmental issues and enhances capacity for future conservation efforts. It also motivates people to think globally by acting locally. Information about nature, experience in nature, and committed nature connectedness are the three components of connectedness with nature, and environmental education helps in introducing, strengthening, and fortifying these components in human lives. EE helps an individual to weigh the various sides of an issue through critical thinking.

Involvement of the youth in formal and non- formal environmental education creates the awareness among those human beings who are at the threshold of becoming active participants in society as citizens, decision makers and leaders. EE fosters skills like enquiring, exploring, finding concerns, analyzing, interpreting, reasoning, generating conclusions and solving various types of problems, and these skills are important for shaping the future world. Environmental Studies has been introduced as a compulsory subject for all undergraduate courses offered in India. It helps us to understand the sustainable utilization of our natural resources and live in harmony with nature. It has been also introduced at the early stage in schools. Young people constitute a large part of global population and because of their longer life expectancy, they have to live for quite some time with the consequences of the deteriorating environmental conditions. One important way to equip the young people to deal with present environmental crisis is through effective environmental education. Young people play a very vital role in environmental protection and in fighting the climate change. Holistic and inclusive approach supports participation and engagement of youth in environmental preservation. They have the capability to change the dynamics of the societies and promote more sustainable and conscious behaviour among the communities. Young minds can actively design and implement sustainable solution for environmental conservations and shape policies for our future. They can make their homes, institutions and youth organization more ecofriendly by adopting more environment friendly practices, reducing the misuse of our natural



resources and proper waste – management techniques. Youth may take ecofriendly initiatives by arranging plantation programmes, waste recycling activities, organizing seminars and workshops on contemporary environmental issues in their institutions for spreading environmental awareness. Environmental education facilitates the responsible consumption of the natural resources and encourages the sustainable practices for environmental protection and amalgamates the concept of environmental sustainability across all disciplines. Environmental education has become a part of school education also. When children study the environment and its functions, they develop a sense of understanding of the environment in the early stage of their life. Children inculcate the sense of caring and loving Mother Earth and learn to act responsibly towards the environment from their childhood. Participation of students in age – appropriate projects along with their academics helps them to address the environmental issues both at personal and societal level.

Conclusion

Environmental education develops the knowledge, skill and proficiency amongst the young learners to cater towards environmental crisis, conscious about the challenges of the environment and find out sustainable solutions and prepare them to face their future with aspiration and commitment. Environmental education is the need of the hour for better and greener future and youth play a pivotal role in ensuring a sustainable future of mankind.

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Post-Pandemic Health Communication : An Educational Dogma

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Abstract:

The present world demands interconnectedness and openness in the comprehension of global and intercultural issues in the field of health communication. The emerging challenge is the authentic and rapid dissemination of health-related information. The infodemics through mass media coverage have already influenced human minds at various levels of cognition. The post-pandemic era may witness evolving and dynamic health care strategies, quality ambience, medical facilities, improved diagnostics and early intervention schemes, enhanced health literacy and diverse psycho-social perspectives. While negative schemas may lead to maladaptive cognition among the general mass, positive schemas may become the central motivation for the sense of overt well-being, creativity and constructive endeavours. The facilitators must inculcate a positive and motivational emotion-cognition interface in the mental framework of the public. The digital pervasiveness in the field of medicine, hospital management, pharmaceutical marketing and mass communication may aid in excavating novel niches in the emerging career and employment prospects in the post pandemic era. Every decentralized body across the country must focus on reliable, accurate, consistent, evidence-based, and culturally competent knowledge dissemination. Extensive research needs to be conducted for integrative communication mitigation and expansion. The prioritization in health management and immense potential of digital integration provide the aspiring job-seekers to engage in both part-time and full-time commitments, leading to a revolutionary economic leap in the post-pandemic human society. The holistic health promotion and awareness propagation will call for various kinds of engagements, sufficing various educational levels in the post-pandemic period.

Keywords: Health Communication, Pandemic, Cognition

Introduction

The healthcare management system has undergone a drastic evolution, with parallel success in online and offline modes of operation. The incidence of the catastrophic COVID-19 pandemic caused by the deadly coronavirus has diversely impacted the global population, affecting psycho-social well-being, irrespective of caste, creed, and religion (Pfefferbaum & North, 2020; Wu et



al., 2020). Besides ravaging physical health, infodemics through mass media coverage have already influenced human minds at various levels of cognition and consciousness. The post pandemic era will need a new media landscape for effective and sustainable health communication. Health communication must be considered as a distinct, valuable, and evolving field of health science for worldwide social integration. The present paper deals with the holistic approach of the healthcare management system with specific emphasis on the significance of health communication in the contemporary pandemic scenario, reflecting on the diverse health care strategies. The paper considers the contemporary issues in health communication in India and abroad in the backdrop of the digital revolution. It encompasses various resources such as systematically conducted reviews, peer-reviewed journal articles, and various reported healthcare outcomes. The paper also focuses on emerging career prospects in the post pandemic world, emphasising on positive psychology-based health care interventions.

Diverse health communication strategies

Health communication aims to enlighten the general masses, thereby generating a huge impact on public decisions concerning health and fitness outcomes. The pandemic events have made information and communication technology-based public communication the contrivance of democratization of knowledge (Viswanath, Lee, & Pinnamaneni, 2020). There is immense responsibility of mass media and health communication system to combat the infodemic outbreak or infodemiology among the general population (Badell-Grau, Cuff, Kelly, Waller-Evans, & Lloyd-Evans, 2020; Mheidly & Fares, 2020). Among various forms of health communication activities, the updated reportage about the aetiologies, trends, and prevalence of the COVID-19 pandemic has a great socio-demographic impact. The post pandemic era must address varied health communication strategies encompassing extensive literature output, usage of multimedia formats and computerized imageries, world wide web documentation, rigorous visual health communication research and application (King & Lazard, 2020). An ideal humanistic strategy must have solidarity in transmission and reception of the real information and the corresponding target audience response (Werder, 2019).

The low health literacy about human ailments and complex pathological conditions is often considered as a 'silent killer' for society. The multi-lingual approach needs to be considered and the language of health-related information needs to be simplified for a popular approach (Zarcadoolas, 2011). The metacognitive human beings tend to rationalize any health-related vision and controversies through the cognitive decision making process, utilizing the attributes of sentience and sapience. The holistic health communication and promotion encompass government, non-government and public competencies in comprehension of public health and communication.



Medical education and post pandemic era

The COVID-19 pandemic has revolutionized the educational system and devised digital electronic-learning novelty for maximum benefit to the medical students, thereby aiding in the perpetuity of the educational progress (Almarzooq, Lopes, & Kochar, 2020; Idris & Edris, 2021; Nentin, Gabbur, & Katz, 2021). There has been a paradigm shift in the nature of medical learning due to rapidly changing treatment and diagnostic strategies, altered public outlooks, and diversification of roles of health care providers (Barash, Dickman, & Karasik, 2021; Nentin, Gabbur, & Katz, 2021). In the present medical education system, the versatile technological goals consist of enabling fundamental knowledge procurement, refining psychomotor skills, coordination and rationality, preparing for emergency and critical circumstances, and acquiring team-based training (Guze, 2015).

Emotion and cognition are closely entwined and a perfect blend can generate a successful learning platform. The advent of computer technology-mediated artificial intelligence has made possible the concept of 'Intelligent Tutoring System', whereby computer systems are as effective as intellectual human educators, dealing with the implementation of customized computer-based instruction and feedback methods without human intervention (Anderson, Boyle & Reiser, 1985; Alqahtani & Ramzan, 2019). Computer tutors are based on a set of pedagogical principles derived from the 'Adaptive control of thought' theory of cognition. This fast-paced user-friendly system helps to provide the students with a more personalized learning milieu, designed to foster curiosity and erudition (Oudeyer, Gottlieb & Lopes, 2016).

The rapidly evolving technologies including flipped classrooms having video and podcast facilities, virtual laboratory resources, mobile devices with various apps, optical display systems such as google glass, simulations, and modeling tactics are the desirable requirements in the present medical educational world (Guze, 2015; Trelease, 2016). The medical students are highly benefitted from the flipped classroom approach, the novel educational system of students viewing video lectures on their own and then engaging in active learning and discussions during the scheduled class times (Angadi, Kavi, Shetty, & Hashilkar, 2019). Students are asked to work through interactive virtual learning modules before in-class sessions leading to a positive learning experience and greater educational gains (Mortensen & Nicholson, 2015; McLean, Attardi, Faden, & Goldszmidt, 2016). This unique learning application has become progressively popular in health and medicine-based education and will tend to flourish in post pandemic era (Hurtubise, Hall, Sheridan, & Han, 2015; Hew & Lo, 2018). The educators as well as the taught consider the 'blended learning approach' as the most coveted approach for the continuousness of the learning process during the pandemic period (Yoo, Kim, Lee, & Rhyu, 2021). The immense impact of information and communication tools in medical education is found in the case of mobile augmented reality-based applications,



interactive computer-assisted teaching especially in acid-base physiology demonstration, case-based computer programs in the form of virtual patient or factual clinical encounters especially in surgical training, second life virtual world and many other essential pedagogical methodologies (Tworek, Coderre, Wright, & McLaughlin, 2010; Wiecha, Heyden, Sternthal, & Merialdi, 2010; Tang, Cheng, Mi, & Greenberg, 2020; Cerritelli et al., 2021).

During the pandemic period, various national and international webinars, online courses, teleconferencing, and workshops have helped students to get updated about the global research trends and discourses. The doctors and researchers are able to collaborate their research activities through the global networking system and exchange their innovative ideas for making a COVID-free world. In India, the most common virtual learning and meeting platforms in educational institutes utilize Microsoft Teams, Google Meet, Zoom, and WebEx and these will be considered as mandatory digital assets even after the end of the pandemic episode. The greater involvement and interaction in the digital world have become significant in fostering better global competencies in the educational world. The media will continue to play a vital role in rendering information regarding the ongoing virtual resources that will add to the ongoing medical education and help aspiring doctors to get motivated and enlightened.

Healthcare management and post pandemic era

Considering consumer-centric strategies and consumer health informatics, there is an inherent cognitive strategy for the pertinent health care perception and selection. In the midst of cognitive dissonance amidst general population, health care service holds responsibility in providing proper, loyal and trustworthy service. Ineffective communication between patients and health care professionals may act as a potent barrier in health care management. Facial feedback and smile reflex response are two vital aspects of interactive personality concerning both offline and online modes of health care management. The post pandemic health care management must focus on the neuro-marketing or application of neuroscience in comprehension of patient perceptions and preferences (Ariely & Berns, 2010). Hospital management is thus linked to hospitality and effective information transmission is the key to patient satisfaction. There is an ardent need for effective health literacy involvements for patient's consent and awareness of treatment protocols and diagnostics, health compensation schemes, premium as well as integrated tiered service schemes, genetic counseling communication, with reasonable disclosure for transparent care provision. The digital database needs to be updated and upgraded for every patient in all hospitals and health care centers.

The diagnostics have become rapid and accurate with diagnostic reports and results becoming accessible through online platforms. The digitalized booking system of health care services, home-collection facilities of samples, online payment and transactions will continue to help customers in



the post pandemic times. The digital revolution has led to the evolution of digital psychiatry encompassing the usage of digital biomarkers as mental health predictors and digital pathology encompassing virtual slide telepathology systems and whole-slide imaging method (Bueno, Fernández-Carrobbles, Deniz, & García-Rojo, 2016; Hariman, Ventriglio, & Bhugra, 2019).

Pharmaceutical marketing and social marketing have a great responsibility in consumer-oriented health care management. It must focus on easy supply and availability of relevant products and accessories, reducing the possibilities of panic buying syndrome witnessed during the pandemic time (Rajkumar, 2021). The online cataloging system and home delivery-cum-trial system, initiated by diverse companies during the pandemic period, has arrived as a boon for the consumers, especially physically handicapped and senior citizens who cannot venture outside for desirable purchase. The decisive purchase or decision neuroscience is also reliant on the regular advertising and poster campaigns in various forms of communicating media, including social media, references and catalogs (Korenkova, Maros, Levicky, & Fila, 2020; Yang, Li, Peng, & Wang, 2020). With the advent of pandemic-related improved health hygiene, consumers have become more conscious and cautious about personal health management. The inherent fear of getting affected has shifted cognitive patterns in marketing selection strategies, encompassing protective equipment kits, face and head shields, food products that have immune-booster, immune-modulatory, and ailment preventative properties (Galmés, Serra, & Palou, 2020; Mrityunjaya et al., 2020). Hence, customization in treatment and pharmaceutical protocols is the main driver to productive health care management (David, 2001).

Role of digital health communication in post pandemic era

With the predominance of digitalization and social media interface, sharing health-related information over the internet has influenced innumerable information seekers over the world. The quarantine or physical isolation periods, characterized by decreased social contagion and restricted mobility, have led to the increased dependence on online health care provision systems as well as online shopping spree for medicines and health supplements (Pagliari, 2021). Due to sudden digital surge, consumers consider digital shopping platforms convenient from the comfort of the home front along with discounted offers (De', Pandey, & Pal, 2020). Digital health marketing depends on the continuous excellence in service quality extended into various branches of health care delivery systems (Chichirez & Purcărea, 2018; Jaksic-Stojanovic & Jankovic, 2020). The pandemic has witnessed augmented usage of digital health facilities, including integrated marketing communication systems, virtual health activities, telehealth and telemedicine facilities (Adashi & Tang, 2019; Rodriguez-Villa & Torous, 2019; Taylor, 2019). Telehealth consultation, e-health services, and online patient engagement platforms will continue to play a great role in the health care system in the post pandemic period (Imlach et al., 2020; Meyer, 2020).



Digital media-based statistics represent a critical determinant for pharmacovigilance (Farooq, Niaz, Fakhar, & Naveed, 2021). In addition to pharmacokinetic and pharmacodynamic studies, such post-market digital monitoring is needed in order to collect data about any drug-based adverse effects and ensure the sustained safety of pharmacotherapy (Lavertu, Vora, Giacomini, Altman, & Rensi, 2021). 'VigiBase' represents one of the international pharmacovigilance databases, which has accumulated more than twenty-one million distinct case safety reports in 2020 (Bihan, Lebrun-Vignes, Funck-Brentano, & Salem, 2020).

Social media plays a crucial and powerful role in recent trends of real time health communication, influencing common masses, patients, and health care providers. The associated benefits of social media encompass greater sharing-interface, readily accessible and customized health related information, public health investigation, and social and psycho-cognitive support. However, social networking also faces the ongoing challenge of maintenance of quality, trustworthiness, and confidentiality, wherever and whenever applicable (Moorhead et al., 2013; Chou, Oh, & Klein, 2018). Social media infoveillance studies reveal that the 'Twitter' platform is dominated by the political actors acting as pandemic related opinion providers, while the 'Weibo' platform has become an official medium for the release of pandemic-related information from government resources (Deng & Yang, 2021).

In order to clarify the ongoing corona myths and false statements, the World Health Organization (WHO) took the strategic initiative to share infographics on social media and flatten the rising infodemic curve in the midst of reactive online searching (Tentolouris et al., 2021; Vraga & Bode, 2021). Social network intervention is the promising way out to handle the global health crisis as well as to foster vaccine confidence (Young et al., 2021). The dissemination of information through various authentic medical journals, health institutes and societies, and patient groups has become an essential part of social networking unit. The post pandemic health communication will be a major socio-cognitive platform for preserving mental and physical well-being of the general population.

Emerging career prospects in post pandemic era

The contemporary world is grappling with the increased rate of unemployment, salary reduction, and job insecurity, leading to financial constraints. These conditions have further led to the cognitive dependence and selection criteria of engagements in dependable and flourishing arena. The contemporary COVID-19 pandemic scenario has generated a plethora of emerging prospects in terms of career and job potential. In general, there will be increasing demand for health care workers as well as science, technology, engineering, and mathematics (STEM) career seekers. The prospective medical diagnostics and pharmaceutical sectors will rely more on digital marketing, leading to augmented demand for digital brand managers, customer relationship managers, search



engine optimization (SEO) specialists, content specialists, and email marketing experts. With increasing rates of cybercrime and cybersecurity risks, there is an increasing need for cybersecurity professionals in various healthcare and research sectors (Williams, Chaturvedi, & Chakravarthy, 2020). The role of cybersecurity experts has been admirable in clinical trials and digital analytics. With the growing prospects of virtual learning platform, online teaching can become a rewarding career option. Artificial intelligence and machine learning will be a technological career prospect.

In the present pandemic atmosphere, proper communication skills are necessary for motivating COVID-affected patients, COVID warriors, and preventive interventions for unaffected individuals. Patient-doctor-family communication must be effective along with patient education and counseling. The role of such psychological counselors has become imperative in patient management, creating job prospects for counselors through offline and online modalities. Cognitive behavior therapy and mindfulness training have become significant fields of acceptance (Li et al., 2020). Telepsychiatry and telecounseling represent promising career options to promote mental health services, stress and time management in the post-pandemic digital era (Di Carlo et al., 2021). There is a greater need for physical and rehabilitation medicine specialists to aid the pandemic survivors (Carda et al., 2020).

With more predominance of e-commerce and automation of various occupations, e-commerce, home delivery, and social media jobs have become emerging occupational arena. The widely prevalent working from home (WFH) strategy has led to greater digital dependence or mass telecommuting (Bouziri, Smith, Descatha, Dab, & Jean, 2020). Since digital medical records have become imperative to all sectors of healthcare, medical transcription and editing can be a prosperous career option as part of work from home occupation (Garcia, David, & Chand, 2010).

The multidisciplinary field of 'implementation science', promoting the application of research findings in routine healthcare settings and knowledge translation in health, is an emerging area of health science, encompassing implementation of knowledge in various health careers, knowledge of customized medicine, economics and policy contexts of implementation (Wensing & Grol, 2019; Bauer & Kirchner, 2020). The pandemic provides a gateway to implementation scientists to analyze real-world data and generate corresponding concerns and management protocols (Wensing, Sales, Armstrong, & Wilson, 2020). The mass media interventions will continue to be powerful determinants in health communication, paving the promising gateway to media professionals in the post pandemic era.

Conclusion

The altered life style and coping strategies, persistent chaotic surroundings, economic crisis, changing educational system, and occupational set-up have profound influence on pandemic inflicted population. The comprehensive understanding of diverse yet integrative health communication



strategies will aid in deciphering the socio-economic benevolence of the society and the country as a whole. The online and digital management system along with traditional and offline strategies, encompassing reliable, accurate, and culturally competent knowledge dissemination, health care morale, and quality service availability, need to be addressed at the earliest, emphasizing on positive coping strategies and alleviate health care management related distress among all strata of the society. The effective, rapid, and credible health communication tactics need holistic socio-economic and psycho-cognitive considerations during the ongoing pandemic as well as post-pandemic era.

The viral catastrophe has redefined human activities and people need to deepen and accelerate digital transformation so that health services are easily accessible. The policymakers along with health researchers and professionals and psychological counsellors must come forward unitedly with virtual rehabilitation protocols, proper dissemination of guidelines, and mental health management strategies. The widespread usage of phone helplines, e-consultation services, de-addiction programs, primary care centres, community health workers, online resources, helps to reduce mental stigma in public health response. The post pandemic period will need reskilling and reconsideration of diverse, unique, and accessible health communication strategies with special emphasis on medical-scientific communication, mass health crisis and risk communication, mass empathetic communication, media-directed health communication, inclusive supporting communication. The pandemic is not only about physical confinement, but it is also about psychological expansion and connectedness in the virtual era, exemplifying the significance of positive psychology to promote over mental well-being in the post-pandemic era.

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Ethical Knowledge For Social Sustainability : The Vision Of National Education Policy 2020

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Abstract:

Ethics is concerned with the way we ought to conduct our lives. The quality of human resources of a country depends on the nature of education, formal and informal, that the children receive in their early stages of life. Quality education provides the essential traits of value judgment, and accordingly, the youth learn the societal norms. Ethics gradually develop among them and mutual trust and respect among the community eventually grow. The children should know their rights and duties at home, school, and in the community for their social interactions. This makes them aware of being vulnerable to any kind of exploitation, at least unknowingly. Self-confidence is also developed in the long run, and they try to become responsible and kind towards fellow children. That's why, the National Education Policy (NEP) 2020 has stressed that the process of inculcating a democratic value system, especially, the rights and duties should be initiated during the school days. Effective parenting, value-oriented schooling, and normative social interactions will definitely reduce the tendencies of deviated personalities and juvenile delinquencies to a great extent.

Keywords : Ethical Knowledge, Social Sustainability, NEP 2020

Introduction

India has a very ancient history in the evolution of ethics. India has been a land of ethics, spirituality, and tradition. In ancient India, education progressed with an abundance of such virtues. But, at present, the whole country is experiencing a degeneration of values, and this is posing a heavy challenge to the development of the nation in its true sense. The future of a country largely depends on the prevailing education system and to reap the maximum dividend out of this, the focus should be on its young population. Many scholars are now emphasizing the need for universal education at the primary level, which is expected to strengthen the base of the entire education system of the country and also expand the democratic and civic values in the young mind, eventually leading them to become ideal citizens.



The current education system is highly dysfunctional and not adequate to address the social and ecological challenges of our time. Very little thought had gone into exploring the reorganization of the educational systems, and how physical landscapes of schools could be actively incorporated into teaching-learning processes. Consumption-oriented modernization has a multi-pronged effect on the social environment. Often this creates a dangerous situation and obviously leads to a remarkable change in the social culture and values. Individualism has replaced communism. Commitment and responsibility to society and family have been replaced by unhealthy individual competition. As a result, there has been increasing in mental disorders among the young population. Rising crime, corruption, exploitation, and strife in society have links with the various market forces that manipulate attitudes, and children become the worst victims. Market culture is leading to consumerism. It is flooded with different spurious goods and services that are creating unlimited greed and lust among the children and the people. These goods and services are simply creating a diversion and misleading them, who are unable to concentrate and inculcate creative thinking in their activities. Broken families, untoward home environment, societal chaos, and irresponsible media including magazines, cinemas, television programs, advertisements, and obscene posters along with these luxurious material goods perturb and frustrate the steady state of young minds.

Significance of values in contemporary society and education

There are different meanings and concepts of 'value'. Views of eminent personalities may differ, but all of them equally stress the significance of it on the personal, national and global levels. The Dictionary of Education (1959) defines values as 'the things in which people are interested; things they want to desire to be or become; feel as obligatory, worship, or enjoy'. Values are standards for an individual's life; based on emotions they can be structured, and they can guide and guard the journey through life. Values are basically conscious or unconscious motivators and justifiers of the actions and judgments relating to ethics. Moreover, ethics is a system or code of morals, and once someone knows his values and knows what is important to him, ethics can help him to set goals. Ethics and values have an indispensable place in the success of human society. To expand values in the young mind reorganization of the educational system is a necessity. Ethics is important not so that "we can understand" philosophically, but rather so we can "improve how we live" (Lafollette, 2007). By being moral, we enrich our lives and the lives of those around us. It's especially important to live a moral life when we are young, as it is helpful to exercise and practise these concepts before being confronted with more complex issues. Lafollette (2007) theorizes that ethics is like most everything else that we strive to be good at; it requires practice and effort. Practising and making an effort to make moral decisions throughout life will pay dividends when we are faced with serious moral dilemmas. Furthermore, having insight into "...historical, political,



economic, sociological and psychological insights...” (Lafollette, 2007, p.7) allows us, as decision makers, to make more informed decisions, which will likely result in moral decisions. Values are standards for an individual’s life; based on emotions they can be structured, and they can guide and guard the journey through life. Values are basically conscious or unconscious motivators and justifiers of the actions and judgment relating to ethics. Moreover, ethics is a system or code of morals, and once someone knows his values and knows what is important to him, ethics can help him to set goals. Ethics and values have an indispensable place in the success of human society.

A proper learning landscape to build a good mind structure is absolutely necessary. Some of the essential qualities of people relating to ethics, values, and good sense become pertinent to avoid and resolve many untoward happenings in society. It is difficult to mould the character of an elderly person, so the process should start at an early age, i.e., among the children, who should be physically and mentally trained not to exploit or be exploited, so that their rights and responsibilities in the society are just and acceptable. It will improve their self-efficacy and strengthen their self-perception. At every sphere of their life from home to school and in other places of their association, they should learn and be trained to maintain discipline and concentrate on one’s activity and act in accordance with the set principles and social expectations. Effective parenting, value-oriented schooling and normative social interactions i.e., both formal and informal education will definitely play an enormous role in the character building of a child.

The excerpt 6.20 of National Education Policy 2020 emphasised that *the students will be sensitized through this new school culture, brought in by teachers, trained social workers and counsellors as well as through corresponding changes to bring in an inclusive school curriculum. The school curriculum will include, early on, material on human values such as respect for all persons, empathy, tolerance, human rights, gender equality, non-violence, global citizenship, inclusion, and equity. It would also include more detailed knowledge of various cultures, religions, languages, gender identities, etc. to sensitize and develop respect for diversity.*

Approach towards stressing on values

It is needed to lay special emphasis on the teaching of moral and spiritual values. Moral values refer to the conduct of man towards the man in various situations. The *Committee on Religious and Moral Instruction*, headed by Shri Sriprakash, was appointed by the Ministry of Education, Government of India (1959) to examine the specific provision.

The Kothari Commission (1964-66) or the Education Commission of 1964-66 recommended that curriculum should be so formulated that it highlights the fundamental similarities of the great religions along with emphasis on broadly comparable moral and spiritual values. This is because



almost all religions preach some of the good qualities like honesty, truthfulness, consideration for others, respect for the old, kindness to animals, and compassion for the needy and sufferers.

The social life of today is significantly different from that of the past mainly because of the immense technological advancements. This has, to a great extent, indirectly changed the human value system. The overall ambiance creates a conflict between the traditional and the emerging values of modernity, and thereby a new social matrix has been created in which ethical and spiritual values have little importance. Now parents themselves engage in lucrative businesses so as to increase what a person *has* and not for what he *is*. Status is given more importance than identity. At schools, the teachers are often overloaded with academic pursuits, and cannot devote time to organize and setting activities conducive to mental health. The little children are in fact forced to accustom to the unwanted societal lay-outs. Sometimes, the parents and the teachers themselves unknowingly strain the mind structure of children. This creates disequilibrium in the peace of mind and the children suffer from ignorance, egoism, selfishness, and isolation. Moreover, the current nature of societal developments widens the gap between the young and the old generations. In addition, there is a lack of trained personnel who can guide and guard the mental hygiene of the child.

Swami Vivekananda says, “We want that education, by which character is formed, strength of mind is increased, the intellect is expanded and by which one can stand on one’s own feet.” Herein, Vivekananda have stressed on three pivotal issues like the *character*, *mind* and the *intellect* which have to be nourished by the instrument of education. The idea of all education and all trainings should be man-making. If there is an absence of proper ‘mind’ none can achieve success or pursue the process of learning. Learning refers to relatively permanent changes in behaviour as a result of experience. The cognitive domain stresses on knowledge and intellectual skills which involves knowledge acquisition, comprehension, application, analysis, synthesis and, evaluation. The affective domain concentrates in subtle and indirect ways to form attitudes and values which involve the inner processes like receiving, responding, valuing, organization and characterization. Ultimately, both ensure to develop the psychomotor domain in the child for adaptation and origination. The excerpt of 11.8 in National Education Policy thereby states that *value-based education will include the development of humanistic, ethical, Constitutional, and universal human values of truth (satya), righteous conduct (dharma), peace (shanti), love (prem), non-violence (ahimsa), scientific temper, citizenship values, and also life-skills; lessons in seva/service and participation in community service programmes will be considered an integral part of holistic education.*

Education is regarded as a powerful tool for social development. The task of education is to guide, direct and suggest to the child. The aim of modern education is to generate a character that



will help the learners to become a useful member of a democratic society. Obviously, the individual turns to be 'resource' and seeks positive social change for the nation. The importance of education in the generation of human capabilities has been emphasized by Prof. Amartya Sen. According to him (1999) human development has great role to play on the augmentation of human rights. Education, one of the most fundamental components of human development, provides people with the essential and individual power to reflect, make better choices, seek a voice in society, and enjoy a better life. Sri Ramakrishna Paramhansa stated (Balamohandas, 2008: p-1) that education is that process that tells us how to live life well, how to find happiness, how to make others happy, how to manage all kinds of people and happenings as well, and how to grow and succeed in the right manner. All human beings have almost the same physiological needs, but they differ in their psychological needs; hence they differ in their values, styles of life and in their employability.

The National Education Policy 2020 in its introduction, has stressed that the *curriculum must include culture, and values along with other disciplines to develop all aspects and capabilities of learners; and make education more well-rounded, useful, and fulfilling to the learner. Education must build character, and enable learners to be ethical, rational, compassionate, and caring, while at the same time preparing them for gainful, fulfilling employment.*

Contribution of different institutions for rights, duties and orientation for children

A child's first classroom is the family of his/ her own. He/she learns to live with all the members in harmony and adopts all family values like respect for the elders, helping parents, brothers and sisters at home; maintaining a warm relationship with grandparents, carrying out responsibilities as appropriate to their age, and also gets acquainted and aware about the socio-economic status of family. This activity-oriented rearing, indeed, lays the foundation for a positive mind-set. The acceptance of the child and involvement in the child's life to establish emotional connection, control of the child to promote mature behaviour and granting autonomy to encourage self-reliance are the pre-requisites of the family. But, to our bitter experience, the present educational framework, often creates such conditions that push the child away from family kinship and makes him isolated and insular. It is at this juncture, parent-teacher associations have an important role to play for creating a proper ambiance for the child. The NCTE Document 2009/10 of National Curriculum Framework for Teacher Education Towards Preparing Professional and Humane Teacher also stresses to promote peace values – A democratic way of life, equality, justice, liberty, fraternity, secularism, and zeal for social reconstruction. This needs to be reflected in the teaching experience which would surely lead to a positive transfer of learning for the children to act for the community welfare.



After the family, the child should adhere to the societal values that he/she comes in contact like at school, college and the other institutions. For this, value education should be a compulsory part of the school curriculum. All methods and techniques, both direct and indirect, need to be employed for inculcating values in students at different stages of psychological developments. Morning prayers, assemblies and meditations may successfully absorb and bind together, almost every one of the people concerned in the institutions.

The third set of value which needs to be developed is the consideration for the environment. Parents and community involvement is important to arouse consciousness to work for the community that may lead the children to become a proactive future citizen through awakening their concern, learning the art of discovery, community living, reinforcement of the curricular learning, community-based approaches like field visits, value clarification, discovery approach, action- oriented practical, etc. according to the age and ability of the learners. Parent and peer relations seem to complement each other. Parents provide affection and guidance which grants children the security and the social skills with which they are able to enter the world of peers. On the other hand, peer interaction extends and sharpens social skills.

The partnership between school, family, and community needs to be established and strengthened. Parents need to be consulted and involved in curriculum transactions and management, and proper community development. Simple projects like green school campus, garbage management, energy conservation among others may be introduced. An emotional bond will be created sensitizing the community and judiciously handling the environmental resources through coordination among the *panchayat*, municipal bodies, NGOs, social workers, institutions and media. The rapid advancement in scientific and technological spheres needs to be strategically administered to young minds. For the positive development of societal conditions, the stakeholders of education need to apprehend, plan and administer the technology on the teaching-learning program in an appropriate manner. In accordance with the National Education Policy 2020 excerpt 4.4, *specific sets of skills and values across domains will be identified for integration and incorporation at each stage of learning, from pre-school to higher education. Curriculum frameworks and transaction mechanisms will be developed for ensuring that these skills and values are imbibed through engaging processes of teaching and learning.* Moreover, in excerpt 4.23 stresses on *Fundamental Duties; citizenship skills and values; knowledge of India; environmental awareness including water and resource conservation, sanitation and hygiene; and current affairs and knowledge of critical issues facing local communities, States, the country, and the world. In the following Table-1 the orientation of future citizens has been discussed in the respect of their rights and duties.*



Table- 1: Rights, Duties and Orientation of children at different institutions

Institutions	Rights to be Conferred	Duties to be Expected	Procedure of Orientation
Home	<ul style="list-style-type: none"> ➤ Not to be discriminated by age or gender ➤ Not to be abused by any means and by any person, family member or relatives ➤ To have basic requirements including nutritious food, decent clothing and shelter, health-care and education for his/ her overall development ➤ To get freedom in selection of the basic things that may not be harmful for him/ her 	<ul style="list-style-type: none"> ➤ To respect for the family traditions, parents and other elderly people ➤ To help in household jobs that suit their capability ➤ To cooperate with others in the family with equal treatment like the self ➤ To utilize properly the basic requirements and resources provided to them ➤ To do all the assigned works for one's development through education, personal hygiene and health ➤ To help in maintaining a good and peaceful atmosphere at home and its surroundings 	<ul style="list-style-type: none"> ➤ Creation of a sensible environment of cooperation, mutual respect, and transparency ➤ Collective decision-making at household level involving the concerned people; value for joint family system ➤ Exposure to cultural heritage and moral/ spiritual activities ➤ Cultivation of inner happiness and confidence ➤ Recognition of the child's performance/ achievements all levels
School	<ul style="list-style-type: none"> ▪ Effective education to become a self-reliant responsible person in future ▪ Not to be discriminated on any ground or form, i.e. gender, caste, religion, social or economic status 	<ul style="list-style-type: none"> ▪ To abide by and maintain the rules and disciplines of the school ▪ To take part in various activities of the school according to age and ability ▪ To treat the peers 	<ul style="list-style-type: none"> ▪ Encouragement in co-scholastic activities and team-works i.e. cultural and sports programmes (NCC, NSS), field-work etc. ▪ Promotion of



Institutions	Rights to be Conferred	Duties to be Expected	Procedure of Orientation
		as he/she like to be fairly treated by them	healthy relation among the students, teachers and supportive staffs
Society/ State	<ul style="list-style-type: none"> ❖ Not to be humiliated mentally and/or physically ❖ To be protected by the rules of custom and law of the society for their holistic growth and development ❖ To be substantially help led by the governments in achieving the above targets 	<ul style="list-style-type: none"> ❖ To have respect for the social and cultural heritages of the society and nation ❖ To participate in promotion of social harmony, unity and national ethos ❖ To take part in community/ environmental developments under supervision 	<ul style="list-style-type: none"> ❖ Strict vigilance on and prohibition of unjust activities by Governments and NGOs ❖ Incentives for good works ❖ The role of mass media should be more responsible for social well-being

Source: Prepared by the author based on her experience and interaction

The above table can be related to a great extent to the A.H. Maslow (1943)'s paper on "A Theory of Human Motivation" in the journal *Psychological Review*, where he used the terms "physiological", "safety", "belonging and love", "social needs" or "esteem", "self-actualization" and "transcendence" to describe the pattern through which human needs and motivations generally move. The hierarchy has been used to explain how effort and motivation are correlated in the context of human behaviour. The goal in Maslow's hierarchy is to attain that level or stage of self-actualization. Maslow later subdivided the triangle's top to include self-transcendence, also known as spiritual needs. "Transcendence refers to the very highest and most inclusive or holistic levels of human consciousness, behaving and relating, as ends rather than means, to oneself, to significant others, to human beings in general, to other species, to nature, and to the cosmos." But, this condition can only be attained through ethical and quality education and well-knitted cooperation from the stakeholders of education.

Herein, in this respect, the excerpt 4.28 of National Education Policy 2020 deserves mention. It states that the *students will be taught at a young age the importance of "doing what's right", and will be given a logical framework for making ethical decisions. In later years, this*



would then be expanded along themes of cheating, violence, plagiarism, littering, tolerance, equality, empathy, etc., with a view to enabling children to embrace moral/ethical values in conducting one's life, formulate a position/argument about an ethical issue from multiple perspectives, and use ethical practices in all work. As consequences of such basic ethical reasoning, traditional Indian values and all basic human and Constitutional values (such as seva, ahimsa, swachchhata, satya, nishkam karma, shanti, sacrifice, tolerance, diversity, pluralism, righteous conduct, gender sensitivity, respect for elders, respect for all people and their inherent capabilities regardless of background, respect for environment, helpfulness, courtesy, patience, forgiveness, empathy, compassion, patriotism, democratic outlook, integrity, responsibility, justice, liberty, equality, and fraternity) will be developed in all students.

Conclusion

We face ethical dilemmas almost every day, both at the individual and the societal level. Ethical dilemmas arise due to conflict of interest or due to ignorance of what is the correct thing to do in a given situation. Value development makes the child cognitively mature enabling him/ her to interpret and respond to the emotions and intentions of others. It teaches the rules of friendship and results in the formation of peer groups and cliques. Peer acceptance and peer sociability facilitates the individual to work confidently and accurately in his future life.

Through socializing a culture develops which binds and controls individual behaviour. Thereby the individual adopts social norms, abides by social principles and beliefs, completely conforms to the societal layouts, and gradually dedicates himself to its progress. With effective socialization, the child gradually becomes conscious of his/her rights and the duties to be discharged by him/her. After all, proper nurturing of a child of today makes a responsible person of tomorrow, as to lead a meaningful life, children need to possess constructive ability, manage their stable thought-process, control emotions, and secure a balanced relationship. Mind management is of utmost importance so that a healthy mind cycle is nurtured. The great poet and educationist Rabindranath Tagore says (cf. Chandra and Sharma, 2002: p-II/204), 'The fundamental purpose of education is not merely to enrich ourselves through the fullness of knowledge, but also to establish the bond of love and friendship between man and man'. Ultimately this humanistic attitude will usher in the international understanding and cooperation.

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Phenotypic characterization of dengue virus isolates in mice model differentiates dengue fever and dengue haemorrhagic fever from dengue shock syndrome: A short review

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Abstract

Dengue virus infection is a common arthropod-borne viral disease in humans and is spread by the bite of infected *Aedes* mosquitoes. Belonging to the family *Flaviviridae*, Dengue virus (DV) causes dengue fever (DF) and dengue haemorrhagic fever/ dengue shock syndrome (DHF/DSS). DV has four serotypes namely - DV-1, DV-2, DV-3, and DV-4 that are antigenically related but still distinct. A large proportion of the human population is at risk of contracting this disease with host genetics playing a crucial role as a risk factor.

Keywords: Dengue, Virus, DENV, Fever

Introduction

The Dengue Virus particle is enveloped, consisting of a single - stranded positive sense RNA genome that resembles a messenger RNA and has a cap at its 5' end but no poly (A) tail at its 3' end. The virus particle is composed of three structural protein genes which encode the nucleocapsid or core (C) protein, a membrane associated (M) protein and an envelope glycoprotein (E) along with seven non- structural proteins (NS2A, NS2B, NS3, NS4A, NS4B and NS5). All the four serotypes (DV-1, DV-2, DV-3, and DV-4) are capable of causing a spectrum of disease ranging from a self limiting disease -dengue fever (DF) to a severe, fatal disease -dengue haemorrhagic fever/ dengue shock syndrome (DHF/DSS). Infection can be asymptomatic or cause certain illnesses characterized by high fever, headache, myalgia and retro-orbital pain. DHF shows cardinal signs of increased vascular permeability, thrombocytopenia and focal or generalized haemorrhages. In the following experimental study, inoculation of three clinical DENV-1 isolates from Cambodian patients experiencing different forms of dengue disease (DF, DHF and DSS) into BALB/c mice showed that the isolate differs in its concentration and tropism in the respective



forms of the disease conditions. Also, it was observed that the DSS virus isolate persists longer (more than two weeks) *in vivo* compared to the DENV-1 isolates of the other milder human cases. However, deciphering the complex mechanisms governing DENV pathogenesis is under study and yet to be explored.

Experimental studies on immune response and pathogenesis in DV infection

Extensive studies have been carried out in mouse to understand the immune response and the mechanisms of immunosuppression and pathogenesis of severe dengue disease. DV induces mainly humoral immune response while the delayed type hypersensitivity response is poor. DV- infected sick mice develop immunosuppression, both to homologous and heterologous antigens¹⁰⁴⁻¹⁰⁶. Macrophages process DV antigen by serine proteases and present it to B cells *in vitro* and *in vivo*, leading to their clonal expansion.

Phenotypic difference of dengue fever and dengue haemorrhagic fever from dengue shock syndrome as studied from the mice model

All mice presented with detectable levels of DENV specific IgG antibodies after successful intravenous infection. They also survived the infection without presenting any clinical signs but some pathological lesions such as hemorrhage were detected in brain, liver, lung, etc. The three DENV-1 isolates showed different tropism; the two DENVs obtained from a DF and DHF case infected primarily lungs, spleen, and liver, whereas the DENV from a DSS patient infected lungs, spleen, and exhibited a strong tropism for brain tissue.

The DENV-1 isolates exhibited different risks for infection that depended both on virus concentration in the inoculum and on time-point post infection. Kinetics of infection differed between the three DENV-1 isolates. Viral RNA in the DF and DHF inoculated mice was predominant during the first week of infection, and declined during the second week. The time course of infection differed in the DSS- infected mice that showed a delayed response to inoculation compared to the DF- and DHF-infected mice. The DSS isolate replicated in a majority

of infected mice and for a longer period of time compared to the DENVs obtained from milder cases.

IFN γ levels peaked in the first week of infection and showed a positive correlation to inoculated virus dose where the highest titer elicited the strongest IFN γ response. Regarding the detection of IL-10 levels – the DF- inoculated mice had higher levels of IL-10 compared to the DHF- and DSS-inoculated mice and the DF-inoculated mice also dominated in serum levels of secreted MCP-1 and showed the biggest difference compared to the DSS-inoculated mice, followed by DHF-inoculated mice. Inoculated virus titer showed a positive correlation to measured serum levels of RANTES in all DENV-1 inoculated mice, and DF-inoculated mice dominated.



(Ref. table 1)

Table 1 Viral RNA was found in various organs depending on inoculated DENV-1 isolate (DF, DHF, or DSS), virus concentration in inoculum, and time-point p.i. In total 54.3% of the DENV-1 infected mice had detectable levels of viral RNA

DENV isolate	DF									DHF									DSS								
Titer (PFU/mL)*	1.5 × 10 ⁴			1.5 × 10 ⁵			1.5 × 10 ⁶			1.5 × 10 ⁴			1.5 × 10 ⁵			1.5 × 10 ⁶			1.5 × 10 ⁴			1.5 × 10 ⁵			1.5 × 10 ⁶		
Day (p.i.)**	3	6	15	3	6	15	3	6	15	3	6	15	3	6	15	3	6	15	3	6	15	3	6	15	3	6	15
Heart	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lungs	-	-	-	2	3	-	2	3	1	-	-	-	2	-	2	2	1	-	-	-	-	3	1	1	1	1	1
Spleen	1	-	-	-	-	-	2	-	-	1	-	-	-	2	2	1	-	-	1	-	-	1	1	2	-	-	-
Brain	-	-	-	-	-	-	1	-	-	1	1	-	-	-	-	3	-	-	1	2	1	1	2	-	2	-	-
Liver	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	2	-	-	-	-	-	-	-	-	-	-	-
Kidneys	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
Infected mice	1	-	-	2	3	-	3	3	1	2	1	-	1	2	2	3	3	1	-	3	2	1	3	3	2	2	1
Infected mice per titer	1			5			7			3			5			7			4			7			5		
Infected mice per day p.i.	6			6			16			6			33			7			7			6			6		
Σ infected mice per virus isolate	13									15									16								
% infected mice per virus isolate	48.2%									55.6%									59.3%								

* Titer of inoculum was significant ($p = 0.012$).
 ** Time-point post-infection was significant ($p = 0.014$).

Discussion

As there are no non-human species that develops the clinical symptoms observed in humans due to DENV infection, therefore animal models have not been found for investigation which hampered the development of vaccines and antiviral drugs. In this study three minimally passaged DENV-1 isolates (DF, DHF, DSS respectively) were considered that show different clinical symptoms in humans. When injected in BALB/c mice, it showed different clinical symptoms compared to humans. This indicates that the DENV of same genotype and serotype may differ enough to cause various clinical symptoms in vivo. Mice was thought to be more susceptible to infection but no symptom of disease was detected. Although viral RNA was obtained in various organs, it was unable to detect any systemic viremia and this suggested an absence or very low level of viral replication in circulating peripheral blood mononuclear cell. Viral RNA was detected from different organs- spleen, liver, kidney, lungs, brain, detected by qRT-PCR.,

Breakdown of blood brain barrier in DENV infected mice have been described before, were shown to be dose dependent. Genome sequencing have shown an amino acid substitution L → F476 in the E protein of DSS isolate that makes it neurotropic. Another amino acid substitution in NS-1, K → R 115. The NS-1 glycoprotein is glycosylated at N130 and N270 which is responsible for neurovirulence. The three amino acid substitution in NS protein 3 (S P → 118) and 5 (T → I 49 and S → N 830) could alter the activity of these proteins. The DSS isolate seemed to persist longer in vivo as viral RNA was detected in majority of mice on day 15 post infection.

In contrast, DF and DHF infected mice showed a decrease in viral RNA after day 6 post infection. Thus, the DSS isolate could be regarded as more virulent in mice than the two other DENV strain.



Cytokines involved in inflammation (IFN γ , IL-1 β , IL-2, IL-6, IL-10, IL-13, MCP-1, RANTES, and TNF α) quantified were low, which is most probably due to the fact that BALB/c mice is poorly susceptible to wild type DENVs. DF inoculated mice had higher detectable serum levels of IL-10, MCP-1, and RANTES which have been seen to be increase in patients with severe DHF and DSS. The preference for the brain of the DHF-, and most notably the DSS-infected mice, could imply locally high levels of proinflammatory cytokines that do not circulate systemically. This could explain why the IL-10, MCP-1, and RANTES levels dominated in the DF-inoculated mice, since the thoracic and abdominal organs were the primary target for DF isolate. Cytokines like IL-1 β , IL-2, and TNF α did not show any differences compared to mock infected controls and this could be due to the transient nature of many cytokines as well as the limited susceptibility of DENVs in mice.

Conclusion

The results confirm that the isolate derived from a DSS patient can be distinguished based on phenotypic characteristics that differ from the isolates derived from a DF and DHF case. It has been observed that the DSS virus isolate persist longer in vivo with extensive neuroinvasion in contrast to the other DENV-1 isolates originating in milder human cases. Genomic characterization of the three clinical isolates identified six amino acid substitutions unique for the DSS isolates that were located both in structural genes (M and E) and in non-structural genes (NS1, NS3, and NS5). The characterization of these clinically distinct DENV-1 isolates highlight that DENVs within the same genotype may have different in vivo phenotypes. However, to define key elements involved in the virulence of these characterized DENV-1 phenotypes reverse genetics systems are needed. Additional low-passage strains of the different DENV serotypes of each clinical forms of dengue are required to fully decipher the complex mechanisms governing DENV pathogenesis.

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Dimensions Of Early Indian Psychological Concepts In CARAKA SAMHITA And SUŚRUTA SAMHITA

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Abstract:

The voluminous treatises of the Caraka SaAhitā and the Suśruta SaAhitā which contain the classic doctrines of Āyurveda (literally, knowledge for longevity) are regarded as the oldest Sanskrit medical texts that have come down to us. They show instances of the understanding of the psychological impact on medical treatment and medical thoughts of the time. That psychological concepts were well known among the medical fraternity is revealed through the two medical compendiums. Physical and clinical treatment of patients was not an adequate methodology of cure but perception has been considered as a part of understanding a disease that is, the mental aspect of a patient has to be considered as the cause may exist in the mind.

Key Words: Function Of Time, Psyche, Gunas, Bodily Humours, Emotions, Personality, DoCās, Pleasure-Pain Principle, Dreams, Use Of Deception, Social Stigma.

DIMENSIONS OF EARLY INDIAN PSYCHOLOGICAL CONCEPTS IN CARAKA SAMHITA AND SUŚRUTA SAMHITA

The Caraka SaAhitā is an exhaustive compendium on therapeutic medicine which claims to contain all that is to be known in this branch.¹ This compilation contains the teachings of the sage Ātreya Punarvasu, recorded by one of his disciples, Agniveśa and revised by Caraka. Later additions to the text around 9th Century A.D. to 11th Century A.D. by D[habala and CakrapāGidatta have only added precision to the contents while the original form still remains.²

The Suśruta SaAhitā constitutes the major source of information about Indian surgery. It contains the teachings of the god Dhanvantari who was incarnated as Divodāsa, king of Varanasi. Suśruta compiled the medical tradition of surgery which was revised and enlarged by an author, called Nāgārjuna. Mention has also been made of the disciples of Suśruta for surgical treatment in the Caraka SaAhitā.³



Both the texts reflect oral teachings of Âyurveda given from day to day with elaborate commentaries for clarification and accuracy. The Bhela SaAhitâ, AcmâEgasaAgraha and the AcmâEgah[daya SaAhitâ are among the other texts that emerged during this age but none of them are so detailed and precise in medical information and treatment as the Caraka and Suçeruta SaAhitâ which represent vital phenomena whether they be normal or pathological. In both the compendiums biology is incorporated with a psychology, for, there is no apposition in the Indian thought between the somatic phenomena and psychic phenomena. Hence, Âyurveda encompasses, besides the rules of medical practice, all organic, biological and psychological conditions of life in health and disease. The conceptual edifice that can be discerned is that of SâAkhyâ, the Nyâya and the VâûeCika, dating from the early centuries of the Christian era. From the viewpoint of SâAkhyâ, both the medical treatises emphasise on the human body as consisting of the same gross elements that constitute the universe.⁴ From the viewpoint of Nyâya, the treatises accept authorities on medical knowledge followed by observation and inference. It also adds logic to medical knowledge. From the viewpoint of VâûeCika, there are medical ideas related to time.

Biological and psychological rhythms governing man's life often has to be restored by the physician. Both the medical compendiums insist on TIME as a restorer and determiner of health. The Caraka SaAhitâ provides the concept that time flows perpetually with the cycle of seasons. Therefore proper diet and treatment, according to time must be followed. The psychological impact of time in the life of human beings had been emphasised first in the Atharva Veda, and in the medical treatises we find that the importance of time as restorer and preserver had been acknowledged as imperative and invincible. According to Caraka, life is everlasting – signifying the need for medical knowledge at all time and age.⁵ According to Suçeruta, time is self-existent (*svayambhû*), without beginning, without end and without middle. Even the minutest fraction of time is ever existent. Life and death are also functions of time. The wheel of time revolves eternally with continuous change.⁶

Psychological conceptions are also discerned in the explanation of the relationship between body and mind. This relationship is asserted in the most direct manner by the medical texts – “*The body is governed by the psyche and the psyche by the body*”, according to Caraka.⁷ According to Suçeruta, the mind (*mana* %) partakes of both the intellectual and operative organs alike.⁸ The importance given to mind-body unity appears in the very definition of life. Life is viewed as a psychological continuum, a ‘support’ (*dhâri*) of the body, a vital phenomenon (*jîvita*), a permanent process (*nityaga*) and a factor of continuity (*anubandha*) throughout the successive lives of the psychic being⁹, death being just the loss of the “gross body” (*sthûlaûarira*) whose constituents are perishable. Life, thus, rests upon a tripod, that is, body, mind and the self and if any of these supports are missing, life ceases to exist.

Caraka is also of the opinion that right conduct (*sadv[ita*) can help in the preservation of physical and mental health and in securing sense control (*indriyavijaya*).¹⁰ Caraka also asserted that



dejection (mental) is the main cause of aggravation of a disease (physical); joy is the chief cause of its decrease; that grief is the principal cause of emaciation of the body; that contentment is the chief cause of its development; that depression is the main cause of its decay; and that carrying out resolution is the principal cause of its growth.¹¹ Caraka also defines an action as the effort of the vocal organs, *manas* and body.¹² The mental act of willing, its expression in language and its expression in a bodily action are the three kinds of acts. Language is recognised as an action which involves physical and mental actions – the inner act of volition and the outer act of the body. Suçeruta, on the other hand, points out the fact that individual differences are due to the preponderance of any of the three *guṇas* – *sattva*, *rajas* and *tamas* inherent in living beings even though they may have the same characteristics like intelligence, memory, mind-will, logical faculty, knowledge gained from experience, ability and perception.¹³

According to the Suçeruta SaAhitâ health involves a state of delight or a feeling of spiritual, physical and mental well-being¹⁴, thus asserting the interrelation between mind and body. Epilepsy is also regarded as a mental disease by him. The causes of epilepsy are psychical, also, according to Caraka and these are lust, greed, anger, fear, delusion, joy, grief, apprehension, anxiety and the like.¹⁵ Diseases caused by hostile persons through poison, fire, hurt and the like are due to the faults of the intellect – *prajñâparâdha*. Caraka also cites the mental remedies for diseases as temperance, dispassion for objects of enjoyment, generosity, impartiality, truthfulness, forgiveness, good company, good will, good speech, good action, purity of mind, clear understanding, true knowledge, austerities and meditation.¹⁶

Caraka regards the cause of insanity as, when the mind is unhinged and intelligence lapses, the bodily humours is excessively provoked and attack the heart, obstruct the sensory currents that come to the heart. Insanity is the perversion of mind, intelligence, consciousness, knowledge, memory, sense perception and efforts or actions. It involves illusion, hallucination, delusion, false reasoning and maladjustment to the social environment.¹⁷ A mental disease is due to the non-attainment of a desired object or the attainment of an undesired object. It is due to non-fulfilment of strong desires.¹⁸ Caraka anticipated Freud's theory that a mental disease was due to repressed desires. Similarly, Suçeruta SaAhitâ distinguishes three major categories of diseases, subdivided into several classes: those which have their origin in the body, those due to external causes and those due to providential causes.¹⁹ Within the first category are included congenital diseases which includes monstrosities attributed either to disturbance of *rasa* or to unsatisfied desires. The second category includes traumas and the last category includes within it maladies of supernatural origin.²⁰ Mental disorders are classed as one of the major category of diseases by Suçeruta. Insanity (*unmâda*) has been regarded as due to deranged humours which obstruct bodily channels and the higher mental and sense faculties.²¹

Regarding the psychological influence of emotions both Caraka and Suçeruta are of the opinion



that any imbalance of the *tridosā*, leads to emotions. They have emphasised upon the negative influence of emotions in the mental make-up of human beings. Suśruta regards anger as a particular perversion of the defects which bring about disharmony of the bodily humours - flatulence, bile and phlegm.²²

Caraka describes three fundamental desires (*eCaGā*) –

- 1) Desire for the preservation of life (*prāṇaiCaGā*);
- 2) Desire for wealth (*dhanaiCaGā*); and
- 3) Desire for a blessed after-life (*paralokaiCaGā*).

These three primary desires are the springs of all our actions. These are the three fundamental motives.²³ The emotions of the new-born child such as smiling, fear, crying are unlearned and instinctive acts. This proves the pre-existence of the soul. Suśruta talks about strong-nerved, devoted assistants of doctors as essential, in connection with surgical actions and emphasizes the positive aspect of emotions.²⁴ Caraka maintains that all emotions and passions are perversions of the intellect (*prajñāparādha*). Envy, grief, fear, anger, pride, hatred and so on are affections of the mind (*manovikāra*). Fear, grief, anger, greed, delusion, envy, pride and false knowledge are regarded as false correlations of the mind to its states. Emotions are thus caused due to confusion of intellect which is the root of all emotions. Sorrow, for instance, is due to – 1) comprehension of non-eternal things as eternal due to confusion of the intellect (*buddhivibhramā*); (2) lack of self-control or power of withdrawing the mind from immoral actions (*dh[tivibhramā*); (3) lapse of memory or forgetfulness of the nature of right knowledge (*sm[tivibhramā*); and (4) unhygienic conduct. Thus *prajñāparādha* – the cause of emotions – is defined as confusion of intellect, lack of self control and lapse of memory which leads to erroneous judgements resulting in wrong actions.²⁵ According to Caraka, fear, attachment, aversion, greed, delusion and pride should be controlled by a virtuous person by the right knowledge of their causes.²⁶ According to Suśruta, the *sattvasāra* i.e. a person having illumined intelligence is generally long-lived. The rasas in his body are harmoniously developed and he possesses keen memory, intelligence, courage, purity of thought, devotion to Gods and revered persons, high ideals of life and natural cleanliness of habits.²⁷

The psychology of personality was studied by both, Caraka SaAhitā and Suśruta SaAhitā and they classified people according to the preponderance of the three *guṇas*: *Sattva*, *Rajas* and *Tamas* and the three *doṣas*: *vāta* (air), *pitta* (bile) and *kapha* (phlegm). A total of thirty-six types of personalities have been discussed under two main categories – physical and mental and six sub categories.²⁸ Suśruta states that personality is the cooperation of *vaikārika*, *ahaAkāra* with the *taijasa* or *rājasa*. The *avyakta* is latent nature. Both accepted the SāAkhyā and Vedānta classification of *guṇas*. Thus, the *Vātaja* temperament is wakeful, averse to bathing, vain, dishonest, fond of music, impulsive, bad tempered, unsteady in friendship and ungrateful. The *Pittaja*



temperament is intelligent and has good memory, loves to monopolise conversations, is prone to baldness or grey hair and eats a lot. The *Kaphaja* temperament is calm in appearance, grateful, self-controlled, forbearing and unselfish. The *Sattvic* category was divided into seven types –

- 1) The *Brâhma* is a type of person who is pure, devoted to truth, self-controlled, with good memory and understanding free from desire, anger, greed, conceit, infatuation and envy and equally well-disposed to all.
- 2) The *Zsi* type is one who is devoted to study, yajnas and celibacy.
- 3) The *Indra* type is endowed with energy, bravery and authority in speech.
- 4) The *Yama* type is governed by consideration of prosperity.
- 5) The *VarGa* type is valiant, courageous and fond of aquatic sports.
- 6) The *Kubera* type commands status, honour and luxuries.
- 7) The *Gandharva* type is fond of recreation, music, dancing, legends and is addicted to fine clothes, perfumes, garlands.

The *Rajasic* category is divided into six sub-categories –

- 1) The *ACura* type is valiant but despotic and pitiless.
- 2) The *RâkCasa* type is cruel and gluttonous.
- 3) The *Piûâca* type is unclean and rude to others.
- 4) The *Sarpa* type is touchy and fearful.
- 5) The *Preta* type is covetous.
- 6) The *Æakuna* type is fickle and intolerant.

Under the *Tamasic* type there are three types –

- 1) The Animal type is intellectually dull and disgusting.
- 2) The Fish type is greedy for food with itinerant habits.
- 3) The Plant type is lazy and devoid of mental ability.²⁹

The Indian approach to psychotherapy is found only in the Caraka SaAhitâ and is termed as *Sattvâvajaya*.³⁰ The Caraka SaAhitâ provides a non-pharmacological approach to improve mental health by managing psychological components of any disorder. Aspects concerned with psycho-social well-being in the causation of illness, are given importance by Caraka. Thus Caraka states that *prajñâparâdha* or perversions / confusions of intellect are the main cause of mental illness besides *Asâtmyendriyârtha SaAyoga* and *PariGâma*.

The basic components of mental well-being and health is *Sattva*, according to Caraka, that is, the ability to establish a proper adjustment with one's external environment, ability to gain optimum



control of one's emotions and gain efficiency in the mental powers. This represents a functional unity in the mind. Apart from *Sattva*, there is *Rajas* and *Tamas*, according to Caraka which make up the psycho-pranic system. *Rajas* and *Tamas* are two modes which demand instant satisfaction of mundane and carnal desires even by means of emotional blasphemy. Thus when *Sattva* is in full control of the mind or dominates the mind, mental balance is maintained. Emotional discharges are controlled, a carefully selective, receptive tendency towards the environment is present, keeping the psycho-physiological system balances, thus ensuring harmonisation of action and thought. On the other hand, an excess of *Rajas* and *Tamas* causes deviation of mind from its balanced state. Since mind is the controller of the body, mental imbalance leads first, to disturbance in the pranic system and then, the body is affected.

The Caraka SaAhitâ states “*Sattvârajaya % punarahitebhyo rathebhyo manonigraha*” meaning the restrengthening of the *Sattvic* tendency makes the psycho physical system free from mental disturbances and disorders. Undue fluctuations of mind are to be avoided through self-control, determination and constant practice. Healthy life is to be maintained by proper understanding of the context of season, circumstances and surroundings. Moreover, the sensory and motor abilities are to be guided for proper action and proper mental functioning of thought, reasoning, presumption, contemplation and determination. Caraka prescribed that good training and practical experience under the guidance of a specialist clinician is required to attain *Sattvârajaya*. Most of the mental problems are due to inadequate life-style or emotional disturbance. Thus Caraka recommends the use of *Jñâna* (informative knowledge), *Vijñâna* (experiential and intuitive knowledge), *Dhairya* (application of retained knowledge with patience), *Sm[ti* (reminiscence) and *Samâdhi* (profound contemplation in search of wisdom leading to specific solution for a problem).³¹

The Caraka SaAhitâ also puts forward the pleasure-pain principle which is still of great importance in the education and training of motives and objectives of children. Caraka traces pleasure and pain to be harmony and disharmony of the elements of humours of the body – flatulence (*vâta*), bile (*pitta*) and phlegm (*kapha*) and equipoise or disequilibrium of purity (*sattva*), energy (*rajas*) and inertia (*tamas*) of the mind, respectively. The body is the source of physical pleasure and pain. The mind is the source of mental pleasure and pain. The proper adjustment of the mind and sense organs to their objects is the cause of pleasure; improper adjustment leads to pain. Pleasure is the cause of desire and desire is the cause of pleasure. Aversion is the cause of pain and pain is the cause of aversion. Pleasure and pain are mental modes. The self becomes associated with these modes and false identification with *manas* but when the mind is concentrated on the self and acquires a pure vision of it, pleasure and pain are no longer experienced.³² Caraka agrees with the Nyâya and the SâAkhyâ philosophy and points out that voluntary action always seek sentient pleasure and lead to pain in our empirical life. Renunciation of voluntary actions leads to the cessation of desires and consequently, to happiness. Sentient pleasure is not real happiness; real happiness springs from desirelessness.³³



Caraka describes and explains perception, recollection, inference and intuition – all psychological aspects which are essential in our daily lives. Perception, according to him is distinct knowledge produced by intercourse of the sense-organs with their objects, the relation of the sense-organs to *manas* and the relation of the *manas* to the self.³⁴

Recollection is due to perception of a cause, form, a part, similarity, contrast, attention, habit, true knowledge of reality. Inference is preceded by perception. It cognizes the past, present and future.³⁵ Intuition is derived from trance by a person who has spiritual knowledge, whose mind abounds in purity (*sattva*), untainted by energy (*rajas*) and inertia (*tamas*) and is free from fear, attachment, aversion, greed, delusion and pride.³⁶

Both Caraka and Suçeruta also provide their opinion regarding the role played by the conscious, subconscious and unconscious in human beings. Caraka points out that there is slight unconsciousness in intoxication. There is greater unconsciousness in swoon (*mûrccâ*). There is complete unconsciousness in apoplexy (*samnyâsa*). When the perverted body humours attack the heart, the seat of consciousness, a person's consciousness is comfounded.³⁷ Dreams are the work of the subconscious mind during light sleep, according to Caraka. No dreams are dreamt in deep sleep because the mind becomes unconscious in this condition. Fearsome dreams, Caraka maintains are due to the filling of the *manovahâ nâ*

i with excessively provoked bodily humours, specially those foreboding death.³⁸ He classified dreams into seven types –

- (1) visual impression;
- (2) auditory impression;
- (3) experience;
- (4) inner desires;
- (5) fancy;
- (6) premonition; and
- (7) morbid humours.³⁹

Suçeruta advances the concept that dreams are warnings of future happenings specially about diseases or death. He describes various types of dreams as indicative of physical weakness, ill-health, impending diseases and death.⁴⁰

Caraka also enumerated eight causes of memory as –

- (1) Impressions, similar and dissimilar;
- (2) coordination of mind;
- (3) practice;



- (4) knowledge;
- (5) recollection;
- (6) repetition of sight;
- (7) repetition of hearing; and
- (8) repetition of perception.⁴¹

Caraka also understood the human being as consisting of a gross body and a subtle body (*âtivâhika deha*). The subtle body does not die. It transmigrates after death. It is made up of subtle elements of earth, water, light, air, ether and manas consisting of merits and demerits. It is imperceptible but can be perceived by yogins who have a divine eye. The soul can assume another body with its aid.⁴²

Conception of a human being thus, occurs due to union of semen, ovum and the spirit.⁴³ By the physical act of mating union takes place between the semen (sperm cell) and the female ovum (germ cell); then the spirit, associated with the mind, descends and enters into the zygote formed and a new embryonic life is created. If the spirit does not descend, no life is created and conception fails to occur.⁴⁴

Psychological aspects of treatment of patients are found both, in the Caraka and Suçruta SaAhitâ. Under this scheme comes firstly, the method of resorting to deception for a good cause in order to cure the patient. In cases of grave illness such as *râjayakCman*, or “royal consumption”, Caraka recommends that the doctor should resort to the violent and cunning form of feeding meat to the patient who is struggling against the gravest disease. Thus the patient must be given the meat of vultures, owls and jays under the name of peacock and crows; under the name of partridge, snakes; under the name of fish, foxes, large mongooses, cats; young jackals under the name of hare, lions, hyenas, tigers, elephants, rhinoceros; horses under the name of buffalo. Caraka adds that if the patients know the truth, they will become disgusted and will not eat or will vomit.⁴⁵ Similarly, the Suçruta SaAhitâ states the exceptionally nourishing character of meat, adding the psychological considerations. Thus, when man has meat if his *manas* is perfectly pure, his flesh is fattened by the flesh that he eats.⁴⁶ Caraka also points out the fact that among the possible causes of consumption and cachexy, the most serious is distress. Fear, anger, passion and other psychological causes, play a primary role in determining illness.⁴⁷ Moreover, Suçruta points out that a pure mind is free from pain, anger and to maintain this, tiger meat is to be given in disguise to the patient so that he can retain a pure mind.⁴⁸

Secondly, both the medical compendiums harp on non-violence. Tranquility, knowledge, friendship (*maitrî*) and compassion (*kârûGa*) towards all creatures is recommended for the physician in opposition to the killing of animals. The Caraka SaAhitâ also states that – “*he who abstains from meat and alcohol and who eats only what is indicated – the pure and pious man, in whom*



the sattva (spirit, the principle of knowledge and purity) predominates, escapes from mental disorders both innate and acquired."⁴⁹ Similarly, the Súcúruta SaAhitâ points out that the medical practitioner must show friendship to all creatures.⁵⁰ Both the texts give importance to treatment of the king. The Súcúruta SaAhitâ devotes to the medical protection of this high personage, a special chapter – "*On the army on campaign.*"⁵¹ The organising of the royal kitchen so that the king's meal is innocuous, pure and therapeutic is recommended as the duty of the BrâhmaG doctor, thus emphasizing the importance and relevance of medicine in the life of the king.⁵²

It is needless to say, that instances of psychological analysis are found more in the Caraka SaAhitâ than in the Suúruta Samhitâ. Two distinct phases of early Indian medical history can be distinguished which shows a transition from magico-religious healing of the early Vedic period, exemplified in the medical charms of Atharva Veda and certain healing hymns of the Zg Veda to the empirico-rational medicine of Âyurveda as exemplified in the classical treatises of Caraka and Suúruta. Thomas Kuhn's theory of paradigm shifts is useful in understanding the revolutionary nature of the transition in Indian medicine. Intellectual transformations occurred whereby new modes of psychological conceptualising and explaining through empirical data, emerged. The only difference from Kuhn's model was that many of the old concepts of medicine were taken and assimilated into the new structure and system of medicine. There was certainly a radical shift in the way of conceiving mankind's afflictions and their cures but, at the same time, the vast store of medical knowledge accumulated in the BrâhmaGic and Buddhistic tradition were incorporated and codified into the new conceptual models which served to authorise the new knowledge by establishing connections with the past.⁵³ It is obvious that Caraka Samhitâ and Suúruta Samhitâ show an empirically and rationally based medical epistemology and psychological theories. The psychological and rational approach is sometimes hidden "*under a heap of intellectual debris.*"⁵⁴

There are also vague and impossible suggestions and advices but these first attempts at codifying medical knowledge must have been a difficult task to perform as they had to conform to the social norms of the time. Written in the *sûtra-bhâsya* style with *kârikâ* (memorial verses) similar to that of the Arthauâstra of Kaumilya, which characterises a whole family of scientific texts of early India, the medical corpuses fall under the genre of creative, logical, rational and scientific literatures of the time. They initiated a new thought and enquiry and a new attitude towards human considerations and also a perception towards the ecological balance of the universe.⁵⁵

The social stigma attached to the medical profession and practitioners is found in the Yajur Veda and the Satapatha BrâhmaGa. They regard the physician as impure. But besides these early literatures, there is the Manusm[iti and the Mahâbhârata which also give scant respect to the physician. Even though Manu states that medicine is to be practised by the three castes – BrâhmaGs, Kshatriyas and Vaioeyas, there are certain modes of obtaining livelihood which are too derogatory to be normally allowed to the *dvîjas* or privileged classes. Only under exceptional conditions



causing dire distress, the *dvîjas* can go in for these. The list of these modes of livelihood includes medicine.⁵⁶ In another section, Manu authoritatively states that – “*physicians, temple priests, sellers of meat and those who subsist by shop-keeping must be avoided at sacrifices offered to gods and to the manes.*”⁵⁷ Manu also warns the BrâhmaGs against taking food from the physician.⁵⁸ Similarly, the Mahâbhârata shows the same contempt for physicians. In the Ūânti-Parvan, BhiCma, is made to enumerate a long list of persons from whom food, if taken, is polluting for the BrâhmaGs. The list includes the physician.⁵⁹ In the Anuœasana Parvan again, BhiCma is made to recite another list of persons to whom no gift is to be offered at the funeral rite; this list includes the physicians.⁶⁰ The contemporary Buddhist literary works of this period, in contrast, show high respect for the medical profession. The Lalitavistâra accords a highly honoured status to the physician as a healer and reliever of pain.⁶¹ The Mîlînda Pañha also shows a positive attitude towards medicine by persistently comparing Buddha’s teachings as physician and surgeon curing the sick.⁶²

Endnotes :

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- ² Mazars, G., *A Concise Introduction to Indian Medicine*, Delhi, 2006, pp. 8-9.
- ³ Ibid., p. 8.
- ⁴ Ibid., p. 26.
- ⁵ Ray, P. and Gupta, H.N., *Caraka Samhitâ* (Henceforth CS), New Delhi, 1965, p. 4.
- ⁶ Ed. Ray, P., Gupta, H., and Roy, M., *Æœruta Samhitâ*, (Henceforth SS), New Delhi, 1980, p. 19.
- ⁷ Mazars, G., op.cit., Ūârâsthâna, IV, 36, p. 35.
- ⁸ Bhisagratna, Kaviraj, K. (trans. and ed.), *The Sushruta Samhita*, Vol. 2, 1, 1, 6, Varanasi, 1963, pp. 113-114.
- ⁹ CS, Sûtrasthâna, 1, 42, p. 7.
- ¹⁰ Ibid., 8, 17, p. 13.
- ¹¹ Ibid., 2, 7, 4, c.f. Sinha, J., *Indian Psychology*, Vol. II, p. 4.
- ¹² CS, 1, 11, 33, p.
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- ¹⁴ Berry, J.W., Misra, R.C. and Tripathi, R.C. (ed.), *Psychology in Human and Social Development*, New Delhi, 2003, p. 62.
- ¹⁵ Valiathan, M.S., op.cit., p. 317.
- ¹⁶ Ibid., p. 50.
- ¹⁷ Ibid., pp. 310-311.



- ¹⁸ Ibid., 1,1, 55, p. XLIV.
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- ²⁴ Bhisagratna, Kaviraj, K. op.cit., pp. 36-37.
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- ²⁶ Valiathan, M.S., op.cit., p. 185 and p. 216.
- ²⁷ SS, p. 45.
- ²⁸ Joshi, K. and Cornelissen, M., *Indian Psychology and Yoga*, Vol. XI, Part 3, Delhi, p. 339.
- ²⁹ Valiathan, M.S., op.cit., pp. 202-203.
- ³⁰ Joshi, K. and Connelissen, M. (ed.), op.cit., Chapter 32, p. 419.
- ³¹ Valiathan, M.S., op.cit., pp. 315-316.
- ³² Ibid., p. LIV and p. 185.
- ³³ Ibid., pp. 189-190.
- ³⁴ Sinha, J.N., *Indian Psychology*, Vol. II, Delhi, 1996, p. 53.
- ³⁵ Ibid., p. 54.
- ³⁶ CS, 1, 11, 29, c.f. Valiathan, M.S., op.cit., p. 47.
- ³⁷ CS, Sûtrasthâna, 17, 30-40, c.f. Valiathan, M.S., op.cit., p. 74.
- ³⁸ CS, Indriyasthâna, 5, 41-46, c.f. Valiathan, M.S., op.cit., p. 225.
- ³⁹ CS, 5, 27-46, p. 12.
- ⁴⁰ SS, Sûtrasthâna, 29 and Sârirasthâna, 4, 35, pp. 18-19.
- ⁴¹ CS., Sârirasthâna, 1, 148-149, p. 12.
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- ⁴⁹ Ibid., IX, 96, c.f. Zimmerman, F., op.cit., p. 190.
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⁵⁸ Ibid., III, 180, *SBE*, Vol. 25, p. 109; IV, 212, p. 162.
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Making of the Patron- Babur & Humayun – Their History, Culture & Family Background, Difficulties, Attitudes and Achievement

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Abstract:

It has been established in the course of this research paper that the Mughals were largely Turkish by race, 'Sufiistic-Sunnis' by faith and Persian by culture. Babur, the fifth descendant from Timur, was aware of the great and remarkable ability of Bihzad but could not devote much attention to art due to political uncertainties. This research paper points out to the fact that painting flourished in his time and is clearly seen from the Alwar manuscript of the Persian version of his memoirs, where the illustrations show the style of painting during his day. He had made frequent references to poets, writers, artists, and architects of the 'Timurid-heritage'.

Key Words: Mughals, Turkish, Sufiistic, Persian, Timurid-Heritage

Introduction

Antecedents and Precedents

It is very interesting to observe that during the period of Emperor Akbar, a highly sophisticated and developed style of miniature court painting comes to the forefront. This raises the question about the antecedents and precedents as well as the sources from which this classical Mughal style evolved. This particular study has been undertaken with the intellectual and aesthetic intention of highlighting, what the Mughals actually inherited, what they imbibed and what they tried to create or establish. It is important to understand in this context that the Mughals were to a great extent racially Turkish, Sufiistic-Sunnis in spirit and faith and Persian in culture and intellect. It is however rather significant to remember that the term or dynastic title, Mughal, actually refers to Babur's maternal lineage, as it is a Persian synonym or equivalent of the term Mongol. Babur had inherited the Timurid – heritage and therefore the Persian elements of Islamic art had always played quite a dominant role in the evolution of Mughal painting with due acknowledgement to the Old-Central-Asiatic –elements which were equally very strong in Timurid – culture.



Birth, Childhood and Schooling: Babur's Ancestry and His Timurid Heritage:

Babur was born in February 14th, 1483 A.D., in Andijan at Farghana, a fertile valley to the east of Samarkand, the Timurid capital, constituting practically a fragment of Timur's vast empire, in Central Asia (a part of the former U.S.S.R.)¹. His father Omar Shaikh Mirza was the great –grandson of Timur and his mother (Qutluq Nigar Khanum) was the daughter of Yunuskhan of the feudal nobility from Taskent. Babur's childhood was spent in the Ferghana valley, and he received his schooling in Andijan and his tuition was primarily in his native Uzbek language². The dynasty of the Mughals in India was established by this romantically adventurous and dynamic Timurid prince – Zahir –Ud -Din –Muhammad (Babur), in whose veins flowed the blood of the two great conquerors. Being the fifth in descent from Timur, the earth-shaker and tracing his ancestry through his mother –Qutluq Nigar Khanum, from Chingiz Khan, 'the terrible', Babur combined within himself the vigour and stubbornness of the Mongol, the hardihood and capability of the Turk and the culture and suavity of the Persian. Thus in the words of Lanepole, "the blood of two great warriors of Asia, Mongol and Turk, Chengiz and Timur mixed in his veins".

Babur's social and philosophical outlook as well as his aesthetical and scientific interests had developed under the influence of the great works of Mirza Ulugh –Beg, Ali-Shir Navoi, Abd ar-Rahman Jami, Lutfi and other Eastern Classical writers. Inheriting his father Umar Sheikh Mirza's precarious throne after his accidental death, the exuberant eleven-year-old prince was made the king. In spite of his popularly famous and established family tradition and identity(ancestral), it was practically natural for Babur to aspire for more, as he had only the rather small kingdom of Farghana as his inheritance. This was more so because, Babur had always identified himself as a rightful Timurid heir and thus throughout the larger part of his life, his primary aspiration and motto(his guiding ambition) was the acquisition and possession of Samarkand, the great and magnificent capital of Timur.

¹ By the time the entire territory of Timur's empire. had been captured by the Shaibanids. Babur undertook two campaigns against Samarkand (1498 and 1500-1501) to liberate the city from Shaibani Khan but failed to achieve success. Thus forced to escape from Farghana and Turkestan and being at an utter loss in trying to suppress and dominate the devastation and menace of the Uzbeks, Babur with a small group of followers and relatives, ultimately moved to Kabul and made it his refuge. This episode has been colourfully depicted in "Humayun-nama", a well-known work by Babur's daughter Gulbadan Begum . "Then (father) Babur, at the head of a group of 200 followers and relatives started out in the direction of Badakhshan and Kabul wearing robes and raw-hide boots and armed only with staves, relying solely on Allah."

² [Timur, or Tamerlane, as he was known in the West, had brought large parts of Asia, from Samarkand to Anatolia, under his sway in a neo-Mongolian drive of conquest. Living up to his Latin nickname, 'Orientis Terror', he had won for himself the favour of Europe at the battle of Ankara in 1402 by defeating Sultan Yidirim Bayezid so devastatingly that the ottomans were kept from taking Constantinople for another fifty years. The Mughals always felt superior to the Ottomans, because of the humiliation of Bayezid, whom Timur had captured and who according to popular legend taken in a cage, on Timur's way back to Samarkand, using him as a step while mounting his horse.]



Babur was a great aesthete of his time. He was a man of action with the spirit of a poet. Although his conquests left no time for patronage of fine arts, he wrote verse and candid records of events and emotions, which abundantly reveal the tastes and weaknesses that were to develop in his descendants. Immediately after Panipath his very first act was to lay out a garden. He did not hesitate to divert himself from the victories or failures of campaigns in order to simply admire a flower or a peculiar bird. Like his descendants, he was seriously attached to music, painting, architecture and outdoor sports like wrestling and hunting. Babur organized week- long picnic sessions which were graced and entertained by animal combats, jugglery, dance and jovial company.

Actually it has to be understood that it was the inclination and fascination of this multifaceted personality towards all forms of fine-arts that proved inspiring for the initial evolution of the Mughal style. Thus, the Mughal concern for naturalism, colourful details, meticulous and throbbing with life, apparently seen from the very beginning of Mughal painting, definitely originated from Babur's deep concern for man, nature and their characteristic intricacies.

Babur was a possessor of undaunted courage but misfortune or luck made him suffer for a long time embroiling and entangling him in a conflict with many a hostile Timurid claimants to the thrones of Farghana and Turkestan.

The Upbringing of a Timurid Prince according to Mirza Haider: Painting and Art – Critic:

According to Mirza Haider, the upbringing of a Timurid prince included training in calligraphy, verse making, recitation, painting, illumination –making, and even seal- engraving³. Apart from being a poet and writer of good repute Babur was also a fine calligrapher, having invented the style, khatt-i-Baburi. Babur was a renounced man of learning, a great lover of gardens and a keen observer of nature, a collector of manuscripts and also a patron of painting. He felt at home with the work of draughtsmen and calligraphers, men of letters and musicians but when it came to painting, he was more of a critic than an admirer as revealed by his comments on the great Persian painters-Bihzad and Shah-Muzaffar. He was also a great patron of wall painting in Garden-Palaces and pavilions. This marvelously scrupulous natural historian thus seemed to have been aware of all the individual styles and traditions prevalent among the artists of Tabriz, Baghdad, Shiraz and Herat and was also well acquainted with the works of the celebrated Persian Masters(Bihzad and

³ For the people of India , however , they remained 'the Mongols' (Muggula, Mugala); the Europeans followed suit and gave them the dynastic title Grao Mogor, Groote Mogul, Grand Moghol, grand Moghol, or Grossmogul. The Timurid period in the history of the peoples of Central Asia was marked by a considerable development of socio-economic relations, the political system and culture. [Timur's appearance in the family of Taragay, a Barlas bek in the village of Khodja-Ilghar in central Asia was purely accidental. Such a personality like Timur met the requirement of his time. It was needed by the country which had been constantly torn by invasions of the Mongol khans and beks from the Golden Horde and tormented by 150 years of foreign rule . As a statesman Timur to a certain extent had the capability of creating a centralized and independent state in Maverannahr]



Muzaffar Ali), having in his private collection their realistic masterpieces in the Shahnama and the Zafarnama.

Babur and Art: Keen Interest & Sound Knowledge About Contemporary Painting:

Again though there is no evidence to prove whether Babur personally practiced painting, or ever established his own atelier, there is no doubt about the fact that he nourished a keen interest and sound knowledge of the art of painting. As already stated above, Babur was also a serious critic as evident from his remarks about the painting activity of Mirza Muhammad Haidar, Baysunghur Mirza, Bihzad and Shah Muzaffar. Babur's critical attitude towards the art of painting imparts credence to the fact that he possibly might have taken serious lessons in painting, like his descendants Humayun and Akbar. The emperor Jahangir, while recording the events of the year 1612, writes that: "Although King Babur has described in his Memoirs the appearance and shape of several animals, he had never ordered the painters to make pictures of them."

New Concern for Naturalism:

Interestingly Babur's extraordinary and lively autobiography (the Waqi at-I-Baburi, written in Chaghatai Turkish and translated into Persian as the Babur- Namah) reveals his mentality so fully that from it one can imagine how Babur might have looked at art. While the miniature paintings of his Persian forebearers can be ascribed as visual equivalents or rhymed verse, views of the world in arabesque, a new concern with naturalism was infused into the tradition by Babur, and thus the pictures of Mughal India are closer to prose narratives⁴.

Babur A Patron of Painting: The Kabul Scriptorium and Studio: The Shah Nama for Ulugh Beg –II

In recent years, many a new material has been discovered which has helped us in understanding the role of Babur as a patron of painting, in the light of the activities of the Kabul scriptorium and studio. The recent discovery of a Shahnama manuscript with seven illustrations and a firm and

⁴ The Persians are great designers of the world. Their paintings and carpets show excellence in colour and balance, using the best and purest colours with masterly effect. This is again one of the inherent qualities of Mughal painting for which it is world renowned. It should also be kept in mind that the Persians drew many motives from the great pool of primitive art which came ultimately from the plains of Central Asia. The animal forms and geometric patterns in Mughal painting and minor arts were due to this inheritance which was of course inspired by the Sasanian metalwork and other forms of minor and monumental art works. From the Sasanian times onwards, there is a real unity in Persian art, which was largely conservative and static, with ofcourse a consistent development of the early decorative ideas. The Persian instinct of balance, ranging from simple confrontations to elaborate compositions, and for colour persisted. What is further surprising and rather significant is the fact that none of the invasions of unparalleled violence, i.e., Mohammedan, Mongol, Timurid could destroy it. And thus, it may be strongly suggested that the Mughals did inherit the ancient art of Persia of course in a new modified form. Persian art constantly returned for strength and inspiration to the Sasanian age. This becomes clear when one is reminded about the great epic of the Sasanian age; which again was the most popular Persian book that is the "Shah-nama" or the Book of kings, the versified history of early



dependable colophon has shown that Kabul had been a center of book production long before Babur's occupation, and the book i.e. the Shahnama had been prepared for Ulugh Beg II (1469-1502), a descendant of Timur, who had ruled Kabul and Ghazni. The paintings and their style are not clearly recognizable and appear to be later additions, made in the second-quarter of the sixteenth century. It cannot be defined exactly as to where these were executed, as there is a difference from their original models or types from Khorasan, Transoxiana or even Tabriz during this time which is not easy to recognize⁵.

Babur The Patron of Picture Galleries: A Surat Khana of Chanar Bagh and Bagh-e Safavid:

From September 1504 to the end of 1525, Babur spent a good part of his life at Kabul. Babur built and repaired or remodeled several gardens in Kabul. In one of them, the Chanar-Bagh, there was a small 'Suratkhana' or picture-gallery. From his writings we come to know of another painted pavilion in a building in the Bagh-e-safavid there, constructed by Sultan Abdul Qasem Babur (1449-1457). Thus by patronizing the construction of picture galleries in garden-palaces/retreats, Babur was infact following the Timurid-tradition of adding pleasure pavilions with painted walls in gardens redesigned by him⁶.

Babur's Chahr-Bagh: The undisputed builder of the Bagh-e-Surat Khana/Bagh-e-Baburi:

After a minute examination of the critically edited Chaghatai Turki text by Eiji Mano, and Abdur Rahim Khan-e-Khanan's translation in old Persian and likewise Bacque-Graymont's French translation, A.S. Beveridge and W. Thackston's English translation, Chahryar Adle came to the

Persia, produced by Firdausi. Similarly a slightly less popular book was the work of Nizami, dealing with a few of the most picturesque stories of the heroic period.

⁵ Babur, Humayun's father had been the ruler of Ferghana, in eastern Iran. Humayun too had come to India from Kabul, where he subsequently maintained a lavish court. A contemporary nobleman had left the following recollection of the period: "Those days that I spent in Kabul were the freest from care and sorrow of any I have ever experienced, or ever shall experience. I spent two years and a half at the court of this excellent prince (Babur), in a continual succession of enjoyments, and in the most complete abandonment to pleasure and absence of preoccupation...I never suffered even a headache unless from the effects of wine; and never felt distressed or sad, except on account of the ringleads of some bellowed one". [The Mughal empire in India had strong ties to the Northern-Lands. Geographically, politically and culturally, the territory stretching from Heart, the last Timurid capital, north to Samarkand and east of Kashgar was the psychological homeland. Lands in India originally were considered southward extensions of the natural Mughal patrimony. This maintenance of ties with the northern area was essential for dynastic identity and justification.] Babur's occupation of India was unrooted, military and the sport of war. The army was a heterogeneous body of adventurers -Chaghatai, Uzbek, Mughal, Persian, Afghan and Hindustani. In Sher Khan Sur, the Afghans produced a truly great leader who might have proved a serious rival to Babur. Humayun the indolent son was hardly the pilot to steer the ship of the state on such a stormy voyage

⁶ The advent of the Safavids to power in 1501 marked the beginning of the modern era in Persia. They created a well-organised and durable state which ended some 250 years of continual political fragmentation and



conclusion that the painted pavilion in the gate-House of Babur's Chahr-Bagh built in 1505-06, and mentioned in two places in his memoirs was infact his own creation. As mentioned by Babur, himself, a party was held on October 1519, on the south-eastern side of the picture –gallery which was built at the Darwaza (Gate) of the Chanar-Bagh. In later writings the same garden is described as Chahar-Bagh or Bagh-e-Suratkhana or Bagh-e-Baburi. His entourage had several people bearing the titles of Kitabdar(librarian), Muzahhib (guilder and ornamentalist) and Arayesh (decorator), but he gave no information about their activities as keepers of his collection of books or the gilding or ornamenting work.

Un-enthusiastic about painting: Rare reference to the art of painting: Inspiration for artistic pursuits: Inspiration for Descendants – Guide for artistic pursuits:

Rarely does Babur refer to the art of painting, and even if he does mention it, he appears to do so in an unenthusiastic manner, rather half-hearted in his approach. Whatever might have been the reason for this treatment, his impact on the artistic development of India was tremendous, though this effect was never immediate and was felt long after his demise. Apparently, Babur's Indian

foreign rule by Mongols, Timurids and the Turkomans .The Safavid dynasty created a kind of Iranian national state , and its decisive adoption of the Twelver Shia, laid the foundations for Iran's specific religious development .[The beginning of the Safavids date back to the destruction of Central religious authority by the Mongol invasions in the mid-13th century, which gave added impetus to a mystical, regional form of "Popular Islam" and to the various Sufi sects .]Shah Ismail had created a theocratically legitimized absolute monarchy but as the Shah he also remained the master of the Safaviya order .Tahmasp was prudent but had a tendency to bigotry. He cleansed the official Shia of the revolutionary and eschatological elements introduced by his father, and encouraged Persian book painting, which reached its first high point during his reign. During this period, for the first time in Safavid history, artists and scholars began considering the aesthetic aspects and content of painting. Until then only calligraphy had been recognized as an art form, because it involved writing God's word, the Koran, it was regarded as hailing God's approval. Now, two artists and a scholar began supporting figurative painting, which had until this point always been condemned by orthodox religion. They cited the fact that Imam Ali, who is highly revered by the Shiites, had been both a calligrapher and a painter. This happened in a state which had been founded with a Shiite emphasis, and in which one might have expected figurative representations to be condemned on religious grounds. Yet none the less it was precisely the highest political leaders who were the most enthusiastic supporters of painting. One of the strong proponents of figurative painting was Dust Muhammad, a painter and calligrapher during the reign of Shah Tahmasp. This transfer of artistic excellence from one nation to the other was not uncommon in the Islamic world. Islamic artistic and intellectual life was quite accustomed to the mobility of painters, calligraphist Shaykh Zadah , Behzad's most faithful student , who had been involved in the illustration of some of the most important early Safavid manuscripts for the young Shah Tahmasp, appears to have lost favour with his royal patron and moved from Tabriz to Bukhara, where he found more sympathetic patronage . [In the annals of Islamic painting it was one of the most significant of migrations, since it laid the stylistic basis for Uzbek painting for two generations.] Safavid artists emigrated west to the ottomans and east to the Mughals, and their emigration was motivated by many factors. [Mir Sayyid „Ali was probably born about 1513 , when his father was already an active painter in Tabriz in the court atelier of shah Ismail I (r. 1501-24) he showed early talent and by 1530s was working as an assistant to Sultan Muhammad on the great Shahnamah executed for Shah Tahmasp between c. 1522 and 1544. His gift for rendering intricate detail in another artist's painting is clearest in the weaponry of warriors and the accoutrements of their horses in the older master's (Sultan Muhammad) "Qaran slays Barman". (Shah Tahmasp's Shahnama)]



sojourn of four short years until his untimely death in 1530 appears to be very brief and insufficient to change the entire course of Indian history as also to leave perceptible impact on its culture and society. The glimpses of all of these are to be found in the Baburnama and in the accounts of his historian cousin Mirza Haider Dughlat. According to Percy Brown, “Babur stands out in high relief as one of the most remarkable men, Asia has ever produced”. He was of distinguished ancestry. The high courage, indomitable will and the fine mental qualities that he exhibited throughout his career, frequently inspired his successors in their artistic and intellectual pursuits. Babur’s ideas acted as a guide and the culture which he bequeathed moulded the character of artistic patronage to a great extent.

Mirza Haider’s account of multifarious talents: Artistic qualities:

Babur’s cousin Mirza Haider, a famous writer gives a list of the emperor’s attainments. After stating that he was “adorned with various virtues and clad with numberless excellencies, above all of which towered bravery and humanity”, this genuine admirer declares that Babur could be considered second only to Amir Ali Shir in the composition of Turki poetry. Moreover, the emperor had also written a diwan in the purest and most lucid Turki. Babur is said to have invented a style of verse called mubayyan and was also the author of a most useful treatise on jurisprudence which has been generally adopted. He also wrote an essay on Turki prosody, more elegant than any other of its kind and versified the Risala-i-Validiyya of his Holiness. His Waqa’ or Memoirs in Turki were written in a simple, unaffected, and yet in a very pure style. He excelled in music and other arts. Compared to Babur none of his ancestors were gifted with such multifarious talents. Besides Babur was also a learned philosopher, a great huntsman, an enthusiastic traveler, an insatiable sightseer. Surprisingly Babur was also an eager and devoted observer of the habits and appearances of birds and animals and specially devoted himself to the serious study of flowers, gardens, and the beauties of nature.

Intellectual and Artistic Qualities: Born artist with the eye of an artist:

After assessing these intellectual and artistic qualities amply evident from the Baburnama, it can be ascertained that the emperor Babur was in fact a born artist. Babur had himself regretted that the technical skill of painting had not been granted to him by the Almighty. But nevertheless, he was amply successful in expressing his artistic ideas in form and colour. At all times and seasons whenever opportunity permitted him, his love for scenery, flowers, and natural effects impelled him to describe these with sympathy and intimacy thus revealing his aesthetic mind.

Babur had the eye of an artist which enabled him to write so freely about the beauty of the campfires twinkling below him, like stars reflected in a murky sea, or the mingling of the yellow and red blooms of the arghwan, which were to him incomparable in the entire world. Even when stricken with extreme scarcity, Babur could always find consolation, refuge and aesthetic satisfaction in the extraordinary growth of a flower, fruit, or a tree etc. On such a dangerous and delicate occasion



when his life was in instant danger, Babur carelessly wandered in an orchard to write one apple – tree had been in excellent bearing on some branches five or six scattered leaves still remained, and exhibited a beauty which the painter, with all his skill, might attempt in vain to portray.

An eager and devoted observer of bird and animal appearances: Regret for being unable to paint; Love for nature:

Babur was fond of gardening and architecture and was also proficient in music. He was keenly sensitive to the beauties of nature. His description of the flora and fauna of Hindustan reveals his quickness of observation and his marvelous interest in natural history. His graphic descriptions of Samarkhand, Kabul and Indian cities are vivid. The section on the various species of birds, animals, plants, and flowers encountered by him for the first time are all observed with lively interest and recorded with meticulous care.

The Palaces of Gwalior–The Indian Masons–Admiration and praises for Indian Craftsmanship: Man Singh’s Palace and the Dholpur Garden:

Babur describes favourably at some length the palaces of the Gwalior fort, praising especially those of Man Singh Tomar. Its special appeal lay in the carved stone walls, tiled facades and exterior chattris . Just as Timur had admired Indian stone masons and some 225 years earlier had carried some back to work on his own buildings in Samarqand, so Babur –who had noted this in his memoirs –also favoured the work of these artisans and employed them freely. Still today the hand of the Indian masons is evident on the tanks at Dholpur lotus garden. These masons had been rewarded with gifts by Babur, who admitted their craft. He was astonished at the ability of Indian masons to inlay and bond pieces of coloured stone without the use of mortar.

Fidelity to Timurid Models: Artisans from Central Asia: Khurasan, heart, Qandahar:

In spite of his admiration for Indian craftsmen, Babur aspired for the overall design of his structures in India to be modeled on Khurasani, that is Timurid examples. Possibly to insure fidelity to Timurid models, two artisans from Central Asia came to work for Babur in India. One was Mir Mirak Ghiyas, identified as a stonecutter in Babur’s memoirs, possibly identical with Mirak Sayyid Ghiyas, the designer of Humayun’s tomb, who came from Herat and owned much land in Khurasan. A second stone cutter, Ustad Shah Muhammad, first had served Babur in Qandahar, before his incursions into India and continued in his employment until at least 1529, the year before Babur’s death.

Babur’s Timurid –Heritage: Dominant role of persian elements of Islamic Art :

Babur had inherited the Timurid heritage, apart from a brief contact with the Safavids, which of course was renewed under his son, Humayun. Infact the Persian elements of Islamic art had always played a dominant role in the evolution of Mughal painting. The Persian elements of lyrical and



poetic fantasy, extraordinary romanticism as well as mysticism created an art form of great beauty, which the Mughals circumstantially and traditionally inherited. Thus the essential quality of Persian miniature painting, which was a unique union of the romantic and emotional is quite discernable in early Mughal painting.

Timurid Intelligentsia:

During this period there lived a whole galaxy of great thinkers of Central Asia, whose names are known to the entire world. These were; the historians Sharaf ad Din Ali Yazdi, Ibn Arabshah, Mirkhvand, Khvandamir, Daulatshah Samarqandi; the scholars Ulugh Beg, Ali Kuschi, Kazi-zage Rumi; the Philosophers and poets Nur ad-Din, Abd ar –Rahman Jami, Alishir Navoi Lutfi, Sakkaki, Atai, the artist Bihzad, Kasim Ali, Mirak nakkash, Muhammad-Muzahib; the scribes Sultan, Ali Meshhedi , Sultan Mohammed Taqi and many others .

Babur and Persianate court culture of Timur's Sons: The rationale approach of Babur inherited by Akbar and his descendants –The Mughals:

Babur's matter-of-fact, rational approach seems to have laid the foundations of Akbar's thinking, in which reason was the driving force, and it remained a characteristic of the Mughal dynasty till the time of Aurangzeb.

Babur and the Artists: Babur's reference to the two artists: Bihzad and Shah Muzaffar:

It is well-known that during the reign of Sultan Husayn Mirza, Herat was full of learned and matchless men – theologians, philosophers, jurists and scholars of all kinds ; poets without number; musicians , calligraphists and painters .Of all the painters, Babur had referred to only Bihzad and Shah Muzaffar . About Bihzad, Babur says –" his work was very dainty , but he did not draw beardless faces well; he used greatly to lengthen the double chin; bearded faces he drew admirably". Of Shah Muzaffar, Babur had only written that "he painted dainty portraits, representing the hair very daintily; short life was granted him; he left the world when on his upward way to fame." Thus though very meager, this record testifies about Babur's interest in all forms of artistic activity and the fact that this royal author was sensitive to the appeal of beauty in colour and form in the natural world.

Babur's patronage to painting:

Babur's reign was short, so it was not possible to do anything more than establish his rule over the Lodi dominions of Delhi, the Punjab and the Jaunpur kingdom, from the Lodi capital at Agra. The only one of his manuscripts known to have survived from his reign is his Divan, so it is rather impossible to know to what extent he patronized scribes and illuminators. There is however no doubt that he was a collector of manuscripts. Babur could not patronize painters on a regular



basis, neither seriously nor diligently as his turbulent life scarcely gave him the opportunity to offer them the settled conditions necessary for the production of paintings of superior quality, more so because the court at Tabriz under Shah Ismail and his son Shah Tahmasp was attracting all the available talent from Iran and central Asia⁷. As is well known that in Babur's blood mingled the blood of his Turkish and Mongoloid ancestors, but his cultural background was Persian. It is improbable that any manuscript of his famous Memoirs prepared in his lifetime would have been illustrated, and he had no time to found a school of painting in India.

Babur and his sons Humayun and Mirza Kamran: Humayun and Art:

The Mughals saw themselves as the heirs of Timur, and whose immediate descendants proved to be great patrons of art and letters and sciences. Neither Babur nor Humayun ever forgot that they ultimately belonged to the line of the Great-Turko-Mongol Conqueror-Timur, whose family had ruled in Iran from 1369 to 1507.

Only four contemporary works dealing with the reign of Humayun Badshah have so far been discovered, they are as follows:

1. Khwandamir's Humayun-nama or Qanun-i-Humayuni,
2. Jauhar Aftabchi's Tadhkirat al-waqiat,
3. Bayazid Bayat's Tarikh-i-Humayun, and
4. Gulbadan Begam's Humayun-nama or Ahwal-i-Humayun Badshah

With the exception of the first work, which Khwandamir was commissioned to write by Humayun at Gwalior during February-March 1533, all the other works were written some 30 years after Humayun's death when the emperor Akbar ordered Abul Fazal to compile a history. Apparently at the same time his relations and officers, who it was believed, had some knowledge of the history of Emperors-Babur and Humayun, were commanded to write down their accounts to provide materials for Abul Fazl's history.

Nassir-ud-din Muhammad Humayun, the cultured prince inherited, his father's empire after the

⁷ Three miniatures of this Nizami of 1539 are scenes from the romantic love story of Khusrau and Shirin depicting Khusrau's court crowded with figures in the most gorgeous costumes. Probably at no period have such beautiful materials, such excellent pure colours and such lovely designs been worn. [In this century every part of the clothes worn from the turban to the collar was covered not only with dot and flower patterns but also a repeat pattern in clouds or birds, like the style of the gold borders of this manuscript, reminiscent of Chinese tastes. It is probable that at about this period in the first half of the sixteenth century, that many of the drawings of the Chinese design, several of which are at the Old imperial Collection at Constantinople were made. Similar costumes may be noticed in the double frontispiece of a copy of the story of Yusuf and Zulaykha by Jami dated 1569. The compositions are very effective with their dark foreground ending suddenly in a light range of hills. The many sketches of single figures mostly young men exquisitely dressed are the portraits of Shah Tahmasp, who came to the Safavid throne in 1524.]



latter's accidental death in 1530. From his boyhood days Humayun had received good training in arts, literature and music, besides being an equally accomplished calligrapher. He not only took good care of the manuscripts collected by his father but also further enlarged them and the imperial library. It is known that Hatifi's Timurnama with Bihzad's illustrations was in his possession, and a painter accompanied him even during the days of his retreat through Rajputana and Sindh. Fond of learning, he was also an accomplished calligrapher. Having interest in astrology, mathematics, and literature, he also wrote good verses. With a mixture of mysticism and superstition in him, he was a liberal Sunni with a predilection for the Shiahite faith.

But inspite of all this, Humayun was but a luckless man. It took him a full year of hard toil and patient waiting to start his own atelier in distant Kabul. Humayun was devoted to books and seems at times to have been more concerned with the loss of his library than of his kingdom. His delight in regaining his temporarily mislaid portmanteau of books is recorded in his son's biography, the Akbarnama (Nos70-1). These must have contained his father's books as well as his own, the library no doubt having been considerably enriched by his sojourn in Iran and Kabul.

Initiation and Foundation of the Mughal School– Safavid picture gallery and brilliant assemblage of artists:

Infact the foundation of Mughal painting was laid by Humayun during the years of his exile in Persia and Afghanistan. Humayun's visit to the Safavid court of Shah Tahmasp, was very crucial and significant towards the initiation of the Mughal school into a regular atelier. It was at Shah Tahmasp's court at Tabriz in 1544 that he was first exposed to the full panoply of the Iranian bibliographic tradition, where he doubtless saw the recently completely Shahnama and Khamsa of Nizami, the greatest masterpieces of Safavid manuscript production.

Humayun's first meeting with Shah Tahmasp took place in July 1544 at the summer quarters of Surtaq near Sultaniya, in a newly constructed picture gallery. The brilliant assemblage of poets, writers, philosophers and painters in the Shah's celebrated court, enkindled in Humayun's mind a covetous desire of possessing a similar entourage. For once in his life goodluck prevailed upon him as Shah Tahmasp suddenly lost his once lively interest in painting and started to think that indulgence in painting was a waste of time –an unexpected development facilitating Humayun to recruit the services of such front –ranking Persian masters like Mir Musawwir, his son Mir Sayyid Ali, and the celebrated calligrapher painter Khwaja, Abd-us-Samad. We also come to know about Ali Musawwir, Mulla Dust, Maulana Darvish Muhammad and Maulana Yusuf, and a few more who were active in Kabul.

The Artists of the Shah:

In this context it becomes very important to take a recourse of the Safavid cultural achievement. While at the Iranian court, Humayun hired several artists and craftsmen . Shah Tahmasp had been



among the very greatest of all Iranian connoisseurs and patrons of painting and book illustration, and his discussions with Humayun were held in rooms newly decorated with wall paintings. Tahmasp was wealthy and immensely cultured; his court exemplified imperial splendour and power. Humayun by establishing a visible association with Tahmasp, could therefore only increase in stature. The Shah did assign an army to Humayun, but the Mughals also took advantage of the Iranian ruler's growing lack of interest in the artists whom he had until then, lavishly patronized.

[Shah Tahmasp's interest in the book art suddenly declined in the second half of his long reign, which lasted from 1524 to 1576. he took some painters to his new capital city of Qazvin, where he finally settled in 1555, so that they could paint the interior of his new palace. However, the other artists were dismissed. Some found jobs with Ibrahim Mirza in Mashhad; others worked freelance in the bazaars, and others still went west to work for the ottomans or east to the court of the Moghul rulers in India.]⁸

Humayun's fortunes were thus promising as the Shah who had offered him refuge, had also known bitter days and had lost battles to the Ottoman Turks, who had sacked Tabriz and intrigued with a brother to depose him. Tahmasp was so upset by these crises that his interest had changed; once an inspiring patron of poets, musicians, and particularly painters, he had become excessively serious. Hence, the arts were suspect when Humayun reached the newly puritanical Safavid court, a situation which led indirectly to the founding of the Mughal school of painting. Humayun's appreciation of the magnificent achievements of the Shah's artists and his invitation to at least one of them to join his entourage, would not have been possible. Apart from this Shah Tahmasp also appeared to have been expecting or rather aspiring for Humayun's assistance, in the same way as Humayun had been eager for his help. The Persian monarch was in dire need for allies against his enemy the Turks.. This was more so because, the Mughal territories lay between Persia and the friendly Decanese –Sultanates. In this case if the Mughals helped the Persians, they could definitely prove to be a formidable wall of defense against the Ottoman Turks.

⁸ This new interesting technique of the miniature artist with the curious effect of carefully finished faces and hands and sketched outline may be attributed to Mohammadi who executed many a lightly tinted sketches, and whose signature is found in some fantasie sketches of loving couples.]. [More important than this emancipation from the old illustrative style of descriptive or narrative miniature painting was the fact that the artist was uplifted and freed from his immensely subordinate or secondary position in relation to the calligrapher. His art and his personality gained dignity and vanity over mere textile decoration. There was infact a role reversal, painting was influencing textiles and carpets.] [Shah Tahmasp I established royal carpet and textile factories in a number of cities, including Tabriz, Kashan, Isfahan, and Kerman .It was in these, for example , that the famous pair known as the Ardabil carpets were produced .Worth noting in this connection are the patterns on a Persian brocade at South Kensington which was clearly borrowed from miniature painting. Other such material survives in the collection at the Castle of Rosenborg near Copenhagen. Interestingly, inspite of this change in the purpose of art the national spirit of the Persian heroic age was not lost. There was a constant falling back to the old subject of the pathos of the meeting of Layla and Majnun in depressing conditions. The representations were however cool and pleasant rather than being real and practically harsh].



The painters -, Mir Sayyid Ali and Abd as-Samad had joined Humayun in Kabul in 1550, followed soon by Mir Musavvir and Dust Muhammad. The illustrations that these men made there are among the earliest identifiable imperial Mughal paintings. They of course, brought knowledge of the latest Iranian artistic techniques and styles to Humayun's court, and as former members of the Shah's entourage, their acceptance of the Mughals patronage must have seemed fitting acknowledgement to Humayun of his own (albeit temporarily suspended) imperial rank. It is not possible to ascertain with surety as to how novel the style practiced by Iranian painters was in the new setting. Not much is known about the style of the artist mentioned by Jauhar, but the quality of workmanship that they represented, must certainly have exceeded what was then otherwise available to Humayun. Following this visit to Iran, Mughal court painting was dominated by the accepted artistic standards of the Iranian court⁹.

It was thus under Humayun's patronage, after his return from exile in 1555, that the imperial Safavid style became firmly established as the basic element of Mughal painting. [(The Mughal stylistic developments can best be judged by their departure from, and relation to, the style) .The Akbarnama records that a meeting of Humayun with the Shah took place in a recently decorated palace : "In a noble palace, on the gilding of which skillful artists had long been engaged and in which they had displayed miracles of craftsmanship, an enchanting picture gallery received its inauguration by the interview with His Majesty ."]

These artists who descended into India to become directors of the imperial studio and the most prestigious painter's in Akbar's employ were the first of the series of Iranian exiles to seek employment at the increasingly wealthy and artistically active Mughal court. They had brought with them at Humayun's court at Kabul and later Delhi, the latest developments in the Iranian book tradition: elaborate and highly finished paintings by master artists; fine calligraphy; illuminated in Shamsas, Unvans, Sarlavhs and other pieces scattered throughout the text, in profusion, sumptuously illuminated margins painted in gold with individual designs; bindings now sometimes painted and lacquered rather than simply in tooled and painted leather; a burgeoning interest in portraiture and the assemblage of albums¹⁰.

Mir Sayyid Ali:

In this perspective it may be said that the life of Mir Sayyid Ali, split in mid-career between

⁹ [The famous calligrapher Shah Mahmud al-Nishapuri, was commissioned in Mashhad by Shah Tahmasp's nephew, Ibrahim Mirza(1540-1577) , the royal house's greatest connoisseur and patron of the arts, to produce a work which is now in the Freer Gallery of Art in Washington . This was the Haft Aurang (Seven Thrones) , seven verse epics by the poet Jami (1414-1492). Detailed examinations has revealed that the book was produced in stages, and many different artists and craftsmen must have worked together to create an artwork of this quality].

¹⁰ [Capitalization Of Timurid Achievements By The Mughals: Actually the dynamic rise of the aesthetically



Safavid Iran and Mughal India and was rather typical of those of many people of talent whose particular gifts or training gave them special appeal to the rulers of Delhi.

A more moderate and independent Bihzadian than Shaykh Zadah, was his “gift” of the Iranian classical style to the Mughal court. A Sayyid (or descendant of Prophet Muhammad), he was the son of Mir Musavvir who, along with Sultan Muhammad and Aqa Mirak, was one of the senior and most esteemed Safavid painters at the Tabriz court of Shah Tahmasp (r. 1524-76). Sadiqi Bek praises both father and son, [and said without elaborating :- Mir Sayyid Ali emigrated to India and “attained high rank under Jalal al –Din Akbar”].

The late 16th century court official and chronicler, Qazi Ahmad Ibn Mir Munshi in his treatise – “Calligraphers and painters”, cites Humayun’s prestigious invitation to father and son to come to his court, prefers the art of Mir Sayyid Ali to that of his father, and reports that both painters emigrated to India and remained there.

Though little survives of Mir Sayyid Ali’s own work he is of great importance for understanding the evolution of the Mughal school as it was, he along with Abd-us –Samad of Shiraz who accompanied Humayun to Kabul in 1550 and headed the atelier which helped in the development of the Mughal school of painting under Akbar.

The other most prominent painter of Shah Tahmasp’s Nizami was Mirak who probably painted five of the miniatures and was the monarch’s personal friend and illustrator.

The last important painter employed by the Shah for his big Nizami was Sultan Mohammed. His paintings are charming and very spacious. His animal drawings particularly of the horse show his special distinction within the traditions of the Persian –miniature school as he was evidently a very good painter of animals. The human figures are graceful and lively but the artist was not a great portraitist. There were probably other artists by the same name or perhaps the different names of

knowledgeable Mughal imperial power in the vacant space or vacuum created by the decline of the Timurid empire helped the capitalization of the Timurid achievement, by them (the Mughals). It is against this shifting historical and political background that the accomplishments of the emerging Mughal atelier must be assessed or measured. It was a period when cultural prowess and patronage began to assume large and complex roles among ruling elites. The Timurid’s early and expedient realization that patronage of Persian art and culture could be perceived in terms of political prestige helped transform the dynasty from a semi-nomadic Turkic military aristocracy into an envied model of urban refinement and sophistication. Their resounding success as patrons was not lost on those powerful, often untutored aspirants to power who sought both status and legitimacy in the volatile Turko-Iranian world of the early sixteenth century: the Uzbeks in Transoxiana (1500-98), the Ottomans in Turkey (1281-1924), the Safavids in Iran (1501- 1732) and the Timurid’s own descendants in India, the Mughals (1526-1858) (Each of these militant states). The Mughals exploited to varying degrees the Timurid cultural legacy by manipulating some aspect of the dynasty’s achievements or ideas, either through imitation, appropriation, or extrapolation. This process, which implicitly empowered the Timurids (Mughals) with an unassailable aura of cultural authority, only helped further to entrench the dynasty as a royal model for those in the process of assuming or enhancing power.]



the same artistic personality – Sultan Mohammed and of course Riza, another artist who copied Sultan Mohammed.

By the end of Shah Tahmasp's reign in 1574, the artists became further emancipated from their old illustrative style under the patronage of their princely patrons. Miniatures had little conjugation with the story or event they depicted. The best of artists were increasingly occupied in executing portrait sketches of frivolous and joyous nature like picnics and romantic meetings.

The Khamsa was not completed during the reign of Shah Tahmasp I, and the manuscript was kept in the royal library as a highly valued work of art. The reason why this magnificent production was not completed during Shah Tahmasp's reign was probably the fact that his interest in book art began to decline around 1545. He himself stopped writing and painting and dismissed the artists working in his studio. Thus around 1545 there was a real and drastic shift in the nature of this grand patron, and the patronage to painting all but ceased. While most of his senior artists were either dead or retired, those in mid-career, like Mir Sayyid Ali, were faced with several alternatives: working for lesser patrons (presumably with diminished salaries and perquisites) who might have been princes like the Shah's nephew, Ibrahim Mirza; provincial governors, other aristocrats or officials; or emigrating to the Ottoman, Uzbek or Mughal courts.

Mir Sayyid Ali's decision may have been easier than that of most, for when the Mughal emperor Humayun had been in exile in Tabriz in 1544, he had seen and much admired the work of the painter and his colleague Abd al-Samad. On Humayun's recapture of Kabul in 1546 a formal invitation was issued, and the two artists, along with the aged Mir Mussavir, set out immediately. [They resided in Kabul in Humayun's employ from September 1549 until November 1554, when they accompanied the emperor on his invasion of India. On the reconquest of Delhi in July 1555, Mir Sayyid Ali and Abd al Samad established themselves as the two leading Iranian painters in the emperor's house of painting.

Two Memorable Portraits:

It was probably during this early period that two memorable portraits were finished. The first is a touching and sensitive rendering of the artist's father Mir Musavvir, now in the Musee Guimet, and the second is a portrait of an unidentified young scholar, which bears his signature :- "Sayyid –Ali, who in the Rarity of the realm of Humayun the Shah painted this".

It was thus mainly due to the coincidence of Shah Tahmasp's increasing disinterest in the arts due to the extravagance, luxuries and lethargy of his court painters, and Humayun's unexpected presence in Persia as a fugitive at the safavid court that the services of two of Persia's greatest master's Mir Sayyid Ali of Tabriz and Khwaja Abdus samad of Shiraz, two prominent painters of the school of Behzad, could be secured by the Mughal emperor. Mir Sayyid Ali followed by his father Mir Musawwir, and Abd-us –Samad left Tabriz, along with a bookbinder and a mathematician



in the summer of 1548. They first went to Qandahar, where they waited for a year, while Humayun fought Kamran, until a lull in the war enabled Humayun to have them escorted to Kabul. They arrived there in November of 1554. Painters were already in service at Kabul for Mirza Kamran long before Humayun's occupation as evidenced by the recent discovery of an illustrated copy of Yusuf Wa Zulaikha prepared for the young Mirza.

Humayun and Mirza Kamran:

Mirza Kamran was a lover of books and also a patron of painting. The paintings found in this manuscript are in a late 16th century Bukhara style, and therefore added later.

Kamran was an undoubted lover of arts as he was able to recruit the services of Dust Muhammad Musawwir, one of the greatest luminaries of Shah Tahmasp's atelier. Dust Muhammad Musawwir was an enigmatic painter (different from the celebrated calligrapher Dust Muhammad) is increasingly recognized as a key member in Humayun's taswirkhana and amongst those who accompanied him to India. [For details consult Martin Bernard Dickson and Stuart Cary Welch, *The Houghton Shahnama*. Cambridge Mass., 1981, pp 118-28; R. Skelton, *Iranian Artists in the Service of Humayun*, in Sheila Canby, ed., *Humayun's Garden Party: Princes of the House of Timur and Early Mughal Painting*, Marg Publications, Bombay 1994, pp 38-44].

Dust Muhammad Musawwir also known as Dust-e Diwana, along with several other painters and craftsmen, among whom were Maulana Darwis Muhammad, Mulla Yusuf, the Ustad Ways-e-Zarkash (gold-wire drawer), and probably also the celebrated painter of Sultan Ibrahim Mirza's court Shaykh Muhammad.

Other companion painters of Dust Muhammad:

According to Abolala Soudavar, the celebrated painter Mirza Ali also went to work for Humayun at Kabul and returned to Ibrahim Mirza's court at Mashhad in C.1556, when the former returned to India. A superb painting showing an outdoor feast by Mirza Ali is mounted in the grand Gulshan album of Jahangir in the Gulistan palace, Teheran. The painting was undoubtedly made for the most exquisite manuscript of Nizami's Khamsa commissioned by Shah Tahmasp but remained incomplete and brought by the painter for his new patron. [M.S. Simpson, *Sultan Ibrahim Mirza's Haft Aurang*, Washington, New Haven and London, 1997 p 310; C. Adle, 1993, p 288; A Soudavar, "Between the Safavids and the Mughals : Art and Artists in Transition", Iran, Vol.XXXVII, 1999, pp 54-5, plate XVIIa.b.]

Mirza Kamran declared himself King in 1541-2 and struck coins in his own name. After he established his rule at Kabul, Humayun considered Kamran as an usurper and after protracted fights over a long period of time, reconquered Kabul in October 1545. Dust Muhammad along with Maulana Darwish Muhammad, Mullah Yusuf, who were working for Kamran, joined his service. The better-known Persian Masters, Mir Sayyid Ali and Khwaja Abd-us – Samad came



from western Iran to join Humayun at Kabul only towards the end of 1549. From Bayazid's account it is known that gifts sent by Humayun to Rashid Khan, the prince of Kashghar in about December 1553, included a drawing by Dust Muhammad, a picture by Darwish Muhammad and another by Mulla Yusuf. [Bayazid Bayat, *Tadkira –I-Humayun wa Akbar*, ed., Hidayat Hosain, Calcutta, 1941, pp 66-9; for a recent translation of the selected passages see Pramod Chandra, *The Tutinama of the Cleveland Museum of art and the origin of Mughal painting*. granz, 1976, pp 171-3]

Humayun had had a good basic training in art, literature, calligraphy, and other subjects. Babur had passed on the best manuscripts found in Ghazi Khan's Library [when he had gone to inspect the fort of Milwat (Malot) on 8 January 1526,] to both Humayun and Kamran. [Beveridge, 1922, p460; Thackson, 1996, pp319: I went into Ghazi Khan's Library (Kitabkhana); I found a few valuable (nafis) books there. I gave some of them to Humayun and sent some others to Kamran [in Qandahar]. Although there were many books with learned contents (mollayana), there were not many valuable ones as I expected."].

Gulbadan Begum report's in the Humayun-nama, that during the wedding reception of their brother Hindal there had been a display of books, decorated qalamdars (pen cases set with gold and precious stones), beautiful portfolios (jozdan-ha-e-Khosh) and fine albums (moraqqa ha-e-latif) containing beautiful pictures and calligraphies. [Consult: The history of Humayun. Humayun-nama by Gul Badan Begum, tr. with introduction and notes by Annette S. Beveridge, London, 1902, p124].

Humayun's interest in painting is well illustrated in Jauhar's account of his commissioning the painting of a beautiful bird that has entered his tent –even as he waited for his clothes to be washed outside, for he no longer had anything to wear¹¹. This painter was thus in Humayun's entourage when he was making a hasty retreat from India. That a painter was among the few people who accompanied him into exile certainly indicates the importance of painting at his court; while information, that the artist was asked to observe, and record aspects of the natural world, allies Mughal painting to the innovative.

Emperors and Princes of the House of Timur:

The earliest surviving painting of the Mughal school is a large painting on cotton of the ancestors in

¹¹ [“The king undressed, and ordered his clothes to be washed, and in the meanwhile he wore his dressing gown; while thus sitting, a beautiful bird flew into the tent, the doors of which were immediately closed, and the bird caught; his majesty then took a pair of scissors and cut some of the feathers off the animal; he then sent for a painter, and had a picture taken of the bird, and afterwards ordered it to be released. -Jauhar, *Tezkereh al Vakiat*, translated by Charles Stewart, New Delhi, 1970,(reprint),p.43-Jauhar, a private servant of the Mughal Emperor. Humayun (r.1530-1540; 1555-1556) made these observations while describing a moment during Humayun's flight from the Indian subcontinent.]



the male line of the Mughal house enjoying an imaginary picnic in the mountains seated in order of their succession. This painting of the Emperors and Princes of the House of Timur c. 1555 with some later additions have survived only in fragments, originally measuring 114 into 107 cm, now in the British Museum, London. This painting in a sadly damaged state, reached the British museum in 1913 and it is agreed that it is almost certainly the work of Mir Sayyid Ali himself, some figures in it being directly derived from the work of his father and the whole style being in the early-Safavid tradition the scale unprecedented for Persia, measuring about forty-five inches each way, perhaps echoes a Mongol- nomadic custom of hanging paintings in the tent .

Originally Timur himself must have occupied the centre of the scene, seated in a pavilion with Humayun facing him on a slightly lower level, unusual both in size and subject matter, it demonstrates the major features that were to become characteristic of the Mughal school: realism, leading direct to portrait painting, and a most polished technique. True portrait painting is virtually unknown elsewhere in the Muslim world. The composition and almost all the main iconographic features are directly derived from Persian models. The gold-painted sky and other colouring are Persian, and so is the illuminated frame of floral arabesques which surrounds it. But there is some slight evidence to support the suggestion that there was a vogue for painting on stuff in India at this time. One other fragmentary picture in the early-Mughal style painted on stuff survives in London, in the Herringham Collection in Bedford College For Women, Regent's park. This is of a hunting scene also almost square.

A second Persian master, Abd al-Samad, a Shirazi of good family, and a calligrapher as well as a painter, joined Humayun at Kabul in 1549, and also became head of his library staff in India. He survived to supervise Akbar's great undertaking in the library until he was appointed head of the mint in 1577. Meanwhile both the Persian masters had instructed the imperial princes in drawing and painting.

Prince Akbar presenting a painting to his Father (Humayun) in a tree house:

A miniature signed by Abd al-Samad, and preserved in the Gulistan Library in Teheran, depicts the young prince Akbar presenting a painting to his father Humayun, in a Tree-House, probably shortly before his death in 1556. This can only have been a work from the prince's own hand which he would thus have offered to his father. This painting was among the early works of the imperial atelier at Delhi, is Iranian in style; only the subject and certain details of the costumes betray a Mughal affiliation.

Forms are organized to create a rich and intricate surface pattern, while the colours carefully balance and enliven. However, space is legible –a roughly accurate ground plan could be drawn – and depth is shown by overlapping and diagonal recession lines. Every detail of the surface is



crystal clear and equally stressed. There is neither atmospheric perspective nor diminution of size according to distance. Lines and patterns are meticulous; wall surfaces, tile patterns, and textiles are minutely detailed. Yet despite such close observation, there are only slight differences among the faces. Figures are types, not individuals.

As our eyes move over the surface, no one detail predominates; slowly the imperial figures are discovered among the branches. Although this must be considered a Mughal painting, the designation is determined by the patron, not by the style. The turbans are crucially identified as distinctive of Humayun's court. The work depicts a historically descriptive subject matter, a specific event as written/related or described in the Akbarnama. The scene may allude to the relationship between prince Akbar and Abd as-samad and the painting embodies an extraordinary technique of force (tour de force) and the taste of the time.

According to Abul Fazl, the work may have been executed in Delhi, for it was only after his father's reconquest of the city that Akbar himself began to paint. The elaborate wall paintings behind the emperor may be accurate descriptions of a kind of painting now completely lost to us. The new innovations emerging in the Mughal style under Humayun and particularly Akbar, can be excellently understood or defined by comparing the Hamza-nama illustrations with a work done by Mir Sayyid Ali in Iran.

Chinese decorative arts and paintings:

The historian Khwandamir, writing in the 1530s of the marriage ceremonies of Hindal Mirza , stated that buildings "were adorned with Turkish and European cloths...while the shops were so beautifully adorned as to be the envy of the Chinese picture galleries , and to excite the jealousy of the high heavens". [The early Mughal studies of birds were on fabric rather than paper, a possible reference to the Chinese practice of painting on silk. Actually, the Mughal artists were open to those imported attitudes and techniques readily available in the libraries of Islamic bibliophiles and the courts and bazaars of India, when asked to depict new motifs or subjects.

Humayun's interest in natural history imagery may have provoked a new responsiveness at the Mughal court to Iranian and Chinese depictions of birds. Babur despite his clear verbal descriptions of natural history subjects in the Baburnama, apparently did not commission animal paintings. [Jahangir explicitly stated : "Although King Babur has described in his Memoirs the appearance and shapes of several animals , he had never ordered the painters to make pictures of them". This claim together with Jauhar's reference indicates that by the early seventeenth century, Humayun may be considered to have originated Mughal animal portraiture. The earliest of the small pictures on cloth are certainly the earliest known Mughal natural history subjects, datable to his (Humayun's) period. It must be realized that early animal imagery consists of variations on a theme, rather than



new, innovative observations. The second painting of the Rosy Pastors could have easily been derived from the first, while the several images of the partridges were copies from other paintings (paintings copying paintings) and not primarily studies derived from nature¹².

Thus the achievement of Humayun lies in his momentous decision, to have his own atelier in spite of his uncertain existence at Kabul and to recruit the services of two of the finest Persian masters already famous for their highly realistic and expressive styles paving the way for the remarkable success under Akbar.

Humayun had lived on Indian soil for fifteen long years. During his invasion and conquests, he had come into direct contact with Banaras (Chunar), Mandu, Cambay, Gujarat (Champaner), Bengal (Gaur i.e. Humayun's Jannatabad), Jodhpur, Bikaner, Jaisalmer, Umarkot, Bhakkar, Tatta and many other places like Peshawar, Lahore, Dipalpur, Hariyana, Sirhind, Badaun, Bayana, Punjab etc.

Humayun a sensitive and artistic man, the builder of Dinpanah, must have been influenced by the Indian miniatures. He may have collected painted manuscripts. These might have again in some way or the other influenced his mind and taste.

In this context it is very important to examine the notes by Humayun on some Hindustani Fruits, which help us in appreciating his scientific love for nature, its flora and his minute observation and also his spirit of enquiry like his versatile father Babur.¹³

Niccolo Conti, a Venetian traveler who visited India in the early part of the fifteenth century, specially notes that all over the country he found temples, the interiors of which were painted with figures of different kinds. But it was left to the Persian mission of Shah Rukh, previously mentioned,

¹² The reference in the memoirs of Jauhar, describing this particular event which occurred in 1543 is not surprising. The memoirs of Babur, Humayun's father, are full of careful verbal descriptions of the flora and fauna he encountered on the Indian subcontinent; thus his son's interest was in fact a continuation of the same. It is now definitely known that Humayun and Kamran both employed artists, and books belonging to Hamida Banu Begam, Akbar's mother, have also survived. Although no direct visual (or literary) evidence for Babur's patronage has yet been found / accepted, it is quite certain that Babur must have patronized artist. A library was expected of any Muslim household, and rather than simple repositories these often served as book-making centres as well, with resident staffs of paper-makers, calligraphers, illuminators, gilders, illustrators and binders. Books were frequently presented or exchanged on ceremonial occasions, and they formed desirable part of the spoils of war.

¹³ The following notes, may be accepted as made by Humayun in the margin of the archetype of the Elphinstone Codex. [They are composed in Turki which differs in diction from that of Babur, but is closer to that Classical model] Worth examining is the (i) f. 283b, p. 506; of the Elphinstone Ms. f. 235b (JRAS. 1907, p. 131 - Elphinstone Codex) on the Khadhil, jack-fruit, *Artocarpus integrifolia*. The contents of the note are thus: "The strange-looking pumpkin (qar, which is also Ibn Battuta's word for the fruit), yields excellent white juice, that the best fruit grows from the roots of the tree, that many such grow in Bengal, and that in Bengal and Dihli there grows



to describe definitely this aspect of Indian temple decoration. The leading member of the party was an educated and observant Persian of the name of Abd ur-razzaq, whose investigations took him over parts of southern India from the year 1442 to 1444. He was much impressed by the lavish display of pictorial art in all the religious edifices he visited, and remarks on those at the temple of belur as follows: "So great a number of pictures and figures have been drawn by the pen and pencil, that it would be impossible, in the space of a month, to sketch it all upon damask or taffeta. From the bottom of the building to the top there is not a hand's breadth to be found uncovered with paintings", adding that "all the other buildings great and small, are covered with

a Kadhil-tree covered with hairs (Arto-carpus nirsuta) (ii) On the „amrit-phal, mandarin –orange, Citrus aurantium (f.287, p.512: Elphinstone Codex, f.238b, l.12) The interest of this note lies in its reference to Babur. [Mr. Erskine's manuscript remains, now in the British Museum Add.26,605, p.88] The amal-bid fruit, and the Jasun flower are also referred to. The note is, tentatively, as follows: [In the margin of the Elphinstone Codex opposite the beginning of the note are the words, "This is a marginal note of Humayun Padshah's".] "His honoured Majesty Firdaus –makan [Every Emperor of Hindustan has an epithet given him after his death to distinguish him and prevent the necessity of repeating his name too familiarity. Thus Firdaus –makan (dweller-in- paradise) is Babur's; Humayun's is Jannat-ashiyani, he whose nest is in Heaven; Muhammad Shah's Firdaus-aramgah, he whose place of rest is paradise; etc (Erskine)]-may God make his proof clear!- did not favour the amrit-phal; as he considered it insipid [chuchuman, Pers. Trs. Shirini bi maza, perhaps flat, sweet without relish. Babur does not use the word], he likened it to the mild-flavoured [chuchuk, savoury, nice-tasting, not acid (shaw)] orange and did not make choice of it. So much was the mild flavoured orange despised that if any person had disgusted (him) by insipid flattery(/) he used to say, "He is like orange-juice" [chuchuknaranj andaq (?) mat aidi kim har kim-ni Shirin-Karlighi bi maza qilkandi, naranj –su I dik tur dirlar aidi.] "The amrit-phal is one of the very good fruits. Though its juice is not of the very good fruits. Though its juice is not relishing (? Chuchuk), it is extremely pleasant –drinking. Later on, in my own time, its real merit became known. Its tartness may be that of the orange (naranj) and lemu". [The lemu may be Citrus Limona, which has abundant juice of a mild acid flavour]. The above passage is followed, in the text of the Elphinstone Codex, by Babur's account of the Jasun flower, and into this a further instalment of Humayun's notes is interpolated, having opposite its first line the marginal remarks, "This extra note, seemingly made by Humayun Padshah, the scribe has mistakenly written into the text". Summarized, it may state that when the fruit is unripe, its acidity is harmful to the digestion, but that it is very good when ripe. The note then continues as below:

The Kamila, H. Kaunla, the orange. [The kamila and samtara are the real oranges (kaunla and Sangtara), which are now (cir. 1816 A.D.) common all over India. Dr. Hunter conjectures that the Sangtara may take its name from Cintra, in Portugal. This early mention of it by Babur and Humayun may be considered as subversive of that supposition. "There are in Bengal two other fruits of the acid kind. Though the amrit-phal be not agreeable, they have resemblance to it". "One is the Kamila which may be as large as an orange (naranj); some took it to be a large narangi (orange) but it is much pleasanter eating than the narangi and is understood not to have the skin of that (fruit)". The Samtara: "The other is the samtara which is larger than the orange (naranj) but is not tart; unlike the amrit-phal it is not of poor flavour (Kam maza) or little relish (chuchuk). In short, a better fruit is not seen. It is good to see, good to eat and, good to digest. One does not forget it. If it be there, no other fruit is chosen. Its peel may be taken off by the hand. However much of the fruit be eaten, the heart craves for it again. Its juice does not soil the hand at all. Its skin separates easily from its flesh. It may be taken during and after food. In Bengal the Samtara is rare (gharib or excellent aziz) It is understood to grow in one village Sanargam (Sonargaon) and even there in a special quarter. There seems to be no fruit so entirely good as the Samtara amongst fruits of its class or, rather, amongst fruits of all kinds".



paintings and sculptures of extreme delicacy”. Further, with regard to the style of this work, he states vaguely that it was executed “after the manner of the Franks (Europeans) and the people of Khata (China)”. [India in the Fifteenth Century (Hakluyt do descobrimento e conquista da India , vol.iii, Society), pp.21,22.]

These contemporary references to the state of painting in India previous to the sixteenth century may be supplemented by an account of some actual examples of the art which have survived. Of the great mass of wall paintings executed after the Buddhist period, practically nothing has survived. At Ellora, in the famous rock-cut temples, there are remains of Brahmanical frescoes of the twelfth century, executed in a style which shows that the traditions of Ajanta were still living at this date. On the walls of some of the palaces of Rajputana, there are paintings which may have been executed previous to the founding of the Mughal empire, but this field awaits exploration.

Apart from the actual remains, there are some literary references, which may as well be treated as concrete examples. According to a Chinese writer of the eleventh century at the monastery of Nalanda in Bihar, the priests painted pictures of Buddhas and Bodhisattvas on the linen of the West [The Hua Chi by Teng Chun; see An Introduction to the History of Chinese Pictorial art, by Giles (Quaritch, London , 1918),p. 157.] obviously similar to the paintings of the tangka or temple –banner of Tibet .

The Jain manuscripts on paper containing pictures of the fifteenth century were crudely painted and show little evidence of artistic experience. Paper found small favour with the Indian people, either for commercial, literary, or pictorial purposes, until brought into common use by the Mughals. Its place was taken by the palm-leaf, on which the writing was executed by means of a pointed iron style. Some of these palm-leaf manuscripts were illustrated, and a few, with Buddhist miniatures of the twelfth century, have been handed down to us. It seems fairly clear, however, that there was a very limited amount of painting executed in mediaeval India on any other surface than that of the walls of buildings.

Conclusion:

When the Mughals started to turn their attention, in the sixteenth century, to the revival of painting in India, they found that there still survived a strong living tradition among the people of the country on which the movement that they had in contemplation might be more surely founded.

It is rather significant to realize that the origin of Indian painting does not begin with the Buddhist frescoes of Ajanta and Bagh. These wonderful wall pictures emerge rather excessively matured, to be considered the novice beginning of ancient Indian pictorial art. Long before the Buddhist



artist perfected his style of work, painting was extensively practiced in India, as many references in ancient literature plainly indicate the outstanding feature of these frescoes of the Buddhist school of Painting, is their 'Indianness', for, with the exception of a few extraneous elements, they are essentially Indian in character, expressing in the most truthful manner the life of the time. In figure—drawing, in costume, in scenes from nature, in all the accessories introduced by these skillful artists, it is India and all that appertains to the Indian people that are depicted. Amazingly it is this very indigenous character, this innate Indianness, which persists and is clearly discernible in the miniatures of the Hindu artists who worked under the Mughal Emperor Akbar.

These two styles of painting are separated from each other in time, culture and religion. The spacious wall-paintings of the Buddhist Ajanta and the minute book paintings of the Mughal school are different from one another in many ways, in subject, in intention, in sentiment, in every outward form, they are individually distinct. But in both these styles of painting the same spirit is visible, reflecting in both these forms of illustration the mind of the same artist. Apart from this indescribable but emotional sense of correlation or kinship, there is practically very little, that could strictly connect these two meridians of Indian culture in the ancient and mediaeval periods.

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