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Mahatma Jyotiba Phule Rohilkhand University
NAAC Accredited A++
Bareilly Uttar Pradesh



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Message from Vice Chancellor Desk

Dear Readers,

With great pleasure, I welcome our readers to the fourth issue of *Omniscient*, an international multidisciplinary journal that continues to showcase the wealth of scholarly contributions across various domains. As the Editor-in-Chief and Vice Chancellor of the University, it is my privilege to introduce the diverse range of research endeavours presented in this edition. The journal's commitment to fostering interdisciplinary dialogue is exemplified through the rich tapestry of papers, each contributing unique insights to our collective understanding of the world. From exploring the transformative impact of digital learning methodologies on students in the educational landscape to unravelling the intricate interplay of Gandhi's ideals within Hindi plays, this issue encapsulates the essence of intellectual exploration. Papers addressing the role of Swachh Bharat Abhiyan in promoting adolescent girls' health, revitalizing rural India through digital empowerment, and scrutinizing the geopolitical dynamics between China, India, and South Korea further emphasize the journal's dedication to examining issues of societal relevance. Additionally, studies on mutual funds, attitudes of secondary school teachers towards evolving teaching methods, implications of mercury pollution in water, and the profound impact of refrigerants on global warming delve into diverse realms of knowledge.

I express my gratitude to the authors for their scholarly contributions, the reviewers the entire *Omniscient* team for their diligent evaluations, which have collectively shaped this edition into a valuable resource for academics, researchers, and enthusiasts alike. As you navigate through the pages of *Omniscient*, I encourage you to engage with the ideas, perspectives, and insights presented, fostering a spirit of curiosity and collaboration that defines the essence of multidisciplinary exploration. May this edition spark new conversations, inspire further inquiry, and contribute to the ever-evolving landscape of academic thought.

Prof. K. P. Singh

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China is a Detrimental to Indo-South Korean Relations

Chitta Ranjan Malik

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Abstract

The significance and wide-ranging impacts of Indo-Korean connections have increased. It is logical to believe that the growing bilateral partnership is the result of their altering tactics and the dynamic global political and economic environment. It was their common colonial history that served as the main point of comparison between Korea and India. India's "Act East" policy is a diplomatic initiative to strengthen connections with the vast Asia-Pacific region on a variety of fronts, including economic, cultural, and geopolitical. India is growing in importance for South Korea, especially in light of the latter's complex strategic alliance with China. The way South Korea now views its economic ties to China has an impact on the strategy it has chosen with regard to other Asian superpowers. India and Korea are justifiably concerned about China's strategic links to Pakistan, which India finds troublesome, and North Korea, which South Korea finds alarming. China now seems to be in a position to dominate the Asia-Pacific region politically and economically, which may not be good news for India and Korea.

Keywords: *Detrimental, Geo-politically, Strategic, Superpower.*

Introduction

Indo-Korean ties have grown in importance and have had far-reaching consequences. The dynamic bilateral relationship can reasonably regard as a result of their shifting tactics and the ever-changing global politico-economic circumstances. On the political front, high-level cooperation is critical to improve Indo-Korean relations. The political willingness to enhance relations helps to kick-start the major process of creating confidence and trust in numerous domains and at various levels. Both India and Korea have vowed to contribute to bilateral and international collaboration as fast-growing economies and emerging powers. Over the last decade, vibrant economic and commercial ties have been a vital aspect of the bilateral alliance. The economic impetus will continue, but the supportive effects of economic engagement on a credible partnership must be verified. The common colonial experiences served as the main point of comparison between India and Korea. Mahatma Gandhi and Rabindranath Tagore are two prominent leaders of contemporary India in the political and cultural sectors, respectively, who struck a spark in the bilateral connection between India and Korea during the early decades of the twentieth century.

The acquisition of Korea by Japan in 1910 was a tragic situation that infuriated India's nationalist leaders. Leaders of the Korean and Indian national movements were linked by deep bonds of mutual inspiration. Thus, internationally known Gandhi was at the heart of interest in Korean print media in terms of Indian affairs, with editorials and news stories in Korean language media routinely reporting on him and his activities. Gandhi symbolized the Korean media's connection with India, leading readers to sympathize with India's liberation fight and nearly adopt it as their own. India played a beneficial role in Korea's freedom after the Second World War, chairing the United Nations committee entrusted with overseeing elections in Korea in 1947. During the Korean War (1950-1953), New Delhi dispatched a medical unit to aid the injured and, in 1953, a 6,000-strong Custodian Force to care for prisoners of war. Politically and diplomatically, India also played a role in preventing various events from catalyzing a dangerous escalation of the war, working to ensure commitment to great powers working collectively in the UN Security Council to reach mutually agreeable resolutions, opposing demonization of opposing sides, and chairing the Neutral Nations Repatriation Commission after the 1953 Armistice was signed.

Summits between Korean President Moon Jae-in and Indian Prime Minister Narendra Modi in the summer of 2018 in New Delhi and February 2019 in Seoul, the bilateral relationship appears to be strengthening on the surface, as the two leaders expressed a "shared vision for peace and prosperity for the people of the two countries." A vision that reaffirms the mutual intent to strengthen the strategic partnership by, among other things, upgrading the India-Korea Comprehensive Economic Partnership Agreement (CEPA), increasing cooperation on national security and technology, and speeding up talks to improve the strategic partnership, with both leaders vowing to increase bilateral trade from \$21.5 billion in 2018 to \$50 billion by 2030.

The India and South Korean Relations

With the elevation of bilateral relations to Special Strategic Partnership (SSP) status in 2015, India-South Korean relations have seen an uptick. Explaining the context and recent trends in bilateral ties. Korea has expressed its readiness to work with India to protect maritime lines of communication (SLOCs) in the Indian Ocean. In October 2017, the fleets of the two countries staged a combined practice in the Indian Ocean, with a squadron of South Korean warships visiting Mumbai. This was followed by a combined drill in Chennai in April 2018 involving the coast guards of the two countries.

The 'Act East' strategy of India is a diplomatic endeavour to enhance strategic, economic, and cultural links with the large Asia-Pacific region at various levels. Since 1992, the country's eastward push has highlighted the region's significance in the country's modern foreign affairs. 'Act East' and its earlier incarnation, 'Look East,' are not diametrically opposed; rather, they are two sides of the same coin, marking two distinct but ongoing periods in the evolution of India's strategy toward the Asia-Pacific region.

When India adopted its 'Look East strategy' in 1991, its own economic strength, international standing, and external environment were not what they are now. At the time of its introduction, India was striving to move from a state-controlled economic framework to a more liberalized one. It took a long time for the country to acclimatize to the newly developing economic environment. When Prime Minister Narendra Modi unveiled the Act East initiative in 2014, India's economy was reasonably strong and its worldwide profile was stronger than it had been in previous decades. South Korea's Moon Jae-in administration has implemented what it terms a "New Southern Policy," which is geared, according to most reports, at boosting the country's relations with India.

Several factors could have been implicated in India and South Korea's diminishing interest. South Korean investors have lost interest in India due to the low efficiency of its workforce. The recent collapse of the \$ 12 billion POSCO steel manufacturing plant project, which was billed as the largest foreign direct investment (FDI) in the state of Odisha, was a huge blow to South Korea's ambitions to establish India as a base for producing and exporting steel goods throughout the world (India Global Business, 2021). Another significant project of South Korea's Kangnam Corporation, for the production of 12 minesweepers at the Goa Shipyard Limited at a cost of Rs 32,640 crores, also collapsed owing to pricing disparities.

On the other side, South Korea's unwillingness to take an independent stance on the Sino-India border conflict has hampered the development of relations between New Delhi and Seoul. South Korea has similarly been hesitant to condemn Pakistan's backing for cross-border terrorism in India. At the same time, India has been hesitant to take a stance on the confrontation between South Korea and Japan over territorial claims such as Dokdo/Takeshima.

South Korea's attempts to improve awareness and understanding of Korean culture, as well as increase brand value and demand for South Korean consumer items in India, have not resulted in significant development. Indian consumers tend to be more concerned with price rather than

quality, which has resulted in the increased appeal of lower-cost Chinese items in this country of over 1.25 billion people. In India, there is still a lack of awareness and understanding regarding South Korean society and history.

The China is an Impediment

South Korea's relevance to India is rising, owing mostly to the latter's expanding strategic conflict with China. Its most important economic partner. South Korea's altering perspective of its economic relationship with China has altered Seoul's stance toward other Asian states. Against this backdrop, authorities in Seoul regard India as a critical partner, and their administration is adopting a variety of efforts to strengthen ties under their new policy framework known as the NPS.

India and Korea are understandably concerned about China's strategic ties with North Korea (which is bad for South Korea) and Pakistan (which is problematic for India). North Korea and Pakistan lacked the technological competence and financial means to acquire nuclear weapons and long-range missiles on their own (Rajagopalan, 2014). These missiles, in the case of North Korea, cover the Korean heartland, while in the case of Pakistan, they cover the Indian heartland. It is reasonable to wonder why China is sending these lethal arsenals to failed states like North Korea and Pakistan, both of which are on the verge of becoming "rogue nations."

The solution is apparent. It is plausible to assume that China's aims were to establish strategic pressure points via proxy in South Asia against India and East Asia against South Korea. China now appears to be poised to dominate the Asia-Pacific region, which may be bad news for India and Korea.

Conclusion

Both India and South Korea experienced negative experiences and suffered as a result of colonial domination. The colonial masters of the east and west established institutions and designed mechanisms to assure an iniquitous, unfair, and profoundly differentiated pattern of interaction between alien rulers and their native people. The objective of the British colonial rulers was to guarantee that no Indians posed a threat to the colonial system by placing them in vulnerable situations.

On the other side, the psychological tactic of South Koreans suffering in comparable conditions was to select strong Indians who would pose a danger to the British authorities. Both India and South Korea have extensive cultural ties. Those relationships with time have become stronger.

India and South Korea confront comparable imperatives in determining their strategic equations. Both countries are under pressure to strike a balance between the United States and China while also cooperating with other regional powers in South and Southeast Asia.

New Delhi and Seoul are committed to promoting strategic stability in the Asia Pacific region. Both South Korea and India have the ability to work out their issues and form beneficial long-term economic and trade partners in the future. In the current chaotic global landscape, that will be the most effective option for both of these economies.

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Role of Swachh Bharat Abhiyan in Promoting Menstrual Health and Hygiene among Adolescent Girls

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Abstract

The Government of India launched the Swachh Bharat Abhiyan to ensure cleanliness across the country and to address the issues of sanitation and waste management in India. While the campaign has made great strides in putting toilets in outlying areas of the nation, a ground report from four Indian states by Youth Ki Awaaz demonstrates that there is still more work to be done in the size of menstrual hygiene management. Although menstruation is a distinct physiological process that signals the start of reproductive life, it is occasionally regarded as an impure event in Indian culture. Most Adolescent girls lack basic information about menstrual health and hygiene. In addition, a lack of understanding and awareness leads to bad personal hygiene habits throughout the menstrual cycle, often resulting in reproductive tract infections. Poor menstrual hygiene practices result in an annual vaginal and urinary tract infection diagnosis in more than 70% of women. Menstrual health is also somewhat influenced by the educational program. The increased susceptibility to reproductive tract infections is strongly influenced by poor menstrual hygiene (RTIs). Currently, RTI affects millions of mothers who pass the virus to their progeny. This study aims to deal with several aspects of menstruation and menstrual hygiene. Every girl's life must include good menstrual hygiene. It is thought that women are most susceptible to infections of the reproductive tract, urinary tract, and different sexually transmitted diseases during this time. Menstrual hygiene is dependent on raising knowledge and expanding access to the necessary sanitary infrastructure.

Keywords: Swachh Bharat Abhiyan, Menstrual hygiene, Health and Hygiene, Adolescent Girl Hygiene.

Swachh Bharat Abhiyan

Swachh Bharat Abhiyan, often known as Swachh Bharat, is a national-level initiative launched by the Government of India to clean up the country's roads and infrastructure. On October 2, 2014, Prime Minister Shri Narendra Modi began this campaign in Rajghat in New Delhi. It is divided into two sub-missions: Swachh Bharat Mission (Gramin) and Swachh Bharat Mission (Urban). The mission's goals include obtaining universal sanitation coverage as well as encouraging sanitary sanitation practices. The Swachh Bharat Mission Guidelines state in point 5.9.2 that "Issues relating to women's hygiene, specifically menstrual hygiene, are to be focussed under the Swachh Bharat Mission (Gramin) because girls and women have hygiene and sanitation needs linked to their menstrual cycle and women suffer in the absence of knowledge about safe practices on Menstrual Hygiene Management (MHM)." Despite the guidelines, menstrual hygiene management has always been a less spoken aspect of the

Swachh Bharat Mission. Probably the main reason for this is social taboos and gender stereotypes because many people feel menstruating with shame and consider it dirty.

In addition, regarding promoting safe menstrual hygiene practices, Youth Ki Awaaz (YKA) found that multi-faceted challenges in rural India continue to hamper its implementation compared to urban India, such as illiteracy, lack of menstrual education, lack of information, poverty, religious barriers, etc. Most girls in Jasonodi, a tribal village in the Betul district of Madhya Pradesh, don't even know what a pad is, and only 2 to 5 percent of them use them, according to the women YKA spoke to about the level of awareness about menstruation there. Most women still prefer to wear clothes during their periods, according to adolescent girls who spoke with YKA. In light of this, women don't use pads even if the local Anganwadi does sell them, with the price acting as a significant disincentive. Women continue to use ash during their periods in areas further distant from the district headquarters. They conduct awareness campaigns to inform girls about menstruation, according to BL Bishnoi, district officer for the Department of Women and Child Development.

Menstruation

Menstruation is generally referred to as a period. The menstrual cycle is a normal biological process. It is a complex cycle governed by female hormones that results in frequent bleeding (periods). When you menstruate, the uterine lining sheds and flows out of your vagina. Menstruation consists of blood, mucus, and uterine lining cells. On average, menstruation lasts three to seven days. Menstruation is a phenomenon that only affects women. One of the most significant changes in girls' lives during adolescence is the beginning of menstruation. With a mean age of 13 years, the first menstruation starts between the ages of 11 and 15 years.

Menstruation Cycle

The menstrual cycle is a cycle of changes that occur every month in a woman's body as she gets ready for potential conception. Ovulation is the release of an egg from one of the ovaries once a month. The uterus is preparing for pregnancy at the same time that hormonal changes are taking place. If ovulation happens but no egg is fertilized, the uterine lining sheds through the vagina. This is known as the menstrual cycle.

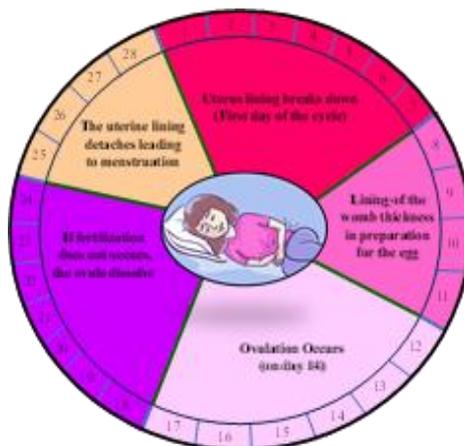


Fig. 1. Feature of Menstruation Cycle

Menstrual Hygiene

Menstrual hygiene is critical to the empowerment and well-being of women and girls around the world since it has a health impact by increasing vulnerability to many health concerns. They struggle with various infections in the reproductive system because they are unaware of the care that should be taken during menstruation. Reproductive tract infections (RTI) and their complications affect the majority of women, and frequently, the infection is passed from the mother to her unborn child. RTI and its effects are less likely to affect women who are more knowledgeable about menstrual hygiene and protective measures. Menstruation demands the availability of material resources to absorb or collect menstrual blood, facilitate personal cleanliness, and dispose of waste, ideally in private. That's mean, menstrual hygiene includes everything from sanitary pads to suitable toilets. It also entails ensuring that girls and women can regulate their menstrual cycles with dignity in a society that recognizes and supports them. Every year on May 28th, people celebrate Menstrual Hygiene Day. In 2014, the German nonprofit organization "Wash United" launched this program. The major goal of this day is to educate girls and women about the need for hygiene and safety during menstruation, which occurs during the first five days of the month.

Effects of menstrual health and hygiene on adolescent girls

Have you ever wondered why many young women drop out of school in rural India? Why don't those girls finish high school or go to college? The answer is poor menstrual hygiene management. Most girls drop out of school during their periods, eventually, drop out at an early age, and miss out on their education due to poor menstrual hygiene management. The menstrual hygiene and health of adolescent girls and women in India have an impact on their self-esteem, dignity, health, education, and economic engagement in the country's labor force. Women experience fear and shame as soon as their periods start. Instead of recognizing

the transition from a girl to a young woman, it becomes their downfall. Menstrual hygiene and menstruation are still discussed in significant parts of rural and urban India. So, these women and young girls are unaware of proper hygiene practices and how doing so will harm their health.

A 2018 study by the Post Graduate Institute of Medical Education and Research found that just 30% of women use sanitary napkins, although 80% of women are aware of them. According to the same report, this plan also has issues with inconsistent and insufficient sanitary napkin supplies. Only 58% of menstruation women in India have access to safe and hygienic menstrual protection options. Another report stated that only 12% of 355 million women and girls of reproductive age in India use sanitary pads during their periods. Survivors turn to discarded clothing or unsanitary cloth, husks, hay, ashes, dried leaves, grass sand, rags, old rugs, and/or newspapers. The fact is that these dirty and unhygienic habits result in many diseases, including fungal infections, bacterial infections, urinary tract infections, pelvic inflammatory disease, reproductive tract infections (RTIs), cervical cancer, etc., which can lead to a variety of severe health problems. Most adolescent females are affected by these infections. Menstrual product preferences vary depending on the home area, way of life, financial level, etc.

Moreover, the luxury of being able to afford sanitary pads is a distant dream for underprivileged women and girls who can hardly manage one square meal daily. Such a variation in menstrual product preferences is directly related to the likelihood of developing infections. For instance, the incidence of reproductive tract infections has increased alarmingly by 70% due to inadequate menstrual hygiene. This is a serious issue because it could harm the condition and economic development of the country.

Impact of Swachh Bharat Abhiyan on menstrual health and hygiene

Menstrual health is necessary for overall physical, mental, and social well-being. India has emerged as a global leader in menstrual hygiene for the last few years due to strong government leadership, and several initiatives from civil society, the corporate sector, manufacturers, and businessmen. A turning point for India's sanitation and hygiene system, particularly the control of menstrual hygiene, was the inauguration of the Swachh Bharat Mission.

In his initial Independence Day speech in 2014, Prime Minister Shri Narendra Modi instructed schools and institutions to have clean water and separate toilets for girls to prevent mid-semester dropouts for female students. Pink toilets have been constructed for adolescent

girls and women under the Swachh Bharat Mission Gramin. These Pink toilets have an incinerator used to safely dispose of sanitary pads and menstrual waste. These toilets have ensured adequate water supply, lighting, a changing room, and other amenities. The South Delhi Municipal Corporation opened a "Pink Toilet" on the occasion of the International Day for Girl Children. A feeding place for nursing mothers is also provided in this toilet. The Sangli (Maharashtra) district government launched a large awareness drive to educate 85,000 girls and 40 million homes in partnership with Swachh Bharat Gramin and UNICEF.

Under the Swachh Bharat Mission Gramin campaign, a scheme has been launched to train women in the village to make sanitary pads through the National Rural Livelihood Mission (NRLM) Self-help Groups. During this time, adolescent girls are being educated. Wall writing, brochures and posters disseminated and posted in public areas, and messages delivered via social media and movies are examples. For females in classes six through twelve, the Kerala government introduced the "She Pad" program on Children's Day at the 300 schools in the region. To improve the way menstrual waste is managed, a request was made by the University Grants Commission (UGC) to install sanitary napkin incinerators in women's hostels.

Some Statements of Girls Who Benefited by the Swachh Bharat Abhiyan

Sitapur, Uttar Pradesh

Sixteen-year-old student of class 10 at the government girls' school in Sitapur, UP, said she had no idea what was happening to her when she first started menstruation two years ago. When she told her mother about it, she was told not to tell anyone about it.

When several counselors visited her school, she learned about the menstrual cycle. She says she now understands why maintaining hygiene is vital during menstruation. She also claims to take iron pills offered to children at school around this time. The Swachh Bharat Abhiyan has not only increased hygiene but has also given menstrual health awareness programs. I'm more confident and knowledgeable about menstrual hygiene."

Rajasthan, Dungarpur

Madhulika, a social worker in the tribal district of Dungarpur, told YKA that even today, women in the tribal district of Dungarpur, Rajasthan, do not use sanitary pads, instead opting to use the same cloth for months at a time. As a result, they are more susceptible to infections and disorders.

When we discussed menstruation habits with the women we spoke with, they drew a blank. While Haru Devi, a resident of Aligarh, 40 kilometers from Udaipur, had never heard of a sanitary pad, Amari Devi, 39, said she had always used cloth. Amara Devi claims she began

using pads only after her daughter Pooja began receiving them from her school two years ago.

The effect of activities

According to the actions in many states, the topic of menstruation is certainly being discussed more freely in rural regions than it was previously. Menstrual hygiene is important to women and girls, and those who have access to them use sanitary pads or clean cloth. They are questioning ancient rules such as not washing until the third day, not entering a temple or kitchen, and not touching a pickle. In schools, incinerators are being erected. This should be extended to all homes and schools around the country. More work is needed to assist women and girls in reaching their full potential, which good MHM can provide. Girls and women should no longer be ashamed to discuss their periods or explain their doubts. If we do not support them, they may miss out on numerous elements of life and may suffer health consequences as a result.

The government, for its part, appears to be aware of how difficult it is to effect behavioral change when it comes to menstrual hygiene, citing it as one of the reasons for lagging in promoting it. With the Swachh Bharat Mission nearing the end of its five-year term, it may be a good moment to examine its aims and step up the implementation of the goals it set for itself in promoting menstrual health.

Celebrities support bringing menstruation into the public eye

The film Padman is inspired by the real-life story of Arunachalam Muruganham, who invented the low-cost sanitary pad-making machine. Meganathan had made a sanitary napkin-making machine at an affordable cost. He was also awarded the Padma Shri for this invention. Actress Sonam Kapoor, who has been filming Padman, which deals with the stigma associated with menstruation, says people's ignorance and backward mindset towards menstrual hygiene is "shocking" when talking about the aspect of ignorance. The film's co-producer, Twinkle Khanna, also expressed a similar view and claimed that the lack of understanding about menstruation leads to poor health in urban and rural women.

Akshay Kumar and Bhumi Pednekar play the lead roles in the 2017 movie Toilet, which promotes campaigns to improve sanitation standards in India, focusing on eradicating poor sanitation, especially in rural areas. The bathroom crisis in India is brought to light in the movie, resulting from cultural and religious prejudice. People in rural areas of India still lack this essential item, which annoys women and encourages sexual harassment.

According to Miss World 2017 Manushi Chhillar, education alone won't fix the issue. She believes that affordable sanitary napkins are also required, along with a sustainable system allowing girls to practice good menstrual hygiene. Manushi has reached over 20 villages with her project Shakti, providing education and low-cost sanitary napkins.

Take some precautions during periods

Change your sanitary napkin every 6 to 8 hours. Prolonged use of the same hygienic product increases the chances of infection. Cleanliness becomes even more critical during periods. Therefore, while taking a bath, take complete care of how clean your organs are. One napkin should be used at a time. Two pads at once will cause the heat to build up closer to the sensitive area. Carry suitable accessories for it during the days of your period. Some examples are additional sanitary napkins, tissues, hand sanitizers, and antiseptic medicine. You may need them anytime if you go out to school, college, work, or anywhere else.

Conclusion and Suggestions

Under the Swachh Bharat Abhiyan, complete care has been taken of cleanliness. Menstrual hygiene is also being taken care of. Toilets have been arranged everywhere. Awareness is being increased so that people are aware of cleanliness. Earlier, women used to wear clothes, so they were at risk of many diseases. Now, they are using sanitary napkins after getting information.

Girls should be educated about menstruation, its physiological effects, its significance, and how to maintain good hygiene while menstruating. Additionally, it is necessary to free them from ingrained prejudices, taboos, and limits. The media, sex education in the classroom, and targeted group discussions can all help achieve this. It is essential to urge all mothers to talk openly about menstruation and menstrual hygiene with their daughters. Social marketing can be used to promote sanitary pad use to all girls.

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Implications of Mercury Pollution in Water

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Abstract

Mercury is a very dangerous pollutant that is highly bioaccumulating. Mercury has no biological function, is potentially toxic, and causes severe damage to the body's metabolic and physiological functions. The aquatic regime is a severely affected area where mercury is the most common pollutant affecting aquatic flora and fauna. Mercury primarily targets the body's nervous system, but can damage any tissue and organ. In fish, mercury has been documented to affect various organs such as the brain, muscles, immune system, immune response, and reproductive system. Since mercury is ingested by fish and transferred to other vertebrates through the food chain, it affects not only aquatic life but also humans through bioaccumulation. Therefore, knowledge of the toxicological effects of mercury on fish is one of the research objectives in the field of fish farming.

Keywords: Mercury, Pollution, Aquatic regimes, Fish.

Introduction

Heavy metals naturally present in the environment are essential to life but can become toxic through accumulation in organisms (Awasthi et al., 2018; Kumar et al., 2022b, 2022a; Ratn et al., 2018). As, Ca, Cr, Cu, Ni, Pb and Hg are the most common heavy metals which are deteriorating the environment. Mercury, lead and cadmium are of major concern because of their ability of bioaccumulation and biomagnification in the atmosphere (Kumar et al., 2019). The heavy metal mercury (Hg) has been used for centuries as a medicine and poison, and is currently used for many commercial purposes. Lately, attention has shifted to this metal due to environmental concerns. Some of the particular sources of Hg exposure that have been disclosed include consumption of contaminated seafood, use in dental amalgam, and involvement in traditional medicine and rituals. Hg is a toxic heavy metal that is widely distributed in nature (Suhendrayatna et al., 2019). Hg occurs in several chemical forms with complex nature and chemistry. Hg can produce a variety of clinical manifestations.

Hg and its derivatives are one of the most common pollutants in the environment. As Hg is bioaccumulated in the higher vertebrates living in aquatic regimes it is equally harming the human population as well. Therefore, knowledge about the toxicological effects of Hg on fish is one of the goals of research in fish farming and aquaculture.

Since Hg is absorbed and bioaccumulated in fish it causes an adverse effect on aquatic regimes as well as to human health through biomagnification. Mercury overdose is responsible for the alterations in marine and freshwater animals, ultimately decline in aquatic animals, and

drastically affecting the whole groups of other aquatic vertebrates (Al-Sulaiti et al., 2022).

Thus, the information on Hg toxicity on fish has become very important in research applied to fish aquaculture.

Material and Methods

Estimation of Mercury in the environment

India is the second largest country in the mercury pollution worldwide with an approximate discharge of 144.7 tonnes Hg/year. Mercury pollution in India is pointing towards lethal conditions due to the release of unwanted pollutants having a range of Hg from 0.058 to 0.268 mg/L. The mercury pollution in India is increasing day by day but data on its potential to harm aquatic flora and fauna is still obscure hitherto.

Table 1. Maximum permissible limit of mercury in the environment

Heavy Metal	Permissible limit of Hg in environment according to EPA and WHO					
	Mercury (Hg)	Ground water	Fresh water	Drinking water	Terrestrial	Human blood
	2 ppb	2ppb	2ppb	1 mg/kg	0.7 ppb	0.46

Measurement of mercury in water, sediments, plants and fish tissues

- **Sample preparation for sediments**

Moisture content from sediments samples will be removed by air drying then crushing and sieving of the samples will be done. 2 g of sieved samples will be digested with 20ml of tri-acid mixture nitric acid: sulphuric acid: perchloric acid in the ratio of 5:1:1. The mixtures will be left overnight and then heated for four to five hours at 80°C. A clear solution will be obtained and filtered through filter paper and stored in 100 ml bottle.

- **Sample preparation for Plants**

The plant samples were dried, grinded and sieved before digestion. 5 ml (HNO₃ (4): HClO₄ (1) mixture will be added to 1 g of weighed dried plant powder. Heating will be done for one hour. The sample will be cooled and volume will be marked up to 50 ml. digestion of samples will be done with concentrated nitric acid (5 ml), cooled and filtered through filter paper. The volume will be maintained up to 100 ml with ddH₂O (APHA., 2012).

- **Sample preparation for fish tissue**

Acid digestion of dried fish samples will be done by adding high purity 70% HClO₄, concentrated HNO₃ and concentrated H₂SO₄ in 1:5:1 ratio to 500mg of each sample for autolysis and digestion. Transparent solution will be obtained after heating the samples at 80 °C. The digested samples will be diluted with ddH₂O.

- **Determination of metal concentration**

Atomic absorption spectrophotometer (Model AAS-4141, ECIL, India) using acetylene - air flame will be used for the estimation of mercury in different samples.

Experimental design on fish

- **Determination of LC₅₀ in fish species**

For the calculation of 96 h LC₅₀ of mercury standard methods under OECD guidelines for fish acute bioassays (OECD203, 92/69/EC, method C1) and the standard protocols of APHA, (2012) were used for *Channa punctatus*. Firstly, approximate toxic range of mercury will be identified on ten well-acclimatized fish. Different concentrations of mercury (0.1, 1.0, 10, 100, and 1000 mg/L) will be given to fishes in different aquaria till 96 h in a semi-static bioassay system. The range of toxicity of mercury will be noted. After having approximate toxic range, logarithmic series of ten nominal concentrations (0, 0.2, 0.4, 0.6, 0.8, 1.0, 1.2, 1.4 mg/L) were given to fish for determination of the LC₅₀ value of mercury.

- **Experimental set up in the laboratory**

Healthy specimens of fishes will be selected and acquired with the aid of fishermen from aquatic habitats. Fish will be transferred to the laboratory and prophylactic treatment with 0.05% KMnO₄ solution for 2–5 min will be given to protect against external infections if any (Awasthi *et al.*, 2018). Acclimatization of fish will be done for 10 to 15 days and fishes will be fed with fish food available in market twice a day. Feeding will be stopped one day before the starting of the experiment. (OECD, 2019). Overall, 135 fish will be kept at random into three groups in triplicates in separate aquaria, each having 15 fish, the group I will be served as control, group II - 96 h-LC₅₀/20, group III – 96 h-LC₅₀/10 of mercury. At one time, the aquaria will be cleaned daily to prevent waste and debris (Palermo *et al.*, 2015). After that exposure period will be selected and 3 fish from every triplicate were anesthetized by using 0.1% (v/w) diethyl ether, their blood and tissues will be collected for the estimation of different biomarkers of toxicity.

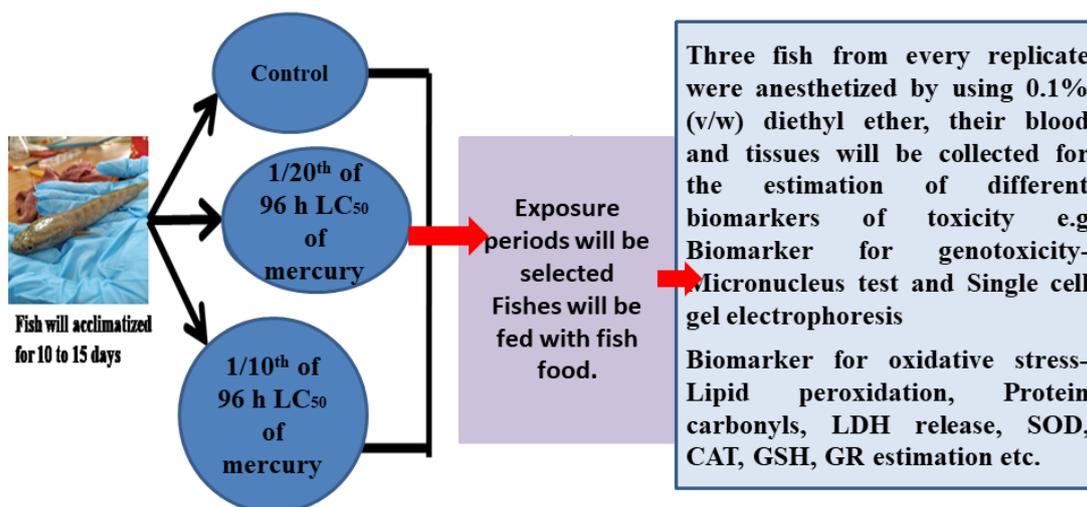


Diagram 1: Representation of experimental set up for toxicity test of mercury on fish

Harmful effects of mercury on aquatic fauna

Pollution is negative feedback from the environment that affects living organisms. The aquatic environment is also not spared from the bad effects of pollution. Recently, interest has shifted to rivers and estuaries as they are considered a major source of pollutants in coastal seas and oceans. Humans are responsible for the pollution of the oceans, which directly or indirectly have introduced hazardous waste into the marine environment. Estuaries and rivers are not spared, as a result of which the adverse effects have paved the way for human health hazards. Hg and its derivatives are one of the most common pollutants in the aquatic environment. Hg affects aquatic ecosystems and humans through bioaccumulation. Therefore, knowledge about the toxicological effects of Hg on fish is one of the goals of research in fish farming.

The amount of Hg in fish and other seafood depends on the type and level of pollution. A 1998-2005 study recorded 27% of fish from 291 rivers in the United States contained high level of mercury (Scudder et al., 2011). Another study found that a fishes caught from the coast of New Jersey had Hg levels greater than 0.5 ppm— levels that initiates the health issues in people who regularly have canned fish in their diet (Burger and Gochfeld, 2011). High concentrations of Hg have been found in fish stocks, especially in coastal areas in India. Mumbai, Kolkata, Karwar and North Koel are some of the worst affected areas. In Mumbai, the Hg content of fish is 0.03-0.82 mg total Hg/kg dry weight (dw); Crabs have a total of 1.42-4.94 mg Hg/kg mercury compared to a limit value of 0.5 mg/kg. Hg levels in oysters in Karwar ranged from 0.18 to 0.54 mg/kg body weight.

Several studies have shown that in a well-known response to oxidative stress, Hg initiates a disbalance in the production of ROS and decreasing their level by the antioxidant system. ROS production after exposure to Hg has been described in fish. In fact, Hg combines with the thiol

group of GSH, which can lead to GSH deficiency and oxidative stress. Therefore, several studies have identified changes in the antioxidant system caused by Hg exposure. Recently, Hg exposure increased ROS levels and decreased the antioxidant potential of serum mucus in *Sparus aurata*, while increasing SOD, CAT, and GR activity in the liver (Guardiola et al., 2016).

Among other mutagenic properties, HgCl₂ adversely effect on tubulin. HgCl₂ interferes with tubulin polymerization, resulting in chromosomal shrinkage at metaphase, delayed centromere cleavage, and slower anaphase movement. Investigation of cytogenetic endpoints like MN formation, chromosomal breakage and exchange of sister chromatids proves a sensitive genetic test to detect genotoxic chemicals and mutagens in the environment at subtoxic levels. In recent years, rapid advances in agriculture and industry have led to widespread mercury pollution from the use of organic and inorganic mercury fungicides in agriculture, entering aquatic ecosystems through rain leaching and direct disposal of sewage and industrial effluents into rivers. Fish liver exposed to mercury chloride exhibits biochemical and histopathological changes with extensive cellular degeneration that can be caused by cumulative toxicity (Trivedi et al., 2022). In rats, mercury is known to increase hepatic cholesterol synthesis (Wu et al., 2013). Acid and base phosphatases are lysosomal hydrolytic enzymes and increased hepatic levels in fish may be due to hepatocyte degeneration and lysosomal rupture, leading to their accumulation in the liver (Trivedi et al., 2021).

Conclusion

Absorption of harmful heavy metals occurs in the fish's body, which is unsafe for human consumption because the bioaccumulated heavy metals have been transferred to humans. An unpolluted aquatic environment can provide humans with the best quality seafood. Fish that are economically important are more susceptible to heavy metal pollution in water bodies. This study covers the toxicological effects of mercury on the environment and fish. The data is extremely useful and provides an overview of heavy metal toxicity in aquatic environments and provides a baseline for the scientific community and government officials involved in health risk assessment and environmental pollutant management to guide best practices for restoration and protecting the health of human ecosystems.

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A Study of Attitude of Secondary School Teachers' Towards Online and Face to Face Teaching Learning in the Context of Types of School

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Abstract

The main objective of this research paper is to determine the attitude of secondary school teachers towards online and face to face teaching learning. To achieve this objective, descriptive survey method was used in this study. The sample of this study has been selected from the Secondary Schools of Rohtak city (Haryana). 307 secondary school teachers have been selected randomly from different schools. One self-made attitude scale was constructed by investigators to know the attitude of secondary school teachers towards online and face to face teaching learning. Results were calculated with the help of mean, S.D. and 't' test and presented by bar graph. Finally, the investigator concluded that secondary school teachers showed more favourable attitude towards face-to-face teaching learning than online teaching learning.

Keywords: Attitude, Secondary School Teachers, Online and Face to face teaching learning.

Introduction

In the present scenario of learning, including formal education takes place in a various expanded forms which are facilitated in a number of ways (Tyagi, 2017). This form of teaching and learning is making things easy for getting education. Various forms of learning exist in present scenario and online learning is the one which is becoming need of hour. Across the world, online teaching and learning is getting adopted and accepted in educational setups and institutions (Gururaja, 2021).

Attitude is defined as a lasting organization and beliefs and cognitions in general, endowed with an emotional charge in favor or against a defined object, which predisposes to a consistent action with cognitions and emotions relating to that object. Attitudes are considered inter current variables, not be directly observable but subject to observable inferences. The attitude is the voluntary disposition of a person given the existence in general or to a particular aspect of this. Humans in your life experience various emotions that are far from being motivated by his free choice; instead, the attitude encompasses those psychic phenomena on which man & use of freedom and that serve for the various challenges that arise in one way or another, {Rodríguez (Kumar, 2017)}.

Teacher's Attitude towards Online and Face to face teaching learning

Teachers' attitudes towards online teaching experience during the COVID-19 pandemic were also examined. Sayeh and Razkane (2021) examined Moroccan high school EFL teachers' anxiety and attitudes towards Microsoft Teams on their use of the platform. The researchers found that the teachers' levels of anxiety and control of the platform played a significant role in their decision to implement such e-learning tools in their teaching. Migocka-Patrzałek et al. (2021) disclosed a strong association between prior experience with distance learning and willingness to implement this mode of teaching in the future. However, Rannastu-Avalos and Siiman (2020) found that although the majority of the teachers reported using video conferencing platforms to teach students synchronously, none of the participants conceived of the distance teaching experience as useful to collaborative learning. Sari and Nayir (2020) reported that the teachers encountered several obstacles, namely lack of constant Internet access and digital infrastructure, and disciplinary issues.

Hypotheses of the Study

1. There is no significant difference between the mean scores of Attitude of Government and Private secondary school Teachers towards online teaching learning in the context of Types of School.
2. There is no significant difference between the mean scores of Attitude of Government and Private secondary school Teachers towards face-to-face teaching learning in the context of Types of School.

Method of the Study

Descriptive survey method was applied in this study.

Population of the Study

In this research paper, we selected secondary schools Teachers' of Rohtak city as a Population. A list of secondary schools of Rohtak city was obtained from UDISE site. 14 Governments and 96 Private secondary schools from this list were selected as population.

Sample of the Study

A sample of 307 secondary school teachers, teaching in government and private schools affiliated to Board of School Education, Bhiwani and CBSE were selected through stratified random sampling technique on the basis of online and face to face teaching learning process. 307 teachers

(118 Government secondary schools' teachers and 189 Private secondary school teachers) were selected as a sample of the study. Layout of the sample is shown below:

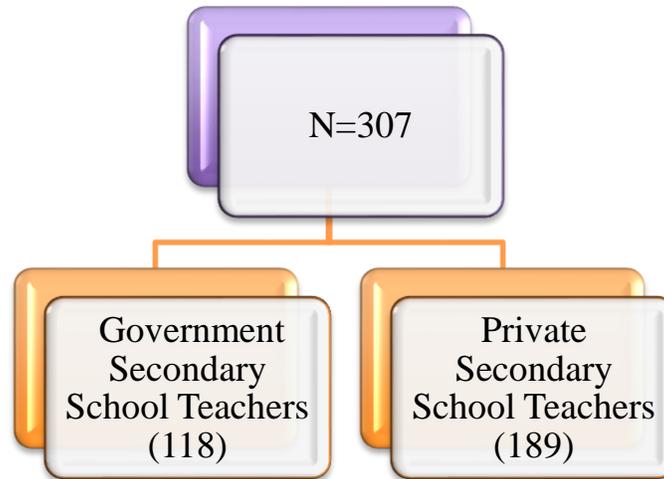


Fig. 1. Layout of Sample of Teachers

Tool Used

Attitude Scale of Teachers towards Online and Face to Face learning was used for data collection

Statistical Techniques

Descriptive statistics were used for data analysis and interpretation.

Results of the Study

Hypothesis 1: There is no significant difference between the mean scores of Attitude of Government and Private secondary school Teachers towards online teaching learning in the context of types of School.

Table 1: Mean, S. D. and 't' value of Attitude of Government and Private school teachers (Online teaching learning)

Groups	N	Mean	S. D.	SEM	't'	p value	Df	Sig./non-sig. (0.05 level)
Government Secondary School Teachers	118	40.94	5.84	.537	-5.087	00	305	Non-Sig.
Private Secondary School Teachers	189	41.13	5.02	.365				

Mean scores of attitude of Government and Private secondary school teachers towards online teaching learning are 40.94 and 41.13 and 't' value is -5.087 which is non-significant at 0.01 level of significance, meaning thereby that there is no significant difference between the mean scores of attitude of Government and Private secondary school Teachers towards online teaching learning. Thus, the hypothesis, "there is no significant difference between the mean scores of attitude of Government and Private secondary school Teachers towards online teaching learning in the context of types of School" is accepted.

Hypothesis 2. There is no significant difference between the mean scores of Attitude of Government and Private secondary school Teachers towards face-to-face teaching learning in the context of types of School.

Table 2: Mean, S. D. and 't' value of Attitude of Government and Private school Teachers (face to face teaching learning)

Groups	N	Mean	S. D.	SEM	't'	p value	Df	Sig./non-sig. (0.05 level)
Government secondary School Teachers	118	44.68	3.17	.292	1.029	.304	305	Non-Sig.
Private Secondary School Teachers	189	44.14	5.13	.373				

Mean scores of attitude of Government and Private secondary school teachers towards face to face teaching learning are 44.68 and 44.14 and 't' value is 1.029 which is non-significant at 0.01 level of significance, meaning thereby that there is no significant difference between the mean scores of attitude of Government and Private secondary school teachers towards online teaching learning. Thus, the hypothesis, "there is no significant difference between the mean scores of attitude of Government and Private secondary school Teachers towards face to face teaching learning in the context of types of School" is accepted.

Findings of the Study

Finally, the investigator found that mean scores of attitude of secondary school teachers of face to face teaching learning 44.68 & 44.14 are higher than online teaching learning 40.94 & 41.13 respectively. Therefore, it is concluded that attitude of the teachers towards face-to-face teaching learning is more favourable in both types of schools.

Educational Implication of the Study

The attitude of teachers does not have anything to do with their place of work or based on institution perhaps the outbreak of Covid-19 had impacted. There is no distinction between Government school's teachers and private school teachers but the attitude of private school teachers is more favourable towards online learning. Academic climate, motivation and focus of both types of schools is different but from the study it seems that these factors are not impacting teachers' attitude towards online teaching and face to face teaching. Organisational climate of both types of schools is different then why is attitudinal difference is not visible?

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Comprehensive Scrutiny of Refrigerants and their Profound Ramifications on Global Warming

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Abstract

The use of refrigerants in various applications, such as air conditioning, refrigeration, and heat pumps, has become an integral part of modern life. However, certain refrigerants have been identified as significant contributors to global warming and climate change. This research paper aims to provide a comprehensive examination of refrigerants and their impact on global warming. It begins with an overview of global warming and the role of refrigerants in exacerbating this phenomenon. The paper then delves into the classification of refrigerants and their environmental characteristics, including global warming potential (GWP) and ozone depletion potential (ODP). Additionally, the study explores the historical use and phase-out of refrigerants, discussing the impact of international agreements such as the Montreal Protocol and the Kigali Amendment. Furthermore, the research investigates the development of alternative refrigerants and emerging technologies that strive to mitigate global warming potential. Lastly, the paper highlights the challenges and opportunities of transitioning to sustainable refrigerant solutions and presents policy recommendations for minimising the environmental impact of refrigerants.

Keywords: Refrigerants, Global Warming, Greenhouse Gases, Ozone-Depleting Substances, Global Warming Potential, Environmentally Friendly Refrigerants, Regulations, Policies, Environmental Impact Assessment, Industry Perspectives, Economic Implications, challenges, Opportunities.

Introduction

The refrigeration and air conditioning industries play a crucial role in our modern society by providing comfort and preserving food, medicine, and other perishable goods. However, the chemicals used as refrigerants in these systems have a significant environmental impact. Refrigerants are substances that absorb and release heat, enabling the cooling and heating processes in refrigeration and air conditioning systems. Traditionally, chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs) were widely used as refrigerants due to their excellent thermodynamic properties. However, it was discovered that these chemicals contribute to the depletion of the ozone layer, which protects the Earth from harmful ultraviolet (UV) radiation. Consequently, an international agreement known as the Montreal Protocol was established in 1987 to phase out the production and use of ozone-depleting substances, including CFCs and HCFCs. As a result of the Montreal Protocol, the refrigeration and air conditioning industries transitioned to hydrofluorocarbons (HFCs) as the primary refrigerants. While HFCs do not deplete the ozone layer, they have a significant

impact on global warming. HFCs are potent greenhouse gases (GHGs) that have a high global warming potential (GWP), meaning they have a much greater warming effect than carbon dioxide (CO₂) over a given timeframe. The link between refrigerants and global warming has gained increasing attention in recent years due to the growing recognition of the urgent need to mitigate climate change. The accumulation of GHGs in the atmosphere, including those emitted from refrigerants, is a leading cause of global warming and its associated consequences, such as rising temperatures, sea-level rise, and extreme weather events. Understanding the environmental impact of refrigerants and developing alternative solutions is crucial for reducing the carbon footprint of the refrigeration and air conditioning industry and mitigating climate change.

Background

The use of refrigerants dates back to the early 20th century, when synthetic chemicals such as chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs) gained popularity due to their exceptional cooling properties and non-toxic nature. However, the discovery of their adverse effects on the ozone layer led to the implementation of the Montreal Protocol in 1987, which phased out the production and use of ozone-depleting substances. Subsequently, hydrofluorocarbons (HFCs) emerged as a substitute for ozone-depleting substances due to their ozone-friendly characteristics. However, it was soon realised that while HFCs do not deplete the ozone layer, they have a significant global warming potential (GWP) when released into the atmosphere. The GWP measures the heat-trapping capacity of a gas relative to carbon dioxide (CO₂), with CO₂ having a GWP of 1. The high GWP of HFCs and other refrigerants has raised concerns about their contribution to anthropogenic climate change.

Classification of Refrigerants



Organic Refrigerants and its impact

Organic refrigerants, also known as natural refrigerants, are substances derived from natural sources that are used for cooling purposes. They have gained attention as an alternative to synthetic refrigerants, such as chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs), which have been found to contribute to ozone depletion and global warming. Here are some common organic refrigerants and their impacts:

- I. **R717 Ammonia (NH₃)** Ammonia is one of the oldest and most widely used natural refrigerants. It has zero ozone depletion potential (ODP) and zero global warming potential (GWP), making it environmentally friendly. However, ammonia is toxic and can pose safety risks if not handled properly.
- II. **R744 Carbon Dioxide (CO₂)** Carbon dioxide, or CO₂, is a natural refrigerant that has gained popularity due to its low environmental impact. It has zero ODP and a GWP of 1, which means it does not contribute significantly to global warming. CO₂-based refrigeration systems are energy-efficient but require higher operating pressures.
- III. **Hydrocarbons:** Hydrocarbons like propane (R290) and isobutane (R600a) are organic refrigerants with low GWP and zero ODP. They are highly energy-efficient and have good thermodynamic properties. However, they are flammable and require additional safety precautions during handling and storage.
- IV. **Hydrofluoroolefins (HFOs):** HFOs, such as R1234yf and R1234ze, are organic refrigerants that have been developed as alternatives to hydrofluorocarbons (HFCs) with high GWPs. HFOs have significantly lower GWPs, ranging from 1 to 6, depending on the specific type. They are non-toxic and have negligible ozone depletion potential.

Inorganic Refrigerants and its impact

Inorganic refrigerants are substances that are not derived from natural sources and are used for cooling purposes. They are typically synthetic compounds and are categorised into two main groups: halocarbons and inorganic compounds. Here are some common inorganic refrigerants and their impact on the environment, specifically regarding global warming:

- I. **Hydrochlorofluorocarbons (HCFCs):** HCFCs, such as R22, have been widely used as refrigerants in the past. They have a lower ozone depletion potential (ODP) compared to chlorofluorocarbons (CFCs), but they still contribute to the depletion of the ozone layer. In addition, HCFCs have high global warming potential (GWP) values, ranging from hundreds to thousands, contributing to the greenhouse effect and climate change.
- II. **Hydrofluorocarbons (HFCs):** HFCs, like R134a and R410a, were introduced as alternatives to CFCs and HCFCs due to their lower ODP. However, they have high GWP values, ranging from hundreds to several thousand, which contribute significantly to global warming. HFCs are potent greenhouse gases that can persist in the atmosphere for a long time.
- III. **Perfluorocarbons (PFCs):** PFCs, such as CF₄ and C₂F₆, are not commonly used as refrigerants but have been used in some specialized applications. They are entirely made up of fluorine and carbon atoms, making them highly stable and non-reactive. PFCs have

extremely high GWP values, ranging from several thousand to over twenty thousand, making them potent greenhouse gases.

Azeotropic refrigerants

Azeotropic refrigerants are a type of refrigerant mixture that behaves as a single substance with a fixed composition throughout the phase change process. These mixtures have unique properties that make them desirable for certain refrigeration applications. The impact of azeotropic refrigerants on global warming depends on the specific composition of the mixture. The impact of azeotropic refrigerants on global warming depends on their composition and the individual GWP of the components. It is essential to consider the GWP and environmental impact of each refrigerant component when evaluating the overall impact of an azeotropic mixture. Transitioning to low-GWP alternatives is crucial for reducing the contribution to global warming from refrigeration and cooling systems.

Global Warming Potential (GWP)

Calculation and comparison

Global Warming Potential (GWP) is a measure of the greenhouse gas potential of a substance relative to carbon dioxide (CO₂). It quantifies the ability of a greenhouse gas to trap heat in the atmosphere over a specific time horizon, usually 100 years. GWP takes into account the radiative forcing potential of a greenhouse gas compared to CO₂, which is assigned a GWP of 1. The calculation of GWP involves comparing the total climate impact of a given mass of a greenhouse gas to the climate impact of the same mass of CO₂ over a specific time horizon. The formula to calculate GWP is as follows

$$\text{GWP} = (\text{Total Radiative Forcing of the Gas} / \text{Total Radiative Forcing of CO}_2) / \text{Time Horizon}$$

The radiative forcing values represent the change in the Earth's energy balance due to the presence of a greenhouse gas. These values are typically obtained from scientific studies and climate models. Different refrigerants have varying GWPs, and their comparison is crucial for understanding their relative climate impacts. Here are a few examples of commonly used refrigerants and their GWPs:

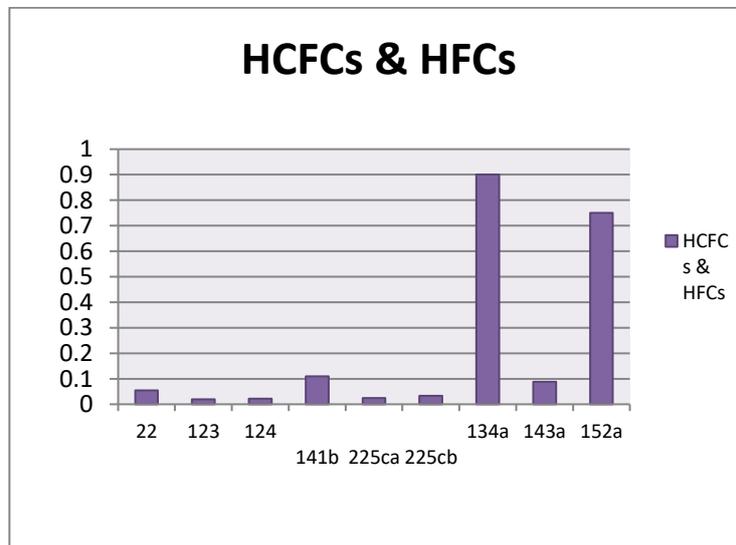
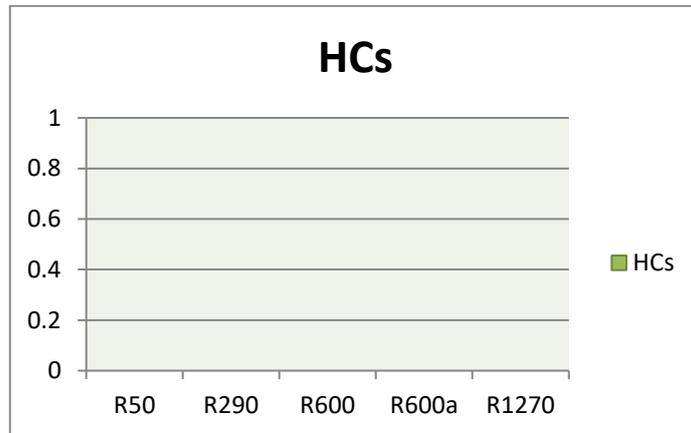
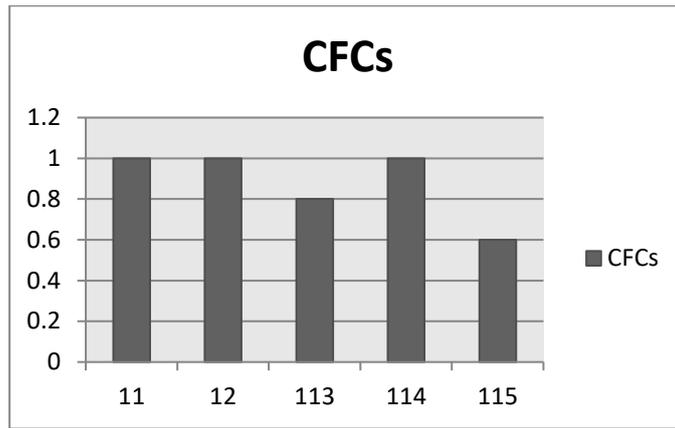
1. Carbon Dioxide (CO₂): CO₂ is often considered a reference gas with a GWP of 1 since it serves as a baseline for comparison.
2. Hydrofluorocarbons (HFCs): HFCs are synthetic refrigerants commonly used in air conditioning and refrigeration systems. They have relatively high GWPs due to their long

- atmospheric lifetimes and strong heat-trapping properties. For example, R-134a, an HFC commonly used in automotive air conditioning, has a GWP of 1,430.
3. Hydrochlorofluorocarbons (HCFCs): HCFCs are transitional refrigerants being phased out due to their ozone-depleting properties. They also have significant GWPs, though lower than HFCs. For instance, R-22, an HCFC commonly used in older air conditioning systems, has a GWP of 1,810.
 4. Hydrocarbons (HCs): HCs are natural refrigerants with low GWPs and zero ozone depletion potential. Common examples include propane (R-290) and isobutane (R-600a), which have GWPs close to zero. It is important to note that the GWPs mentioned above are approximate values and can vary depending on the specific time horizon considered. Also, the phase-out of high-GWP refrigerants and the adoption of low-GWP alternatives are part of ongoing efforts to mitigate climate change and reduce the overall impact of refrigeration and air conditioning systems on the environment.

Impact of GWP on Climate Change

Refrigerants play a significant role in global warming and climate change. When released into the atmosphere, refrigerants can contribute to the greenhouse effect, trapping heat and leading to an increase in global temperatures. The impact of refrigerants on climate change is influenced by their Global Warming Potential (GWP) and their usage in various applications. Refrigerants with high GWPs, such as certain HFCs, have a more potent warming effect compared to other greenhouse gases like CO₂. This means that even small releases of high-GWP refrigerants can have a significant impact on global warming. For example, a kilogramme of R-134a, with a GWP of 1,430, is equivalent to emitting 1,430 kilogrammes of CO₂ over a 100-year period. By transitioning to refrigerants with lower GWPs and improving leak prevention, the refrigeration and air conditioning industries can significantly reduce their contribution to greenhouse gas emissions and mitigate climate change.

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Environmental impact

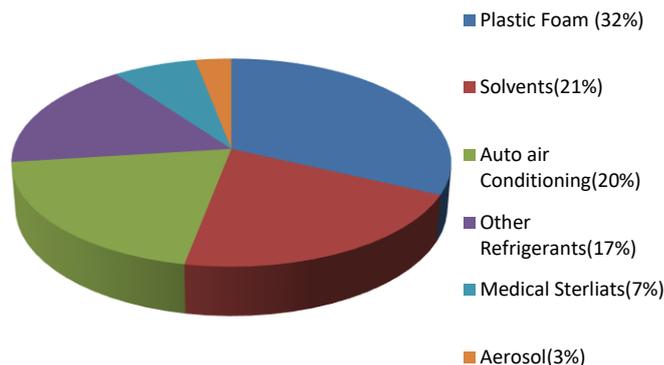
Ozone Depletion Potential (ODP)

Refrigerants release chlorine or bromine atoms when they contact the stratosphere, as it is well known that Chlorine and bromine are highly reactive and can break down ozone molecules. The ozone depletion potential (ODP) is a measure of a substance's ability to deplete ozone in comparison to chlorofluorocarbon-11 (CFC-11), which has an ODP value of

1.0. The ODP values of various refrigerants indicate their relative contributions to ozone depletion. For example, CFC-12 has an ODP of 1.0, while hydrochlorofluorocarbon-22 (HCFC-22) has an ODP of 0.05, meaning it is less damaging to the ozone layer than CFC-12. The significance of ODP values lies in assessing the potential environmental impact of refrigerants. Lower ODP values indicate reduced ozone depletion potential, which is desirable from an environmental perspective. International agreements, such as the Montreal Protocol, have been established to phase out the use of ozone-depleting substances, including high ODP refrigerants, and promote the adoption of alternative, environmentally friendly refrigerants.

Stratospheric Ozone Holes

Stratospheric Ozone Holes are linked to the presence of certain chemicals, particularly chlorofluorocarbons (CFCs) and halons, which were extensively used as refrigerants, fire extinguishers, and fire extinguishing agents in the history. When CFCs and halons are released into the atmosphere, they ultimately reach the stratosphere. There, they're broken down by the ultraviolet (UV) radiation, releasing chlorine and bromine radicals. These radicals catalytically destroy ozone molecules, performing in the thinning of the ozone substance. Over Antarctica, during the polar spring, unique meteorological conditions, similar as the presence of polar stratospheric clouds, enhance the destruction of ozone. This leads to the conformation of the "ozone hole" over that region. The goods of stratospheric ozone holes are primarily associated with increased situations of dangerous UV radiation reaching the Earth's face. UV-B radiation is known to beget colorful health problems, including skin cancer, cataracts, and vulnerable system repression. It can also have mischievous goods on terrestrial and marine ecosystems, including damage to phytoplankton, crops, and marine organisms. The connection between refrigerants and ozone holes led to the transnational treaties to phase out ozone-depleting substances and borrow alternatives with lower or zero ozone reduction eventuality. The given data shows the ingredients that are making holes in the stratospheric Ozone substance. Then, it's easily defined that about 37% holes are forming by refrigerants.



Other Environmental Impacts

Refrigerants can have direct and indirect environmental impacts beyond ozone depletion. Some refrigerants, such as hydrofluorocarbons (HFCs), have high global warming potentials (GWPs). When released into the atmosphere, they contribute to the greenhouse effect, leading to global warming and climate change. High-GWP refrigerants can trap a significant amount of heat in the Earth's atmosphere, exacerbating the effects of greenhouse gas emissions. Additionally, refrigerants, particularly those used in older systems or improperly managed, can be released into the air during leaks, maintenance, or end-of-life disposal. These emissions can contribute to poor air quality, as certain refrigerants are classified as volatile organic compounds (VOCs) and can participate in the formation of ground-level ozone (smog) when combined with other pollutants.

The indirect environmental impacts of refrigerants also include their potential to harm ecosystems and human health. To mitigate these environmental impacts, there has been a push to develop and adopt alternative refrigerants with lower ODP, lower GWP, and reduced toxicity. These alternatives include hydrofluoroolefins (HFOs) and natural refrigerants such as carbon dioxide (CO₂), ammonia (NH₃), and hydrocarbons. Transitioning to these alternatives, along with proper handling, maintenance, and disposal practices, can help minimise the environmental impact of refrigerants.

Alternatives and Mitigation Strategies

Low-GWP Refrigerants: Low-GWP (Global Warming Potential) refrigerants are substances that have a lower impact on global warming compared to high-GWP refrigerants like hydrofluorocarbons (HFCs) commonly used in many refrigeration and air conditioning systems. Some examples of low-GWP refrigerants include:

1. Hydrofluoroolefins (HFOs): a new generation of synthetic refrigerants with significantly lower GWPs compared to HFCs.

2. Hydrocarbons (HCs): such as propane (R-290) and isobutane (R-600a) are natural substances with very low GWPs.
3. Ammonia (R-717): Ammonia is a natural refrigerant with zero ozone depletion potential and a GWP of zero.

Advantages of low-GWP refrigerants include

- Reduced environmental impact: Low-GWP refrigerants have significantly lower GWPs than traditional high-GWP refrigerants, resulting in reduced greenhouse gas emissions and less contribution to global warming.
- Regulatory compliance: The phase-out of high-GWP refrigerants is being enforced in many countries through regulations such as the Kigali Amendment to the Montreal Protocol. Adopting low-GWP refrigerants helps comply with these regulations.

Limitations of low-GWP alternatives include

- Flammability: Some low-GWP refrigerants, such as hydrocarbons, have flammable properties. While they can be safely used in specific applications with proper design and safety measures, their flammability poses challenges in certain contexts.
- Toxicity: Certain natural refrigerants like ammonia can be toxic, requiring appropriate safety precautions during installation, operation, and maintenance.

Natural Refrigerants

Natural refrigerants are substances that occur naturally in the environment and have low or zero ozone depletion potential and GWPs as it has discussed earlier in brief, they include hydrocarbons (propane, isobutane), carbon dioxide (R-744), and ammonia.

Advantages of natural refrigerants include

1. Environmentally friendly: Natural refrigerants have low or zero GWPs, contributing significantly less to global warming compared to synthetic refrigerants
2. Energy efficiency: Natural refrigerants have favorable thermodynamic properties, which can result in more energy-efficient cooling systems.

Challenges of natural refrigerants include

- Safety considerations: Some natural refrigerants, like ammonia and hydrocarbons, have flammable or toxic properties, requiring proper handling, training, and safety measures during installation and maintenance.

- **Infrastructure and compatibility:** Adopting natural refrigerants may require modifications to existing refrigeration and air conditioning systems to ensure compatibility, efficiency, and safety.

So, we can say that in adopting low-GWP refrigerants, including natural refrigerants, and implementing advanced technologies and energy-efficient cooling systems are key strategies for mitigating the impact of refrigerants on global warming. These approaches help reduce greenhouse gas emissions, comply with regulations, and promote sustainable cooling practices.

Research and Development Efforts

Emerging Refrigerants

The research on next-generation refrigerants focuses on developing alternatives that have even lower GWPs, improved energy efficiency, and reduced flammability and toxicity. Innovations and breakthroughs in the field include:

HFO Blends: Researchers are exploring blends of hydrofluoroolefins (HFOs) to optimize their performance and improve their compatibility with existing refrigeration systems. These blends offer a balance between low-GWP properties and desired performance character.

HFO-HC Blends: Combining HFOs with hydrocarbons (HCs) such as propane or isobutane can create refrigerant blends that have both low GWPs and reduced flammability concerns.

Carbon Dioxide (CO₂) with Additives: CO₂ is a natural refrigerant with a GWP of 1. However, it has challenges related to high operating pressures. Researchers are investigating the use of additives to enhance CO₂'s performance, reduce pressures, and improve energy efficiency.

Hydrofluorocarbon (HFC) Replacements: Efforts are underway to develop non-flammable alternatives for high-GWP HFCs used in specific applications. These replacements aim to provide similar performance while reducing environmental impact.

Sustainable Refrigeration Systems

The development and deployment of sustainable cooling technologies focus on creating refrigeration systems that minimize environmental impact and maximize energy efficiency. Some key areas of research include:

Advanced System Designs: Researchers are working on optimizing system designs to improve energy efficiency, enhance heat transfer, and reduce refrigerant charge requirements. This includes innovations in heat exchangers, compressors, and controls.

- **Natural Refrigerant Systems:** There is a growing emphasis on the adoption of natural refrigerants such as hydrocarbons, CO₂, and ammonia. Research focuses on developing reliable and efficient systems that can safely handle these refrigerants while minimizing leakage and maximizing energy performance.
- **Integration of Renewables:** The integration of renewable energy sources such as solar and wind power into refrigeration systems is being explored. This includes the development of hybrid systems that combine renewable energy generation with energy storage solutions to ensure continuous and sustainable operation.
- **Energy Storage:** Researchers are investigating energy storage technologies to address the intermittent nature of renewable energy sources. Energy storage systems enable better utilization of renewable energy, allowing refrigeration systems to operate efficiently even during periods of low or no renewable energy generation.

Conclusion

In conclusion, refrigerants play a significant role in global warming. The impact of refrigerants on the environment is mainly due to their potential to contribute to the depletion of the ozone layer and their high global warming potential (GWP). Historically, chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs) were commonly used as refrigerants but were found to have a severe impact on the ozone layer. The Montreal Protocol, an international agreement, was enacted to phase out the production and use of these substances, leading to the development and adoption of alternative refrigerants. However, many of the replacement refrigerants, such as hydrofluorocarbons (HFCs), have a high GWP. HFCs have a significant warming potential compared to carbon dioxide (CO₂), which is the reference gas used to measure the GWP. Their long atmospheric lifetimes and potency as greenhouse gases contribute to global warming. Recognizing the need to address the impact of HFCs on climate change, the Kigali Amendment to the Montreal Protocol was agreed upon in 2016. The amendment aims to gradually phase down the production and consumption of HFCs and promote the use of low-GWP alternatives, such as hydrofluoroolefins (HFOs), natural refrigerants (e.g., ammonia, carbon dioxide, hydrocarbons), and blends. Transitioning to low-GWP refrigerants and implementing more energy-efficient technologies can significantly reduce the environmental impact of

refrigeration and air conditioning systems. These efforts are crucial to mitigating global warming and achieving climate goals set forth in international agreements like the Paris Agreement. It is essential for governments, industries, and individuals to prioritize the use of environmentally friendly refrigerants, promote energy efficiency, and ensure proper handling, disposal, and recycling of refrigerants to minimize their impact on global warming. Continued research and innovation in the field of refrigerants are also necessary to develop even more sustainable and climate-friendly alternatives in the future.

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Imparting Creativity into the Classrooms Practice through the Curriculum

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Abstract

Education is the perfection existing in human according to the words of Swami Vivekananda and the quality of the education system emerging in the present scenario is not meeting the expectations of the student population. The 21st century students are exposed to technological gadgets and gain a lot of knowledge through the internet sources. The discipline of the students and the respect for the teaching profession is slowly deteriorating over the years. The factors that could help to redeem the decline of the profession are commitment towards the profession, creativity, innovation in the classroom, compassion for the students by the teachers, administrators, etc. Expanding students' creative capacity can make them more adept at forming original ideas, as well as exercising their critical thinking skills. Creativity is also a life skill, which can help students unlock new avenues in their personal self-expression. It allows to view and solve problems more openly and with innovation and it opens the mind. A society that has lost touch with its creative side is an imprisoned society, in that generations of people may be closed minded. It broadens individual perspectives and can help to overcome prejudices. A child's creative activity can help teachers to learn more about what the child may be thinking or feeling. Creativity also fosters mental growth in children by providing opportunities for trying out new ideas, and new ways of thinking and problem-solving. The present study throws light on the innovative practices that could be employed in the school level to uplift the present scenario existing in the education system in the country. From the curriculum, creativity allows all students to look at problems and challenges from different angles and to come up with solutions that may not be immediately obvious and also an ability to think outside the box is essential in today's fast-paced, rapidly changing world.

Keywords: Creativity, Curriculum, Classrooms Practice, Teacher Role.

Introduction

The myth that creativity is only for a special few has a long, long history. For the Ancient Chinese and the Romans, creativity was a gift from the gods. Fast forward to the mid-nineteenth century and creativity was seen as a gift, but only for the highly talented, romantically indulgent, long-suffering and mentally unstable artist. Fortunately, in the 1920s the field of science began to look at creativity as a series of human processes. Creative problem solving was the initial focus, from idea generation to idea selection and the choice of a final product. The 1950s were a watershed moment for creativity. After the Second World War, the Cold War began and competition for creative solutions to keep a technological advantage was intense. It was at this time that the first calls for Science Technology Engineering and Mathematics (STEM) in education and its associated creativity were made. Since this time, creativity has been researched across a whole range of human activities,

including maths, science, engineering, business and the arts. Creativity is the interaction between the learning environment, both physical and social, the attitudes and attributes of both teachers and students, and a clear problem-solving process which produces a perceptible product that can be an idea or a process as well as a tangible physical object and it is producing something new, relevant and useful to the person/people who created the product within their own social context. The idea of context is very important in education. Something that is very creative to a year one student for example, the discovery that a greater incline on a ramp causes objects to roll faster would not be considered creative in a university student. Creativity can also be used to propose new solutions to problems in different contexts, communities or countries. An example of this is having different schools solve the same problem and share solutions. Creativity is an inherent part of learning and whenever students try something new, there is an element of creativity involved, if schools have effective curriculum intent, they are often focused on a strong commitment to developing meaningful learning experiences that help pupils develop their capacity to learn. If curriculum intent is focused on creativity, teachers will need to embrace teaching for creativity as the tool for implementation. Many teachers already teach creatively and they use imaginative and innovative approaches to deliver curriculum and make learning interesting and memorable. However, teaching for creativity is slightly different. It enables children to develop their own learning capacities (Cattell, R. B., and Drevdahl, J. E., 1984).

Objectives of the Study

1. To review the creative process in education
2. To highlight Creativitized Curriculum
3. To discuss about Imparting Creativity into the Classrooms Practice Through the Curriculum

Methodology

The present study is mainly established on secondary data which are gathered from renowned research articles, journals, position papers, etc. and are all related to “Imparting Creativity into the Classrooms Practice Through the Curriculum.”

Creativity

Creativity is the ability to think about a task or a problem in a new or different way, or the ability to use the imagination to generate new ideas. Creativity enables you to solve complex problems or find interesting ways to approach tasks. If you are creative, you look at things from a unique perspective. You can find patterns and make connections to find opportunities.

There is some risk involved with being creative, but you can show you are self-motivated to try things that have not been done before. Creativity is the ability to produce or develop original work, theories, techniques, or thoughts. A creative individual typically displays originality, imagination, and expressiveness. Creative thinking refers to the mental processes leading to a new invention or solution to a problem. Products of creative thinking include new machines, social ideas, scientific theories, artistic works, and more (Davis, L., 2018) Creativity is a fundamental quality of the human mind. At the same time, creativity is incredibly difficult to describe and define. Leonardo da Vinci is an excellent example of creativity. Da Vinci was not only a prolific painter, but also a scientist and engineer. In order to tackle the problem of the difficulty of painting the human figure, he studied anatomy at a scientific level, which was recorded and later used in the medical field. The popular Four-C model of creativity lists four different types of creativity. Mini-C creativity involves new ideas and insights that are personally meaningful, while Little-C creativity involves everyday thinking and problem solving. Pro-C creativity is a professional's ability to solve problems in unique ways and create new things in their respective fields. Big-C creativity is the creation of ideas that are largely considered great. Creativity is derived from the word 'creo' meaning – 'to create' or 'to make'. Spearman (1931) defines "Creativity is the power of human mind to create new contents by transforming relations and generating new correlates". Drevdahl (1956) says that "Creativity is the capacity of a person to produce compositions, products or ideas which are essentially new or novel and previously unknown to the producer". Guilford J. P. (1992) defines that "Creativity is the capacity to produce ideas that are both new and useful through divergent thinking".



Fig.1. Creative ProcessSource: <https://ideapod.com/the-creative-process/>**Creativitized Curriculum**

1. The content is organized around key ideas and questions that can be viewed from multiple perspectives and it includes information about the creative methods of the discipline being taught.
2. The methods include instructional techniques that require students to ask questions, generate varied options, and consider multiple perspectives.
3. Activities ask students to represent information in multiple forms, using varying media and points of view.
4. Assessment includes multiple formative and summative assessments, including some that offer choices and use content in new ways.
5. Assessment for creativity builds intrinsic motivation through a sense of increasing competence.
6. This requires the wise use of diagnostic and formative assessments, as well as appropriate feedback.
7. It provides opportunities to use content in new ways, through examining multiple perspectives, solving problems, and applying ideas in original situations.
8. It builds intrinsic motivation through the use of choice and meaningful tasks.

Significance of Creativity in Curriculum

Creativity is a natural extension of our enthusiasm. according to Earl Nightingale. Creativity is an essential element towards the overall development of students. Classrooms are one of the ideal places where teachers inspire the students to use their imagination to enhance learning. The right mix of creativity along with curriculum helps students innovate and also encourages them to learn new things easily. Creative classrooms can really transform the way students grasp knowledge and influence how they apply it in their real life. According to Rabindranath Tagore, creative expression plays a key role in a student emotional development. It makes them good communicators and improves their emotional and social skills. Creativity is as important in education as literacy and every child has some inborn potential of creativeness. Creativity plays a crucial role in the aspect of developing personality and provides a direction to analyse things diversely and uncommonly. Creativity cannot happen overnight, instead it needs to be cultivated, nurtured and needs proper guidance. This process of cultivation of creativity starts from the classroom and the teachers play a very important role in this regard and are lots of ways in which the teachers can play

their part both inside and outside the classroom. We have to incorporate new and innovative things for the students. The teachers can promote active learning with the help of the technological tools that helps to generate the creativity and innovation among the students. Active learning enables the addition of a creative touch to already learnt concepts and facts.

Influence of Creativity in the Classroom

- **Reduces Stress and Anxiety:** When a certain time is allocated towards creativity during the strenuous study hours, it will reduce the stress and offer comfort and relaxation to prepare well for the examinations.
- **Emotional Quotient:** It is enhanced and creativity gives the freedom to explore the surroundings and learn from them. It gives the opportunity to express their own self, boosts the self-confidence and enhances their emotional development and being considerate towards others opinion.
- **Promotes Fun Learning:** When the concepts are transacted through play-way method, the students have a higher tendency of grasping concepts as they enjoy learning and this will facilitate the exchange of ideas among students and promote critical thinking.
- **Improves communication Skills and Problem-solving Skills:** Creative classrooms will enable the students to think out of the box and think and analyse logically thereby interacting with peers developing their communication and the communication skill is developed as the children are open minded in accepting the ideas of others through discussion.

Means to Develop Creativity in the Classroom

- Re-wording Assignments to promote Creative thinking
- Creating a compassionate and trustworthy environment
- Accepting student ideas and encouraging Autonomy
- Giving students immediate feedback on their creativity
- Assigning creative projects to the students
- Supporting student intrinsic motivation
- Making the students understand that creativity needs effort
- Using creative instructional strategies, models and methods
- Experimenting activities to promote creative thinking

Creative Activities at the Primary Level

Languages

- **Learning the synonym through an image:** The teacher while teaching a simple three or four-letter word will initiate to symbolize the word through drawing in a chart or making colourful postures depicting the meaning of it. For example, if the teacher wants to teach the meaning of the letter and level the pictorial depiction of the word could be given in the form of heart with a smile. Moreover, the teacher can insist the students to draw about the synonym of the word to induce creativity.
- **Associating favourite Characters with student names:** The teacher during transaction of instruction in the classroom during the reinforcement of the right act and correct answers from the students can associate their favourite cartoon characters and call them along with their names.
- **Story Completion:** The teacher would narrate a part of the story and make them understand about the favourite characters and can ask them to complete the story according to their perception.
- **Introducing the various sounds through Multi-media:** The teacher would introduce the animal or bird through animation and will play the respective sound to the children. The children will grasp and repeat the sounds one by one and will learn collaboratively. In Languages too, the child will learn the sound of the alphabets through multi-media for better learning.
- **Formation of the alphabets:** The child could be induced of their psychomotor domain in order to learn through imitation and manipulation. Children are provided with coloured clay and after the introduction of the alphabets with the respective sounds they can imitate the teacher in framing the letter with the clay material thereby gaining a firsthand experience.
- **Composing songs to learn Alphabets:** The series of alphabets can be taught through a song with a catchy tune and appropriate actions should be taught in order to stimulate their senses for learning through fun.

Social Sciences

- **Learning Continents through Jigsaw Puzzle:** The children are given fun time activities in learning about the seven continents of the world by giving the actual picture and small

cutouts of it in order to arrange through analysis. Similarly, our country India outline was presented and children would solve through Jigsaw puzzle.

- **Train game to learn cities and culture:** A group of children are asked to form a human train and few students are asked to spread out carrying placards representing different cities of India and also natural resources of those cities. As the train approaches various cities, the children are involved in participatory learning thereby learning about the culture and resources of various cities in the country
- **Role Play:** The various kings and freedom fighters in Indian History and their significant role could be asked to be acted by students through role play in order to learn their contribution and achievements and this will enhance their creativity as they dress themselves as different personalities.
- **Tasting Flavour:** Across The various flavours and crops of the country could be exposed to the children through a healthy display of food from other states of the country. This will imbibe a spirit of enquiry and coordination with peers
- **Hands on activities on Natural Resources:** The children could be given purposeful projects in order to know about the rivers, dams and vegetation and monuments of different places in the country and a first-hand exposure could be also given by making them visit zoo, bird sanctuaries and parks.

Sciences

- **Exposure to varied Temperature:** As suggested by Maria Montessori the sensory learning experience could be provided to the primary children to understand the difference between temperatures both hot and cold and get familiar with the concept of temperature.
- **Understanding the Universe:** The concept of the solar system and the revolution of the sun and the moon could be taught creatively through outdoor activities with the names of the planets written and pinned to the children and the attributes of each planet, sun and moon are explained and will promote a joyful learning experience in children increasing their creativity.
- **Activities for Identifying Plants and Animals:** The primary children could be split into two groups consisting papers with information. One group will be having the details and characteristics of the plants and animals and the other group of students will have the names with them. The children by looking at the attributes should identify the name of the animal and plant. The groups could be interchanged and the game could be continued.

- **Orienting herbal Plants:** The primary children could be given exposure to herbal gardens and the health benefits of various plants could be explained to them thereby creating a desire to grow plants at home for medicinal benefits and the creativity in growing plants in a roof garden or backyard could be instilled in an early age.
- **Demonstration of basic experiments:** The basic experiments performed to understand the concept of air, sound and heat will enhance their interest as the teacher demonstrates in classroom and ask the students to repeat and gain conceptual understanding.

Creativity at the High School Level

Languages: The children could be asked to write poetic lines in a bookmark while creating a bookmark as a recreational activity. This will stimulate the child creativity and will enhance the literary writing skills. The children could be also asked to dress up like a poet and explain the context of the poetic lines being aware of the pronunciation and expression. The teacher can play podcasts of different plays to imbibe the concept of the play and can make them to write the summary on their own. The children can be made to involve themselves in Book Reading Clubs and review it moreover, the children can be asked to contribute towards class and school magazine. The creative humour in children can be brought out by asking them to prepare comic strips.

Sciences and Mathematics: The students at the high school level could be asked to sort jelly beans to learn genetics and to understand air pressure and force by the means of a balloon powered car. The tea bag experiment to understand how heat affects air molecules could be performed and understood by the students in the sciences laboratory. The tendency of an egg in salt water could be understood by performing simple experiments thereby stimulating divergent thinking.

Mathematics: Here, the dice game can be played to understand subtraction and addition. Students can be made to learning arithmetic operations in a grocery store, understand measurement through volume of liquids in various measures and learning Geometry through measuring tapes thereby creating angles of various measures. The teacher can involve the students in finding the area of the bench in the class and also the perimeter of the classroom to understand the formulas in Mensuration.

Social Sciences: The children could be given map projects by giving a country or a region inside country and asked to create a map. Creation of timeline of the history of an empire or region will enable them to learn the information in a detailed manner with deep understanding. The teachers can ask the students to perform a drama of pre-historic times and

collect ancient coins moreover, hands on experience can be given by taking them to a museum of places of historical significance.

Creativity Process in Education

The creative process is an act of solving problems through innovation and it is a systematic approach to solving problems by finding new ways of looking at old concepts. This system can be executed by an individual/a team of people for personal, educational, business, etc. purposes. Creativity is valuable in education because it builds cognitive complexity. Creativity relies on having deep knowledge and being able to use it effectively. It develops over time and is more successful if the creative process begins at a point where people have at least some knowledge and skills. To continue the earlier example of the ramp, a student rolling a ball down an incline may notice that the ball goes faster if they increase the incline, and slower if they decrease it. This discovery may lead to other possibilities like the student might then go on to observe how far the ball rolls depending on the angle of the incline, and then develop some sort of target for the ball to reach. The world of education is now committed to creativity. There has also been a global trend in education to move from knowledge acquisition to competency development. Creativity often is positioned as a competency or skill within educational frameworks. However, it is important to remember that the incorporation of competencies into a curriculum does not discount the importance of knowledge acquisition and it is essential that teachers consider both how they will support their students to acquire the necessary knowledge and skills in their learning area as well as the opportunities they will provide for applying this knowledge in ways that support creativity. In fact, creativity requires two different sets of knowledge: knowledge and skills in the learning area, and knowledge of and skills related to the creative process, from idea generation to idea selection, as well as the appropriate attitudes, attributes and environment. The role of the teacher is to ensure that all ideas are listened to and given feedback in a respectful manner. In terms of the physical environment, a set of simple changes rather than a complete redesign of classrooms is required: modifying the size and makeup of student groups, working on both desks and on whiteboards, or taking students outside as part of the idea generation process can develop creative capacity. Even something as simple as making 21st century students more aware of the objects and affordances which lie within a classroom may help with the creative process (Kaufman, S. B., & Gregoire, C., 2016).

Conclusion, Discussion and Summary

Creativity in the classroom transforms the learning experience for students, it will promote a readiness to learn and grasp even the difficult concepts. If schools put creativity at the heart of their curriculum intent with teaching for creativity as the mechanism for how that intent is implemented, the impact can be an outstanding learning environment where significant and sustained progress is evident in all aspects of school life. The teacher is a second mother to the children at the primary age group and has the responsibility to imbibe creativity in them through classroom activities and role modelling. A set of activities can be carried out to arouse interest and active participation from their side. Creativity also directly enhances learning by deepening understanding, and promoting joy. Intrinsic motivation is essential to the creative process and it will lead the student pursue meaningful goals. As per the components of the revised Bloom 's Taxonomy, createll is at the final level of the cognitive domain and by noticing broader patterns and connecting material across academic disciplines, creative thinking can facilitate deeper cross-curricular learning. Hence, creativity stands as a vital ingredient in the process of education and hence the teachers should role model and imbibe creativity in every class to redeem the system of 21st century education (Runco, M., 2008).

Educational Implications and Suggestions

- Try setting student tasks with differing time constraints, this will challenge pupils to adapt and think quickly.
- Develop pupil's imagination by asking open questions that encourage dialogue and exploration, this approach helps pupils to develop deeper transferable thinking.
- Start a lesson with a provocation/with a series of intriguing questions.
- Explore issues from different perspectives and experimenting with thoughts and options stimulates imagination (Gowan, J., Khatena, J., & Torrance, E. P., 1981).
- Encourage pupils to generate new ideas within a safe environment.
- Equip pupils with the tools to learn independently.
- Inspire a love of learning.
- Embed a culture that enables learners to grow in resilience and embrace challenge.
- Empower learners to find new solutions.
- Prepare learners fully for changing 21st century world.

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- Source: <https://ideapod.com/the-creative-process/>

A Study on Relationship Between Aum (AUM) of Indian Mutual Funds and Macroeconomic Variables: A Pandemic Period Study

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Abstract

COVID-19 has affected people physically, emotionally, behaviorally, and financially. People locked themselves for safety but unlocked their funds and assets to reduce losses. Society is transforming after the pandemic. Protectionism trumps reasonable investment decisions in financial markets because individuals want to save. Early financial theories ignored human behavior, but emotions now seem to drive investors' choices. Individual, demographic, geographical, regulatory, macroeconomic, and other variables affect investors' behavior. Systemic macroeconomic difficulties directly and profoundly affect investment choices. This research uses AUM(AUM) to analyze how macroeconomic factors affect investors' mutual fund sentiments during the COVID-19 pandemic. Negative news and investor behavior are the focus of this research.

Keywords: Financial markets, COVID-19 macroeconomic variables, AUM(AUM), VECM, E-GARCH Model.

Introduction

Financial literature classifies risks as systemic or non-systemic, with the former being the assimilation of macro-economic factors and the latter as the amalgamation of organization-specific factors. Investors must take these risks in various amounts when investing. Diversification eliminates un-systemic risks, but cautiousness cannot decrease systemic hazards, according to literature. Investors must understand the financial climate and its effects on various investment options.

In India, security market investment relies on gut feeling, herd behavior, or apparently professional advice, which is readily available yet unreliable and may lead to losses. To address this, financial markets created mutual funds, initially established by Unit Trust of India in 1964. Mutual funds allow clients to deposit their money with an asset management business, which invests it in well-diversified, professionally managed portfolios with minimal risk for target returns. This industry has grown steadily since its founding. India has 42 Asset Management Companies (AMCs) with an Average Asset Under Management of Rs. 32,42,537 crore (in April 2021). The mutual fund industry has also experienced the impact of pandemic.

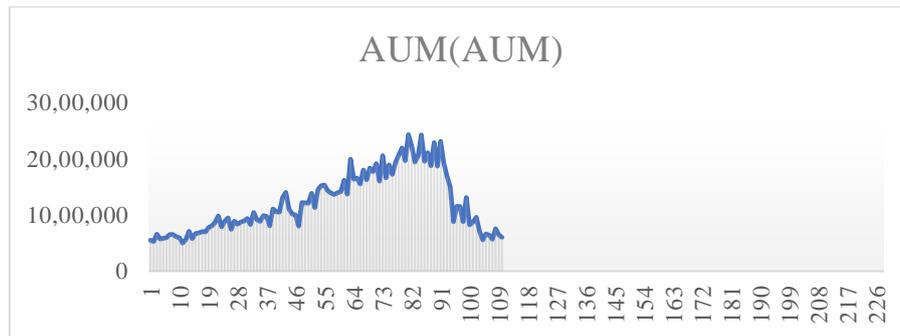


Figure 1: Chart for AUM (2012-2020): Source: Processing of Data

As shown in the image above, AUM fell sharply during the first wave of COVID-19 and is now recovering, but at a different speed.

In this work, the researcher examined the relationship between investor sentiment towards mutual funds and macro-economic indicators and the influence of COVID-19. Because AUM is the market value of AMC's investments, it is used to measure investors' views on mutual funds. This investment uses retail investor's funds. Increasing or decreasing AUM shows investors' preference for mutual funds and its relationship to other macroeconomic variables. The article is organized into four sections: literature, data and methods, analysis and interpretation of data, and findings.

Review of Literature

The literature shows that macroeconomic variables have had many studies on their target variables using various methods.

Mishra (2012) emphasized the critical point that while there is no short-term impact, real GDP growth affects mutual funds' long-term resources. Ioana Radu (2013) examined quarterly data from 2004 to 2012 in Romania and found a link between the mutual fund market and economy. Kariuki (2014) found that macroeconomic conditions affected mutual funds' net asset values by 70.9% in Kenya.

Qureshi Kutan and Ismail (2017) evaluated market volatility and equities and balanced mutual fund flows using a panel auto-regression model. They found that equities mutual fund flows increase market volatility while balanced mutual fund flows decrease it. Imran and Ahmed (2018) used correlation and regression analysis to compare the effects of macroeconomic variables on conventional and Shariya compliant mutual funds in Pakistan and found that systematic factors affect both types of mutual funds similarly.

Panigrahi, Karwa, and Joshi (2019) discovered that macro-economic variables can explain up to 52.22% of risk-adjusted returns of selected equity mutual funds using attribute analysis. Gyimah, Addai, and Asamoah (2021) used the Auto-Regressive Distributive Lag Model

(ARDL) to track macroeconomic determinants on Ghanaian mutual fund performance and found that monetary policy had a long-term, positive effect.

With an aim to test the asymmetric effect various researchers attempted to employ E-GARCH model like Goudarzi (2010) used the Fractionally Integrated E-GARCH Model to track the Indian stock market's long-term memory and validate its long memory quality. E-GARCH and T-GARCH models were used by Goudarzi and Ramanarayanan (2011) to assess the Indian stock market's volatility and test news asymmetry. They found that bad news increased volatility more than good news. The asymmetric GARCH model produced similar results in Nairobi Stock Exchange, according to Maqsood et al. (2017), but it fit the data better. Ali et al. (2012) used the E-GARCH model to examine how the 2008 global financial crisis affected India and Pakistan's stock markets and found that both were affected.

Data and Methodology

Objectives of Study

- a. To determine the association between identified macroeconomic variables and AUM
- b. To identify any information asymmetry that may exist regarding the AUM of mutual funds in India.
- c. To test the impact of COVID-19 pandemic on the relationship of macro-economic variables with AUM.

Database: This analysis used monthly secondary data on AUM and seven macroeconomic variables—inflation, the consumer price index, the index of industrial output, the sensex, interest rates, and the foreign exchange rate—from January 2012 to February 2021. The day the first COVID-19 case was detected in India is used to separate pre- and post-COVID-19 data. Thus, pre-pandemic data covers January 2012 to December 2019, and pandemic data covers January 2020 to February 2021. Computation uses data's inherent log values.

Tools Used

Vector Error Correction Model: Because VECM aids in the calculation of more effective estimators for co-integrating vectors, it is utilized instead of Engle and Granger's (1987) two-step error-correction model for tracking the impact of macroeconomic variables on the assets managed by various mutual funds.

$$\Delta Y_t = \sum_{j=1}^{k-1} \Gamma_j \Delta Y_{t-j} + \alpha \beta' Y_{t-k} + \mu + \epsilon_t \quad \text{Eq. 1}$$

Where $\sum_{j=1}^{k-1} \Gamma_j \Delta Y_{t-j}$ and $\alpha \beta' Y_{t-k}$ are the first difference and error correction components of equation (1), which are, respectively, the vector auto regressive (VAR) component. Y_t is an

order 1 integrated P*1 vector of variables, and is an ordered P*1 vector of constants. u_t is a P*1 vector representing the white noise error term, and K is a lag structure. At the jth lag, α_j is a P*P matrix representing short-term adjustments among variables across the p equation, β is a P*R matrix of cointegrating vectors, and marks the first difference. The speed of the error correcting mechanism is represented by the P*R matrix of the speed of adjustment parameter.

E- GARCH model: Nelson (1991) created the E-GARCH model to account for the leverage effect of shock (policy, news, incidents, events, etc.) on the intended financial metrics. It aids in testing for asymmetries, or if metrics respond to both good and bad news in a similar fashion. In an E- GARCH (p, q) model conditional variance equation, the conditional variance can be expressed as

$$\begin{aligned} \text{Log}(h_t) = \varphi + \sum_{i=1}^q \eta \left| \frac{u_{t-1}}{\sqrt{h_{t-1}}} \right| + \sum_{i=1}^q \lambda_i \frac{u_{t-i}}{\sqrt{h_{t-i}}} \\ + \sum_{k=1}^p \theta_k \log(h_{t-k}) \end{aligned} \quad \text{Eq. 2}$$

Where, φ is a constant, η represent ARCH effect, λ signifies for asymmetric effect and Θ stands for GARCH effect. So, if in an E- GARCH model if, $\lambda_1 = \lambda_2 = \dots = 0$ the model is said to be symmetric but if $\lambda_i < 0$ it implies that negative shocks generate larger volatility than good news. The log of variance series is generally used for this model because this ensure that estimates are non- negative and the leverage effect turns out to be exponential rather quadratic. For testing the leverage effect in Asset Under Management log of the returns is used. After applying the ARCH -LM test it is known that ARCH effect is present in the series. f- statistics and the Chi-square test have probability values that are less than the 0.05 level of significance (0.0164, 0.0166), respectively. Based on the LR, FPE, AIC, SC, and HQ decision criteria, the ideal lag length is 8.

Observations and Discussion

Panel-1 Descriptive Statistics:Skewness coefficients show that assets under management, the Sensex, inflation, the consumer price index, and m3 are positively skewed, whereas the interest rate, foreign exchange rate, and industrial production index are negatively skewed. The distributions of Kurtosis of Assets Under Management, Interest rates, Sensex, Foreign Exchange rate, Consumer Price Index, Inflation, and M3 are platykurtic, while Index of Industrial Production is leptokurtic because it is higher than 3. Based on Jarque Bera test probability values, AUM and Index of Industrial Production are normally distributed since their values are less than 0.05, while the rest of

the variables are non-normal since their values are greater than 0.05, accepting the null hypothesis of non-normality. Since most variables are not normally distributed, log values are utilized to obtain normal distribution.

Test of Stationarity: For this, Ajewole, Adejuwon, and Jemilohun (2020) use the Augmented Dickey Fuller and Phillip Peron tests. The null hypothesis that a unit root exists does not hold since the probability values of the T-statistics are greater than the threshold of significance of 0.05 at level. Therefore, the data is not stationary at level. The T-statistics probability values are below 0.05, rejecting the null hypothesis of a unit root. Thus, the data is non-stationary at level but stationary at first difference.

Selection of optimum lag length: Lag 3 is chosen as the optimal lag based on the AIC decision criteria (Maysami& Koh, 2000b).

Co- Integration Test:As we can see, there is only one co-integrating equation (see table No. 5 in the appendix). The Trace test and (max) both reject the null hypothesis $r=0$ in Favor of $r=1$ at the 5% level of significance. As a result, it can be said that there is only one cointegrating equation.

Vector Error Correction Model:Following are the co-integrating vectors as determined by the analytical results of the VECM model.

$$B_1' = (1.00, 1.56, 3.84, 0.26, 0.028, -0.98, -4.72, 0.37)$$

Values for AUM, CPI, FOREX, IIP, INF, INT, M3, and SENSEX that are stated above stand for long-term elasticity measuring coefficients (co-integration) and can be expressed as

$$AUM = -112.32 - 1.56CPI - 3.84FOREX - 0.26IIP - 0.028INF + 0.98INT + 4.72M3 - 0.37SENSEX. \quad \text{Eq. 3}$$

According to the equation above, AUM decreases as CPI rises and vice versa at a rate of 1.56 because the t-statistic value is higher than the cutoff rate ($3.42 > 1.96$) and the relationship is negative. FOREX and AUM have a negative relationship due to the elasticity of 3.84, which is greater than the cutoff threshold ($8.54 > 1.96$). AUM falls 0.26 per unit if IIP raises 1 unit. This link is essential since the t-statistic exceeds the cut-off rate ($2.97 > 1.96$). The link. Inverse correlation between the Sensex and AUM is minimal. The correlation between AUM and the 10-year bond interest rate is significant and has a positive elasticity of 0.98 since the t-statistic value is greater than the cut-off rate ($5.27 > 1.96$). M3 and AUM are particularly positively correlated. The change's magnitude, 4.72, exceeds the cutoff rate of 1.96 and has a t-statistic of -12.35.

The VECM model equation is as follows.

$$\begin{aligned}
 & -0.051\text{ECT}-0.58\Delta\log\text{AUM}_{(t-1)}-0.58\Delta\log\text{AUM}_{(t-2)}+0.46\Delta\log\text{CPI}_{(t-1)}+0.006\Delta\log\text{CPI}_{(t-2)}- \\
 & 0.487\Delta\log\text{FOREX}_{(t-1)}+0.072\Delta\log\text{FOREX}_{(t-2)}+0.015\Delta\log\text{IIP}_{(t-1)}-0.005\Delta\log\text{IIP}_{(t-2)}+0.011\Delta\log\text{INF}_{(t-1)}-0.001\Delta\log\text{INF}_{(t-2)}-0.18\Delta\log\text{INTR}_{(t-1)}+0.18\Delta\log\text{INTR}_{(t-2)}+0.15\Delta\log\text{M3}_{(t-1)}-0.14\Delta\log\text{M3}_{(t-2)}+0.37\Delta\log\text{SENSEX}_{(t-1)}-0.068\Delta\log\text{SENSEX}_{(t-2)}+0.026
 \end{aligned}
 \tag{Eq. 4}$$

The equation above shows AUM's near-term link with macroeconomic factors.

The co-integrating equation's coefficient, -0.051, is negative but insignificant since the t statistic is smaller than |1.96| (-1.12<1.96). This coefficient measures system resilience. The coefficient indicates that the model is unreliable and that variables will not respond quickly to structural changes. The coefficients and t-statistics of the independent variables show that SENSEX at lag 1 has a strong positive relationship with AUM (t-statistic more than 1.96<2.53), In the near run, everything else is unimportant. The model's R² value is 0.4541, indicating that the factors under study explain 45.41% of AUM movements. The proposed model lacks autocorrelation since its Durbin Watson statistic is 1.73, which is within the permitted range of 1.5 to 2.5.

Residual Diagnostics: Serial correlation and heteroskedasticity tests diagnose residuals. Breusch-Godfrey Serial correlation LM Test, a Lagrange multiplier test for typical high-order ARMA defects, was performed. The null hypothesis for this test is that the residual has no serial correlation up to a particular order. Due to F-statistics and Chi-square statistics being larger than 0.05 (0.72, 0.46, respectively), cannot reject the null hypothesis that the recommended model has no autocorrelation. Breusch-Pagan-Godfrey test assesses model heteroskedasticity using R² test statistics, where N is sample size and R² is regression of squared residuals from first regression. Test statistics may be approximated by a Chi-square distribution. Null hypothesis: homoscedastic error variance. F-statistics and Chi-square probability values of 0.0537 and 0.149, respectively, are larger than 0.05 and indicate that the model does not contain heteroskedasticity. Thus, the null hypothesis stands.

The ARCH-LM test is used to assess the data's fitness, and the results show that the probability values for F-statistics and Chi-square are more than 5% level of significance. As a result, the null hypothesis that the model does not exhibit heteroskedasticity is not rejected. Thus, we draw the conclusion that the E-GARCH (1,1) model appropriately captures the volatility imbalance in the AUM.

$$\text{AUMRET} = -0.145 - 0.188\text{AUMRET}_{(t-1)} + \varepsilon_t \tag{Eq. 5}$$

$$\text{Log}\sigma_t^2 = 0.1398 - 1.16 \left| \frac{u_{t-1}}{\sqrt{h_{t-1}}} \right| - 0.355 \frac{u_{t-i}}{\sqrt{h_{t-i}}} + 0.971 \log(h_{t-k}) \tag{Eq. 6}$$

After looking at the equation (6) existence of leverage effect is also confirmed because the value of $\lambda_i < 0$ (-0.355) and statistically significant (0.0045<0.05). So, it can be confirmed that bad news has a greater influence on AUM volatility than good news.

Influence of the COVID-19 pandemic on the relationship between macro-economic variables and AUM: On the association between identified macroeconomic indicators and AUM. Statistics indicate that before the pandemic, macro-economic variables under study were able to explain the variation in AUM up to 87% (R^2 values) which reduced to 78% since the first case of COVID-19 was reported in India. Further, if we look at probability F statistics it can also be visualized that the relationship between AUM and Macroeconomic variables are not significant since the inception of the pandemic as the probability value is more than 0.05 ($0.16 > 0.05$) which was significant before the crisis.

After analysis it can be observed that Consumer Price Index, M3, Inflation and Interest Rates were not contributing significantly in explaining the variations in AUM but other variables namely Sensex, M3 Inflation and Interest rates were significant contributors in above relationship whereas after the attack of pandemic, none of the variables are significant contributor in the established relationship.

Findings

Inflation and interest rates, two macroeconomic indicators, have a weakly negative relationship with assets under management, whereas the others have a weakly positive link. Pre-COVID, macroeconomic indices and AUM correlated strongly. During COVID-19, no substantial connection was seen. The discovered macro-economic variables can explain 45% of the variation in assets under management, but if we divide the time into pre-COVID and pandemic phases, R^2 drops sharply from 87% to 78%. VECM found that only SENSEX, at lag 1, positively affects AUM in the short term. Since the error correction term is modest, the suggested model is unsuitable for policy implications and needs more independent variables. The E-GARCH model argues that bad news influences AUM more than favorable news because to knowledge asymmetry. AUM and Consumer Price Index, AUM and M3, CPI and IIP, CPI and M3, IIP and Interest rates, and IIP and Sensex are causally linked by the Granger Causality test. The other macroeconomic elements are unrelated. COVID-19 has changed the relationship between AUM and macroeconomic parameters. In the table below, dark lines indicate significant relationships and dotted lines indicate insignificant relationships, M3, inflation, and interest rates had the greatest impact on AUM before COVID, but after COVID, they lost significance.

Conclusion

Statistical analyses of the AUM data set over 10 years and identified macroeconomic variables show that pre-pandemic macroeconomic characteristics can explain the increase or

decrease in AUM by up to 87%. The pandemic reduced macroeconomic factors' explanatory power to 78%. The VECM model found that macroeconomic factors explain 48% of AUM fluctuation. Small error correction terms indicate that the model is not resilient and will not return to equilibrium if purposely changed. Long-term, CPI, FOREX, and IIP exhibit negative and strong associations with AUM, indicating that if consumer prices rise, AUM would decline as investors have less investable income, affecting market sentiment. Rising SENSEX offers investors more lucrative investment possibilities, but rising inflation reduces the amount of money that can be invested. Because mutual fund investors are more inclined to trade stocks, this association is no longer statistically significant. However, rising M3 stimulates investors to make larger investments, therefore the M3-AUM relationship is beneficial. 10-year Treasury bond-AUM relationship Favorable interest rates lower bond prices, encouraging investors to put their capital in mutual funds to protect their holdings. When discussing the short-term implications of macroeconomic issues on mutual fund AUM, the Sensex has a significant positive impact. The E-GARCH (1,1) model shows that news asymmetry dominates AUM volatility, meaning bad news affects volatility more than good news. The association was considerable before the pandemic but became insignificant during it, and the macroeconomic factors' explanatory power decreased, suggesting that COVID-19 significantly affects it. The outbreak also diminished the elements that drove this connection. Investors, policymakers, researchers, and other stakeholders can use the proposed model to assess mutual fund investors' sentiments and understand the dynamic impact of exceptional circumstances like COVID-19 on the relationship because this phase is not yet complete and India is expected to experience a third wave of the pandemic.

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Inculcation of Life Skills in Teacher Training Program: Strategy from the Past

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Abstract

The development of one's physical, moral, and intellectual faculties was the primary goal of Vedic education, and in order to attain salvation, a strong emphasis was placed on focus, attention, and yoga. Vedic education has an answer for each challenge troubling our world today. Now that we have the answers and solutions, we must search farther. The aim of Vedic education was the development of morally sound and emotionally sound character. After the Britishers invaded India, our Indian education system took a huge turn. With technological advancement and work pressure, desire to lead a happy life, today's youth need to learn how to cope up with change. Their ability to overcome obstacles in life with bravery and confidence stems from their life skills. Students who acquire life skills are better equipped to handle stress and other challenges in life with poise and composure. Life skills are the aptitudes that support young children's mental and social development as well as their ability to deal with life's realities. Teachers play a very pivotal role in every child's life. Their proactive engagement in the skill-building process of students makes a substantial contribution to their overall success and growth. This paper focuses on challenges in implementing life skills education and the importance of inculcating life skills education in the teacher training program.

Key words: Vedic Education, Life Skills, Curriculum, Teacher Training.

Introduction

The system of education that originated in ancient India is referred to as the Vedic system. In Vedic education system children were taught Vedas in Gurukul. Rig Veda, Samaveda, Yajurveda, and Atharvaveda were the Vedas that were studied during the Vedic education. Learning wasn't just theoretical during the Vedic era. It had something to do with the truth of life. Vedic education was student centered. Students in the Vedic education system memorized the texts that their teachers recited to them. The earlier Vedic educational system was regarded as an extremely sophisticated kind of education that emphasized life's purity and happiness. Debate, discussion, storytelling, introspection, travelling, practical exposure, hands on experience were the methods used to teach the students in Vedic system. The teacher was expected to have a solid foundation in his field of expertise. He used to teach his students skills that were essential in their life such as problem-solving skill, decision making skill, empathy skills, self-awareness skill. These skills were required for students' wholesome personality development, emphasising discipline, character development, mental development, and moral development. Today we term these skills as life skills. In addition to

creating a knowledge-based approach that children can utilize to grow throughout their lives as they learn to understand, perform, become and coexist with others, education aims to prepare such human beings who are happy both inside and outside of themselves. Life skills are those that can support and encourage happiness and well-being in young people. It is imperative to educate children about the value of life skills. They need to developing self-sufficiency in fulfilling their own mental, physical, emotional, and financial requirements is crucial. Students can work with this great model to accomplish their goals. The role of a teacher is very important in imparting life skills among students. A creative and skilled teacher provides children a variety of learning environments in order to develop into productive and efficient individuals in the future (Shridevi, 2019). The teachers must receive training before they can impart the vital life skills to the students. Therefore, it is imperative to include life skills in teacher training curriculum.

Objectives of Vedic Education

The goal of the Vedic educational system was to shape the young students into people who could live ideal and fulfilling lives by adhering to the Dharma. Vedic education focused on virtues like independence, discipline, compassion, and reverence for all living things. Pupils were instructed to value the harmony that exists between nature and humans. The primary goal of Vedic education was to attain salvation by the development of one's mental, ethical, or spiritual, and physical capabilities. Some objectives of Vedic education are mention below that is relevant with life skills.

1. Personality development

The main goals of Vedic education were the development of character and personality. Morality was considered very essential in Vedic system. Moral principles were instilled in students to be followed throughout their lives. The teacher attempted to instil in his students the values of self-worth, self-assurance, self-control, and self-respect by setting an example.

2. Practical education

Vedic education placed equal emphasis on gaining practical expertise and academic knowledge from sacred texts such as the Ramayana and Mahabharata. In addition to receiving other occupational training, children were taught how to perform manual labor. Among the professions were weaving, ceramics, etc.

3. Infusion of Spiritual & Religious Values

The main goal of education in the past was to inculcate in students a spirit of piety and religiosity for the benefit of mankind and the honor of God. The search for information was a

search for moral principles. It was thought that rigorous practice of sacred rituals was the only way to promote greater awareness of spiritual values.

4. Civic Responsibilities and Social Values

Students were required to return to society after completing their education at the Gurukul and contribute in various ways to enhance and develop it. They had to extend kindness and hospitality to those in need.

5. Emphasising Discipline

It was necessary for a student to give up overjoy, lust, rage, desire, ego, and arrogance. He was told not to gamble, gossip, deceive, backbite, or harm other people's sentiments. Every student, regardless of wealth, was expected to live a modest life in the Ashram or Gurukul.

6. Character building

If a person lacked morality, their intelligence was meaningless. The higher "Dharma" was regarded as ethical or acting in the proper way. Values like self-control, honesty, truthfulness, and rigorous deference to elders were thought to be instilled through education.

7. Promotion of Social Efficiency and Welfare

Education was given to all members of society in order to prepare them for the professions they were expected to pursue, not just to preserve culture or advance mental abilities.

What are Life Skills?

A person can develop life skills gradually; they are innate abilities. Students must be guided towards success through practice and awareness of their potential in order to develop these skills. The World Health Organisation (WHO) has defined Life skills as "the abilities for adaptive and positive behaviour that enable individuals to deal effectively with the demands and challenges of everyday life". 'Adaptive' means that a person is flexible in approach and is able to adjust to different circumstances. 'Positive behaviour' implies that a person is forward looking and even in difficult situations can identify a ray of hope and opportunities to find solutions. (CBSE, 2013, p. 13). United Nations International Children's Emergency Fund (UNICEF) has defined life skills as "A behaviour change or behaviour development approach designed to address a balance of three areas: Knowledge, Attitudes, and Skills" (UGC, 2023, p. 7). World Health Organization (1997) has laid down 10 core life skills:

- **Decision making** enables us to approach life's decisions in a positive way. If youth actively choose their activities in connection to health by weighing the available options and potential repercussions, this could have negative health implications.

- **Problem solving** is the ability to deal effectively with the challenges in our life. If major issues are not handled, they can lead to psychological distress and physical strain as well.
- **Creative thinking** assists us in responding adaptably and flexibility to the events that arise in our daily lives, even in the absence of a problem or choice that has to be taken. It allows us to see beyond our immediate experience.
- **Critical thinking** helps in assisting us in identifying and evaluating the elements—such as ethics, peer pressure, and the media—that shape our attitudes and behaviors, critical thinking can improve our health.
- **Effective communication** is the ability to communicate effectively involves being able to express ourselves in ways that are appropriate for our cultures and circumstances, both orally and nonverbally. This entails having the capacity to communicate wants, anxieties, and viewpoints. It could also indicate having the ability to seek guidance and assistance when needed.
- **Self-awareness** entails our understanding of who we are, our personality, our likes and dislikes, as well as our strengths and shortcomings.
- **Empathy** is quite helpful in understanding and accepting others who may be very different from ourselves. This is especially true when there is ethnic or cultural diversity.
- **Coping with emotions** identifying emotions in oneself and others, understanding how emotions affect behaviour, and knowing how to react to emotions.
- **Coping with stress** is the understanding of the underlying causes of stress in our lives, how they influence us, and taking actions to assist manage our stress levels.

Importance of Life Skills Education

Life skills enable us to be competent in knowing how to simplify our lives, make them positive, and choose the best ways to spend our time. As a result, life skills are crucial to our success. Students can gain self-confidence by learning life skills. It encourages cooperation and communication in them. It equips them to act quickly in any bad situation. Life skills are interpersonal and social abilities required by all the people, in order to operate competently and confidently toward one another as well as within their communities and society (Kumar, P. 2017). In order to help students make wise decisions, solve problems, think critically and creatively, communicate effectively, form healthy relationships, empathize with others, and deal with managing their lives in a healthy and productive way, life skills education and training take into account psychosocial competencies and interpersonal skills (Prajapati, R et al. 2017). The World Health Organization (WHO) states that life skills are beneficial in many aspects of

life and in a wide range of issues, such as preventing drug and substance abuse, HIV and AIDS prevention, sexual violence prevention, teen pregnancy reduction, suicide prevention, peace education, environmental education, livelihood and income generation, and more. We acquire life skills through our personal encounters, perspectives, revelations, narratives, literature, parents, clergy, educators, the media, and so on. People need to acquire life skills, also known as survival skills, in order to fulfill their unique or particular demands. Life skills enable a person to deal with various life circumstances in an appropriate manner. The complete growth of a child's personality is the primary objective of education, since it is the only means of instructing and training someone. Education can therefore play a significant role in equipping student with life skills (Kaur, N. 2022).

Challenges of Implementing Life Skill Education

Worldwide the teaching of life skills education has faced many difficulties. Children today are bewildered lot due to the contemporary conditions of rapid industrial development, urbanization, and globalization. Teachers and parents place a great deal of emphasis on performance and achievement. The first obstacles to life skills education in India most likely stem from the British colonial era. Under the British Empire, modern education was established. The medium of instruction was changed from vernacular to English. The fundamental principle of British education was to produce a workforce of clerics rather than knowledge seekers. The second change is the rapid shifts in the workplace, society, morals, ethics, religion, and familial beliefs have altered modern society's lifestyles, particularly for young people. Children today are particularly lacking in experiences because they are not required to perform household chores or are not encouraged to do so, especially in urban, affluent families.

Thirdly, the concept of life skills education in Indian schools is similar to that of value or character education. Teachers also claimed that all school teachers lacked access to LSE teaching, learning, and assessment approaches, and that in-service training was inadequate. Since LSE is not graded, parents and students gave it less importance. Teachers and students were also overburdened with extracurricular and academic activities that would be tested in final exams (Grover, J 2018). Wangchuk (2019) reported that time constraint, teachers' lack of knowledge of life skills, inadequate teaching-learning materials, absence of fulltime counsellor, and lack of school-parent partnership are the major challenges that impeded the implementation of life skills education in school. Behrani (2016) pointed out that few teachers are unaware of modes of introducing life skills, teachers require time for preparation to incorporate life skills

in curriculum, students felt LS to be an extra burden due to academic and extracurricular activities. The study suggested that the best way to guarantee that life skills curricula are implemented in schools is for teachers to receive life skills training both during pre-service and during in-service training. To make the teaching of life skills more engaging and dynamic for the students, additional resources such as board games, digital activities, and audiovisuals must be created.

Kitimo (2104) stated that Inadequate resources for teaching and learning, the LSE's non-examinable status, the excessive workloads brought on by shortage of teacher, and the absence of qualified teachers on the LSE are the major challenges for implementing life skills.

Kitivui (2013) stated that Teachers who have received life skills training are better able to execute the curriculum, and those who have not should not instruct students in life skills. In order for LSE to be implemented successfully, it is important to make sure that teachers receive sufficient and pertinent training for the subject, that time set aside for LSE in schools is not used for syllabus coverage, and that instructors are encouraged to use participatory strategies when teaching life skills.

Ranjekar (2008) The current educational system is frequently criticized for being overly theoretical and disconnected from reality. The majority of education appears to be concentrated on simple cognitive abilities centered on memorization of course material. Education rarely consciously addresses life skills like critical thinking, interpretation, self-reflection, communication, interpersonal skills, and, most importantly, learning and relearning how to adapt to constantly changing new situations in life.

Koloso and Makhakhane (2010) focus attention on that the program was only made available to pre-service teachers and students in person. Open and distance learning delivery, or ODL, was never thought of as a way to accommodate teachers and students who had attended training sessions prior to the introduction of life skills education. Education on life skills has suffered from the lack of clear standards for assessment and evaluation procedures.

Abobo & Orodho (2014) Highlighted the fact that the students opined that the aims and objectives of teaching life skills education was irrelevant and unattainable. Due to the lack of examinations, life skills education is not taken seriously by teachers or students. These principals made it abundantly evident that, given the examination-oriented curriculum interpretation of learning in most schools, teachers and students only take examinable subjects seriously.

Otieno (2015) highlighted that curriculum's implementation requires careful consideration of the importance of teacher preparation. The institutions of teacher preparation curricula do not

incorporate LSE pedagogy. Teachers become incompetent and incapable of effectively teaching LSE. In order to carry out the curriculum, the teachers must rely on their general knowledge and expertise. Some teachers are incredibly inept at teaching LSE and have very little experience.

Singh & Sharma (2016) pointed out that in India, teachers must be given the tools and encouragement to incorporate life skills into their teaching methods. It is obvious that life skills instruction in schools must take place in the framework of more extensive reforms to the educational system. Teachers who are qualified and driven and who can use experiential and interactive teaching methods to teach life skills must implement age-appropriate, inclusive curricula in schools.

Teacher training institutions and universities have not included life skills education in their curriculum. Teachers who are expected to teach Life Skills Education lack the necessary skills to effectively teach the material, which makes them ineffectual at teaching it. Teachers used LSE minimally and were ill-prepared to teach it. Most teachers approach teaching LSE education in the same way they teach other subjects because they lack the necessary training. There is a contradiction between principle and execution when it comes to teaching values because they appeal to the heart rather than the head.

In India various efforts have been made to impart life skills education among the students. Realising the importance of LS, CBSE has introduced life skills manual for the teachers. But if look at the ground reality; many teachers are not aware of the concept of life skills, teachers are unable to implement LS activities in their daily teaching learning process. Most teachers in schools focuses on education and exam preparation for their pupils. Teachers play an integral part in helping students to develop their psychosocial competencies. By encouraging young children to take initiative, teachers support and encourage their development. The transition of young people into adolescence requires this support. It is acknowledged that a teacher's character influences a student's character in significant ways. "Teachers who model the values of character that they want their students to aspire to will be the primary source from whom pupils will learn good character habits." (Arthur & Revell, n.d. p. 9, Cited in Otieno, 2015). The LSE's pedagogy requires re-evaluation. Since LSE is not just a topic for the cognitive realm. Indeed, the affective domain of a child's development is more stimulated by this subject. It is imperative for teachers to adopt a non-cognitive strategy for teaching and create learning objectives that resonate more with the affective aspect of students' personalities. To make life skills learning a lifetime endeavour, more hands-on activities must be incorporated into the curriculum.

Importance of Inculcating Life Skills in Teacher Training Program

Teachers must implement a learner-centered approach and design creative group and/or individual life skills activities in order to instill life skills in their students. Games, project work, assignments, case studies, brainstorming sessions, surveys, role plays, dramas, poster presentations, group discussions, quizzes, debates, and so on can all be included in these individual or group activities. In order to fortify these life skills through the content and the planning and execution of suitable activities in the classroom, an efficient and high-quality teacher preparation program is necessary. Therefore, teachers need to be trained in integrating these skills into their lessons. As a result of these modifications, learners may gain comprehension and be empowered to acquire and produce new types of knowledge as they mature. For their life to be innovative, beneficial, and cheerful, this understanding is essential. It is now necessary to apply life skill education in a relevant and appropriate manner. Giving students life skills instruction is a good way to meet children's needs as well as to provide them with useful, self-management, social, emotional, and cognitive skills for life adjustments (Kumar, 2017). Therefore, it is necessary that teacher training institutions should include life skills education in their curriculum.

Conclusion

A variety of psycho-social and cognitive skills are referred to as life skills, and they help children make decisions that will guide their emotional health and improve their communication skills. To live a successful life, one must possess life skills. Around the world, life skills education is a huge and essential component of the educational system. However, life skills education has not yet been fully implemented and acknowledged as a crucial component of the curriculum in Indian schools. Adolescents must be taught life skills through interactive activities that simultaneously affect their cognitive and affective domains. School teachers must receive pre-service training and in-service interventions regarding pedagogy and recent advancements in the area of teaching life skills in order to prepare them for the challenges facing life skills education. Vedic education has always emphasised on the education in which the student can become independent and can face the challenges of life.

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Revitalizing Rural India: Paving the Way for Digital Empowerment by Addressing Barriers and Crafting Strategic Solution

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Abstract

In rural India, digital empowerment has the capacity to transform socioeconomic growth and close the urban-rural gap. However, there are several obstacles that prevent rural communities from effectively adopting and using modern technology. Digital empowerment is the technique of giving people access to information and communication technologies (ICTs) and the knowledge and abilities to use them efficiently for their own and their society's development. The bulk of those living in India lives in rural areas, where digital empowerment offers a viable path to improve local economies and elevate up communities. This part offers an overview of the paper's structure, presents the relevance of digital empowerment in rural India, and describes the goals of the study. In order to help rural areas embrace digital prospects, this study examines the obstacles they confront and suggests solutions. This study attempts to offer insights into promoting digital accessibility in rural parts of India by looking at the current technological infrastructure, socioeconomic problems, governmental policies, and cultural features. According to the survey, the availability of an internet connection, knowledge of digital technologies, and cultural barriers to using technology are major issues in rural areas of India. But there also exist lots of chances to encourage the use of technology in rural areas.

Keywords: *Digital India, Digital empowerment, Rural India, Digital Initiative, Socio-economic Development.*

Introduction

Digital empowerment is the technique of giving people the opportunity to utilise information and communication technologies (ICTs) and the know-how to use them efficiently for their own and other people's development. The bulk of the population in India lives in rural areas, where technology offers a viable path to improve local economies and elevate up populations. This part offers an overview of this paper's framework, presents the relevance of digital empowerment in rural India, and describes the goals of the study.

Background of the Study

India has particular difficulties and potential for technological empowerment in rural regions due to its various landscapes and large population. India has made significant strides in the field of digital infrastructure as well as technology over the last couple a long time, making it among the top countries in the world for providing IT services. The majority of these advancements,

however, have taken place in metropolitan areas, leaving rural communities with little access to modern technology and their advantages.

Almost sixty-five percent of Indians live in rural areas, making this region crucial for economic development. There is a sizable digital gap between rural and urban regions as a result of inadequate technological facilities, internet access, and a lack of digital literacy. The rural populations in India are unable to fully participate in the digital age and reap its potential advantages as a result of the widening socioeconomic inequality. From the beginning, the Indian government saw the value of digital empowerment in rural regions and began a number of programmes to close the gap. The "Digital India" campaign, which was started in 2015 with the goal of transforming India into a knowledge-based society, is one of the most well-known efforts. Through this initiative, all citizens—including those who live in rural and isolated areas—will have access to digital infrastructure, internet connectivity, and digital services.

Numerous obstacles still prevent digital empowerment in rural India despite these initiatives. There are still issues including restricted access to energy, a shortage of reasonably priced digital equipment, a shortage of digital competence, and cultural barriers to adopting technology. Furthermore, given rural India's different socioeconomic environment, there is a need for customised solutions that take into account regional demands. It is crucial to recognise these obstacles and put into practise efficient solutions that are tailored to the particular requirements of rural communities in order to open up opportunities for technology in rural India. Enhancing knowledge about technology, upgrading the technology infrastructure, encouraging entrepreneurial activity, and integrating culturally considerate methods of adopting new technologies should be the main goals for effective solutions.

For policymakers as well, development organisations, and other stakeholders hoping to close the digital gap and advance equitable development, study in this area is essential. In order to guarantee that the adoption of technology for rural populations in India becoming a reality and contributes to sustained economic growth and enhanced lives, it is important to understand the barriers and best practises. This study can provide insightful advice that can be put into practice.

Literature Review

By addressing the digital gap and empowering marginalised people, digital empowerment in rural India has an opportunity to bring about revolutionary change, according to the literature on the topic.

- Gangwar, D.S., Tyagi, S. & Soni, S.K. (2022). A techno-economic analysis of digital agriculture services: an ecological approach toward green growth. Digital innovation increased the opportunities for the identification of farming needs. The conducted techno-economic analysis of smart farm interventions assisted in the identification of value creation attributes of digital agriculture services. Different attributes that farmers value can help in the domestication of digital agriculture technologies. Digital agriculture innovations must focus on capacity building and social value creation as the ongoing agrarian crisis in India has many social aspects.
- Quy, V. K., Et, al. (2022). IoT-Enabled Smart Agriculture: Architecture, Applications, and Challenges. I hope that the findings of this study will constitute important guidelines in research and promotion of IoT solutions aiming to improve the productivity and quality of the agriculture sector as well as facilitating the transition towards a future sustainable environment with an agro ecological approach.
- Naika, M. B., Et, al. (2021). Digital extension service: Quick way to deliver agricultural information to the farmers. This chapter covers various digital tools and their efficiency with a supporting case study on utilization and impact of digital extension services (DES) on farmer's knowledge in terms of agricultural practices in selected villages of Belagavi district, Karnataka, India. In conclusion, digital extension services play a vital role in the dissemination of updated information for improving agricultural supply chain management.
- Araújo, S. O., Et, al. (2021). Characterising the agriculture 4.0 landscape—Emerging trends, challenges and opportunities. This work will positively impact the research around Agriculture 4.0 systems, providing a clear characterisation of the concept along with guidelines to assist the actors in a successful transition towards the digitalisation of the sector.
- Raj, S. & Darekar, A. (2020). investigated India's Agri value chain's digitalization. According to the report, digital technologies have a tremendous potential to change the agriculture industry. Under the Digital India Programme, the Indian government has launched a number of efforts to help the agricultural community. In order to standardise output, organise farmers, and build logistical capacity in rural regions.
- Theodore, R. (2020). Studied the Public Private Partnership (PPP) model for rural India's digitalization. The government has reportedly launched a number of programmes to digitally transform rural India. The study conclusions show that rural India may benefit from

digitalization in a variety of ways, including agritech companies, e-governance, healthcare, education, banking and finance. The PPP model has the potential to revolutionise India's rural economy. The participation of rural regions into a new India is crucial.

Research Gap

There remain a number of research gaps that continue to be filled despite the increasing interest in and efforts towards digital empowerment in rural India. To improve the comprehension and application of digital inclusion programmes in rural locations greater analysis and research are needed in these areas of research. Finding the socioeconomic determinants that prevent digital inclusion in rural communities, for example, is one of the major research gaps. For the successful implementation of digital empowerment efforts in rural India, it is imperative that these research gaps be filled. Policymakers, organisations, and stakeholders may create more effective and contextually appropriate policies to realise the full potential of digital technologies in fostering equitable development and raising standards of living through conducting in-depth studies and bridging these research gaps.

Research Objectives

1. To identify social and economic issues, such as levels of income, educational gaps, gender hurdles, language and cultural obstacles, that prevent digital inclusion in rural regions.
2. To look at how digital training and literacy programmes might help rural people and communities take advantage of digital potential.
3. To evaluate the contribution of government programmes and efforts, such as the Digital India programme and other infrastructure initiatives, to advancing digital inclusion and improving access to digital services in rural regions.
4. To investigate the potential of digital entrepreneurship and e-commerce in rural India, assessing prospects for these businesses and looking at problems and possible solutions.
5. To provide a thorough framework for putting scalable and long-lasting solutions to close the digital gap and open up digital possibilities in rural India into practice.

Research Methodology

To achieve the research objectives outlined for the study on " Revitalizing Rural India: Paving the Way for Digital Empowerment by Addressing Barriers and Crafting Strategic Solution" a mixed-methods approach will be employed.

Research Design: Descriptive research

Data Sources: Secondary data collected from sustainability reports, annual reports, and corporate governance documents can provide valuable insights into their efforts, performance metrics, and strategic goals.

Findings and Reporting: The research findings are reported in a descriptive manner. Conclusions are typically drawn from the descriptive data, and recommendations may be made based on the findings.

Results and Discussions

1. Socio-economic Factors Influencing Digital Inclusion

- 1. Income Levels and Affordability:** In rural India, income levels have a big impact on whether people have access to digital technology. Financial limitations may prevent lower-income households from being able to access and afford digital technology and internet services.
- 2. Educational Disparities:** Education is a key factor in determining one's level of digital literacy and, by extension, one's level of participation in the digital world. Rural India's unequal educational opportunities may make it difficult to embrace and use digital technology effectively.
- 3. Gender Barriers:** In rural India, where traditional societal norms and practices might restrict women's access to and use of digital technology, gender gaps in digital inclusion are pervasive.
- 4. Language and Cultural Challenges:** In rural India, where there are many different linguistic and cultural identities, language and cultural issues might provide obstacles to digital inclusion.

It is crucial to address these socioeconomic issues if one wants to advance digital inclusion in rural India. Affordability and accessibility, teaching digital literacy and skills, challenging gender stereotypes, promoting regional languages, and incorporating digital technology into contexts that are culturally relevant should all be focal points of strategies. All residents of rural communities can experience significant and lasting digital empowerment via tailored initiatives that take into account the distinctive socioeconomic situation of rural India.

2. Impact of Digital Literacy and Training Programs

- 1. The significance of digital education:** The effectiveness of digital empowerment programmes in rural India depends heavily on the level of digital literacy among the population. It refers to a person's capacity to utilise digital technology successfully and ethically for a variety of tasks, such as communicating, doing online transactions, and getting information. The following points highlight the significance of digital literacy in rural areas:
 - a) Individual empowerment:** People who are digitally literate have the knowledge and skills necessary to engage in the digital economy and take advantage of a variety of online possibilities.
 - b) Information Access:** Rural communities may access a multitude of online resources, including government services, healthcare information, and educational materials, thanks to digital literacy.
 - c) Socio-economic growth:** As it creates new chances for education, entrepreneurship, and employment, digital literacy stimulates socio-economic growth in rural regions.
 - d) Digital Safety:** literacy promotes safe and responsible internet usage by assisting people in understanding online hazards, privacy issues, and cyber threats.
- 2. Training programme efficacy:** Training programmes in digital literacy are essential for enhancing rural people' ability to use digital technology successfully. The following variables affect how well these training programmes work:
 - a) Tailored Content:** Training programmes are more likely to engage participants and provide noticeable effects when they are specifically designed to meet the needs and interests of rural communities.
 - b) Hands-on Approach:** Practical, hands-on instruction that enables participants to engage with digital tools and apps in authentic settings improves learning results.
 - c) Support for Local Languages:** Making training materials available in regional tongues makes it easier for rural populations to obtain the information and helps overcome language obstacles.
 - d) Follow-up and assistance:** After the first training, participants can continue to get assistance and follow-up sessions to help them with any problems they may be having.
 - e) Involvement of Community Leaders:** Promoting and endorsing training programmes with local community leaders and influencers can boost their acceptability and involvement.

3. The involvement of non-governmental organisations (NGOs) and companies: NGOs and corporations have a major impact on the promotion of digital literacy in rural India. They must participate for the following reasons:

- a) **Grassroots Presence:** NGOs frequently have a significant presence at the grassroots level and are aware of the particular demands and difficulties that rural communities confront. They are therefore well prepared to develop and carry out successful digital literacy programmes.
- b) **Community Engagement:** NGOs can interact with rural communities directly to foster trust and promote enrollment in digital literacy programmes.
- c) **Corporate Social Responsibility (CSR):** Numerous businesses have specific CSR programmes that emphasise digital inclusion and empowerment. They may help rural communities with digital literacy by providing resources and knowledge.
- d) **Public-Private Partnerships:** Cooperation between NGOs, businesses, and governmental organisations can result in extensive and long-lasting digital empowerment initiatives that have a wider reach.
- e) **Resources and Innovation:** Businesses frequently have the equipment, know-how, and experience necessary to develop and expand digital literacy programmes in rural India. Rural India may experience better digital empowerment and improved socioeconomic development by highlighting the value of digital literacy, developing efficient training programmes, and enlisting the aid of NGOs and businesses. To guarantee that digital literacy becomes a potent instrument for equitable growth in rural regions, several stakeholders must work together.

3. Government Policies and Initiatives

1. **Digital India Campaign:** One of the most important endeavours to make India a knowledge economy and a society empowered by technology was the start of the Digital India campaign by the Indian government in 2015. The programme includes a number of initiatives and regulations that aim to close the digital gap between urban and rural communities.
2. **BharatNet and Connectivity Projects:** A key initiative of the Digital India movement, BharatNet intends to connect all 250,000 gramme panchayats (village councils) in India to the internet. The initiative is essential for increasing internet access in rural regions and making it possible to supply digital services.

3. E-Governance Initiatives in Rural Areas: The Indian government has put in place a number of e-governance programmes that emphasise digital access to public services and are aimed at rural regions. Several significant e-governance projects in rural India include Common Service Centres (CSCs), Digital Land Records, E-Gram Swaraj, Pradhan Mantri Jan Dhan Yojana (PMJDY), Direct Benefit Transfer (DBT).

Digital inclusion and closing the digital gap in rural India have been greatly aided by government programmes and initiatives like BharatNet, Digital India, and e-governance projects. These efforts empower rural communities by giving them access to better digital infrastructure, digital literacy programmes, and e-governance services, opening up information, government services, and economic prospects in the digital era.

4. Digital Entrepreneurship and E-commerce in Rural India

1. Opportunities for Rural Entrepreneurs: For Indian rural entrepreneurs, digital entrepreneurship offers a variety of options to take use of technology and build cutting-edge businesses. In the context of digital empowerment, some of the major potential for rural entrepreneurs include:

- a) **Agri-Tech Startups:** Agri-tech businesses can provide solutions for precision farming, crop monitoring, market linkage, and supply chain optimisation, increasing farmers' productivity and revenue. Agriculture is a significant industry in rural India.
- b) **Rural E-Commerce Platforms:** A broad variety of goods and services, such as agricultural supplies, handicrafts, and regional produce, may be accessed through rural e-commerce platforms that are targeted to the needs of rural consumers.
- c) **Online Education and Skilling:** Rural entrepreneurs may fill the gaps in education and training facilities in rural regions by offering online educational and skill-building programmes thanks to digital platforms.
- d) **Digital Services:** Rural company owners may offer a range of digital services to people and companies in metropolitan regions, including digital marketing, website design, and app development.
- e) **Handicrafts and Artists:** By promoting rural handicrafts and artisanal goods on digital platforms, artisans may engage with a larger audience of customers.

- 2. Challenges and Solutions for Rural E-commerce:** Rural e-commerce has great potential, but it also has particular difficulties. The following issues must be recognised and resolved for rural digital firms to succeed:
- a) **Connectivity and Infrastructure:** Poor internet access and outdated digital infrastructure might make it difficult for e-commerce platforms to operate effectively in rural locations. Using offline transactional methods and investing in last-mile connectivity might be solutions.
 - b) **Digital Literacy:** Rural customers' use of e-commerce platforms may be hampered by low levels of digital literacy. With the help of user-friendly interfaces and educational programmes, rural businesses may close this gap.
 - c) **Trust and Security:** Customers in remote locations can be concerned about the security of their data and the reliability of internet transactions. Building trust requires honest communication and secure payment options.
 - d) **Logistics and Delivery:** Running an e-commerce business in a distant rural location might be difficult in terms of logistics and on-time delivery. This problem may be solved by putting in place effective delivery and supply chain networks.
 - e) **Payment Options:** Due to restricted access to digital payment options and the prevalence of cash-based transactions in rural regions, this factor might be problematic. Entrepreneurs in rural areas should promote the use of digital payments or investigate novel cash-on-delivery possibilities.

5. A Framework for Digital Empowerment in Rural India

1. Integrating Digital Literacy and Skill Development

- Open digital literacy centres in remote regions to provide training sessions and workshops on internet usage, digital literacy, and online safety.
- Create training programmes that are specifically tailored to the interests and requirements of rural areas, including local business, healthcare, and agriculture.
- To maintain sustainability and relevance, involve local youth and community leaders as digital literacy teachers.
- Work together with businesses, NGOs, and educational institutions to broaden the impact of digital literacy campaigns.

2. Enhancing Digital Infrastructure and Connectivity

- Make investments to increase mobile network coverage and internet connection in rural regions, with a focus on last-mile connectivity.
- Use technology to fill up connectivity gaps, such as satellite internet, public Wi-Fi, and cell towers.
- Use collaborations between the public and commercial sectors to hasten the development of digital infrastructure in rural areas.
- Subsidise internet services or offer reasonably priced data plans to increase rural communities' access to connection.

3. Strengthening Government Policies and Incentives

- Create policies that encourage public and private organisations to invest in digital infrastructure in rural regions.
- Provide tax breaks or other financial aid to companies who support digital inclusion in rural India.
- Adopt supportive policies that encourage entrepreneurship, innovation, and e-commerce in rural areas.
- Promote the adoption of e-governance projects by government organisations and the provision of digital services to rural residents.

4. Promoting Digital Entrepreneurship and E-commerce

- Assisting and guiding rural entrepreneurs to launch digital businesses catered to the need of their communities.
- Develop e-commerce systems that link rural businesses, farmers, and craftsmen with customers and marketplaces.
- Provide financial incentives, grants, or low-interest loans to support digital and entrepreneurial businesses in rural areas.
- Make it easier for rural entrepreneurs to acquire business training and market information so they can make educated decisions.

5. Fostering Public-Private Partnerships

- Promote cooperation between the government, non-profit organisations, businesses, and regional communities to share resources and knowledge.
- Work together to create and carry out digital inclusion initiatives that are in line with rural India's needs and goals.

- Use corporate social responsibility (CSR) programmes to aid rural communities' attempts at digital empowerment.
- Encourage the sharing of best practises and expertise among public and private stakeholders.

6. Empowering Local Communities and Grassroots Organizations

- Work with grassroots organisations and local communities to jointly develop digital empowerment programmes that take into account their priorities.
- Support and finance neighborhood-based programmes that promote diversity and solve digital problems.
- Offer instruction and capacity-building to local organisations to enable them to actively promote digital inclusion.
- Celebrate local inventions and success stories to motivate more initiatives for digital empowerment.

Stakeholders may cooperate to empower rural India with digital technology by combining these components into a coherent framework. To guarantee that the framework is effective in addressing the special difficulties and possibilities given by rural areas, it should be flexible, responsive, and continually assessed.

Conclusion

Summary of Findings

The study "Digital Empowerment in Rural India: Identifying Barriers and Strategies to Unlock Opportunities" has uncovered a number of interesting details about digital inclusion in rural regions. According to the survey, digital infrastructure, internet connection, digital literacy, and cultural barriers to technology adoption are major issues in rural India. But there are also lots of chances to encourage digital empowerment in rural areas.

Key findings include

- Many rural communities still have poor Internet connectivity and accessibility, which restricts access to digital possibilities.
- Education gaps and low levels of digital literacy are obstacles to successful technology adoption.
- The acceptability and application of digital technologies in rural areas are influenced by cultural and socioeconomic considerations.

- Successful case studies from other areas show the transformative potential of digital inclusion in rural communities. Government initiatives like the Digital India campaign, BharatNet, and e-governance projects play a crucial role in bridging the digital gap.

The inclusive growth, decreased socioeconomic gaps, and improved livelihoods for millions of rural people are all possible outcomes of this vision of a digitally empowered rural India. Stakeholders can turn rural India into a beacon of digital development and opportunity by putting the suggested solutions into practise and prioritising digital inclusion.

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Innovative Practices in Teacher Education (NEP: 2020)

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Abstract

The paradigm has already shifted in teacher education program due to globalization. We have shown various problem and challenges in the field of education. Teacher education is the backbone of our education system. Today we expected teachers as future leaders and to ensure sustainable education from them. In present time teacher's role is to create an environment where learners developed their capacity to create their own knowledge. Teachers are not just an information provider or an instructor, teachers are the guide who make learner able to reveal their ability to enhance their intellectual and potentialities to the fullest. If we want to improve the quality of school education, first we have to work on teacher education program, it is the most important vehicle. There are various problems that need urgent attention in teacher education program to enhance the quality. To uplift the educational standard, it is necessary to revitalization of teacher education system. Innovativeness means something new or beyond the boundaries and create different. This paper focuses on the changes that has risen in teacher education program and innovations done in the field of teacher education, also discusses the need and importance of teacher education program to be innovative.

Keywords: Innovation, Teacher Education, NEP2020, Digital Era, E-Learning.

Introduction

In the Vedic period senior students among the Brahmin students teach to junior students and they were trained in teaching during their academic period, it was the form of teacher education in Vedic period. But in the present e-world, situations are completely differing; teacher should have the ability to adopt the new things in new environment. Teacher should need to upgrade their skills and also need to change their attitude according to the society. We live in virtual world so teacher should be aware about the innovative practices in teaching learning environment, basically its e-education. Especially in the pandemic circumstances, e-learning or digital learning plays a vital role.

In this digital era the role of the mentor or teacher is completely changed, now teacher is just not an information supplier but there are variety in his or her role. He plays the role as a counselor to suggest the student to walk on right path, as a motivator to motivate the student for enrichment and he is facilitator who plans to achieve the objective of teaching learning process. NEP 2020 suggested that Teacher preparation is an activity that requires multidisciplinary perspectives and knowledge, formation of dispositions and values, and development of practice under the best

mentors. Suer & Oral, (2021) suggested some technique for improving the implementation of innovative pedagogy in classrooms. Thus, we have to create quality teachers if we want quality in education system because teacher is the central point of our education system. And it may be possible when we have such teachers who have the ability to adopt new technology and they should ready to accept various innovative programs. Innovativeness is the major requirements of teacher education program so that advancement can take place. Innovativeness means create something differ from the existing things and ideas with valuable output. Today there are lots of issues and disputes in teacher education system; we face because of globalization, technology, competition at international level and because of pandemic condition in the world.

Concept of Innovative Practices

If we talk about innovation in teaching learning process its actually differing according to the need of society because the demands of innovative practices depend on the need of the particular society. Today our kids grown up with technology and AI, they like to spend more time with various types of gazettes, playing video games, using internet etc. so it is big question to decide the teaching learning objective for these advanced children and how to educate them?

Innovation words comes from the latin word innovationem, actually relates to renewal and means to create or do something in a new way or new technique. Innovation in teaching learning process specially include IT literacy and digitization in education with other things. It is also mentioned in NEP 2020 that Teachers should be encouraged to use various online training platforms like SWAYAM/DIKSHA, so that standardized training programs can be administered, within a short span of time to the large numbers of teachers. The target of teacher education program is basically to develop the professional competency and accountability in teachers to lead the nation forward. Some points are explained there which focused on what innovative practices will take place in teacher education system:

Collaborative or Cooperative Approach

Collaborative approach is actually team teaching, where each group member is responsible for team learning and also responsible for its succeeding. Teacher creates the groups and they are work together to solve the problem and complete the given task towards common academic goal. In this approach teacher make sure and observed that learners are actively participate rather than rote memory of facts. We can develop Self-management and leadership skills through this

innovative practice. It is truly active process where learners develop the ability to organize their thoughts and present their innovative points also improves cooperation.

Reflective Teaching

For new teachers reflective teaching can be a marvelous approach to improve the teaching learning process. It is actually self-assessment process for teachers. You may be asking yourself that how would I introduce this method into my teaching learning process. Reflective teaching approach work for professional growth for teachers and they can find it as a key of improvement or success. Teacher analyzes his or her method and behavior in the class room and change with their new ideas and experiments to achieve maximum success. There are various ways to do reflecting teaching approach in the class room like teacher can maintained the dairy and note about what happened, do or don't etc. second option is peer observation is also better option, videoing practice and also encourage reflective discussion.

Constructivism Approach

Students can make their own knowledge in constructivism approach and actively participate in teaching learning process. The constructivist theory of education was introduced by Lev Vygotsky, Bruner & piaget also defined that learner learned with their own experiences. Teacher role as a constructivist theory is just to assist the learner and encouraged them to draw, discuss and write the new things. Child should be able to construct their own knowledge with the help of prior knowledge, they testing new ideas and experience and then use these experiences according to the situation. Problem solving and critically analyzing ability developed in the learners through this constructivism approach.

Blended Learning Approach

In the blended learning, there is integration of technology and digital media with a traditional instructor. Students are more flexible and customize the learning experiences according to their convenience. Many research studies found the positive impact of blended learning approach in improving learner's achievement, at the same time it's also demands that teacher should be trained in using technology in teaching learning process. Blended learning is better option for e-learning industry and one of the most necessary pedagogical approaches which helpful to enhance learner's results. In this approach teacher provides flexible teaching learning environment, and teacher also ensure maximum involvement of students with effective

outcomes. This approach provides both online and face to face learning experiences and developed the ability of self-pace and self-direct in the learners. However traditional mind set students is not too comfort with blended learning strategies but still we can't neglect its important in present digital era.

Initiative steps of Innovation (NEP 2020)

Innovative Pedagogy (Transforming teaching learning process) introduced in NEP 2020, some are:

- A. **Experiential Learning** actually its focus on experiential, and inquiry and discovery-based teaching learning methods are helpful in this category.
- B. **Integrated Pedagogy** define as integration of Arts, sports, and story-telling and ICT-integrated pedagogy for achieve educational objectives.
- C. **Promotion of peer tutoring** Promoting peer tutoring, it should be done under the supervision of teachers or mentors and it would be done as voluntary activity and done. Collaborative approach may be helpful in this category.
- D. **Equal Weightage** in the NEP 2020 provide freedom of selecting a variety of subject combination for students.
- E. **Use and integration of technology** in teaching learning process gives the opportunities to the students to learn better and according to the need as well as demands of the society.

Innovation through NEP2020 in Teacher Education Program

According to NEP 2020 in India teacher education program will gradually be moved by 2030 into various multidisciplinary educational institute. And these higher educational institutes offering the 4-year integrated B.Ed. program and it is also facilitating the students of various remote area of our country by blended or ODL mode of teaching.

4 Year Integrated B.Ed.	2 Year B.Ed.	1 Year B.Ed.
<ul style="list-style-type: none"> • Minimum degree qualification for teaching that includes students-teaching at local school, by 2020 	<ul style="list-style-type: none"> • For applicants with an existing bachelor's degree in other specialized subjects 	<ul style="list-style-type: none"> • For those who have completed the equivalent of 4 years multidisciplinary bachelor's degree or have obtained the master's degree in a speciality

Innovative Improvements in Teacher Education (NEP2020)

- It is decided that all teacher education program to be covered under united interdisciplinary institutions.
- To promote innovation in teacher education, a new curriculum framework (by 2021) has been designed which is very comprehensive and designed for the holistic development of the child.
- NTA testing for admission to B.Ed.
- Strict action will be taken against those teacher educational institutions which are not able to meet the assessment standards.
- It is suggested that higher education sector and teacher education work together and National Higher Education Regulatory Council (NHERC), work as a single point regulator to achieve desire goals.
- Such educational programs should be included which promote overall development and are multidisciplinary and at the same time integrated.
- Merit based scholarships for 4-year B.Ed. Integrated.
- A National Mission should be established for proper mentoring with all the senior and excellent faculty members who have retired.
- Teacher Eligibility Tests (TETs) at all stages will be ameliorate.
- Technology-based planning and forecasting of teacher-requirement to assess expected subject-wise teacher vacancies over next two decades.
- Setting up National Professional Standards for Teachers by 2022.

Conclusion

Teacher education is the important part of education; consider as a backbone of education system. If the innovations take place in teaching practices, then the possibility of improvement can be further increased. All the countrywide education departments have to be contributing in this area for best outcomes. Along with cognitive development, we should concentrate on techno-pedagogy because teacher should be trained as online facilitator. To tackle the challenges of this digital era teacher or mentor should be able to handle the digital challenges. Reinventing is requisite for constantly investigate new opportunities which may be helpful in professional growth. NCTE already done many things to augment the quality of teacher education, NEP 2020

(national education policy) defined various innovative strategies like DIKSHA, SWAYAM, blended learning models, ICT integration in teaching learning process etc. but one thing has to be kept in mind that as a teacher how honestly, we follow all the things in our profession and we have to remember that teacher can shape the future of a child as an instrument. Taru Konst & Liisa Kairisto (2020) mentioned in their paper that in present time the big challenge for all education is promoting an ecological civilization and Innovative mindset is needed to fulfil this purpose.

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हिंदी नाटकों में गांधी चेतना : सत्य और अहिंसा

शिवसर्जन होनाजी टाले

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सारांश

हिंदी नाटकों में सत्य और अहिंसा का जो भाव स्थापित हुआ है उसके पीछे गांधी जी की अहम भूमिका रही है। जिसके कारण हिंदी साहित्य की सभी विधा में उनके चेतना का प्रभाव दिखाई देता है। हिंदी नाटकों में सत्य और अहिंसा यह दो भाव प्रमुखता से प्रकट हुए हैं, जयशंकर प्रसाद का 'विशाख', रामकृष्ण भट्ट रामकृष्ण भट्ट का 'पार्वती' नाटक, हरी कृष्णप्रेमी का 'विहान', सियाराम शरण गुप्त का 'पुण्य पर्व', मैथिलीशरण गुप्त जी का गीति नाट्य 'कर्बला', उदय शंकर भट्ट का 'सगर विजय', रघुवीर शरण जी का 'भारत माता', विष्णु प्रभाकर का 'स्वाधीनता संग्राम में एक सैनिक', वृंदावन लाल वर्मा का 'नीलकंठ', विष्णु प्रभाकर का 'हमारा स्वाधीनता संग्राम', भगवती चरण वर्मा का 'बुझता दीपक', दुर्गादास गुप्त का 'महामाया', धर्मवीर भारती का 'अंधा युग', जयशंकर प्रसाद का 'आजादशत्रु' आदि नाटकों में भारतीय गुलामी की बेड़ियाँ को मुक्त करना, सत्य और अहिंसा के रूप में गांधी चेतना को भारतीय समाज में प्रस्तावित करना इनका मूल हेतु रहा है। गांधी जी के सभी तत्वों को हिंदी साहित्य में स्वीकृत किया गया है। जिसका प्रभाव साहित्य के हर पात्र पर दिखाई देता है। सत्य, अहिंसा, करुणा, दया का संदेश अपने रचनाओं के माध्यम से हिंदी साहित्यकार देते हैं।

बीज शब्द: सत्य और अहिंसा, अहिंसा से समाधान का हल, हिंदी नाटक और गांधीजी, सत्य से विजय प्राप्त।

सत्य गांधी जी के जीवन और दर्शन का ध्रुवतारा है। सत्य शब्द की उत्पत्ति 'सत्' धातु से हुई है। 'सत्' का मूल अर्थ 'त्रिकालबाधित एक रूप में अस्तित्व में रहने वाली वस्तु' होता है। उसी को अपना हत्यार मानकर संपूर्ण जीवन सत्य को साथी बनाकर जीवन यापन करना कठिन ही नहीं नामुमकिन है। सत्य कोई स्थिर गुण नहीं है। सत्य के लिए खोज की ऐसी प्रक्रिया है, जो आगे बढ़ती ही जाती है। गांधी जी के सूत्रों के आधार पर श्री सुमन कहते हैं कि "मनुष्य एकांत में जिसे सच्चे मन से सत्य समझता हो उस पर दृढ़ रहने, उसे ही प्रकट करने एवं तद्रूपसार जीवन में आचरण करने से धीरे-धीरे व्यापक सत्य की प्रतिष्ठा स्वतः होती है। पहले उसमें दया, क्षमा और करुणा आती है। फिर प्रेम और अहिंसा की मात्रा वृद्धि के साथ-साथ सत्य का प्रकाश उसमें होता है।" १ (हिंदी साहित्य में गाँधी चेतना – डॉ.शर्मा – पृष्ठ क्र. 329) सत्य और अहिंसा के पद पर चलने वाले इन महान व्यक्तित्व का साया हिंदी साहित्य पर पड़ना स्वाभाविक था। हिंदी के समकालीन तथा आधुनिक कवियों, उपन्यासकार, कहानीकार, निबंधकार तथा अन्य विधाओं के रचनाकारों

में इनके तत्वों को लेकर लिखा गया। गांधी के विचारों का प्रभाव हिंदी साहित्य तथा साहित्यकारों पर सत्य और अहिंसा के रूप में अधिक रहा। हिंदी नाटककारों पर भी गांधी चेतना का प्रभाव रहा। गांधी के विचारों से प्रभावित द्रशमान हुए तीन बंदर तथा प्रेम, सत्य, अहिंसा, दया, करुणा जैसे विचारों को नाटकों में स्थान दिया गया। अंग्रेज शासक का विरोध, आजादी की भावना, गुलामी प्रवृत्ति से छुटकारा आदि भावनाओं से प्रेरित होकर हिंदी साहित्य लिखा गया। हिंदी नाटकों की भूमिका भी आजाद भारत की रही थी। हिंदी नाटकों के प्रवर्तक भारतेन्दु हरिश्चंद्र जी ने 'अंधेर नगरी' तथा 'भारत दुर्दशा' जैसे नाटकों से अंग्रेजों के प्रति विरोध और आक्रोश की भावनाओं को रेखांकित किया। समाज में जनजागृति का कार्य उनके नाटकों ने किया। वहीं पहली पहल हिंदी साहित्य में गांधी चेतन की रही है। इस काल में नुक्कड़, एकांकी तथा नाटकों का प्रसारण भारत की गाँव-गाँव तथा गलियों में प्रस्तुतिकरण के रूप में होने लगी। नाटक गाँव-गाँव खेले जाने लगे। लोगों में देशाभिमान, गुलामी प्रवृत्ति, तथा होने वाले अन्याय और अत्याचार को प्रस्तुत करने लगे।

जयशंकर प्रसाद के नाटकों में महात्मा गांधी के विचारों की प्रभावशीलता है। 'विशाख' के 'प्रेमानंद' गांधीवत ही चरित्र हैं। सत्य की महत्ता का निरूपण 'जन्मेजय का नागयज्ञ' में भी किया गया है। यद्यपि यह नाटक पौराणिक परिवेश को लेकर चला है तथापि श्री कृष्ण का अर्जुन को दिया गया उपदेश गांधी जी की भावधार की अभिव्यक्ति जैसा प्रतीत होता है। उन्होंने सत्य, अहिंसा, प्रेम, दया, विश्व शांति का संदेश दिया है। तथा स्वयं को शाश्वत संघ का अनुयाई बताया है। सुश्रवा को समझाते हुए कहते हैं- "सत्य को सामने रखो, आत्मबल पर भरोसा रखो, न्याय की मांग करो।" (विशाख – जयशंकर प्रसाद - पृष्ठ क्र. 77) प्रसाद जी कृत 'तितली' में भी ग्रामीण जीवन के चित्रण पर प्रसाद जी का अधिक ध्यान है। तितली और शैल मिलकर ग्राम सेवा और शिक्षदान का पवित्र कार्यक्रम स्वीकार करती है। प्रसाद जी ने इसमें संकेत दिया है कि, सामान्य व्यवस्था के अवसान पर ही ग्रामीण सभ्यता का उत्थान हो सकता है। बद्रीनाथ भट्ट लिखित 'वेन चरित्र' में अत्रि के माध्यम से सत्य की अभिव्यक्ति की गई है। उनका कथन है कि- "जहां राजा-प्रजा में अनबेल होती है, वहां गहरी उत्तल-पुथल होती है, नाश होता है और पुनर्जन्म होता है। इस उत्तल-पुथल में जीत उसी की होती है, जिसकी तरफ सत्य हो।" (वेन चरित्र – श्री.बद्रीनाथ भट्ट - पृष्ठ क्र. 23) रामकृष्ण भट्ट का 'पार्वती' नाटक भी सत्य निष्ठा का परिचय देता है। परमानंद को सरल व सत्यनिष्ठ चित्रित किया गया है। उनके 'विक्रमादित्य' नाटक में सत्य और अहिंसा की स्वीकृति है। सत्य को दबाने वाला कभी सुखी नहीं हो सकता। इस

आशय को लेकर लक्ष्मी नारायण लाल के नाटक 'सिंदूर की होली' बहुत चर्चित नाटक रहा। जिसका एक पत्र माहिरअली असत्यआचरण के कारण अंदर ही अंदर जलता रहता है। एक दिन वह दृढ़ निश्चय कर लेता है कि, वह पाप स्वीकार कर लेगा तथा सब सच-सच बता देगा, क्योंकि "एक बार फांसी चढ़ जाना, रोज के फांसी से अच्छा है।" ४(सिंदूर की होली – श्री. लक्ष्मी नारायण लाल - पृष्ठ क्र. 31) गांधी जी अपना संपूर्ण जीवन सत्य की राह पर चले। इस रास्ते का चुनाव करना मौत के बराबर है। जिंदगी भर सच बोलते रहना ही समस्याओं को उत्पन्न करना है। इतनी कठिन परिस्थिति में भी वह ना डगमगाए, ना परेशान हुए। सत्य का पथ हमेशा से ही कांटों से भरा हुआ होता है। इसीलिए गांधी जी ने कहा था 'सत्य परेशान हो सकता है, लेकिन पराजित नहीं।' यह उक्ति आज के जमाने में जैसे की तैसी लागू होती है।

राष्ट्रीय आंदोलन पर लिखा गया हरिकृष्ण प्रेमी का 'स्वर्ण विहान' बहुत ही सशक्त नाटक है। इसमें अहिंसा के प्रति अहम भूमिका को रेखांकित किया गया। उनका दूसरा नाटक 'शक्तिसाधना' अहिंसा के ऊपर लिखा गया नाटक है। उसमें वह कहते हैं कि "भारत में इस समय जितने भी धर्म प्रचलित है, वे भी अहिंसा को मानव का उच्चतर धर्म मानते हैं। लेकिन अहिंसा को सच्चे अर्थ में समझने की आवश्यकता है। अहिंसा का अर्थ सहशीलता और कायरता नहीं है।" ५(शक्ति साधना – हरिकृष्ण प्रेमी - पृष्ठ क्र. 40) अहिंसा की भावना समकालीन नाटककारों में बहुत जादा पाई जाती है। अहिंसावादी विचारधारा से प्रभावित होना उस काल की मांग थी। गाँधीवादी काल में असहकार आंदोलन तथा अन्य आंदोलन के माध्यम से अंग्रेजों को परेशान करने का कार्य महात्मा गांधी जी ने किया था।

अहिंसा के ऊपर लिखे गए नाटकों में महात्मा ईसा, नक्शे का रंग, रेवा, सगर विजय, बुझता दीपक, बापू के प्यारे, पुण्य पर्व, हमारा स्वाधीनता संग्राम आदि कई रचनाओं का निर्माण हुआ। 'पुण्य पर्व' नाटक के रचयिता पर प्रस्तुत करते हैं। मैथिलीशरण गुप्त जी अपने गीति नाट्य 'कर्बला' में सत्य और अहिंसा का पाठ पढ़ाते हैं। 'कर्बला' में हिंदू और मुसलमान को सत्य व अहिंसा के रूप में दृष्टि को परिवर्तित करने की राह देते हैं। मुसलमान के प्रति वह कहते हैं। उनके धर्म ग्रंथों के इस उपदेश की बात वह करते हैं। "कत्ल करने की अपेक्षा दोस्त बना लेने में अधिक फायदा है।" ६ (कर्बला – मैथिलीशरण गुप्त - पृष्ठ क्र. 39) जिससे अहिंसा की पुकार उस समाज को करते हैं। चंद्रगुप्त विद्यालंकार अपने नाटक 'रेवा' में सत्य और अहिंसा के बारे में लिखते हैं। नाटक का पात्र 'आचार्य पुंडलिक' शस्त्र विजय की अपेक्षा हृदय की विजय को श्रेष्ठ मानते हैं। उदय शंकर भट्ट के नाटक 'सगर विजय' में दुर्गम नामक पात्र भी हृदय की विजय को

श्रेष्ठ और अंतिम साध्य मानते हैं। रघुवीर शरण का 'भारत माता' नाटक में अहिंसा को सर्वशक्तिमान मानता है। यह वह शक्ति है जिसमें आत्म बल का हुंकारता है। विष्णु प्रभाकर का नाटक 'हमारा स्वाधीनता संग्राम' में एक सैनिक के माध्यम से शपथ ही दिलाई जाती है कि वह जब तक संघ का सदस्य रहेगा तब तक वह मन, वचन और कर्म से अहिंसात्मक रहने का प्रयत्न करेगा। दूसरी तरफ 'बुझता दीपक' में भी भगवती चरण वर्मा अहिंसा का वर्णन करते हैं। 'नीलकंठ' नाटक में श्री वृन्दावन लाल वर्मा कहते हैं कि "हम सदा कम से कम एक काम परसेवा का नित्य करेंगे जिसके पलटे में हम कुछ नहीं चाहते।"७ (नीलकंठ – वृन्दावनलाल वर्मा - पृष्ठ क्र. 98) गांधी के विचारों की फसल हिंदी नाटकों में बहुत ही फली-फूली हुई है। जिससे उपजाऊ भूमि से उपज कर्म के आधार पर है। सत्य और अहिंसा का नाता हर इंसान में आज बसा हुआ मिलता है। सभी धर्म का सार हिंसा का विरोध है। सत्य का पथ भले ही कांटों से भरा क्यों ना हो लेकिन आखिर में उसे फूल ही मिलते हैं। जिसका सुगंध संपूर्ण जीवन तथा मृत्यु के पश्चात भी द्रवित होता है।

गांधी जी ने अहिंसा को प्रेम की पराकाष्ठा, हिंसा का जवाब और वीर का लक्षण माना है। अर्थात् अहिंसा की आवश्यकता हिंसा और घृणा से प्रतिकार करने के लिए पड़ती है। किंतु यह एक प्रकार का निशस्त्र प्रतिकार होगा, तथा इसका चालक लाचारी, कायरताविहीन अदम्य साहसी योद्धा ही हो सकता है। बुजदिल इसकी शक्ति को सम्हाल ही नहीं सकेगा। हर किसी के बस की यह बात नहीं होगी। दूसरी बात यह एक सामाजिक चीज है, जो समाज मरना जानता है, वहीं इसका सफल प्रयोग कर सकता है। तथा दुखी जगत की पीड़ा को निर्मूल कर सकता है। ठीक उसी प्रकार हिंदी नाटकों में गांधी जी की अहिंसा को रेखांकित किया गया है। जहां पर मानवीय दृष्टिकोण को महत्व प्रदान किया गया। जिससे प्राणियों पर भी दया दिखाने का काम आज जमाना करता है। इसी मानवतावादी दृष्टिकोण के ऊपर लिखा श्री प्रताप नारायण श्रीवास्तव का 'विसर्जन' नाटक महत्वपूर्ण है। जहां पर देवकीनंदन खत्री की दलीलों से प्रभावित होकर परिस्थितियों की मार खाकर मिल मालिक अपनी गलती को मानते हैं, तथा मजदूरों का शोषण के प्रति प्रवृत्ति त्यागने की प्रतिज्ञा करते हैं। अब्दुल मजीद का कथन है कि, "फर्ज और मैं भी खुद को हाजिर नाजिर समझकर सही होशहवास से इकरार करता हूं कि आज से मेरा मजहब इंसान की खिदमत करना और इंसान समझना होगा।"८ (विसर्जन – श्री.प्रतापनारायण श्रीवास्तव - पृष्ठ क्र.27) उपर्युक्त कथन से स्पष्ट रूप से मानवता की दुहाई देता है। जिससे अहिंसा रूपी भाव मानव में जागृत हुआ है। धर्मवीर भारती का नाटक 'अंधायुग' से अहिंसा की स्थापना पर ही बल देता है। त्याग,

बलिदान, आत्मोत्सर्ग पर ही देशहित, विश्वहित में अपना सर्वस्व अर्पण करने की भावना ही मानव जीवन को सार्थक बनाती है। हिंदी नाट्य साहित्य में भी इस भावना का सुंदर प्रतिफल हुआ है। महात्मा जी ने इस परंपरागत आदर्श को आचरण में लाकर एक नया मोड़ दिया, एक नई ताजगी से भर दिया। सत्याग्रही का यह मूल मंत्र हो गया कि वह अन्याय, अत्याचार के विरोध में अपना सर कलम कर सकता है, लेकिन झुका नहीं सकता। इसी भावना से अभय की उच्चवस्था सहज ही प्राप्त हो जाती है। कर्तव्य पालन करते हुए जो बलिदान और शहीद हो जाता है। उनकी जय जयकार नित्य नियम से दिनों दिन आने वाली पीढ़ी को दुहाई देती रहेगी। दुर्गादास गुप्त के 'महामाया' नाटक में आत्म बलिदान की विचार भावना को लोगों में व्यक्त करने के लिए निम्नलिखित पंक्तियों कही गयी है -

"प्राण से पूरण करूंगा, देश हित के काज को।

राज तो क्या छोड़ दूँ मैं स्वर्ग के सुख साह को॥"९(महामाया – दुर्गादास गुप्त – पृष्ठ क्र. 33)

आगे चलकर वह आत्मबलिदान की महिमा दिग्दर्शित करता है -

"है वीर वही जो मन में नहीं भय खाते।

जीते हैं सदा जो धर्म हेतु मर जाते॥

जो जन्मभूमि की वेदी पै शीश चढाते।

उन्हीं का कविगण सुयश सदा हैं गाते॥"१०(महामाया – दुर्गादास गुप्त – पृष्ठ क्र. 65)

भारत गुलामी की बेडियों से जकड़ा हुआ था। उसकाल के साहित्यकार अपनी कला से अहम भूमिका का निर्वाह कर रहे थे। जयशंकर प्रसाद के नाटकों में गांधी चेतना बहुत अधिक रही। उनका 'विशाख' नाटक क्रांति की मशाल ज्वलंत करने वाला था। तब भारत में गांधी जी के माध्यम से सत्याग्रह की शुरुआत हो चुकी थी। रोलेट एक्ट का विरोध हो रहा था। जलियांवाला बाग हत्याकांड से संपूर्ण भारत विह्वल उठा था। जनरल डायर के खिलाफ लोगों के मन में गुस्सा फूट पड़ा था। जनता पर होने वाले अमानुष अन्याय और अत्याचारों का अंत अब आवश्यक था। तभी भारतीय राजनीति में गांधी जी का आगमन हो चुका था। 'विशाख' नाटक का पात्र 'विशाख' को बंदी बनाकर न्यायालय में हाजिर किया गया। सभी न्याय व्यवस्था एकपक्ष की ओर झुकी हुई थी। तभी इस न्यायिक व्यवस्था पर व्यंग करते हुए विशाख कहता है कि "मैं नहीं जानता कि उसे उस समय क्या उत्तर दिया जाता है, जबकि अभियोग ही उल्टा हो और जो अभियुक्त हो वही न्यायाधीश हो।"११ (विशाख – जयशंकर प्रसाद – पृष्ठ क्र. 64) जयशंकर प्रसाद का दूसरा नाटक 'आजादशत्रु' में

बुद्ध के चरित्र का चित्रण किया गया है। बुद्ध के जीवन काल के समस्त धार्मिक, राजनीतिक और सांस्कृतिक समस्याओं को रेखांकित किया गया है। 'अजातशत्रु' में क्रांति की भावनाओं को ध्वनित करते हुए, क्रांति की मशाल ज्वलंत की गई है। अहिंसा उसका मूल तत्व है। प्रसाद युग में अंग्रेजों के विरोध में जनसाधारण का आक्रोश बहुत अधिक है। प्रसाद जी ने अपने नाटकों का मूल उद्देश्य श्रम और निष्पक्ष न्याय को लिखा। संक्षिप्त रूप से कहा जाए तो हिंदी नाटकों में सत्य और अहिंसा की अद्वितीय शक्ति को प्रस्तुत किया गया। गांधीजी के सत्य और अहिंसा रूपी तत्वों का लोहा आज भी सर्व मान्य है। सत्य की विचारधार अन्य विचारों से अधिक शक्तिशाली है, और अहिंसा एक मानवीय परमोच्च गुण है। सत्य और अहिंसा को हिंदी साहित्य में गांधीजी के महान तत्वों की ही देन है।

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Impact of Modern Digital Content Based Learning vs Accustomed Learning Method in Students Learning

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Abstract

Today world is upgrading with a blink of eyes with robotics and CHATGPT involvement in all sphere of world, to take responsibility is urged to students to track their learning (NITI AAYOG ,2019). The study determines the impact of Modern digital content-based Learning Vs Accustomed Method in students' practical representation, Visualisation and symmetry skills. The course was designed as per NCERT XII textbook and Materials prepared by Ministry of education subsets at school level. The impact was measured as per learning outcomes decided by Ministry of Education guidelines. ANCOVA analysis on samples indicate that there is significance difference between both method of teaching. Based on results, modern digital content-based Learning appeared as authentic environment of teaching.

Keywords: *Modern Digital Content-Based Learning Visualization and Symmetry.*

Introduction

United Nations have been constantly striving towards reaching out to support nations for achieving Sustainable Development Goal 2030. one of the crucial aims of SDG is goal 4 which deals and aims for quality education, In India, National Policy on Education got its nod in July 2020, since then there has been much excitement about the teaching practices and assessment of learning. Teachers and educational experts have been constantly involved in its advantages and what it has for coming foundation of nation (Children). Rechard (2018) mentioned in study that active involvement of stakeholders and healthy discussions can help becoming policy sharp and effective.

Need and Significance of the Study

As per study conducted by Morris (2010) Effectiveness of practices tools is more relevant when they help in achievement of analytical subjects taught at formal stage of Piaget stages mentioned. In context of effective teaching at school level, researcher made an attempt to study modern digital content-based learning practices tools in teaching of mathematics - visualization and symmetry at middle school stage. Mathematics is counted as most crucial subject when it comes to higher thinking and visualization skills. Therefore, researcher thought of studying about this particular subject area. Keeping with the pace and self-direction of the practice's topics demanding more analytical thinking and special contributions were taken as part of study.

Operational Definitions

- *Modern Digital Content Based Learning*

Technology which are free and open sourced available are easily adaptable in classroom learning (Cheng,2023). Digital content-based options such as visualization 360 degree using maps and spatial representation software are basically considered for present study. Canva sources were shown for user friendly experiences.

- *Accustomed Learning Method*

Learning is modification of behaviour as defined by educationist. Accustomed learning method is acclimatized method where learner and teacher both are familiar with teaching aids and conventional method.

Objectives

1. To compare post practical representation test of visualization on groups.
2. To compare post practical representation test of symmetry on groups

Hypotheses

There is no significant difference in the score of groups on Visualization test

There is no significant difference in the score of groups on symmetry test.

Methodology

The present study is an equivalent quasi experimental design. The sample were selected randomly and were allotted group by lottery method. There were 40 students for the study 20 control group and 20 experimental group from 7th grade of English medium with mandatory curriculum (NCERT- Textbook Mathematics). Intervening variables were reduced as students belong to same locale and same economic status (annual salary of gaurdian ranged from 4LPA to 8LPA).

Results and Discussions

The research results are found on IBM SPSS 24 Version. The statistics used is ANCOVA keeping pre-test as covariate.

Table 1. Between subject factors

Groups	N
Group 1	20
Group 2	20
Total	N=40

Table 1. represent 1 for experimental group (with systematic order and complete cycle were followed for modern digital content-based learning practices tools)

2 for accustomed group (with unsystematic order and incomplete cycle were followed for modern digital content-based learning tools)

Table 2. Descriptive Statistics

Group	Mean	Std. Deviation	N
1	22.0000	5.67543	20
2	20.2000	2.28496	20
Total	21.1000	4.36654	40

Table 2 represent descriptive statistics for the scores obtained. Here mean for experimental group is 22.00 which is greater than mean for control group which is 20. The result indicates that post test scores of experimental group(modern digital content based) is more than treatment group 2 (accustomed mode).

Here from the result above, it can be concluded that there is not much significant approximation as targeted. Therefore, it can be said that null hypothesis cannot be rejected. That means the statement that there is no significant difference in the score of groups on Visualization test cannot be rejected.

Table 3 Levene's Test of Equality of Error Variances

Dependent Variable: POST-TEST			
F	df1	df2	Sig.
12.497	1	38	.001
Tests the null hypothesis that the error variance of the dependent variable is equal across groups.			
a. Design: Intercept + PRE-TEST + GROUP			

Group	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1.00	22.054 ^a	.944	20.141	23.967
2.00	20.146 ^a	.944	18.233	22.059

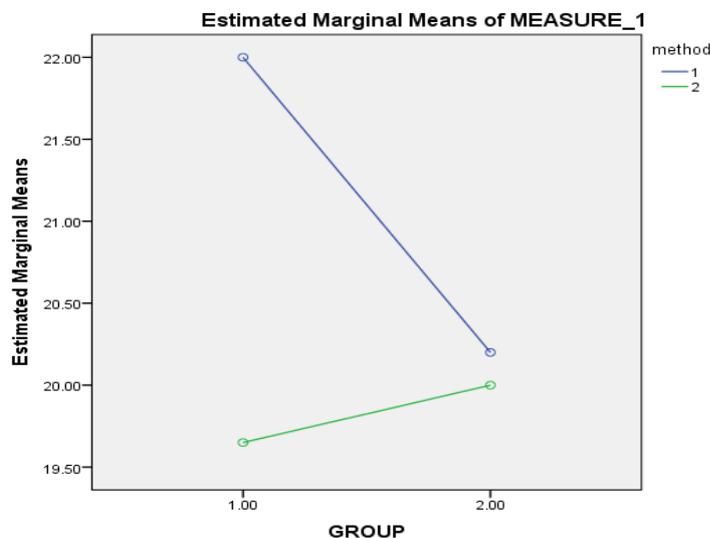
Covariates appearing in the model are evaluated at the following values: PRE-TEST = 19.8250.

From Table 3 it can be clearly seen that for experimental group it is 22.054 and for control group it is 20.146. Though there is difference but it is found to be in much less significance. Therefore, p value is seen which is found to be more than 0.01. Hence null hypothesis could not be rejected. There is no significant difference in the adjusted mean score of groups on post practical representation test keeping pre-test as covariate.

Table 4 Pairwise Comparisons of groups

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig. ^A	95% Confidence Interval for Difference ^a	
					Lower Bound	Upper Bound
1.00	2.00	1.908	1.336	.162	-.800	4.615
2.00	1.00	-1.908	1.336	.162	-4.615	.800

From the above table it can be concluded that there was a significant difference in the adjusted mean score of groups on post practical representation test keeping pre-test as covariate. Shindey (2005) found exact result in his study on self-directed guide to designing courses. This study dealt with significant learning techniques.



Graph 1: representing interaction between groups and methods

From the graph it is clear that modern digital content-based method is effective in visualization and symmetry skills. This means that interaction of modern method is useful in pre and post scores. This further implies that development of modern digital methods are useful in learning of STEM subjects among senior secondary students in comparison to accustomed method employed.

Conclusion and Implications

The result from above study indicates that the objectives were reached with surprising results. Groups did not give much difference in the scores. Therefore, we cannot reject null hypothesis i.e. there is no significant difference in the score of groups on Visualization test. It gave value of p less than 0.01 which made it eligible for rejection of null hypothesis. *The systematization plays very crucial role in implementation of digital content-based Learning practices tools for analytical subjects like STEM.*

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