

CLUSTER HEAD LINK REPAIR MECHANISM**A. Taranum¹, R. Banu² and G.F. Ali Ahammed³**^{1,2}Department of ISE, GSSSIETW, Mysuru³Department of CSE, VTU-RO, Mysuru**ABSTRACT**

The essential target of these applications in the association, ought to be talented to pass on in any environment paying little mind to traffic densities. The utilization of collection estimation is amazing in-network since computation makes it a more generous and versatile association. Regardless, because of the extraordinary versatility of centers, it is difficult to get consistent bundles. Hence, various groups are dropped and the overhead on account fixes or disillusionment sees augments in a general sense, provoking low transport extents and high transmission delays. This framework is expected to overcome the steadfastness of gathering.

Keyword: Link, Network, Neighbour

I. Introduction

Right when the gathering head leaves the pack, we ought to guarantee that, if the gathering is partitioned, one more bundle head is designated to each piece. Bundle head reassignment fills in as follows. Expecting that the bundle head moves toward the latest information about the circumstance of the target concerning each gathering part, it can keep an invigorated overview of the best pack head up-and-comers. Exactly when the pack head decides to leave the gathering, it establishes a connection with its neighbors containing a masterminded summary of the best bundle head upand-comers. Each gathering part takes out from that overview all centers that are not inside its space, which is known to each center. Pioneer political choice then, occurs as in the second time of the standard bundle pioneer political choice instrument.

II. Literature Survey

In [1], makers proposed a computation reliant upon bunches using soft an estimation. In this show, information is collected about BS, spot with levels of energy huge number of centers in the association. This computation made the bundles depending upon the geographic spaces of the centers. The pack head was the center having most outrageous abundance energy into that gathering. From the outset, center points associations send advancement data including data of energy and location communicated previously. BS calculates the social event place additionally and distributes the sensor

community focuses to the particular group. The noteworthy thing in this assessment was, level of belongingness that was offered out to the middle focuses in the pack as opposed to circulating them to just one get-together. The focuses on the line of packs had a variety of levels of belonging. The pack head employed an errand message, which comprised the time plan of information transmission, to send out unique focuses, resulting in the choosing of the social affair head. The radio aspect of the sensor position concentrates on conserving energy and enhancing the sensor's lifetime, and this time plan was basic for turning back on. Jau-Yang Chang et al. [2] established a streamed bundle figuring and energy-efficient coordinating game plan for IoT frameworks. The standard goal was to make progress on social event planning and pick group head focus areas. Each player competes in a stage that is hidden from view. During the secret stage, each perceiving focus point was used to generate an optional number. Because it dropped with per unit time, this value was also used as the count respect. When the middle's count value dropped to zero, it morphed into an unheard-of group community, sending out many solicitation signals to its extension's neighbours in order to build a pack structure. When examining the condition of interfacing focal foci, there were three examples for constructing the social affair structure. Initially, it was presumed that all neighbouring focus focuses were not yet people who had attended any social gathering. The picking factor, which was not necessarily dependent on the point of convergence of

gravity and additional energies of the pack individuals, was then chosen as the gathering head, taking into account the picking factor, which was not necessarily dependent on the point of convergence of gravity and additional energies of the pack individuals. In the second scenario, all interacting perceptual focuses were supposed to be individuals from the packs. Taking everything into consideration, the chief pack leader used to attend social occasions based on the point of convergence of gravity of a number of lower-value gatherings. The pack head's confirmation is completed by taking into account the most important factor, which is the precise time when it joined the gathering. Final condition, with distinctive focuses be located pack individuals and others have not been selected

III. Link Repair Mechanism

During the data transmission, if any CH center point in the way finds that the association with the downlink center point has broken then it starts the course fix instrument. The uplink center point imparts the RREQ package again to find the course to the accompanying center in the manner (the center point near the downlink center).

The association breakages happening as a result of predictable changing topography reduce the show of the association. This paper presents a Cluster Head Link Repair Mechanism for multicasting controlling show that bright lights on fixing the close-by associations in an energy useful way by the aide of association quality document assessed by the mix of the neighborhood get over Received sign strength.

NeighborhoodOverlay is been measuredamid gathering head center and with other neighbour hoodotherneighborcenters, we select brief neighborcenters from pack head measure Neighborhood Overlay. We depict a Neighborhood Overlay metric as in the occasion that addresses the pack head center point and addresses independently the game plans of neighbors of center points

$$NOVER(u - v) = \frac{2 * |N_{CH}(u) \cap N_{CN}(v)|}{|N_{CH}(u)| + |N_{CN}(v)| - 2}$$

The expansion with 2 in the numerator is used to compress the space between the last two centres, v and u, into a regular neighborcenter point. The inclusion of 2 at denominator gives clarification which provides intended to prohibit counting centre points u and v as neighbours of each other and, as a result, evaluating the degree of shared neighbourhood solely by considering centres in the space of v and u other than v and u. If both u and v have a similar attitude to their neighbours, NOVER (u-v) will be 1. NOVER (u-v) will be 0 if u and v have no central neighbours. As a result, the NOVER (u-v) rating will increase from 0 to 1: the better ,the more noteworthy the respect, the more recognizable is the degree of the shared region.

The idea of the association is surveyed by RSS (Received sign strength) got from the adjoining CH. It is given by,

$$Link_Q = \begin{cases} \text{Very good,} & \text{if } RSS < -10 \text{ dBm} \\ \text{Good,} & \text{if } RSS < -20 \text{ dBm} \\ \text{Bad,} & \text{if } RSS < -40 \text{ dBm} \\ \text{Very Bad} & \text{if } RSS < -60 \text{ dBm} \end{cases}$$

Above mentioned decision guidelines for substitute association are evaluated by,

$$c(AL) = W_1 \times NOVER + W_2 \times Link_Q$$

The weight factor is somewhere between 0 and 1, and its value is somewhere between 0 and 1.

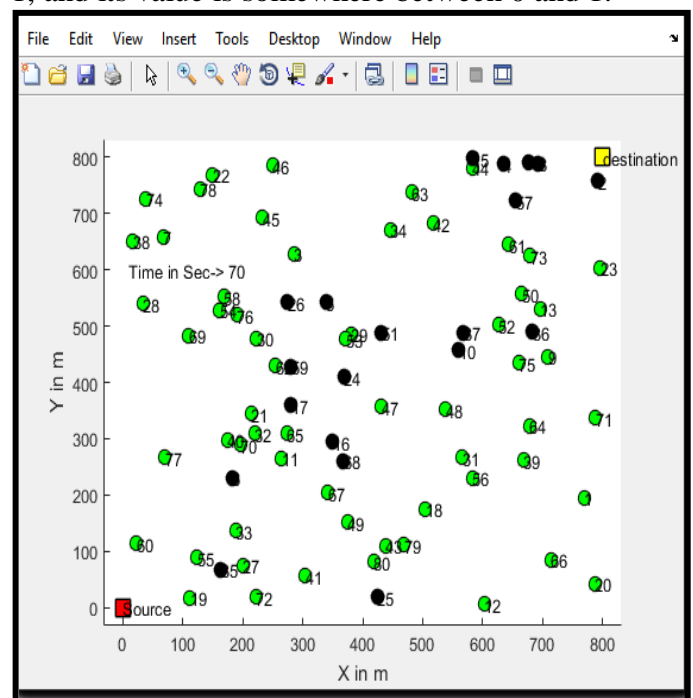


Figure 5.1: Link Repair between source and destination

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E1 = 1.0e+03 *
Columns 1 through 6
1.5605 0.7795 0.4834 0.8078 0.1929 0.2639
Columns 7 through 12
1.8841 1.9123 1.1504 0.1196 0.4696 0.7063
Columns 13 through 18
1.6424 0.0308 0.0860 0.3380 1.2982 1.4634
Columns 19 through 24
1.2955 0.9018 1.0940 0.5926 1.4894 0.3779
Columns 25 through 27
1.3736 0.3670 0.7370
E2 = 1.0e+03 *
Columns 1 through 6
2.2512 2.5605 1.1623 2.8588 2.5514 1.9736
Columns 7 through 12
1.8717 1.8936 1.6127 2.0170 2.0215 2.6353
Columns 13 through 18
2.5897 2.2886 1.7572 2.6232 2.0657 1.7015
Columns 19 through 24
2.8780 2.7519 2.1003 2.2450 2.1741 1.4155
Columns 25 through 27
1.6025 1.9418 1.4610
E3 = 1.0e+03 *
Columns 1 through 6
3.6886 2.3895 2.4518 2.3414 2.4553 2.8714
Columns 7 through 12
2.6222 3.8468 2.8604 2.3696 3.8098 3.9595
Columns 13 through 18
2.8777 2.2222 2.5161 2.8174 3.1898 2.5244
Columns 19 through 24
3.2057 3.4224 2.4435 2.2348 2.5934 2.6376
Columns 25 through 26
2.8483 3.0157
E = 1.0e+03 *

```

```

Columns 1 through 6
1.5605 0.7795 0.4834 0.8078 0.1929 0.2639
Columns 7 through 12
1.8841 1.9123 1.1504 0.1196 0.4696 0.7063
Columns 13 through 18
1.6424 0.0308 0.0860 0.3380 1.2982 1.4634
Columns 19 through 24
1.2955 0.9018 1.0940 0.5926 1.4894 0.3779
Columns 25 through 30
1.3736 0.3670 0.7370 2.2512 2.5605 1.1623
Columns 31 through 36
2.8588 2.5514 1.9736 1.8717 1.8936 1.6127
Columns 37 through 42
2.0170 2.0215 2.6353 2.5897 2.2886 1.7572
Columns 43 through 48
2.6232 2.0657 1.7015 2.8780 2.7519 2.1003
Columns 49 through 54
2.2450 2.1741 1.4155 1.6025 1.9418 1.4610
Columns 55 through 60
3.6886 2.3895 2.4518 2.3414 2.4553 2.8714
Columns 61 through 66
2.6222 3.8468 2.8604 2.3696 3.8098 3.9595
Columns 67 through 72
2.8777 2.2222 2.5161 2.8174 3.1898 2.5244
Columns 73 through 78
3.2057 3.4224 2.4435 2.2348 2.5934 2.6376
Columns 79 through 80
2.8483 3.0157
path11 = 32 55 77 51 76 17 59 29 44 2
path11 = 55 54 51 76 28 8 29 61 36
path11 = 35 69 33 51 17 28 8 50 73 57

Columns 1 through 11
32 16 47 80 56 25 79 48 44 61 36

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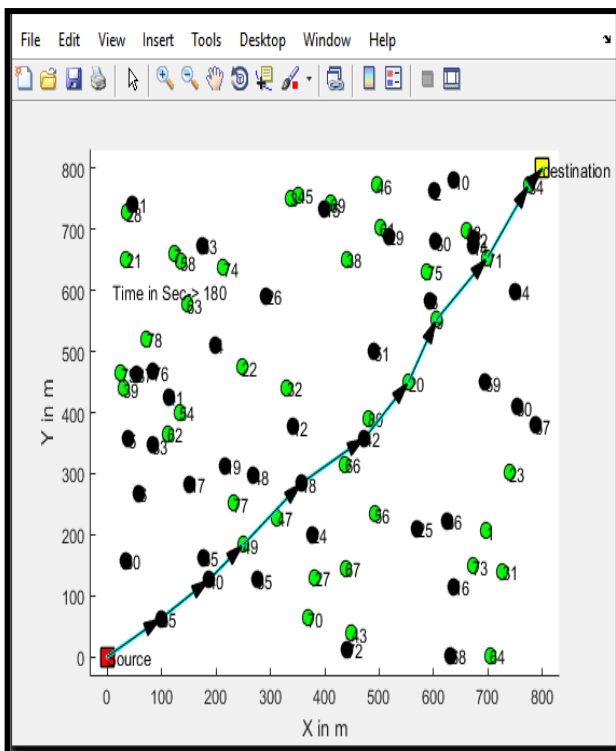


Figure 5.2: Link establishment between source and destination

End of Simulation

Elapsed time is 133.205286 seconds.

The above mentioned figure 5.2 provides the image of Link establishment between source and destination and the execution of the steps which display the link preparation and calculates the elapsed time.

IV Conclusion

This study establishes a link between value zero and one of the NOVER (u-v) levels: the higher the respect, the more recognised the level with the normal region. The RSS (Received sign strength) collected from a neighbouring CH is used to assess the notion of the relationship. W stands for weight factor, and its value ranges from 0 to 1.

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NEOCOLONIAL POLITICS IN CRICHTON'S *DISCLOSURE*

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ABSTRACT

Critical discussions concerning Michael Crichton's Disclosure have invariably tended to engage it from an essentially feminist perspective. This of course is very much warranted in that the plot's central point of contention is the subject of sexual harassment at the workplace, in which uncharacteristically a male employee is presented as a victim, and a female colleague of his is accused of being the aggressor. The basic aim of this paper is to shift this perspectival focus to a whole new concern all together, namely that of neo-colonial politics. The shift of course is not by any means meant to undermine the significance of the feminist take on the novel. It is rather aimed at foregrounding a fresh perspectival paradigm for analyzing the text, so as to open new vistas of understanding and interpretation.

Keywords: *feminist, colonial, neo-colonial, first world, third world.*

After the charges of racism and xenophobia incurred by *Rising Sun*, one might have expected Michael Crichton to be discrete in his follow up venture. However, if the choice of subject is anything to go by, it is quite evident that discretion was probably the last thing on Crichton's mind when he wrote *Disclosure*. Sexual harassment is an extremely sensitive topic to deal with even under normal circumstances, but the way Crichton handled it in the book through reversing the gender roles, made it indelibly controversial. As one might expect, the move garnered severe criticism from several quarters, feminists in particular, for allegedly misrepresenting the real situation of women at the workplace. It also came under immense fire for deliberately distorting the image of a professional woman, with the result that both the book and its author have been widely condemned as being intentionally misogynistic. Notwithstanding the fact that there have indeed been counter voices that have opposed it, this paper fully acknowledges the point that the overwhelming antifeminist reaction to the text is thoroughly merited. After all, Crichton himself in the afterword that he appended to the plot admits "that the great majority of harassment claims are brought by women against men" (Crichton343). In doing so however, the paper does not propose to continue in the same vein, by contributing further to the antifeminist backlash incited by the text. Rather the critical question it seeks to explore is whether over and beyond the feminist saga that surrounds the work, there is any other significant consideration to reckon

with. Its central point of contention is that there is, and this happens to be the notion of neo-colonial politics. On the face of it, the proposition that *Disclosure* entails neo-colonial politics might sound highly farfetched, to both those who have read the text, and perhaps even Crichton himself who is no more now. The fact however is that it constitutes a very real concern in the work, and probably the first thing we need to do in order to put ourselves in perspective of it, is familiarize ourselves with what neo-colonialism essentially typifies.

As the very term denotes, "neo-colonialism" (Ashcroft et. al. 146) signifies a new type of colonialism that emerged in the aftermath of the Second World War, when several colonies of Europe overthrew their colonial yoke and prevailed as independent nations. Although the term as such was originally coined by the French philosopher Jean Paul Sartre in his influential *Colonialism and Neocolonialism*, the credit of imparting to it a concrete conceptual significance is really due to Kwame Nkrumah and his book *Neo-Colonialism: The Last Stage of Imperialism brought out in 1965*. As theorized by Nkrumah, Neo-colonialism is different from old colonialism in that unlike in the latter where imperial domination was exercised through overt political control, in the former it is administered via covert economic means. "The essence of neo-colonialism is that the State which is Subject to it is, in theory, independent and has all the outward trappings of international sovereignty. In reality its economic system and thus its political policy is directed from outside" (Nkrumah ix). This

feature of latent imperial control that underlies its operations, makes neo-colonialism for Nkrumah the most lethal of its kind. “Neo-colonialism is also the worst form of imperialism. For those who practice it, it means power without responsibility and for those who suffer from it, it means exploitation without redress” (Nkrumah xi). “With neo-colonialism neither is the case” (Nkrumah xi). What Nkrumah is fundamentally driving at is a need to conceive of colonialism in a completely new light, from the “conventional view of it as a vertical and hierarchical structure” (Ashcroft 50), on account of the power dynamics having transformed. In the new and updated version for instance, “...power doesn’t operate in a simple vertical way from the institutions in which it appears to be constituted; it operates dynamically, laterally and intermittently” (Ashcroft 50). In short, there is “no ‘master-plan’ of imperialism” (Ashcroft 50) as such at work anymore. This neo-colonial concern that Nkrumah invoked with specifically the African situation in view, emerged as an evil plaguing the entire globe hardly three decades down the line, when the phenomenon of “Neo-Liberalism” (Ashcroft et. al. 148) became a rampant reality.

“Neo-Liberalism which denotes the idea of “unfettered liberalization of market forces” (Ashcroft et. al. 148), became the economic policy of choice at the start of the 1990s, exemplified by the implementation of the norms proposed in the “Washington Consensus” (Ashcroft et. al. 148) by the economist John Williamson. When the idea was initially proposed, it was presented as the policy that was meant to free all developing and under developed nations of the world from the burden of financial debt, and set them on the path of irrevocable progress. However, it only proved to be an appalling myth, which like the idea of the “civilizing mission” (Ashcroft et. al. 148) popularized during the era of classic colonialism, only sought to advance the cause of the developed nations at the expense of their developing and less-developed counterparts. Neo-liberalism thus exemplifies in earnest “the most obvious medium of neo-colonial domination” (Ashcroft et. al. 148), which continues to ensure that the economy of the western powers particularly the

United States is kept booming, while its Asian and Latin American partners are continually exploited. The ultimate point is that the politics of colonial domination remains powerful as ever, with wealthy subjects in the “first world” (Scott 41) calling the shots, and those in the “third world” (Scott 41) bearing the brunt. This dynamics of neo-colonialism is what the paper essentially strives to unravel in the context of *Disclosure*, and the key lies in understanding the corporate background that underlies the sexual harassment episode central to its plot.

The harassment issue in *Disclosure* implicates two high level employees of a multinational computer firm called DigiCom, Meredith Johnson, in line to become the company’s next vice president, and Tom Sanders, one of four division managers. The incident that sets off the controversy happens when Meredith under the pretext of a business meeting, calls Tom to her office and tries to seduce him. Notwithstanding the point that many critics have described the incident as highly improbable, the critical question to consider is whether Meredith’s advances are indeed motivated by exclusively lust, or there is something more to it. There is certainly lust involved, Meredith and Tom after all are ex-lovers, but there is also another ulterior motive at work in Meredith’s actions, perhaps stronger than even lust, which becomes clear when we consider the larger picture in view.

DigiCom is desperate to finalise a lucrative merger deal with Conley-White, a publishing conglomerate from New York, and their trumpcard for forcing the latter’s hand is a revolutionary piece of computer equipment they have successfully developed, a standalone CD-ROM codenamed Twinkle. Conley are also essentially interested in the merger, because obtaining Twinkle would help tellingly update their business operations by enabling them go digital. There is however one concern to reckon with, which in fact is the major stumbling block stalling the merger. Impressed as they are with Twinkle, the Conley management is none too pleased with the high cost involved in producing the drives. This is where Meredith comes in. In an attempt obviously to boost her prospects in DigiCom, she sets about convincing the Conley people that manufacture cost can be considerably

lowered by carrying out some changes in the production line. Her plan however goes horribly wrong when altering the line results in Twinkle developing a glitch that considerably slows down its rate of performance. Knowing full well that she would eventually be found out, Meredith plots for somebody else to take the fall. The obvious choice of course turns out to be the person who was obligated in the first place to set up the line, Tom Sanders. So she invites Tom over and imposes herself sexually, creating thus an opportunity to file for a harassment charge, which would no doubt have him booted out of the company. Once he is out, she could conveniently blame the glitch on him, and vindicate herself of any fault.

Meredeth is a woman of ambition, who wants to climb up the corporate ladder quickly, and has no qualms regarding how she makes it. It is this aspiration to rise fast, with no consideration for scruples that essentially underlies her actions towards Tom. The corporate world is a domain of cut throat competition, and what Meredith does to get on in this highly competitive universe, by itself is nothing unheard of. What is however critical from our perspective is the reckless way in which she makes use of a third world employee to achieve her ends. To explain, the plant meant to mass produce the Twinkle drive is moved by Digicom to an offshore location in Kuala Lumpur, Malaysia. So in order to make the changes in the production line Meredith has to travel there in person, and obtain the services of a local employee. This local employee happens to be Arthur Khan, the supervisor who is given charge of overseeing the production line, and who has to directly report to Tom. Arthur Khan of course agrees to go along with Meredith's plan to conceal the actual reason as to why the drives are malfunctioning, by not informing Tom of the changes she has made to the line. One might argue here that Arthur had a choice, after all if he wanted to do the right thing, could have told Tom of the truth, but this is easy said than done. Though Arthur might be a high ranking official in the Malaysia plant, where the drives are actually produced, he still happens to be someone who is at the beck and call of his superiors in the United States. Meredith of

course is fully aware of it and plays it to her advantage.

"But if he calls me about the production line--"

"Just evade it, Arthur. Be mystified. You can do that, I'm sure. Now, who else does Sanders talk to there?"

"The foreman, sometimes. Jafar. Jafar knows everything, of course. And he's one of those honest sorts. I'm afraid if--"

"Make him take a vacation."

"He just took one."

"Make him take another one, Arthur. I only need a week here." (Crichton 316)

Meredeth's plan of sabotage however fails, which not only puts her in a tight spot, but entails dire consequences for her accomplice in Malaysia. Cleared of his charges, and restored to his position as division head, Tom has one last video call with Arthur in which he terminates the latter from the company. Arthur makes a desperate last ditch effort to save his position by trying to come clean, but to no avail.

It was Arthur, in the plant.

"Oh, Tom. Good. I hope it's not too late," Arthur said.

"Too late for what?" Sanders said.

"I know there's a meeting today. There's something I have to tell you.

"What's that, Arthur?"

"Well, I'm afraid I haven't been entirely straightforward with you, Tom. It's about Meredith. She made changes in the line six or seven months ago, and I'm afraid she intends to blame that on you. Probably in the meeting today."

"I see."

"I feel terrible about this, Tom," Arthur said, hanging his head. "I don't know what to say."

"Don't say anything, Arthur," Sanders said.

Kahn smiled apologetically. "I wanted to tell you earlier. I really did. But Meredith kept saying that you would be out. I didn't know what to do. She said there was a battle coming, and I had better pick the winner."

"You picked wrong, Arthur," Sanders said.

"You're fired." (Crichton 327 – 328)

It is of course easy to conclude that Arthur fully deserves what he got for going along with Meredith's underhand dealings, but as posited above, being a third world employee having no influence as such, he really did not have much of a choice. Moreover, it was an open secret that Meredith was touted to be the company's next vice president, which would naturally put her in a position of authority not merely over him but that of Tom too. So eventually his fate in the company would be more in the hands of Meredith, a fact she makes abundantly clear to him.

"Jesus," Kahn said. "I'm not sure- "

"She cut in: "Arthur."

"Yes, Meredith."

"This is the time when a new vice president counts favors that will be repaid in the future."

"Yes, Meredith."

"That's all." (Crichton 316)

So compelled to pick a choice, Arthur played the odds like anyone would, and chose to throw his lot with the person he thought would eventually prevail. However, as things turn out, Meredith is exposed, and he goes down with her. Nonetheless, it must be specified here that though both Johnson and Khan are going to be out of DigiCom, the imminent prospects they are respectively faced with is not exactly the same, something that becomes obvious in the light of the former's final interview with Tom.

"This whole thing was Garvin's idea. For three years, Garvin's been looking for a buyer. He couldn't find one. Finally he sent me out, and I found him one. I went through twenty-seven different companies until I got to Conley-White. They were interested, and I sold them hard. (Crichton 332)

Garvin is DigiCom's boss, and it is plain as daylight from Meredith's words that her actions were carried out on his behalf. It is indeed not clear whether Garvin was in on her scheme, but one thing is certain, Meredith would most probably leave DigiCom with a large settlement, while Arthur as the insignificant pawn in the dealing would not only have such a luxury to look forward to, but

would have to also leave with a blot on his professional reputation.

Arthur's portrayal in *Disclosure* is very reminiscent of Ariel in *The Tempest*, in that he too like the latter typifies a compliant worker thoroughly trained both in terms of professional skill sets and temperament to serve his imperial overlord. Being so of course has its perks, like the spirit in Shakespeare's romance, Khan too is bestowed with a favoured treatment that is reflected in the high position he holds in the plant and the attractive pay package it entitles him. Moreover, people like him find themselves in high demand in the neo-colonial context, for with the ever increasing trend of multinational firms seeking to move their operations to third world locations for reducing cost, native professionals like Arthur would be continually required to fill vacancies. Crichton himself confirms the point by specifying how after being booted out of DigiCom, Arthur did land himself a position with a similar sort of company called BullData Systems, and that too in the same city Kuala Lumpur, where he was previously working. All this said however, the fact still remains that Arthur typifies a position of vulnerability that third world subjects are forced to endure in the face of neo-colonial politics. After all, though he might be leading a relatively privileged life, like Ariel, is ultimately stripped of any agency. The point is Tom can fight his case against Meredith, as a white male in a first world set up he has the opportunity to do so, but Arthur as a native employee of a third world does not, even though he is also a victim of Meredith's wiles. This is the paradox involved in neo-colonial politics, you are given more lucrative prospects to contend with, in any event, far more than what you could make doing the same job locally, but then you are always kept as someone expendable, who could be readily discarded if found to be undesirable. It is the civilizing mission all over again, and exploitation is the name of the game. It is however crucial to remember that traditional colonialism and neo-colonialism are different phenomena. For one thing, unlike the former, the latter does not present an overt enemy to readily confront, and is therefore relatively much more difficult to resist. For another, the

latter need not be resisted in a complete sense at all. As Nkrumah himself testifies, “The struggle against neo-colonialism is not aimed at excluding the capital of the developed world from operating in less developed countries” (Nkrumah x). Thus, in tackling neo-colonial politics, what is required is a programme of empowerment by which third world subjects involved in the operations could be guaranteed

more freedom and security. If this could be done, then neo-colonialism could actually be transformed into a policy that ensures a win for all scenarios. This is what ultimately Disclosure implies, if the Arthur’s of the world could be prevented from being so recklessly misused by the Meredith’s going around, then God can peacefully rest in his heaven, and all shall be well on earth.

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**EXPLORATION OF GENEALOGY IN BETTY LOUISE BELL'S
THE FACES IN THE MOON**

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ABSTRACT

The Native American writers are predominantly known for their works that are furnished with their tribal culture, oral tradition and ancestral heritage. The novels of the Native American have become popular, as they narrate the true and own experiences that are meted out in their personal lives. Most of the novels carry the mythical stories which are narrated by the ancestors of the families and in this way, the importance of familial relationships are inferred. The novel, Faces in the Moon stresses upon the disciplined and virtuous way of leading a life; the Cherokee tribal women follow certain principles to possess a righteous livelihood. Betty Louise Bell, has brought in the stories of three consecutive generation of families to establish firmly the concept of Genealogy. The approach of Genealogy is applied to the novel Faces in the Moon, where the lives of the women of same families but variant age groups are analysed. This paper examines in detail about how the Genealogy is studied through the various characters of the novel, Faces in the Moon. The co-ordination between the dead fore-fathers and the present younger generation of the Cherokee tribe is also critically studied.

Keywords : Native American Writings, tribal culture, ancestral heritage, Genealogy, Cherokee tribe.

The Native American writings mainly deal with the oral tradition, culture, ancestry and heritage. The Red Indians, as they are fondly termed as, follow various genres of literature to register their thoughts and ideas. Every piece of literature is driven by an ultimate force. The Native Americans have rendered their views in the form of writings, even before the colonial rule. After the colonial expansion, the Indians have been subjected to sorrows and sufferings. Their form of expression through writings has become the powerful and unique weapon for the Natives to expose the aggressive nature of the immigrants. The major themes of the novels of Native American writers are storytelling, connectivity with nature, family ties and strong bondage to the land that they live in. The Native American writers have narrated mythical stories through their novels and also their personal experiences through autobiographical sketches.

Betty Louise Bell, a prominent and well-known Native American is the author of notable works such as *Faces in the Moon*, *A Red Girl's Reasoning: Native American Women Writers and the Twentieth Century* and she also served as an editor of *Reading Red: Feminism in Native America* and a co-editor of *Norton Anthology of Native America Literature* etc. Betty Louise Bell, who is the famous novelist of the times, highlights the importance of native culture, tradition, heritage and familial relationships in her works. Having belonged to

Cherokee tribe, Bell focuses primarily on the welfare and upliftment of her own tribe and its members and expresses the same in her novels. She gives voice for the voiced less Cherokee tribal people.

Having born on November 23, 1949 in her native place, Oklahoma, Bell has faced untold miseries in her childhood; she has explained her sorrows and sufferings in her autobiographical work, *Faces in the Moon*. Betty Louise Bell's works prioritize upon the ideology and importance that the younger generation must be educated and made to lead a moralistic way of survival. It is done effectively through the narration of myths and stories told and re-told by the ancestors. Bell uses realistic situations and first-hand experience in order to make the tribal people realise the importance of ancestry and cultural heritage. She uses first-person narrator in her work to narrate, explain and portray the characters of the novel in a vivid and picturesque manner.

The underlying theme of the famous novel *Faces in the Moon* is Genealogy. Genealogy, as the term signifies, is the study about families, the ancestors of the families and the link with the ancestors and the younger generation. It is attained through telling and re-telling of stories or any oral sayings and interviews from the older generation to the younger generation. Genealogy explains in detail about the descent of a particular

individual and through this, the connectivity with an individual's forefathers and nature is achieved. Along with this, the characteristic traits of the family and its roots are studied; when a child is born, it is said to possess the innate and inborn qualities of their ancestors. A man or woman is said to follow their forefathers in behaviour or skill or physical features. This is revived in the work of Betty Louise Bell. This could be explicitly found in these words of Michel Foucault: "Genealogy does not seek to originate but seeks to dig deep into the episteme and to try to lay down the ground of truth in each episteme at every time. Genealogy is also not a theory but is a perspective to dismantle and question the episteme, social practices and the human self." (Kali 39) In this novel, it is witnessed that the protagonist takes initiatives to find out her true self, identity and cultural background through the study of Genealogy.

Through Genealogy, the historical details of the family, the cultural and traditional background and the religious beliefs are gathered. Genealogy is where the characteristic traits of ancestors are reflected in the lives of younger generation. This assists them to lead a disciplined life and also educate the forthcoming generations to have a moral etiquette in their way of living. Gene is the DNA, that is present in the physical bodies of the ancestors and these genes travel to reach the descendant to revive and rejuvenate the thoughts and opinions of the forefathers. Genes, which are instilled in the blood, also help in constructing and re-constructing the younger minds to re-vitalize the journey through their walks of life. It is observed through the work, *Diskursus Seksualitas*, where it is stated that: "... genealogy is an attempt to describe the history of the episteme, the history of the origin of an engraving to find the starting point of departure without linking it to the essence or identity of the lost. With this, Foucault proves that history so far is distorted history, not the history of language and meaning, but of power relations." (Kali 41)

The concept of Genealogy carries the complete family history of an individual; through Genealogy, the ancestral inheritance followed by the generations is ably studied. Though

there may be generation gaps, they are interspersed through family values and stories. By analysing Genealogy, one can trace the unknown facts of their ancestors. By knowing in detail about the forefathers, the individual can replenish the ancient ideals in the modern society and adhere to them.

Betty Louise Bell in her important work, *Faces in the Moon* has highlighted the importance of familial relationships and the ways to lead a moralistic and disciplined way of life. Her first autobiographical work *Faces in the Moon* was published in the year 1994. This work turned to be an immense success, since Bell has recorded only the realistic, painful and unbearable torments and traumas faced by a small girl. Moreover, this novel is structured in the form of 'Bildungsroman', since the novel describes in detail about the early life of the protagonist and her adolescent life. The novel further elucidates on the Cherokee tribe and their struggles in the White-stricken world.

The novel is entirely about Lucie (novelist herself) who has undergone innumerable and indescribable sufferings and traumas in her life from her childhood. The novel begins with Lucie returning to her hometown and she is reminded of her past memories in her home with her mother, Gracie. Gracie is shown to be an irresponsible mother and she is portrayed as a woman who craves for money. It is seen that Gracie is least bothered about her own daughter, that she does not even know the name of Lucie's father. She abandons her own daughter with her sister and never bothers to nurse her own child.

It is seen that the stories, which are told by the aunt Lizzie Evers, have converted Lucie to become a good human being, rather than a spoiled child like her mother. It is evident from the lines of Betty Louise Bell's *Faces in the Moon*: "I have lived in desire these four decades and practiced invention for just as long, but no matter how great my desire to run away from home, to live in a place and history free from secrets, I always take up my position at the table, in the early morning hours, and listen for those women's voices." (Bell 5) The sharp contrast observed between Gracie and Lizzie is that they are diametrically opposite signs of evil and goodness respectively. Hellen, the mother of Rozella and Gracie, has taken

efforts in taking utmost care of her children. Hellen married against the will of her father and her aftermath life also resulted in disaster. Her father died and Hellen's husband also forsook them and Hellen had to suffer without proper food, clothing and shelter. It is mentioned that the family took refuge in a car. Hellen had undergone numerous problems in her life ever since she married against the advice of her father.

Robert Henry Evers, Hellen's father suggested his daughter to attend school and his dream on Hellen were beyond limits and expectations. Robert Henry Evers dreamt and imagined his daughter to become a teacher. From this, it could be seen that the Cherokee tribal people were not given equality in education. The Cherokee people also believed in dreams. It is seen and understood from the novel that Robert Henry Evers had to sell his own land for the welfare of his family. Robert Henry Evers had aspiration to own the entire land, which he had sold to the Whites. His life's ambition had been to cultivate crops and establish agriculture firmly in the White-stricken land. Though all his ambitions are shattered, his deep-rooted desires lingered in his blood and soul. This is transmitted to his own daughter, Hellen. In this manner, the approach of Genealogy is studied here. The aspect of patriotism and preserving the nation has been instilled in Hellen from Robert Henry Evers. Hellen's notion to fight and permanently stay in the nation (though having faced innumerable problems) has been imbibed in her from her father's attitude which is not to abandon the nation (though the nation had forsaken him).

Hellen is the portrayal of a hard-working and disciplined woman and it is evident in many instances. She loses her father and is also abandoned by her husband, Hellen sticks onto the principles of a moral etiquette life. Moreover, she teaches and educates her own daughters in a righteous manner. She had to work as a house-maid in her surroundings to lead a livelihood. It is seen that Hellen also faced sexual harassment with the White men who employed her and the White women gave her tough and heavy chores to make her toil hard. In addition to which, Hellen was disrespected by her own tribal men and women. She never loses hope and confidence,

but she works more hard to educate her children and allow them to be independent.

Hellen is shown to possess a strong bondage with her daughters; she also narrates stories to them frequently by tutoring them in her own way. She believes that the younger generation children are refined and their evil thoughts are rebuilt and replenished by the stories narrated by her (which has been narrated by her ancestors). The aspect of Genealogy is explored here, where the belief of Hellen which states that, the habitual customary act of narrating the mythical stories rejuvenates the younger minds. This is transferred to Lucie, the protagonist. The ideals of Hellen are followed by Lucie, and through her it is identified that the younger generation is associated with their ancestors through the dreams and stories.

The traditional way of narrating the stories is also followed by Lizzie, Hellen's sister-in-law. Lizzie Evers is shown to be the best care taker of Lucie, whenever she falls sick or whenever she needs motherly care and affection. There are instances where when Lucie is sick and sleeps on the floor, Lizzie Evers allows her to sleep with her in bed and she is the woman who also narrates stories to Lucie. Lizzie serves to be a guardian angel in protecting and guiding Lucie. Lizzie Evers educates Lucie about the appropriate and proper way of leading a righteous life; it is seen that Gracie had married many men and she also yearns for physical affection and money.

Lizzie Evers advises Lucie to lead a moralistic life and not to lead an amoral life like her mother. Moreover, the stories of Lizzie Evers have converted Lucie to be more attached to her grandmother, Hellen. Lizzie fulfils the innermost interests and preferences of Lucie. Here, Lizzie resembles her mother Hellen; it is seen in an incident that Rozella feeds her, when Lucie is sick. Lizzie treats Lucie as her own child throughout the novel. The exploration of Genealogy is done here, where Lucie follows the ideals and principles of both Hellen and Lizzie Evers.

Lucie, the protagonist of the novel, is the perfect exemplar of Genealogy in the novel. She denotes the characteristic traits, skills and behavioural attitude of Robert Henry Evers, Hellen and Lizzie Evers. The novelist has termed the protagonist as 'Unnamed Narrator'

and it signifies that the protagonist becomes glorified when she follows her ancestors' ideals. Lucie becomes the backbone of the novel, (i.e.) she takes the role of connecting three generations together and she stands as an epitome of binding family histories.

Lucie Evers, who is ignorant about the details of her father and leads her life with an irresponsible mother; she sustains the drastic problems and sufferings of her life, single-handedly. Her childhood life with her mother moulds her to become a vulnerable child. Lucie single-handedly does numerous activities. She cooks dishes, cleans the rooms and maintains the house regularly in the times of her childhood. She attends schooling only in the later part of her age.

Lucie is made to stay with her mother's aunt Lizzie Evers and uncle Jerry; initially, Lucie finds it difficult to cope up with her new caretakers. Later she becomes used to the lifestyle of Lizzie and Jerry, as she had already dreamt of the similar life. Lucie acquires the knowledge of her ancestral background through the stories narrated by Lizzie Evers and Uncle Jerry. The Cherokee tribal people believe that dreams play an important role in connecting the lives of the people with their ancestors. Similar to which, Lucie trusts that she can foresee her future through dream-vision.

The Cherokee people also believe that the dead people's faces can be viewed in the moon. According to Lucie, she can see the faces of Hellen and Lizzie, whenever she sees the moon and this is one effective method for the younger generations to be interspersed with their ancestors emotionally and physically. Photographs also have an important role to play in the novel. Through the photographs taken during different stages of the protagonist, she realizes that her grandmother was alive, when she was a child. The character of Lucie Evers has different shades of Genealogy

portrayed in it. As a child, Lucie follows her mother Gracie; Lucie was brought into the world through Gracie and Lucie did not have anyone to rely upon in her childhood except her mother. Her later part of the childhood is spent with Lizzie and Jerry; from the stories narrated from them, she realises her spiritual connection with her grandmother, Hellen. Finally, in her adolescent age, she refuses to leave her native land and survives in her birth-place. Through this deed, she resembles the characteristic features of her great grand-father, Henry Evers. Through these words from the novel, *Faces in the Moon* it is clearly found that she feels righteous to be the sole survivor of her generation:

“... I am the great-granddaughter of Robert Henry Evers, I am the granddaughter of Hellen Evers Jeeters, I am the daughter of Gracie Evers, the niece of Rozella Evers, and the grandniece of Lizzie Sixkiller Evers.” ... “I am a follower of stories, a negotiator of histories, a wild dog of many lives... And I am centuries of Indian women who lost their husbands, their children, their minds so you could sit there and grin your shit-eating grin.” (Bell 192)

It could be clearly understood that every individual has a spiritual connection with his / her ancestors. A man / woman inherit the cultural values, beliefs and ancestral heritage from their forefathers. Moreover, the ancestor leaves behind a particular and unique trait such as skills, physical appearance and talents in their successors. This unique trait guides and inspires an individual to establish the ideas and principles of their predecessors firmly and successfully. In this manner, the genes, along with the right features are transmitted to the consecutive generations and through this way, the approach of Genealogy is studied.

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CONVICTIONS, INTERVENTIONS AND AMELIORATION OF WITCHCRAFT AND WITCH-HUNTING PRACTICES**M. Kumari¹ and S. Alam²**^{1,2}Department of Contemporary and Tribal Customary Law, Central University of Jharkhand, India
¹meena.kumari@cuja.ac.in, ²shamsher.alam@cuja.ac.in**ABSTRACT**

The practices of witchcraft and witch-hunting, despite cultural and regional differentiations, have been able to maintain its global presence. Ubiquitously traced in several countries, the convention of accusing and killing people, especially women, on charges of practicing witchcraft is prevalent in India as well. Resting upon empirical data, we attempt to put forth an overview about the nature and character of these practices from the perspective of community members residing in the province which records the highest number of witchcraft related killings in India, i.e. Jharkhand. An evaluation of reasons, as well as policy interventions in place for preventing such practices in the region have been delineated in the paper. Simultaneously, fortified within the emancipatory framework of research, steps for contending and combating this protruding concern have also been advanced. Putting compendiously, the overall quintessence of this endeavour is to put forward ways to bring about the desired social change, wherein such superstition driven customs take an adieu.

Keywords Emancipation, Jharkhand, Social Change, Superstitious Killing, Tribals, Witchcraft, Witch Hunting.

1. Introduction

Natural calamities, bad weather, diseases, epidemics, and deaths have always bothered human beings. All these have paved the path for faith in super-natural powers and coming up of religion and magic (Frazer, 1998). In religion, powers are revered and pleased for preventing negative circumstances, whereas magic aims at gaining control over such powers for causing benevolent or malevolent influences (Frazer, 2013). Witchcraft as a form of malevolent magic, has established its presence for negative situations across the globe (Hutton, 2017). Owing to its perceived negative intents, witchcraft is looked upon with pessimism (Bosker, 2020). People suspected to be allied with this craft are often accused of causing detrimental impacts (Mabefam&Appau, 2020) and are often trialled, branded, hounded, flogged and even ruthlessly murdered (Purohit, 2020). This practice is witch-hunting.

Witch hunting is reported from almost all existent communities of the world since times immemorial (Behringer, 1999). It has been predominant in India as well, particularly among the rural and isolated precincts, which also happens to be the dwelling place of tribals (Saletore, 1981). The latest report of NCRB

(National Crime Records Bureau, a unit functioning under the Ministry of Home Affairs, Govt. of India) mentions that 2694 people were hunted in India between 2001 and 2018, on alleged charges of practicing witchcraft. The non-reported cases, and those involving human right violations but not leading to execution, are however completely left out in these figures (Mehra & Agrawal, 2016). Dissection of these numbers reveal that such incidences are more protuberant in provinces of Haryana, Rajasthan, Gujarat, Maharashtra, Madhya Pradesh, Uttar Pradesh, Chhattisgarh, West Bengal, Jharkhand, Odisha, Bihar and Assam (Singh, 2011). Among them, more than one-fifth of the cases are from Jharkhand (Srivastava, 2015).

Year	Jharkhand	Odisha	Andhra Pradesh and Telangana	Madhya Pradesh	Haryana	Chhattisgarh	Bihar	Other States	India
2018	18	05	11	10	03	08	00	07	62
2017	19	09	05	13	00	06	01	20	73
2016	27	24	19	19	02	17	00	26	134
2015	32	26	15	20	00	13	02	27	135
2014	47	32	02	24	00	16	06	29	156
2013	54	24	15	11	00	07	00	49	160
2012	26	32	24	10	00	08	13	06	119
2011	36	39	28	15	05	17	00	100	240
2010	15	31	26	18	57	08	02	21	178
2009	37	28	27	23	30	06	02	21	174
2008	52	23	23	16	25	15	00	21	175
2007	50	28	33	14	30	08	00	14	177
2006	29	36	26	13	34	10	11	27	186
2005	26	25	75	13	28	09	01	20	197
2004	26	22	24	14	00	11	00	14	111
2003	19	26	37	26	00	09	00	23	140
2002	26	39	23	24	00	04	01	34	151
2001	21	30	20	13	00	14	01	27	126
TOTAL	560	479	433	296	214	186	40	486	2694

Table 1 - Witchcraft Killings in India (2001-2018)
(Source :NCRB, Govt. of India)

These varied forms of violence involving gruesome acts of maltreatment and eventually murdering of people, are among the least acceptable standard of behaviour in any human community. It infringes a whole range of regional, national as well as international laws. Furthermore, agencies working for preventing witch-hunting have been relatively less successful in preventing such acts. The number of cases registered with police under various sections of existing laws, judgments delivered by courts, initiatives by governmental and non-governmental agencies, and overall policies of government for countering witchcraft and witch-hunting, have made very insignificant contribution towards changing the mindset of people for banishing this practice, due to which it still continues to exist in Jharkhand (Purohit, 2020; Singh, 2016). Also, studies conducted by scholars for tracing socio-cultural and associated facets accountable for pervasive prevalence of this phenomenon, especially among the tribals of the state, have been very scarce. Henceforth, there stands a pertinent compulsion to have an enquiry for understanding the perspective of tribals on witchcraft and witch-hunting, including its intersection with existing laws in force, and prevailing policies in action for thinking through, with the people, about ameliorative

and emancipatory process for combating this inhuman practice.

2. Review of Literature

Etymologically the term 'witchcraft' is a compound of two words 'wicce' and 'cræft' wherein the word 'wicce' derives its origin from the old English word 'wicca' meaning 'witch' and 'cræft' denotes 'skill or ability' (Dilts, 2015). It thus infers to the practice of, and belief in, magical skills and abilities which are believed to influence the mind, body, or property of others, in a malicious manner. Malinowski (1944) acknowledged witchcraft as a pragmatic and logical means for overcoming the uncertainties of human life and held it to be rational, which comes to aid when things could not be explicated through logical thinking (Levack, 2013) or whenever religion was assumed to be insufficient in coping difficult situations (Oliver, 1989). People associated with witchcraft are often accused of causing detrimental events and are thereafter subjected to mass torture and outrage, often leading to adverse inhuman treatments, comprising of ostracizing, banishment, hounding, rape, burning alive and even execution (Singh, 2011).

This practice of eliminating the practitioners of witchcraft has been pervasively customary in

almost all societies of the globe and has led to killing of huge number of people on alleged charges of practicing the craft (Allen & Reid, 2015). Geographically, witchcraft violence has global presence as evidenced by documentations, paintings and other testimonies emanating from African, American, European, Middle East, South Asian and Island nations (Alam & Raj, 2017). Witch-hunting is pervasive in India as well. Reports indicate that 2,694 people were assassinated on charges of practicing witchcraft between 2000 and 2018 (NCRB, 2018). These are statistics which have been logged in, however the unrecorded ones are anticipated to be far more than this number (Mehra & Agarwal, 2016). More women have faced implications of witchcraft accusations and hunting than males, clearly inferring towards its gendered nature (Kingsley & Clement, 2014). It has acted as a form of terrorism through which males have frightened, dominated and controlled females (Goodare, 2016) and have also utilized it to keep women 'in their place' by means of rape, domestic violence, sexual harassment, and other acts of brutality (Stewart & Strathern, 2004). However, there have been several instances of assassination of males and children as well on charges of practicing witchcraft (Amnesty International, 2010).

Although witch-hunting is very context dependent, but still there are certain commonly observed factors which often instigate it. Among them, caste conflict, class-differences, gender strife, lack of critical thinking, poverty, ill health, and anything worthy of attracting envy - are some of the common reasons behind witch-hunting (Mallick, 2008; Summers, 2000). These circumstances prompt blaming and scapegoating, and this is how it has evolved as a way-out for coping with uncertainties of human existence (Sundar, 2001). For combating witch-hunting, legal recourses have been put in place. However, they should not be taken as sufficient response to problems originating in society due to evil practices, irrationality or superstition (Mehra & Agarwal, 2016). Such legislations cannot end superstition, provide redressal to victims or inject scientific approach and rationality in the community. They also do not take into account the conditions under which such practices

flourish, the gaps in existing laws, the mode of reporting of cases, the investigation carried after reporting, and emergent needs of victims and survivors. Hence, a more social approach needs to be adopted, than just being strictly legal (Mehra & Agarwal, 2016).

A comprehensive analysis of conducted studies leads to identification of certain gaps which have been relatively less touched upon previously. Amongst them, the ones which come out predominantly include dearth of studies relating to perception and conviction of tribals concerning witch-hunting and witchcraft. Also, a circumscribing analysis of factors accountable for sustained continuation of witch-hunting has not been attempted in earlier researches. Another void is the limited number of emancipatory researches pertaining to forwarding of inclusive and recuperative measures for combating witch-hunting. Against this backdrop, the current paper attempts to comprehend the perspectives of tribals concerning witchcraft and witch-hunting, including its intersection with existing laws, prevailing policies and education, for suggesting ways for its amelioration.

3. Objectives and Adopted Methodology

The current study was carried out with the objectives of : (a) bringing in light the nature and character of witchcraft and witch-hunting, (b) assessing reasons for rampant protuberance of such practice among the tribals, and (c) forwarding ways through which witchcraft and witch-hunting could be truncated. For this, phenomenological and emancipatory methodologies formed the kernel of this paper. Due to preponderance of witch-hunting cases in Jharkhand, it was selected as the study area. Here witchcraft killings are mostly reported from tribal dominated zones. In view of this, Ranchi district, which has the highest tribal population among all districts of the state, was sampled as the target area for this research. Ranchi district has two sub-divisions, namely Bundu and Ranchi. For making the study representative in nature, two villages from each of these sub-divisions were sampled for study. In the study area, respondents were largely selected through purposive snowball sampling. Primarily, the elected village heads (locally designated as mukhiya) were consulted in each

village. After explaining them about the objectives of study and convincing them for their support, information about people who were involved in treatment of supernatural ailments, were gathered. They also facilitated in getting nodal people who assisted in providing information about the village, its geography, instances of witchcraft allegations which had occurred in past, and access to other key respondents who were intimately or distantly related to such occurrences.

For collection of primary data, field work was conducted between March 2019 and June 2020. Initially key informants were identified and thereafter, rapport was established. After a brief baseline study of sampled villages, data relating to research were gathered by means of quasi participant observation, schedule and case study techniques. A total of 113 respondents comprising of youth, village elders, witch-doctors, elected representatives and alleged witches, were interviewed. Questions were largely open-ended where respondents were allowed to speak at length for congregating factual as well as contextual information. Genealogical table, photography and audio recording tools were utilized for effective capturing of information. Secondary data relating to the study were gathered from NCRB reports, court cases, and other data sources including online and offline newspaper reports, relevant websites, published reports, media clippings, online journals, books, circulars, office orders and publications of NGOs.

Once collection of data culminated, all recorded interviews were transcribed from local languages (Hindi, Sadri, Nagpuri and Khortha) to English, and thereafter broad themes and sub-themes were identified. Overlapping themes, commonalities and divergences were segregated through colour-based coding. Thereafter, findings were analyzed to arrive at segments expounding in detail about the research. The findings arrived at, were then suitably placed under different headings and sub-headings for easy discernment and comprehension. During the study, ethical concerns especially those relating to field-based researches, were diligently taken care off. Informed consent was sought before gathering of data. Participation of informants

was purely confidential and voluntary. If at any point during data gathering, informants did not feel comfortable, they had the liberty to opt-out. Also, anonymity was maintained for all research participants.

4. Salient Findings

Ethnographic study in the four sampled villages provided intricate understanding of witchcraft and witch-hunting in the region. Largely leaning towards malevolent form of magic, witchcraft plays its role in everyday activities of community residents. It forms an important part of the vast background of socio-religious activities prevalent in the area, the influence of which is evidently visible on the customary practices, laws, morals and etiquettes of people. The prominent findings have been delineated in the following sub-sections, wherein nuances pertaining to nature and character of witchcraft and witch-hunting, reasons for its protuberance, and interventions in existence for preventing such practices have been rendered.

4.1. Nature and Character of Witchcraft and Witch-Hunting

Witchcraft, colloquially famous as *dayan-bisahi* in the study area, is something which haunts and scares people in the entire region. According to resident tribals, it infers to the practice of invoking diabolical occult powers for causing unfortunate happenings. Faith in the craft is so deep-seated and entwined that existence of witches, their craft, bewitchment and super natural happenings is not at all a matter of surprise or wonderment in the community. People staunchly trust that it has existed, and will continue to exist, just as existence of God and evil-powers in this world. According to them, everything happening in this world is controlled by cosmic powers and it is the intervention and disturbances caused to these powers, through the action of witchcraft, that they are deviated from their natural course, leading to manifestation/s in the form of uninvited events. These convictions also bestow people with moral justification for initiating preventive and corrective measures for safeguarding themselves from malevolent influences of witchcraft like performing religious rituals, pleasing supernatural powers,

offering sacrifices, conducting ordeals, and even killing alleged individuals accountable for such deleterious happenings. The blame for unfortunate happenings in the tribal cosmos is often levelled upon witches, colloquially referred as *dayan* or *bisahi*. Faith in reality of witches is so pertinent that not even a single individual in the entire study area, denied their existence. It is widely held that witches control evil supernatural forces by their craft to seek assistance in their deleterious doings. Usually, spells and evil-eye are the most commonly perceived modes of operation, however other methods like inscription of characters, immolation, piercing of needles on mud images, and divination are also believed to be employed for malevolent usages. They are also alleged of performing conjuring activities for gaining power from malevolent spirits for harming people. This perceived symbiotic relationship with evil supremacies, scares people and therefore it is widely suggested in the community to maintain safe distance from witches.

Just as perceived reality concerning existence of witches, tribals also ardently believe in their deleterious powers. It is widely faithed that they can cause an array of unsolicited events, ranging from pregnancy termination, sterility in males/females, ill health of pregnant mothers, ineffectiveness of medicines, inhibition of social interaction, memory loss, and burning sensation in body parts. Apart from these, grappling through invisible forces, cursing through spells, evil eye, rendering financial loss, poisoning of body, creating strife among family members/neighbours, vituperation, inability to attract lover, are some of the other unsolicited events which can also be maneuvered by witches. About learning the art of witchcraft, there was nobody in the entire study area who could bear testimony of having seen the witches, learn the craft. Resident tribals only speculated that necromancy, spell casting, divination, conjuring, hypnosis, incantation, evil eye, shooting invisible arrows, poisoning, and metamorphosing, were the major sub-crafts which are mastered during the process of learning witchcraft. In the course of erudition, the trainee witches learned how to kill and bring back an individual to life. During initial stages, the craft is practiced on trees. If

the learner is successful in making it dry, it is considered that her learning is entering into its advance stages. Thereafter, if she is able to bring it back to its healthy state, it is perceived that the craft has been mastered, and is ready to be tested on humans.

Owing to its apparently destructive intents, fear of influences caused by witchcraft is well stamped in the minds of tribals. There were several dogmas affiliated to this fear. A few of them include the faith that - (a) whenever there is prolonged illness in family, it is very likely to be the influence of witch residing in vicinity; (b) witches do not have any special physical character, however it is possible to identify them by their uncommon magico-religious activities carried out on moonless nights; and (c) witches can hear what is being talked about them, and hence people talk about them in susurrations and refrain from discussing it with strangers. Apart from these, it is also ardently believed that - (d) females are more engaged in witchcraft than men, because after marriage, due to patrilocality, woman shift to new households and for gaining control over family affairs in the new abode, they engage in practicing the craft, which otherwise does not happen in case of men; (e) witches are actively involved in necromancy, for which skull or humerus of un-married boy or girl after his/her death (locally called *saadhak*) is brought in use, which in return of prayers and offerings, assists in intended deleterious activities; and (f) witches are very jealous and deleterious in causing evil influences, hence it is always better to refrain from engaging in any interaction with them, or their family members. In instances of unsolicited events which are not considered to be natural, accusations are often levelled upon neighbours or closely residing relatives. In most cases, there is some pre-existing history of animosity between the parties. It is from here that the process of social construction of witch is triggered. In most cases - neighbours, relatives and acquainted people are the ones who spread this word. This defamatory narrative building plays significant role in congregating support against the perceived witch, thereby creating an atmosphere of anxiety wherein people actually start believing that the cause of unfortunate events is vested in supernatural powers

controlled by those witches. The veracity of the rumoured individual of being a witch is thereafter confirmed by the local sorcerer (bhagat) or sorceress (bhagatain). Consequently, several ex-communications and exclusions are faced by allegedly accused witches. Fellow tribals and kinsmen abstain from inviting them in occasions of birth, marriage and socio-religious events, fearing their negative influence on the auspicious occasion. They also refrain from consuming food prepared at their home and desist their children to socialize with them. In several cases, they are driven away from community settlement, and even forced to build their house outside the village vicinity. In short, there is no sympathy for witches in the tribal worldview. Subsequently after confirmation by sorcerer (bhagat) or sorceress (bhagatain), the position of witch is similar to that of a community criminal. If the extent of damage is less, the alleged witch is forced to consume urine or excreta. Apart from coercive feeding, face is painted with lime, head is tonsured, and she is forcefully wandered around the village with garland of shoes and damaged winnowing baskets, for making residents aware about the presence of witch, in their vicinity. These humiliations also act as warning, both for the alleged witch, as well as on-lookers for desisting from such practices. If the magnitude of loss is more, then in such instances, all of the above is followed by hunting the identified witch. In most instances, killing is performed during night, when the alleged witch is jolted from sleep. Also, since the witch is believed to be armed with supernatural powers, the entire community lends support in the act. The name of fellow tribals uttered during the course of flogging and thrashing are also considered as partners in crime, and subjected to similar terminal treatment. This public action of lynching is considered to be an act of social cleansing carried out for public welfare, and hence there is no remorse about killing their own community mate. This rationality also delivers the morality for accepting witch-hunting as a justified act within the community.

In the process of witch-hunting, the conceptualization of 'victim' and 'victimizer' is quite antagonistic. For resident tribals, one

who harms the community (i.e. the witch) is viewed as victimizer, and people who suffer the brunt, are perceived as victim. Contrastingly for outsiders, the witch who is ousted or killed is seen as victim, and people who are involved in branding and killing the alleged witch, are perceived as victimizers. This stark difference was also prominently noted in the study area.

4.2. Reasons for Rampant Protuberance of Witchcraft and Witch-Hunting

There are several factors which directly, or indirectly contribute in the sustained existence of witch-hunting in the study area. Amongst them - lack of education, unmoving faith in superstitions, lack of critical thinking, village level animosity, dearth of basic health care facilities, culturally disconnected awareness schemes, sparseness of political will, absence of rehabilitation policy, deficiency in accountability fixation of village representatives and witch-doctors, and ignorance about prevailing laws - are the prominent ones. Apart from these - dearth of clarity in defining witchcraft, low quantum of punishment and piecemeal nature of Jharkhand Anti-Witch Hunting Act, combined with absence of national legislation, acquittal of culprits on evidence deficiency, under reporting of cases, lack of media attention, police apathy, poor law enforcement, non-functional fast track courts, provoking television serials, paltry funding for civil society organizations - are the other crucial factors which contribute towards sustained presence of witch-hunting.

In nutshell, witchcraft finds its expression in customs and traditions of tribals, where they have deep-rooted belief that it has existed since times immemorial, and shall continue to exist for ever. This faith is so embedded through socialization and upbringing, that it sharply digresses from scientifically tempered understanding of reality, making people ardently believe that anything unsolicited happening around them, is due to the considered intervention of evil spirits. By this witchcraft allegations become a way of adapting with vulnerabilities of human existence, and crediting it to local actors is the only way out in such situations (Sundar, 2001),

which ultimately leads to finding of scapegoats and initiation of witch-hunting. By evaluating reasons for these uncertainties, it comes out evident that poor educational facilities, accompanied with debauched condition of healthcare amenities and stressful economic conditions, are the prime proliferators of witch-hunting.

4.3. Interventions for Combating Witchcraft and Witch-Hunting

There are several authoritative and judicial instruments for up-keeping the standards of human rights at par with global standards, and contending witchcraft related violence in the country. Amongst them, the prominent international instruments include Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW) 1979, United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) 2007, Convention Against Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment (CAT) 1984, International Covenant on Civil and Political Rights (ICCPR) 1966, International Covenant on Economic, Social and Cultural Rights (ICESCR) 1966, and Universal Declaration of Human Rights (UDHR) 1948. Apart from international legislations, the national instruments, directly or indirectly aiming at preventing witchcraft violence, comprises of several articles of Indian Constitution, relevant sections and clauses of Indian Penal Code (IPC) 1860, Drugs and Magic Remedies (Objectionable Advertisements) Act 1954, Scheduled Castes and Scheduled Tribes (Prevention of Atrocities) Act 1989, and Protection of Human Rights Act, 1993. However, till date a national legislation on witch-hunting is still awaited. Apart from international and national commandments, there is a state legislation titled Prevention of Witch-Hunting (Dayan Pratha) Act, 2001 in the province of Jharkhand, which exclusively deals with witch-hunting related cases in the study area and prescribes for punishment in instances relating to such crimes.

Policy interventions for combating witch-hunting were found to be very scanty in the study area. Examination of local newspapers revealed that witch-hunting cases were well

covered as news-items, but advisory advertisements defying such practices were barely issued by government. Regarding usage of radio, once there was a month-long drive in one of the FM radio stations against witch-hunting. However, after that, nothing was heard over the radio in this regard. The same is the case with television with no informatory advertisements being broadcasted in any of the national or regional channels. Considering the increasing instances of witch-killings, the Law Department of Government of Jharkhand, in 2016, notified the establishment of fast-track courts in Ranchi, Chaibasa, Khunti, Palamu and Simdega districts of the state, to ensure speedy trial of cases exclusively related to witchcraft violence. However, requisite man power and infrastructural resources were still awaited to be put in place for disposal of existing and emanating cases.

The Government launched a toll-free number (Women Helpline - 1091), and a mobile based application (SHAKTI) for registering issues relating to female concerns, including witch-hunting. However, there was no awareness about their existence in the study area. The Jharkhand State Women Commission in 2017, announced conducting of survey in all the villages of Jharkhand for identifying vulnerable women, likely to be labelled as witches. However, till date nothing has been initiated in that front as well. The only wing which appears to be functional at the grassroot level, are the NGOs involved in this. Only a few agencies like Sanskriti, Bhavishya Kiran, Rural Litigation and Entitlement Kendra, Free Legal Aid Committee (FLAC) and ASHA, were operational for the cause. However, due to limited outreach and fund crunch, their role also seizes to make a larger impact.

5. The Way Forward

Research in the study area affirms that women are overwhelmingly targeted in cases of witch-hunting. They are made scapegoats in instances of illness and conflict between families or extended families. In fact, it acts as a means through which conflicts are managed and losses are rationalized, in the community. The commonalities which emerge in all these instances include - poverty, lack of basic health care facilities, ignorance, non-rationality,

socio-religious practices lacking scientific standing, and animosity with neighbours. However, given the high level of materialistic and economic deprivation in the area, it would be inappropriate to write off the entire culpability upon debilitated tribals for their lack of rationality, belief in superstition and gendered practice of witch-hunting, as they do not opt for deprivation, rather suffer the consequences of it. It signals toward the negligence and apathy towards the community, and thus there is need to ponder upon the underlying causes that need amelioration. This calls for addressing the underpinning causes and conditions by adopting a holistic approach which guarantees prevention, prosecution, redressal and reparation. For ensuring this, role of education, law and public policy, are very pertinent (Alam & Raj, 2018).

5.1. Role of Education

If analyzed critically, it comes out evidently that the prime reasons leading to faith in witchcraft and subsequent deleterious actions, are largely rooted in superstitious institutional practices, economic deprivation and healthcare concerns. All these factors intersect in a multi-dimensional manner causing augmentation of witchcraft related delinquencies. These culpable agents can be mitigated with the help of measures, amongst which betterment of economic condition coupled with enhanced health care facilities, inculcation of scientific temper, and adoption of rationalistic institutional practices, are of paramount significance. These curative measures can be realized by inducing education as the pivotal resolution.

In instances of witch-hunting, it is widely presumed that the witches evoke supernatural powers to cause harmful events. If pondered carefully, it comes out evidently that majority of these unsolicited events are directly, or indirectly, allied to pitiable financial conditions. Due to deficiency of monetary resources, proper reparative measures for averting the exact cause of the problem, cannot be availed (Atalay, 2015). Resultantly, the liability for everything bad is transcribed upon witches. By promoting education - economic opportunities including securing of sustained livelihood options, enhancement of career

opportunities, augmentation of productivity, and promotion of entrepreneurial and technological advancements, can be ensured. Additionally, it can also bring about social change by altering the existing socio-economic power dynamics, wherein the alleged witches are less powerful than the people alleging them as culprits. Thus, by fostering education, negative economic circumstances accountable for bewitchment and witch-hunting can be countered efficiently, leading to weathering away of such practices.

Similarly, communities which are infamous for witch-hunting have certain common features. Amongst them - unmoving faith in existence of witches, conferment of accountability of unsolicited happenings on supernatural powers, unmitigated trust on witch-doctors and their treatment, and culturally induced mis-education which inculcates rationality and morality for accepting lynching as a justified act within the community, are quite universal (Kumari & Alam, 2017). All these postulates are not in conformity with the basics of scientific temper and logical reasoning. With integration of critical thinking and rationality inculcated through education, diversion of faith from irrational reasoning to rationally viable causes of unsolicited events, can be ensured. Resultantly, gratuitous violence based on fictitious and un-scientific reasonings, can be deterred significantly.

Summarily speaking, education, comprising of knowledge, skills and attitude - aids in opening inward flow of ideas using critical reflection to evaluate ideas, problems and policies, that pave the path for common good of individuals as well as society. Furthermore, education conveyed through critical pedagogical mode, can lead to inculcation of critical consciousness, encouraging reasoning, questioning (Freire, 1970); and eliminating prejudices and blindfold conformity. It also supports in fostering informed choices, empowering financially, discarding health oblivions, and inducing institutional practices which are in congruence with scientific rationality. All these competences bestow education to thrive as a powerful agent of social change, and combat agents behind the sustained existence of witchcraft beliefs and witch-hunting, which are largely grounded on

blaming, alleging and scapegoating. Although, substantial economic and sustained visionary efforts are required at the ground level for ensuring education to reach to those at the margin, but once achieved, it can lead to departure of such beliefs and culturally induced notions.

5.2. Legal Recuperations

Based on the identified reasons for sustained existence of witch-hunting in the region, it can be convincingly put forth that - the presumption behind devising of anti-witchcraft law of Jharkhand, is somewhat incongruous. It is merely an impeding mechanism and not a full proof response to the complications originating due to evil practices, unreasonableness and superstitions. It does not take into account - (a) the convictions of people, (b) the conditions under which such practices flourish, (c) the mode of reporting of cases, (d) the investigation carried after reporting, and (e) the emergent needs of victims. Due to these, it cannot end superstition, inject scientific rationality, or provide redressal to victims. Also, there is considerable gap between what the law aims to achieve, and how it is actually provisioned and thereafter executed.

First of all, the religio-cultural practices of tribals frequently involve performing of visibly similar rites and rituals, as followed in witchcraft, or opted during combating of witchcraft influences. These are very often misconstrued as witchcraft practices. Thus, what all activities and convictions are covered under the ambit of witchcraft, needs to be clearly defined in the Anti Witch Hunting Act. This dearth of conceptual clarity often leads to relatively less informed law enforcement, judgement and policy formulations. Secondly, the quantum of punishment awarded in the Act, in terms of imprisonment tenure and imposed financial penalty, if found guilty, is quite paltry. It fails to create fear and deterrence in society about the crime, and hence, a quantum increase in the prescribed punishment is solicited. Alongside these, the criminal justice system is accountable for prosecuting the wrongdoers. It necessitates registering of accurate complaints, followed by investigation with due diligence, and then prosecution.

However, in instances of witchcraft accusations, FIRs are not registered at the time of bewitchment. Police often reckon it as matter of internal strife of minuscule magnitude, and therefore desist from initiating any reparative measures. Also, cases are registered only when nature of assault involves extreme cruelty and degradation such as - physical assault, naked parading, tonsuring, forced consuming of excreta or killing. If the victims or their family members, approach the police without occurrence of such grave physical violence, cases are usually not registered. This is a major loop hole, which requires attention and attitudinal moderation.

Consequent upon registering of case, the anti-witch hunting law has to be invariably invoked with other provisions of IPC, indicating that the special law legislated for the purpose - is insufficient in circumscribing all forms of violence in the committed crime. Due to this, many a times, such performances tend to get booked as trivial offences. This gap needs to be addressed. Also, the nature of violence committed during witch-hunting, does not signify the mere desire to eliminate the alleged witch. There is gendered and sexual violence involved in the act, such as forced disrobing, tonsuring and naked parading, carried with the intent of degrading, stigmatizing and dehumanizing the identified witch, for which there is no penal redressal commensurate with the nature of inflicted injury. The anti-witch hunting act needs to recognize, name and accommodate commensurate redressal for such forms of degrading violence.

While legislative reforms are necessary, its impact is greatly diminished by indifferent and dispirited implementation. From failure in registering cases, taking preventive action, to poor investigation and prosecution, all such acts of omission, undermine the law. There is a pressing need to address these gaps by sensitizing the agencies working within the criminal justice system. Also, there is need for the judiciary to specifically send directions to concerned agencies and individuals, along with their judgments, so that steps toward ensuring accountability for their lapses, are inevitably taken. Another major concern, which is usually side-lined in the entire process of justice delivery, is the lack of accountability fixation.

Usually in instances of witch-hunting, concomitant violence cannot thrive without consent of traditional heads and elected panchayat representatives, who despite being aware of local dynamics, do not alert local law enforcing agencies on time. Also, witch-doctors, who actually play the protagonist in identifying witches are equally accountable for instigating such practices. Their abetment in such vices are often neglected in court proceedings. This necessitates fixation of accountability and punishment, while adjudication of such cases in the court of law.

Alongside these loopholes, in view of the growing number of cases of witchcraft related violence in Jharkhand, the state government notified for establishment of fast-track courts for ensuring speedy trial and disposal of such cases. However, due to executive sluggishness, requisite man power and infrastructural resources have not yet been put in place. This needs to be taken up on priority. Also, till date, there is no national legislation for preventing witch hunting in India. Due to its non-existence, the state law fails to effectively combat witch-hunting, in want of the much-needed legal backing administered by a national legislation. This void requires immediate attention. Parallely, another crucial hiccup identified in the study area was the -prevailing ignorance about the very existence of an act legislated for thwarting witchcraft related crimes. Resident tribals were ignorant that their custom of eliminating the witch is a punishable offence, that too cognizable and non-bailable. This ardently calls for promoting legal awareness among the tribals.

5.3. Ameliorating Public Policy Initiatives

In the study area, it came out conspicuously that most cases of witchcraft violence fail to reach police stations or courts. Even if taken, a substantial number are dismissed due to factors such as lack of proper investigation, absence of witnesses, minor punishment to perpetrators, or 'compromise' between victims and perpetrators. Due to these, the state witch-hunting law is unable to achieve its desired purpose. Keeping these in mind, a more social and reformative approach for subscribers of this belief system, along with addressing underlying causes, is solicited for combating

this menace, rather than being strictly penal. First and foremost, is the acute shortage of healthcare facilities. Due to abysmal condition of trained medical personnel, infrastructure crunch, affordability issues, and accessibility concerns, resident tribals are forced to rely on un-trained medical personnel (i.e. bhagats and bhagatins), who eventually, in most cases, fleece them. The grimmer side pertains to cases of failure in treatment wherein the blame of hindering the curing process is veiled upon witches. Such conditions of deprivation, indicate indifference towards the prevailing disparities and failure in governance. This calls for urgent structural transformation ensuring availability, accessibility and affordability of healthcare facilities. Secondly, due to deficiency of monetary resources, corrective measures like treatment in hospital for ill health, proper irrigation and manuring of crops, availing service of veterinary doctors for cattle, or other reparative measures for averting the exact cause of problem, cannot be availed. Resultantly, liability for everything bad is transcribed upon witches. Thus, addressing impoverishment, through generation of employment opportunities, is another major solicitation for contending witchcraft practices and hunting.

Adding to sorry state of affairs is the minimalistic coverage of news relating to witch-hunting and their follow-up action, by print and electronic media, especially national level agencies. Due to this, it fails to draw larger public attention, and resultantly, the accountable state actors (i.e. police and government agencies) treat it just like 'any other case of murder'. Exclusive and detailed coverage by media houses can surely assist in betterment of this depraved condition. Another crucial moderation imperative at this front, is the change in methodology of registering the case count. Currently, data relating to witchcraft related crimes in India, is aggregated by National Crime Records Bureau. It considers only the number of executions which have taken place on alleged charges of practicing witchcraft. However, instances involving gross desecration of human rights such as physical assault, naked parading, tonsuring, forced consuming of excreta etc., in which the victims were either spared or

somehow managed to survive, are not covered in this counting. This under-reporting belittles the real magnitude, and hence the currently followed methodology of capturing the number of cases solicits transformation.

Another recent development has been the surge in television shows aired over popular hindi entertainment channels portraying contents relating to magic, superstitions and witchcraft. Such contents reinforce faith of tribals in existence of witches and their supernatural powers. Due to this, a genre meant for entertainment of people, has emerged as a contributor in pulling back the society. This needs to be monitored and wherever required, aptly censored contemplating its larger societal impact. Additionally, another glaring concern is that two decades have passed since establishment of Jharkhand, but not even a single discussion has ever taken place in the legislative assembly of state for thwarting witchcraft related crimes, especially when the state out-ranks all other states in number of witch-hunting cases. This reflects the lackadaisical approach of political parties and elected legislators, and implores for remedial measures through moderation of existing law, ameliorating causative concerns, and ensuring accountability for acts of omission in delivery of basic needs and services, through the executive machinery.

Alongside these, there are several exclusions which are faced by alleged witches. Many survive the stigma and violence, and sustain to live with devastating consequences such as loss of home, livelihood, temporary or permanent displacement, and breakdown of family and societal relationships. However, to counter this situation of isolation, fear and impoverishment - there is no policy in the state. Measures for rehabilitation, strategy for providing

compensation, legal aid, protective shelters, medical assistance, food security, re-integration of victim with families, and above all, authoritative assurance about non-recurrence of violence - are unavailable. These deficiencies, drastically inhibit recuperation of victims affected due to witchcraft stigmatization, and hence calls for immediate attention.

6. Conclusion

If pondered and analyzed critically, it comes out evidently that the prime causes leading to faith in witchcraft and subsequent deleterious actions, i.e. witch-hunting, are largely entrenched in superstitious institutional practices, economic deprivation and healthcare concerns. All these factors intersect in multi-dimensional manner (Crenshaw, 1991), causing augmentation of witchcraft related delinquencies in the area. These causative agents can be mitigated with the help of measures, amongst which - accountable administration, accessibility to healthcare facilities, responsive law enforcement, and efficient judicial system, are pivotal for ensuring material transformation. However, for levelling socio-economic inequalities, and transcending long held convictions, change must emanate from within the community. For this, education alone can help in desisting superstitious institutional practices, averting blindfold conformity, promoting community dialogue, engaging in remedial practices, improving livelihood support, and fostering economic empowerment. Cumulatively, all these can heal and rebuild the lives and families broken by such gratuitous victimization, and also contend faith in existence of witches, their perceived craft and witch-hunting.

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ROTATION, SCALE AND FONT INVARIANT CHARACTER RECOGNITION SYSTEM USING BACK-PROPAGATION NEURAL NETWORKS

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ABSTRACT

The text extraction suffers from the drawback of size and rotation of the text appeared on the images and the scanning device has to be focused on the textual area of the image. This can be automated if the algorithm is designed in way so as to identify the text area on the image at some orientation or sizes. In the presented work, the characters are segmented by using the pixel neighborhood technique and resized to a 32x32 block. The centre of gravity of the character is computed by using the first order moments. The contour of the pixel is extracted by means of Robert's operator. The radii from centre of gravity to contour pixel and are arranged in descending order. If the same character is rotated about its centre of gravity by some angle, the same radii are extracted and are arranged in descending order. In this article, it is observed that the first few radii are same for the same character if rotated at any angle. This gives the rotation invariant character recognition. Further, the characters are normalized with respect to size by dividing the radii(radius). The location invariance is obtained by use of centre of gravity.

Keywords: Segmentation, Image thresholding, Rotation invariance, Size invariance, Orthogonal transformation, Radial vector

1. Introduction

Text extraction from images finds application in most of the documents related entries in offices and the most popular application is in libraries where no. of books are entered daily by typing the book title along with its author name and other attributes. This can be made easier by using a suitable algorithm or software application that can extract the text from the book cover and present in a text file thereby reducing the typing job of the user. Now he needs only to arrange the book title and authors name and etc. by formatting the material.

The problem with the traditional Character Recognition System is that the characters in the image have to be of a proper size and properly oriented and they should not be rotated, if the characters are rotated and varying in size it results in degradation of the performance of the system and system produce error. Also, the system should identify characters of different fonts effectively. To overcome this problem an effective algorithm is required to make the system invariant of rotation, scale and font of character. In this research, a system is proposed which can detect characters effectively from an image irrespective of the size, font and rotation of the characters in the image.

The purpose of document-image analysis is to transform the information contained on a digitized document image into an equivalent

symbolic representation. Due to the tremendous reduction in the storage space of the processed results, it is advantageous to reproduce, transmit, and store the document in the processed form. The extracted regions can then be processed by a subsequent step according to their types, e.g., OCR for text regions and compression for graphics and halftone images.

2. Review of Related Literature

Techniques for page segmentation and layout analysis are broadly divided in to three main categories: top-down, bottom-up and hybrid techniques Cho(2013). Many bottom-up Approaches are used for page segmentation and block identification Nagy &Seth (1984), Sinha &Bansal (1995). Yuan, Tan Khedekar et.al., (2003) designed method that makes use of edge information to extract textual blocks from gray scale document images. It aims at detecting only textual regions on heavy noise infected newspaper images and separate them from non-textual regions.

The sequence of separating the text from the image is basically fall into two categories: statically methods and syntactic methods. First category includes techniques like template matching, measurement of density of point in a region, moments, characteristic loci, and mathematical transformation. In the second category the process aims at collecting the

effective shape of the numeral generally from counters or counters.

The White Tiles Approach Yuan & Tan (2001) described new approaches to page segmentation and classification. In this method, once the white tiles of each region have been gathered together and their total area is estimated, and regions are classified as text or images. George Nagy, Mukkai Krishnamurthy Antonacopoulos & Ritchings (1995) have proposed two complementary methods for characterizing the spatial structure of digitized technical documents and labelling various logical components without using optical character recognition. Projection profile method Lee, Choy & Cho (2000), Perroudet.al. (2001) is used for separating the text and images, which is only suitable for Devanagari Documents (Hindi document).

The main disadvantage of this method is that the irregular shaped images with non-rectangular shaped text blocks may result in loss of some text. They can be dealt with by adapting algorithms available for Roman script. Kuo-Chin Fan, Chi-Hwa Liu, Yuan-Kai Wang Drivas & Amin (1995) have implemented a feature-based document analysis system which utilizes domain knowledge to segment and classify mixed text/graphics/image documents. This method is only suitable for pure text or image document, i.e., a document which has only text region or image region. This method is good for text-image identification not for extraction.

The Constrained Run-Length Algorithm (CRLA) Zramdini & Ingold (1993) is a well-known technique for page segmentation. The algorithm is very efficient for partitioning documents with Manhattan layouts but not suited to deal with complex layout pages, e.g., irregular graphics embedded in a text paragraph. Its main drawback is the use of only local information during the smearing stage, which may lead to erroneous linkage of text and graphics. Kuo-Chin Fan, Liang-Sheen Wang, Yuan-Kai Wang proposed an intelligent document analysis system to achieve the document segmentation and identification goal. The proposed system consists of two modules: block segmentation and block identification. Two kinds of features, connectivity histogram and multi resolution features are extracted.

3. Development of Algorithm

The presented work deals with the automatic visual inspection of the geometric patterns to recognise and classify. The algorithm basically involves extracting the features of each character effectively and then used these features for neural network training.

Fig. 1 shows the block diagram of the presented approach.

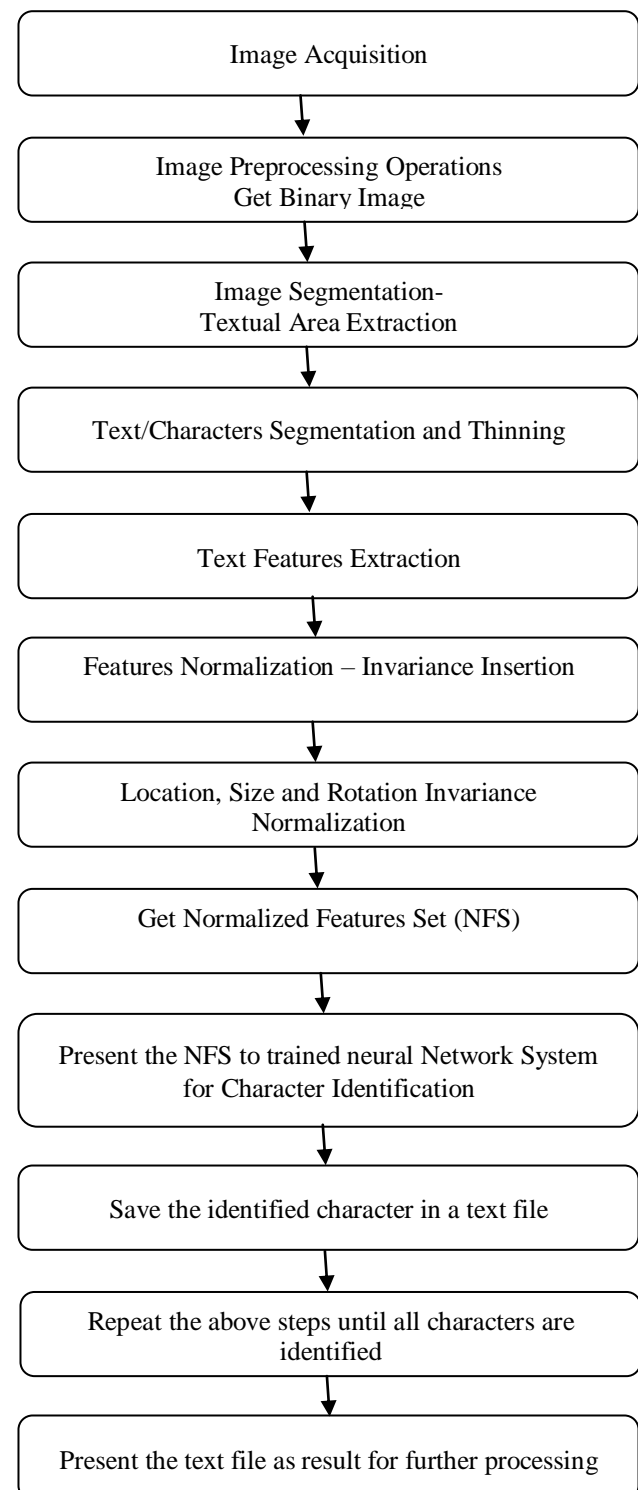


Figure 1: Block Diagram

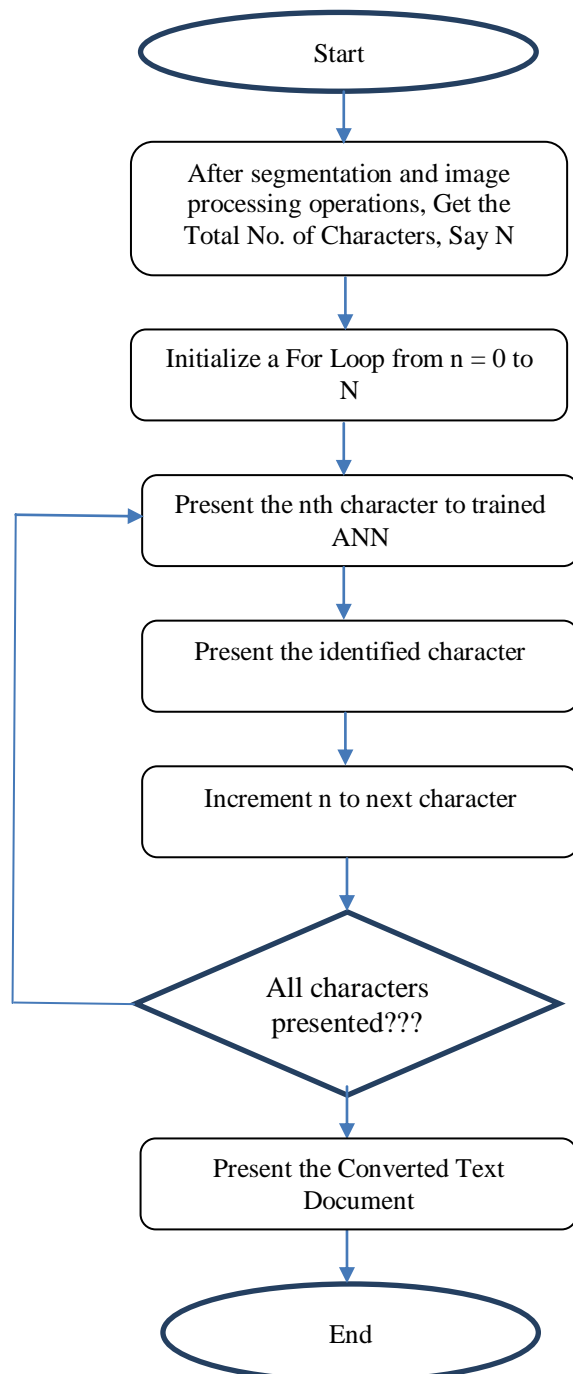


Figure 2: Flow Chart

In the above figure 2, a flow chart is presented that represents the complete process flow of the algorithm, how an image document is processed for text identification.

Image acquisition is the very first step while conversion of text from scene to a textual information. The image of the text matter is either scanned or clicked using the digital camera. The acquired image is in jpeg format i.e., 24-bit color format. The same is converted to 8-bit color format i.e., graycolor format using the `rgb2gray` command in matlab. The gray

image is now binarized using the Otsu algorithm. This gives a binary image consisting of black color text material on white back ground.

4. Character Segmentation and Normalization

Now the text material is segmented using the labelled image conversion process. The binary text material or image is scanned for the grouped pixel in black using the 8-connectivity in a 3x kernel.

The segmented characters are now exposed to feature extraction process. For, the centre of gravity (COG) is computed by using the first order moments. The COG is computed using the first order statistical moments as follows:

$$G_x = (1/N) \sum X_i$$

$$\text{And } G_y = (1/N) \sum Y_i$$

Where (G_x, G_y) are the co-ordinates of COG and (X_i, Y_i) and 'N' are the co-ordinates of i_{th} pixel and total no. of pixel on the object respectively. Now, maximum and minimum radii and intercepts on axes are computed in each quadrant using the following equation:

$$R = \sqrt{\{(G_x - X_1)^2 + (G_y - Y_1)^2\}}$$

Where (G_x, G_y) and (X_1, Y_1) are coordinates of COG and pixel on contour of the pattern.

The perimeter and character area are computed by counting the pixels on boundary and total pixels on the character portion. A schematic view of the above steps is given below:

The extracted features are divided by the mean radius in order to normalize the features size invariant. The features are already location independent as all the features are computed around the centre of gravity of the character under study.

The perimeter, area and Euler no. are absolute features and do not depend upon the rotation. However, the character identification primarily depends upon the radii distribution in different quadrants around the COG. For this purpose, all the radii from COG to periphery are computed and arranged in descending order. The same procedure is repeated for the same character rotated at different angle. In the below table, character 'A' is taken for example and radii in descending order at different rotation are tabled below:

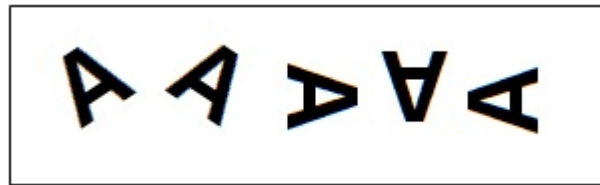


Figure 3: Same Character at Different Orientation

The table-1 shows the first 20 radii in descending order along with mean radius, perimeter, standard deviation and Euler no. for the character ‘A’ rotated at different angles as shown in fig. 3. It can be observed from the table that the radii, mean radius, perimeter, std. dev. and Euler no. are very close to each other, thereby proving the efficiency of the propose

algorithm. Same effect is observed with same character in different font style.

5. Character Identification

The character features are now normalized between 0 and 1 by dividing the features by the maximum value for inputting them to a neural network classifier.

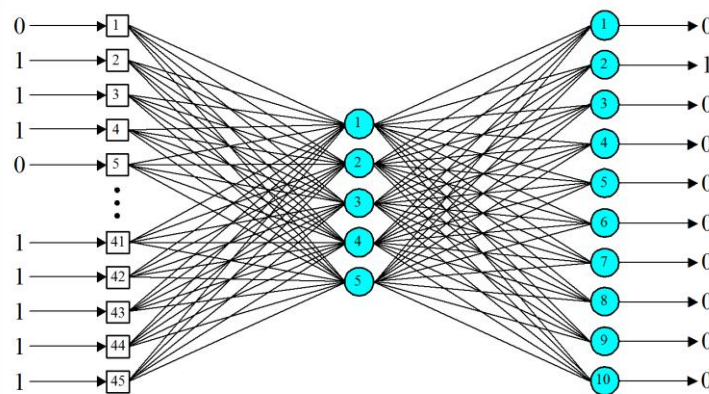


Figure4: Extracted feature set act as input to the neural network

The normalized feature set is presented to the neural network in order to train the system. The features act as input to the neurons, the number of neurons are equal to the number of the normalized feature vector of the each character. Once the system is trained, it can be used for validation purposes. The system is trained by using back propagation algorithm. A neural

network is trained for different shapes and style of the same character for proper training of the neural network and proper adjustment of weights. Once the neural network is trained for each of the character in different style or fonts, the system is ready for application in field. Before, putting into application, the same is tested on some test images.

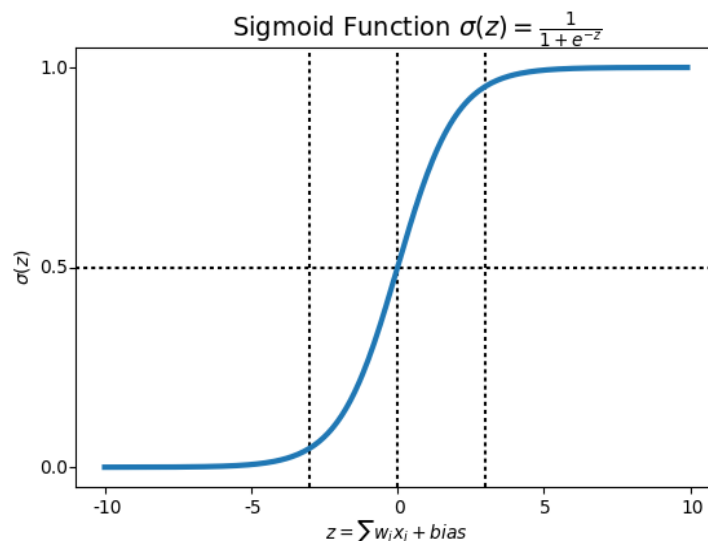


Figure 5: Sigmoid Function

A sigmoid function is used in the presented ANN algorithm that threshold to present the optimized character to that of the input feature set as input neurons. Sigmoid function is given by:

$$\text{Sigm}(z) = \frac{1}{1 + e^{-z}}$$

Where $z = \sum_{i=1}^n w_i x_i + \text{bias}$

And x_i is the i^{th} feature and w_i is the weight vector.

6. Results

The feature table for the characters A – Z and numerals 0 – 9 is given in table-1. A back propagation neural network is trained using the extracted features as input neurons and alphabets A-Z and numerals 0-9 as output.

Following back-propagation neural network is designed for training of the network:

Input Neurons = 20 (Features)

Learning Rate (η) = 0.75

No. of Hidden Layer = 1

No. of Hidden Layer Neurons = 2

No. of Outputs = 36 (A-Z + 0-9)

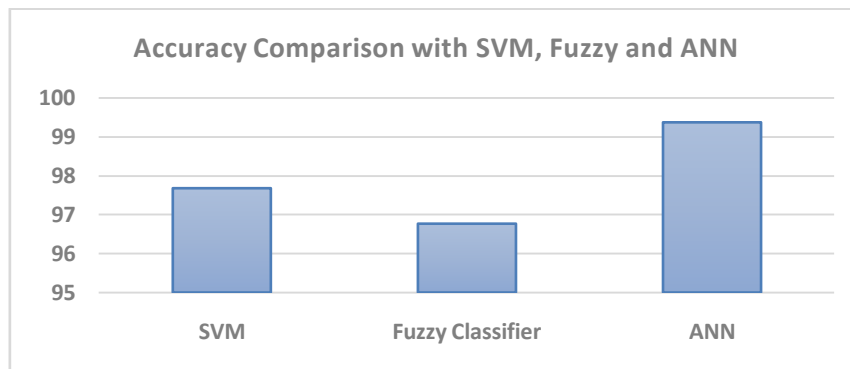
Target MSE = 0.00001

Training Set = 180

The training set includes five different font sizes for each A-Z and 0-9 thereby making (26x5 + 10x5) 180 training sets. After completion of the NN training, the NN was tested by giving different input characters and found to identify with accuracy above 99%,

Table 1: Features of the character at different angle

Sr. No.	Fig. 1	Fig. 2	Fig. 3	Fig. 4	Fig. 5
R1	1.5944281	1.5462864	1.5555151	1.5545055	1.5595873
R2	1.5452849	1.5462864	1.5555151	1.5545055	1.5191996
R3	1.5345495	1.4972632	1.5555151	1.5545055	1.5191996
R4	1.4994348	1.4771985	1.5152329	1.5182238	1.4818075
R5	1.465986	1.4517276	1.5152329	1.5142494	1.4818075
R6	1.4407085	1.4517276	1.4779384	1.5142494	1.4797594
R7	1.4407085	1.4375263	1.4779384	1.4769791	1.4797594
R8	1.4266149	1.4100175	1.4758956	1.4749377	1.4413445
R9	1.399315	1.4100175	1.4758956	1.4749377	1.4413445
R10	1.399315	1.3927161	1.437581	1.4408365	1.4040391
R11	1.399315	1.3846579	1.437581	1.436648	1.4040391
R12	1.3620642	1.3656705	1.400373	1.436648	1.4040391
R13	1.3553045	1.3519448	1.400373	1.3994641	1.4040391
R14	1.345784	1.3519448	1.400373	1.3994641	1.3679339
R15	1.341683	1.3491829	1.400373	1.3994641	1.3679339
R16	1.3389421	1.3450294	1.3643621	1.3634765	1.3679339
R17	1.3293043	1.3394714	1.3643621	1.3634765	1.3679339
R18	1.3293043	1.3394714	1.3643621	1.3634765	1.3331264
R19	1.3293043	1.3394714	1.3643621	1.3634765	1.3331264
R20	1.3293043	1.315588	1.3296455	1.3287825	1.3331264
Perim.	220.898	225.74	237.994	237.839	235.498
MeanR	1.58	1.546	1.539	1.539	1.512
SD	0.052	0.49	0.051	0.052	0.048
Euler No.	0	0	0	0	0



CLASSIFIER	MSE (%)	ACCURACY (%)
SVM	2.321	97.679
Fuzzy Classifier	3.232	96.768
ANN	0.629	99.371

Accuracy Comparative Analysis

A comparative analysis of accuracy for different classifier is shown above.

7. Conclusion

The presented radial based feature set and characterization algorithm-based extraction of text from the scene and can be extended to application like in library, word processing, and image to text converters. Some existing approaches for the same are studied and found the disadvantage of size, location and rotation

invariance. In the proposed approach, invariances are inserted into the features extraction process so that the characters are normalized in all respect. Once the features are set and are constant for the same object in either form, then the features may be used for identification purposes. The algorithm is developed in matlab version 7.5 and can be converted to any front-end language for commercial applications.

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CEREBRAL PALSY AND ITS IMPACT ON EYE MOVEMENT, VISUAL PERCEPTION AND READING ABILITY**M.Akon¹, R. Ghoshal² and A. Das³**^{1,2}Department of Optometry, CT University, Ludhiana (Punjab), India³Department of Ophthalmology, Spectra Eye Foundation, Kolkata, India¹akon.optom@gmail.com, ²rituparna17615@ctuniversity.in, ³drananyabrata@gmail.com**ABSTRACT**

Cerebral palsy (CP) is a group of permanent developmental disorders. It is caused by non-progressive disturbances in the developing fetal or infant due to prenatal, perinatal, and post natal brain injury. Different types of CP affect different skills of a child decreasing his or her physical, visual and social wellbeing. Impairment of motor function and non-motor visual skill results in restricted daily living activities along with poor academic performance and in children. Sound visual skills and visuomotor skills are required for carrier out academic activities including reading, writing. Visual-motor perceptual skills are important predictors for handwriting performance, including both readability and writing speed and integrate visual information processing skills with fine-motor movement which is impaired in palsied patient. Thereby, the overall management plan of CP would depend on the understanding of the various visual skills of the affected individuals. Eye movements, visual perception and reading skills are some of the measures that represent visual skills. An optometrist and other eye care practitioners should consider them along with routine visual acuity and ocular assessment while evaluating a child with CP. The present paper aims to discuss eye movement, visual perception and reading performance among children with CP.

Keywords: cerebral palsy, eye movement, visual perception, reading performance

Introduction

In 1862, William James Little, an orthopedic surgeon used the term “Little’s disease” for spastic rigidity related to prematurity and birth complications. Later on, William Osler introduced the term ‘Cerebral Palsy’ in 1888 (Blumenthal 2001). The term “Cerebral” refers to brain and “Palsy” refers to lack of control in muscles. The classic definition of cerebral palsy is “a disorder of movement and posture due to a defect or lesion of the immature brain” (Bax 1964). This definition was modified in 1992 to enclose the heterogeneity of the disorders covering a group of non – progressive, but permanent, motor impairment syndromes caused by lesions or anomalies of the brain occurring in the early stages of development (Mutch et al. 1992).

Cerebral palsy (CP) has been reported to be the most common cause of physical disability among children in the developed countries. CP causing lifelong motor impairment is often associated with cognitive deficits, impaired communication, and impaired sensory perception. CP relies upon three common features, body movement or posture disorder, static abnormality in the brain, and acquired brain disorder early in life (Blair and Watson 2006). The motor disorders of cerebral palsy include disturbances of sensation, perception,

cognition, communication and behavior by epilepsy and by secondary musculoskeletal problems. Thus, Individuals with CP might exhibits vision deficits. Vision being an important sense that plays role in the overall development of a child is thereby considered as one of the majors areas that require attention among the population with CP. Association of CP with visual disabilities have been studied and term such as “cerebral visual impairment” has been introduced. Cerebral injury may involve damage in one or many areas of visual pathway, visual cortex and its associate areas leading to variety of deficits in visual functions including visual acuity, visual field along with oculomotre corordination and visual perception. However, not many study reported parameters of vision including eye movements, visual perception and reading abilities of these children. Thereby the present article aims to discuss these three important visual parameters in children with CP. The present articles also summaries incidence, etiology, classification and management of CP at the beginning of the paper.

Incidence and Etiology of Cerebral Palsy

The worldwide incidence of CP has been reported to range from 2 to 2.5 per 1000 live births (Sankar & Mundkur 2005). The increasing rate of CP is due to rate of survival

of premature infants. The etiology of CP is diverse and multifactorial. Some of the causes reported are congenital, genetic, traumatic inflammatory, infectious, anoxic, metabolic, brain injury which could be prenatal, natal or postnatal. Sankar and Mundkur (2005) have reported that 75% - 80% of the cases of CP are due to prenatal injury whereas 10% of cases are due to birth trauma or asphyxia. They have further reported that 10% 18 % of babies with CP had birth weight ranging from 500-999 grams. Similarly O’Callaghan et al. (2011) and Shi et al. (2017) reported risk factors of CP include preterm birth, perinatal infection (particularly chorioamnionitis), intrauterine growth restriction, use of preterm antibiotics before rupture of membranes, acidosis or asphyxia, and multiple gestation, which can lead to brain injury.

Classification of Cerebral Palsy

The topographic classification of CP includes monoplegia, hemiplegia, diplegia and quadriplegia. Monoplegia and triplegia are Quadriplegia is the most severe form trunk and upper limbs are more severely involved compared to lower limbs. This condition is linked with acute hypoxic intrapartum asphyxia (MacLennan 1999). Pseudobulbar signs are noticed in most children with recurrent aspiration of food material and dysphagia. Most of CP palsied show Optic atrophy and seizures and severe intellectual impairment. Hemiplegia is unilateral paresis with upper limbs strictly affected than lower limb. It is

more common in term infants than in preterm infants with improper coordination of index finger and thumb, expanded wrist and supination of the forearm. Dorsiflexion and aversion of the lower foot are damaged most with sensory abnormalities present in affected limb (Menkes et al. 2006).

Diplegic cerebral palsy occurs in infant with prematurity and low birth weight. Monoplegic cerebral palsy affects only one limb. Sometimes, the paralysis is confined to a single muscle impairing minor functional abilities enabling the affected individual to perform their daily living activities (Sankar and Mundunkar 2005). In triplegic cerebral palsy, one side of body is completely paralyzed with the arm or limb being affected in another side.

The physiological classification of CP include spastic CP presenting with muscle spasticity, stiffness, depressed inhibition, muscle co-contraction, muscle hyper tonicity, slow writhing movement due to lesion in pyramidal cells and tract.

Athetoid (Dyskinetic) CP, another form of CP occurs due to lesion in basal ganglion presenting superior gaze problem, drooling, lurching, grimacing, involuntary motion interferes with voluntary motion, extraneous movement; Ataxic CP occurs due to lesion in cerebellum with clinical features disturbed equilibrium, depressed motion awareness, directionality disturbance, fine motors (Table 1).

Table 1: Classification of cerebral palsy [Source: Maino (2006)]

Classification	Lesion location of brain	General signs
Spastic	Pyramidal cells and tract	Muscle spasticity, Muscle stiffness, depressed inhibition, muscle co-contraction, muscle hyper tonicity, slow writhing movement
Athetoid	Basal Ganglion	Superior gaze problem, Drooling, Lurching, Grimacing, Involuntary motion interferes with voluntary motion, extraneous movement.
Ataxic	Cerebellum	Disturbed equilibrium, Depressed motion awareness, Directionality disturbance, Fine motors

Clinical feature of Cerebral Palsy

Various signs and symptoms of non-motor visual analysis skill deficiency comprise of late learning of the alphabet, crowding-like spatial confusion when viewing coincident visual stimuli, defective automatic sight word vocabulary, confusion in letter transpositions, difficulty in basic mathematics, visual search-

like tasks, spelling non-regular words, visual discrimination, visual sequential memory (Garzia 2000). Other signs and symptoms include Pain, inability to walk, hip displacement, epilepsy, incontinence, behavioral or sleep disorders (Novak et al. 2012). Brain lesion causing CP leads to positive reflexes; spasticity, hyper-reflexes, co-

contraction and negative features such as weakness, loss of selective motor control, deficits in balance and co-ordination (Graham & Selber 2003; Gage & Novacheck 2001; Mayer & Esquenazi 2003), contractures in wrist, ankle, knee (Menkes 2000). Motor disorder associated with CP results in poor facial expression, gesture, speech, body movement which can ultimately decrease child's communication.

Management

The primary care include: anticipatory guidance, immunization, and developmental surveillance. All routine immunization and vaccine should be provided to mother and baby. Specific treatment include physical, occupational, and speech therapy, orthopedic and neurosurgical intervention, and drug treatment whereas some of the children with CP may require combine treatment option. (Jan 2006).

As discussed, cerebral palsied population have learning, seeing, hearing, speaking, behavioral, drooling issue which may affect the daily activities of a child .To examine visual perception status in different type of CP and severity of motor dysfunction is one of the important factors for organizing the need for palsied children. This article is focused to correlate reading performance, visual perception and eye movement in cerebral palsy.

Visual Perception

Visual perception is a process which takes the information about the detail, depth, spatial relation, and locations of objects to be visualized from surrounding depending upon subserving visual-perceptual processes and early visual experience (Gilmore 2003). It is capability to interpret the immediate environment from visual information (Lueck & Dutton 2015). As per Oxford dictionary, Cognition is defined as the mental action or process of acquiring knowledge and understanding through thought, experience, and the senses. Visual perception of sign language involves focal attention (Segall 1966): serial scanning of image, information is processed from the foveal area which is 2.5 of

visual angle around the center of the visual field (Muir & Richardson 2005). Visual attention extend when the information is complex or when we are in new situation (Vicker 2007).

Clinically visual analysis skills are subdivided into visual discrimination, visual figure ground, visual closer, visual memory: visual sequential and spatial, visualization, attention and visual processing speed. Menken et al. (1987) reported that TVPS Test for Visual Perception skills are low in children with CP (Ego et al. 2015) and visual-perceptual impairment is frequent in hemiplegic and diplegic depending on the difficulties in shifting visual attention from central to peripheral targets and using anticipatory saccadic movements to gather information about the nature and locations of targets (Fedrizzi et al. 1998). Visual perception impairment (VPI) in spastics CP is due to reduction in white matter in parietal and occipital lobe. (Fazzi et al. 2004; Goto et al. 1994). Fedrezzi et al. (1998) have reported that lesion in optic radiation can be associated with impairment in visual perception. Mathematical learning is a difficult task in cerebral palsied children than typically developing children which include subitizing (quantifying sets); counting; and basic arithmetic problem-solving (Jenks et al. 2009). VPI present in high percentage of CP with significant difference between the subtype of CP according to gender.

Reading performance, Cognition and Academic skills in CP

Reading is a complex process, sustained near work that uses unique visual stimulus characteristics and require extraordinary long period of visual attention, serial saccades and accommodation to near target. The five modes of reading such as scanning, reading, skimming, learning and memorizing. Reading can be intensive or extensive. It is the capacity to understand, use, and reflect on written texts inorder to achieve knowledge. Reading performance is not a one dimensional skill that can be analyzed by one test, it includes reading level, reading accuracy, reading comprehension and reading rates (Table 2).

Table 2: Chall's stages of reading development with expected reading rate for each stage

Stage	Approximate Age/grade	Characteristics and masteries by end of stage	Result/ Acquired	Rate of reading
Stage 0	0-6years preschool	Pre reading (child pretend to read)	Learning to read	68 Standard word per minute (A standard word means six character spaces.) Swpm
Satge 1	6-7years 1st to 2nd grade beginning	Formal training letter Child is able to read simple text.	Learning to read	99 swpm
Stage 2	7-8years 2 nd and 3 rd grade beginning	Whole-word patterns , reading fluency Child read simple , familiar stories with fluency	Learning to read	121-141 swpm
Stage 3	8-14years 4 th to 9 th grade	Comprehension ,Single perspective Child get new ideas , knowledge, feeling, experience.	Reading to learn	141-204 swpm
Stage 4	15-17years 10th to 12th grade	Multiple perspective , layer of knowledge Broad range simple to complex material	Reading to learn	216-248 swpm
Stage 5	≥18 years	College and beyond , mature reading Subject reads for personal and professional need.	Reading to learn	263swpm

Basic cognitive and academic skills show the level of intelligence of a person which is important for success in life. Most studies show that intelligence is strongly (but not absolutely) correlated with the degree of motor impairment (Fennell & Dikel 2001) and also with epilepsy (Pahlman et al. 2019). The academic skills of the children with CP depend upon primarily the physical functional level of the child and secondarily the cognitive and neuro physiological impairments present in the child. Fluss and Lidzba (2020) highlighted children with CP have neuropsychological deficits which affect predominantly visuospatial function, attention, and executive function ultimately academic performance and social participation ineffective. Cognitive function includes language, visual memory, visuo-perceptual and visuospatial function. CP show working memory and executive function deficit which affect daily activities of child (Bottcher et al. 2010; Jenks et al. 2009; Satdskleiv et al. 2018). Cognitive dysfunction is frequent in CP, with motor impairment associated speech deficits.

Laterality of lesion may also have its impact on performance of intelligence measures. It has been reported that right hemiplegic children

with impaired acquisition for drawings relative to control subjects might exhibit poorer performance compared to left hemiplegic children and sibling controls in terms of the ability to understand and monitor bonds between words in a sentence (Kiessling et al. 1983). Diffuse lesion in white matter has been reported to be linked with reduce competence of information processing leading to impaired cognition (Luciana 2003). Similarly, lesions in periventricular white matter in anterior (Schatz et al. 2001; White & Christ 2005) or parietal regions might cause attentional and executive task.

Language functions cover receptive and expressive language, including phonological, syntactical, and semantic processes and later during school age the acquisition of reading, spelling, and writing abilities (Temple 2014). At least 60 percent of childrens have speech impairment. They have dysarthria ranging from slurred voice, poor voice or no comprehensible voice (Pennington et al. 2005). Research has shown that children with severe speech impairments face numerous barriers in their efforts to become literate (Vandervelden & Siegel 2001). Some study show retelling ability in the children with is dependent on language

comprehension and production, and memory functions (Nordberg et al. 2015). The role of the ability of children with speech impairment to make phonological coding; they described the articulatory element of the phonological coding as “not essential”. Sandberg and Hjelmquist (1997) find nonvocal children showed decreased reading and spelling task than two comparison group, one matched for mental age and one for mental and chronological age.

Eye Movement

Eye movement is an essential natural reflex which direct our gaze towards a visual stimulus and maintain a stable clear image on the retina. Humans visually explore their environment by making three to four fixations every second, each of them is followed by a series of saccadic eye movement to the next object of interest. Basically eye movement is divided into four types; saccades, smooth pursuits movement, vergence movement, and vestibule-ocular movement. Saccades reposition the eyes on the stationary object at velocity ranging from 100/sec to greater than 7000/sec. (Carpenter 1988) whereas pursuit eye movement tracks a target which is moving with a velocity of about 400/sec. While fixating at a target moving with greater velocity, saccadic movement also come into role (Robinson 1981). The frontal

eye field and posterior parietal cortex area are especially important for initiating saccades, and in primates, saccades using electrical stimulation (Terao et al. 2017). Convergence is the one of the component of near reflex triad. Vestibulo-ocular reflex prevent the image being away from retina by moving the eye opposite of head movement direction thus stabilizing the image.

Three types of eye movements occur during reading. They are saccades, fusional vergence movement, and fixation. Normal range for saccades for skilled reader is about 7-9 letter spaces, and fixation duration is 200-250 ms. The longer fixation and shorter saccades leads to slow reading. The types of eye movement depend upon the spacing of word, visual acuity. Conjugate eye movements should prevail as long as the targets are on an iso-vergence surface within which a change in vergence is not obtained. Proper alignment of the eyes is one of the necessary conditions for accurate target, difficulties may have longer fixation and shorter saccades with visual search task (Figure 1). Coltellaro et al. (1995) found that individual with CP have more fixation, more saccadic intrusion during horizontal pursuit test which result difficulty to maintain constant eye movement velocity.

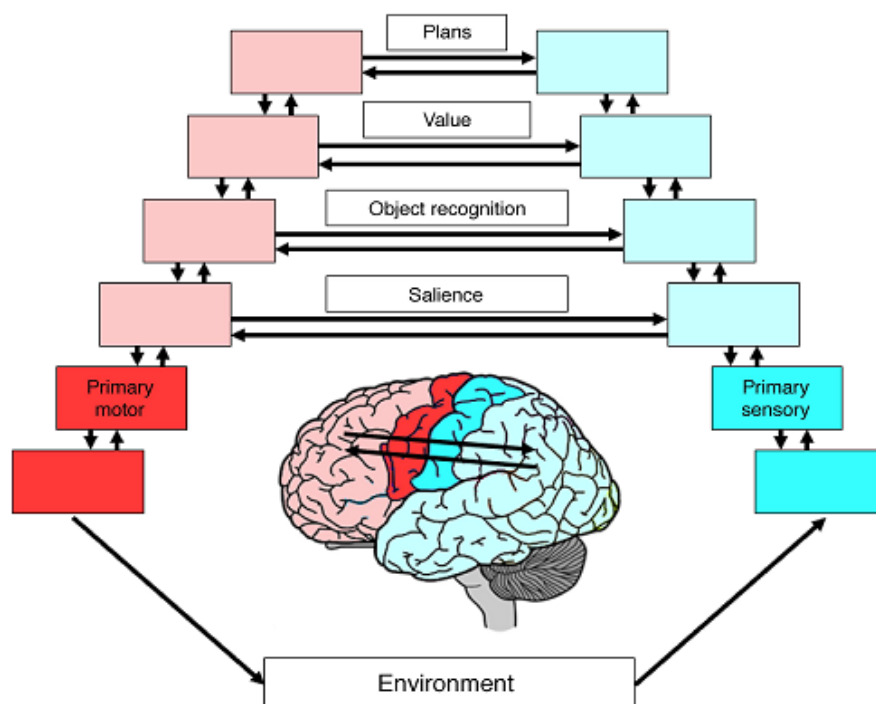


Figure 1. Framework for the control of saccadic eye movements [Source: Fuster (2004)]

Relationship between eye movement, reading performance and visual perception

Visual Motor Integration (VMI) is combined work of eyes & hands in smooth, efficient patterns we get visual information with help of motor skills. It requires visual perception and eye-hand co-ordination (Reery 1989). VMI is the ability to interpret the visual information with the coordination of fine motor action of eye, hand, body and limb. Visual-motor perceptual skills are important predictors for handwriting performance, including both readability and writing speed (Fusco et al. 2015) and integrate visual information processing skills with fine-motor movement. Visual motor integration can be represented by individual's capability to replicate geometric shapes (Reery 1989). Copying geometrical shapes can be considered as relatively sensitive measures of neurological integrity. Thus, low VMI skills are observed in children with learning disability as learning disability is linked with integrational problems. It has been reported that majority of the children with learning disability has visual motor defects (Darcy 2001). The poor gaze stability is the work of the visual fixation and head position. The visuomotor deficit contributes to disorganized relationship in children with CP. Slow readers employ more processing resources while coding and perceiving the fixated word compared to fast readers (Häikiö et al. 2009), dyslexic readers and older readers (Rayner et al. 2010). All of them have smaller spans of perception compared to skilled college-age readers. A question that has much attention is how we perceive a stable visual world among the saccades (Melcher & Colby 2008; Wurtz 2008). Recent work on the relationship between perception and action in general (Milner & Goodale 2006) has led to a number of studies comparing the signals used for motion perception to those controlling pursuit eye movements. Paradiso et al. (2012) indicated that proper changing in eye movement will improve the visual perception. Lampe (2014) showed cerebral palsied patients may experience difficulties in searching for words during reading. Ghasia et al. (2008) highlighted CP children with gross motor function classification system 1 to 2 have

sensorimotor deficit resembling those of neurologically normal with amblyopia and strabismus.

According to Rayner et al. (2010) slow readers exhibits a smaller perceptual span than fast readers whereas Häikiö et al. (2009) perceptual span depend on the size of the letter identity span. However, there were no difference found in the individuals' capacity to recognize words/ letters presented at different distances between slow and fast readers. As discussed above the best explanation for this result is that slow readers use more processing resources to encode and understand the fixated word than fast readers. This is similar to the finding that kids (Häikiö et al. 2009), dyslexic readers and aged readers have smaller span of perception compared to collage going readers. In the above cases the reason of the difference seen could be because of the fact that to the difficulty in processing the fixated word may cause decrease information processing to the right of information. As per Park et al. (2016) cerebral palsied patient with strabismus showed abnormal ocular motility and nystagmus. Ozturk et al. 2013 reported presence of nystagmus is 18.6%. children with severe CP showed pendicular-jerk nystagmus, gaze apraxia/palsy and fixation impersistence (Ghasia et al. 2008). Lampe et al. (2014) found CP patient took longer to read with shorter and more saccades fixation and regression.

Conclusion

Different types of CP effect different skills making them physically, visually, socially restricted. Impairment of motor function and non-motor visual skill results in poor academic and daily activities performance. From the above discussion, it could be concluded that impairment of eye movement, visual perception and reading abilities are evident in children with CP. Thereby, when evaluating a child with CP, these parameters along with routine ocular parameters such as visual acuity should be evaluated regularly. Moreover, developing a protocol for complete eye examination in children with CP would be beneficial for early diagnosis and timely treatment.

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ASSESSMENT OF WATER QUALITY CHARACTERIZATION BY WATER QUALITY INDEX IN THE VICINITY OF BUDDHA NULLAH INDUSTRIAL ZONE, PUNJAB, INDIA

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ABSTRACT

The increase of Industrial and unguided anthropogenic exercises taint water sources in many regions of the world particularly in agricultural nations like India. The current assessment focused on the Distribution of Heavy metals, supplements, and some Physico-chemicals factors were considered in water, suspended and bed sediment tests along Buddha Nullah and its feeders during pre-and post-storm seasons. Since remediation of groundwater is truly challenging, information on the current nature, extent, and wellsprings of the different contamination loads is essential to evaluating groundwater quality. The water quality index (WQI) is esteemed as an element of different Physico-chemical and bacteriological parameters were determined for groundwater obtained from a total of 10 selected locations. Twenty groundwater tests were gathered from open and tube wells during summer and post-rainstorm seasons. The directions as far as latitude and longitude of the sampling areas were recorded with the assistance of a Global Positioning System. This has been dictated by gathering groundwater tests and exposing the samples to comprehensive physicochemical evaluations. For calculating the WQI, the following parameters have been considered: pH, total hardness, calcium, chloride, nitrate, sulfate, total dissolved solids, turbidity, magnesium, conductivity. The increased convergence of dissolved solids during post-rainstorm tests displays the low quality of water when contrasted with the late spring season. It could be because of more drainage and development of groundwater during the post-storm. The WQI esteems from the current study show the exceptionally low-quality water in the space overwhelmed by industrial and construction activities. Poor water quality has been observed in the commercial zone of the study area. Metal concentrations were moderately high in the suspended sediment tests when contrasted with the bed sediment samples.

Keywords: Assessment, Water Quality Index, Physico-chemical parameters, Pollutants

1. Introduction

Groundwater is used for domestic and industrial water supply and irrigation all over the world. In the course of recent many years, water demand has been expanding ceaselessly because of expanding water and energy balance by this load of areas and constant expansions in population, prompting water deficiency and quality degradation. Water contamination influences water quality as well as threatens human health, economic development, and social prosperity [1]Thirteen percent of the world population do not have access to safe drinking water [2].According to WHO organization, about 80% of all infections in individuals are brought about by water. High paces of mortality and horribleness because of water-borne illnesses are notable in India. Access to safe drinking water remains an urgent necessity, as 30% of urban and 90% of rural households actually rely totally upon untreated surface or groundwater [4] By the year 2030, a big part of the total population would experience the ill effects of a significant

water deficiency [3].On the other, inappropriate administration of sanitary landfills, over-exploitation for irrigation, urban runoff, intense nitrogenous fertilizers used in agriculture, contaminated industrial sites, and industrial discharges [5][6]causes an increase in environmental degradation. India, similar to some other agricultural nations of the world, is dealing with expanding ecological issues. The huge populace and always expanding industrial activities in India make its water assets more defenceless against water quality deterioration. Quality of water has transformed into a critical concern particularly in rural regions where the populace is extensively dependent upon groundwater for drinking purposes. The release of untreated harmful wastewater effluents from the enterprises decays the groundwater quality, which influences human wellbeing, soil, and crop yield. The groundwater assets are at higher danger as their remediation is undeniably challenging. In Punjab (India), over 81% of the land is under farming where, the whole state is exceptionally dependent on groundwater consistently [7]. Groundwater,

fundamentally from tube wells and bore wells have been a critical asset for millions of people in Punjab. There are around 1.5 million tubewells (both electric and diesel worked) in Punjab. The water nature of the Buddha Nullah Stream is influenced by an enormous number of different contaminations; notwithstanding, the ecological issues are mostly the after effect of the contamination from untreated industrial and wastewater releases as well as from agricultural infiltrations throughout the flow. Geographical Positioning system (GPS) is proven as a potential tool in managing dynamic frameworks like the groundwater frameworks [8][9]. A few investigations have exhibited the use of indexing concepts like water quality index (WQI) which is a significant strategy for outlining groundwater quality and its appropriateness for drinking purposes coupled with geospatial techniques in analyzing the groundwater quality [10][11][12]. WQI provides a composite influence of different water quality parameters. The water quality index provides information on the quality of any water body. The mathematical equation of WQI transforms a large number of water quality data into a single number. The most effective tool to transmit information on the quality of water concerns to citizens and policymakers is assessed by WQI. The principles for drinking purposes as suggested by WHO [13] and IS 10500 [14] have been considered for the calculation of WQI. There are three steps for computing WQI. In the first step, each of the ten parameters (pH, Turbidity TDS, Total hardness, Cl-, NO, F, Mg, Ca, and Fe) has been assigned a weight (W) according to its relative importance in the overall quality of water for drinking purposes. The goal of the current work is to examine the appropriateness of groundwater for human utilization dependent on computed water quality index values.

2. Materials and methods

2.1 Description of Study area

Punjab, a small state in the northwest of India, is recognized as the land of five rivers. Sutlej is the longest of the five feeders of the Indus River. The Sutlej enters Punjab close Nangal, continues ahead to fields at Ropar, goes through region Ludhiana, and joins Beas at Harike prior to navigating to Pakistan. Ludhiana city was established on the edge of Buddha Nullah which implies an old creek or conduit and runs corresponding to the Sutlej on its south. Buddha Nullah is a seasonal water stream and restricted unlined channel. It floods during the monsoon season. It starts close to Chamkaur Sahib town and joins in the stream Sutlej. The high speed of industrialization and growing people pressure has gotten an enormous gathering of ecological & natural issues and Buddha Nullah which enters and (30°95'N 75°55'E) in the wake of going through thickly populated Ludhiana city, channels into Sutlej stream (29°38' N, 71°03' E) at Walipur Kalan, in the northwestern corner of Ludhiana City. Because of the absence of preparation and absence of authorization of laws, major enterprises are unloading their modern waste variety to Buddha Nullah which courses through the core of the city. It has turned into a wellspring of public aggravation and represents a genuine health hazard. A tremendous measure of raw domestic and industrial sewage from Ludhiana streams into the Sutlej consistently and is conveyed all around the state through water system waterways. Punjab has been represented as having an undeniable degree of tainting in light of overpowering metals from untreated industrial effluent discharge. This water channels undergrounds spring defiling it. The ruled significant toxins in wastewater are high suspended solids, compound oxygen demand, destructiveness, and other dissolvable substances (World Bank, 2008). This contaminated water through water system trenches is utilized for developing yields and is a transporter of destructive deadly diseases.

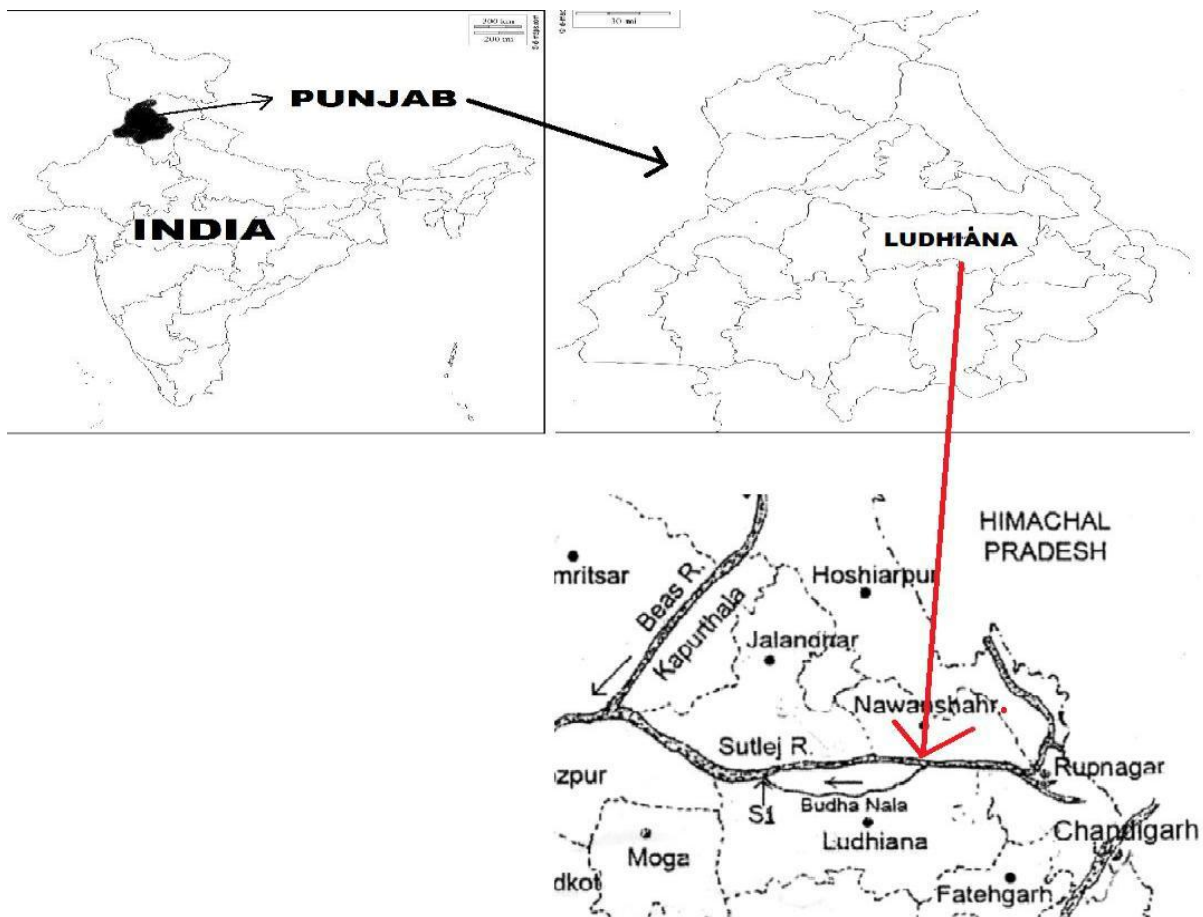


Fig. 1 Location map of water samples

2.2 Groundwater sampling and analysis

A total of Twenty different groundwater samples for both pre-monsoon (April-May) and post-monsoon (November-December) periods of 2020 were collected from different locations of the study area. Details of sampling locations along with their latitude and longitude are presented in Table 1. The groundwater samples were collected from different sources such as Government tube wells and hand pumps. For the collection of groundwater samples, the American Public Health Association [APHA; AWWA] standard protocol was adopted: Pre-washed glass bottles were used for sampling and are rinsed with sample water before filling, run the tap for five minutes, and then collect the groundwater sample from tube well, motor pumps, and hand pumps. During the collection of samples, standard tools were used; water samples were taken in glass bottles for the organic parameters and in polyethylene bottles for inorganic parameters & water temperature were recorded by a standard thermometer after

running the tap, which was found to be in the range of 25.0–30.0 °C on sampling time. The sample bottles were labelled with the time, date, and source of sampling; they were stored in airtight bottles and stored at a temperature of 4°C and analyzed within seven days of sampling [16]. Each of the groundwater samples was analyzed for different parameters such as pH, electrical conductivity, TDS, total hardness, chloride, sulfate, nitrate, calcium, magnesium, sodium and potassium using standard procedures recommended by APHA. Total hardness and chlorides were determined by titration method as described in American Public Health Association (APHA 2017). A flame Photometer was used for determining calcium, sodium, and potassium as given in (APHA 2017). Sulfate and nitrate were measured spectrophotometrically as per methodology in (APHA2017). Magnesium is determined with the help of an Atomic Absorption Spectrophotometer (AAS4143 by ECIL) as described in (APHA 2017). The water quality index is calculated from the point

of view of the suitability of groundwater for human consumption. The objectives behind the study are to develop an overall picture of the groundwater quality in terms of suitability for

different purposes, contamination causes, geochemical changes, and assessment of seasonal changes in the groundwater quality.

Table 1. Sampling location along with their latitude and longitude

Sample Code No	Locations	Source	Latitude	Longitude
GWS-1	Haibowal	Tube well	30°55'04.7"	75°52'56"
GWS-2	Village Churpur	Hand pump	30°56'10.0"	75°47'55.5"
GWS-3	Opp treatment plant, Jamalpur	Tube well	30°54'59.1"	75°54'25.2"
GWS-4	Tajpur Bhamian link road	Hand pump	30°55'01.3"	75°53'41.6"
GWS-5	Near Fish Market, Tajpur Road	Tube well	30°55'31.5"	75°50'38.5"
GWS-6	Near Old Sabji Mandi, Tajpur Road	Tube well	30°55'03.1"	75°53'12.5"
GWS-7	Salempura	Hand pump	30°55'51.9"	75°41'31.6"
GWS-8	Pritam Nagar Tube well	Tube well	30°55'11.9"	75°49'37.6"
GWS-9	Kitchlu Nagar	Tube well	30°54'59.7"	75°48'52.8"
GWS-10	Talwara	Hand pump	30°56'20.9"	75°45'39.1"

2.3 Water Quality Index (WQI)

Among the various indexing approaches to get a comprehensive picture of the overall quality of groundwater, water quality index (WQI) is widely recognized, and user-friendly tool for assessing the drinkability of groundwater [17]. It could facilitate the researchers in reducing the wide range of data and represent the physicochemical parameters in a way which could be easily interpreted. WQI is defined as a rating reflecting the composite influence of different water quality parameters on the overall quality of water. The Indian standard specified for drinking water (BIS 2012) was used for the calculation of WQI. Water Quality index is valuable and unique rating to depict the overall water quality status in a single term was assessed by [19]. WQI is calculated by weighted arithmetic water quality index method using the following steps.

2.3.1 Weightage factor (Wi)

Each physicochemical parameter was allocated the weight age as per their consecutive implication in representing the contamination levels of groundwater. The weightage factor (Wi) was calculated using Eq (1).

$$W_i = \frac{w_i}{\sum_{i=1}^n w_i} \tag{1}$$

Where, Wi is the relative weight, wi is the weight of each parameter, and n is the number of parameters

2.3.2 Quality rating (qi)

Further, the quality rating scale (qi) for each parameter is assigned by dividing its concentration in each water sample by its respective standard according to guidelines (BIS, 1991), and the result is multiplied by 100:

$$q_i = (C_i/S_i) \times 100 \tag{2}$$

Where, qi is the quality rating, Ci is the concentration of each chemical parameter in each water sample in mg/L, and Si is the Indian drinking water standard for each chemical parameter in mg/L.

2.3.3 WQI Calculation

For computing WQI, the sub index (SI) is first determined for each chemical parameter, as shown in Eq.(3) And (4)[10]

$$SI_i = W_i \times q_i \tag{3}$$

$$WQI = \sum SI_{i-n} \tag{4}$$

Where,
 SI_i is the sub index of ith parameter;
 W_i is relative weight of ith parameter;
 q_i is the rating based on concentration of ith parameter, and
 n is the number of chemical parameters.
 The computed WQI values are categorized into five types as “excellent water” to “water, unsuitable for drinking”. The range for WQI for drinking purpose is tabulated in Table2.

Table 2. Range of water quality index

S. No.	WQI range	Water quality
1	0-25	Excellent water
2	26-50	Good water
3	51-75	Poor water
4	76-100	Very poor water
5	>100	Water unsuitable for drinking purpose

Source: (Brown et al., 1970; Goher et al., 2014)

3. Results and discussion

Water is a fundamental product that is needed for industrial, agricultural, domestic, and different employments. It is desired that it have

a particular quality so it tends to be utilized promptly for different purposes. Extensively, the water quality appraisal needs assurance of different abiotic (physicochemical) and biotic (natural) boundaries. Different anthropogenic exercises, aside from defiling the water with poisonous fixings and causing obliteration of the biota, the contamination issues additionally are liable for bestowing unwanted shading to the water, which is questionable both mentally and esthetically. Since remediation of groundwater is very difficult, knowledge of the existing nature, magnitude, and sources of the various pollution loads is a prerequisite to assessing the groundwater quality. Ludhiana District is notable for its Industrial and dying work, the effluents of enterprises release straightforwardly to the regular water bodies like lakes, streams, and so on with next to no inadequate treatment of treatment plants. The effluents likewise scatter into the groundwater springs and making it unacceptable for human utilization. Table 3. Shows the information of different physicochemical boundaries got during the study. Physicochemical qualities of water tests were assessed utilizing guidelines techniques (APHA 2012), which incorporate assurance of the significant ionic fixations, pH, electrical conductivity, and TDS.

Table 3. Physicochemical parameters analysis in the Selected Area Surrounding Buddha Nullah during pre- and post-monsoon season

Parameter	Season	GWS-1	GWS-2	GWS-3	GWS-4	GWS-5	GWS-6	GWS-7	GWS-8	GWS-9	GWS-10	Min	Max	Mean
pH	Pre-monsoon	8.4	7.77	8.21	7.76	7.95	9.2	8.5	8.2	5.7	7.6	5.7	9.2	7.245
	Post-monsoon	7.7	7.5	8	7.79	7.4	8.7	6.1	7.9	8.4	7.9	6.1	8.7	7.9
Temperature (C)	Pre-monsoon	32.1	31.9	31.4	29.6	29.4	28	30.2	28.7	29.5	27.6	27.6	32.1	29.84
	Post-monsoon	26.2	24.2	25	24	23	24	22.6	24.5	27.5	24.6	22.6	27.5	24.56
Turbidity (NTU)	Pre-monsoon	3.8	4.1	14.9	65.1	55.3	41	168	172	155	139	3.8	172	81.82
	Post-monsoon	3.1	3.8	7.9	44.2	40.5	30.6	101.5	140.2	98.5	88	3.1	140.2	55.83
Tot. dissolved solids (mg/L)	Pre-monsoon	280	501	500	635	765	752	1624	1506	1668	1301	280	1668	953.2
	Post-monsoon	295	489	595	600	703	557	1265	1307	1402	1507	295	1507	872
Conductivity (µS/Cm)	Pre-monsoon	969	633	954	965	785	782	629	1011	1542	1035	629	1542	930.5
	Post-monsoon	897	589	894	759	698	957	568	894	1689	989	568	1689	893.4

Total hardness (mg/L)	Pre-monsoon	169	162	181	154	271	180	449	162	598	687	154	687	301.3
	Post-monsoon	141	130	106	101	204	119	398	110	403	501	101	501	221.3
Chloride (mg/L)	Pre-monsoon	51	86	94	64	78	106	300	356	361	321	51	361	181.7
	Post-monsoon	68	98	109	89	98	142	325	368	401	398	68	401	209.6
Sulphate (mg/L)	Pre-monsoon	13.2	24.6	28.6	18.1	26.8	28.6	16.9	30.1	31.1	30.9	13.2	31.1	24.89
	Post-monsoon	15.9	32.1	30.8	19.9	30.4	40.8	28.6	55.4	57.1	51.7	15.9	57.1	36.27
Nitrate (mg/L)	Pre-monsoon	0.01	0.15	0.1	0.014	0.1	0.01	0.25	0.23	0.41	0.25	0.01	0.41	0.152
	Post-monsoon	0.02	0.19	0.16	0.019	0.2	0.02	0.4	0.47	0.3	0.19	0.01	0.47	0.196
Dissolved oxygen (mg/L)	Pre-monsoon	7.7	8	7.8	7.8	7.3	7.2	7.8	6.3	7.9	7.8	6.3	7.9	7.56
	Post-monsoon	6.5	6.1	6.2	6.8	7	7.01	6.2	6.3	7.4	7.2	6.1	7.4	6.671
potassium (mg/L)	Pre-monsoon	0.2	1.9	0.95	1	1.5	2.1	1.8	2.2	2.3	1.7	0.2	2.3	1.565
	Post-monsoon	0.5	2.3	1.6	2.5	3.5	2.5	2.1	2.9	2.5	2	0.5	3.5	2.24
calcium (mg/L)	Pre-monsoon	40.1	32.5	38.5	36.1	33.2	43.3	39.3	46.2	54.5	49.5	32.5	54.5	41.32
	Post-monsoon	55.1	65.2	33.5	43.2	42.2	59.2	66.4	57.1	59.2	69.4	33.5	69.4	55.05
Magnesium (mg/L)	Pre-monsoon	3.6	7.2	20.1	29.2	18.1	54.1	59.3	55.8	62.7	48.9	3.6	62.7	35.9
	Post-monsoon	3.9	6.5	22.5	34.8	23.2	60.5	61.2	59.4	65.2	51.8	3.9	65.2	38.9
Total coliforms (CFU/100 ml)	Pre-monsoon	16	19	14	21	22	15.5	18	34	32	31	15.5	34	22.25
	Post-monsoon	42	38	25	45	75	65	78	145	123	84	25	145	72
Fecal coliforms (CFU/100 ml)	Pre-monsoon	1	1.6	1.5	1.9	2.1	2.7	2.4	3	3.5	4	1	4	2.37
	Post-monsoon	1.2	1	1.4	1.8	15.4	22.1	7.9	6	22	34	1	34.2	11.37
Biochemical oxygen demand (mg/L)	Pre-monsoon	1.9	1.6	0.9	1.9	1.6	0.9	0.7	2.3	1.5	2.8	0.7	2.8	1.61
	Post-monsoon	1.8	1.9	1.6	1.5	2.3	1.4	1.2	3.9	1.4	3.4	1.2	3.9	2.04

3.1 Physicochemical parameters

During the study period, the recorded pH values show a slightly acidic to alkaline nature (Pre 5.7 to 9.2, Post 6.1 to 8.7) of groundwater in the study area. The turbidity is a significant boundary for describing the nature of water. Turbidity in water might be because of a wide assortment of suspended materials [21], In Buddha Nullah, the turbidity of the groundwater shifted somewhere in the range of 3.1 and 172 NTU (3.8–172 NTU in pre-rainstorm season and 3.1-140.2 NTU in post-storm season). 40% and Sixty Eight % tests

were found to exceed the acceptable limit of BIS, 2012) during pre-and post-rainstorm seasons, separately.

The turbidity in the water test means that contamination of water quality especially because of various sources viz, seepage, cesspool ditches, and so on Subsequently, from the outcomes, it is evident that there is an opportunity for pathogenic organic entities to be encased in the turbidity causing particles accordingly, prompting potential human dangers. The higher values of turbidity in groundwater, particularly during post-monsoon

samples, might be caused by enhanced erosion of host rocks and leaching from lateritic soil.

The removal of sewage will in general increase the calcium content in water [21]. In any case, the calcium content in all examining stations (pre 32.5 to 54.5 mg/l) and (post 33.5 to 69.5) is adequately well inside suggested standard qualities. The BIS limit for calcium is 75 mg/l as acceptable limit and 200 mg/L as permissible limit for drinking water.

The electrical-conductivity esteems for groundwater went from 629 to 1542 $\mu\text{S}/\text{cm}$ with the mean worth 930 $\mu\text{S}/\text{Cm}$, in the pre-storm season, 17.1% of water tests were found surpassing the adequate furthest reaches of Bureau of Indian Standards (BIS 2012), while during the post-rainstorm season, 19.4 % locations were found exceeding the acceptable limit of BIS. For the most part, groundwater will in general have high electrical conductivity because of the essence of high measure of disintegrated salts [21]. The huge variety is credited to agrarian/anthropogenic exercises and to geochemical processes winning in the surface and subsurface areas. Electrical conductivity is a definitive boundary in deciding the appropriateness of water for a specific reasons and classified according to electrical conductivity (<250-Excellent; 250 to 750-Good 750 to 2000-Permissible; 2000 to 3000- Doubtful >3000-Unsuitable).

The determined total hardness in all stations is 154 - 687mg/l. The data indicate that only one groundwater sample from all the wells (less than 5%) has a TH value below 300 mg/L, which is the limit for potable water (BIS 2012). The variations of total hardness every month in all stations are due to the fluctuations in the quantity of water and waste disposals in the river. The remaining samples exceeded the limit, which accounts for the encrustation on water-supply distribution systems. Water with TH greater than 80 mg/L cannot be used for domestic purposes because it coagulates soap lather [22][23].

The highest total dissolved solids value is observed to be 1668.00 mg/l at GWS-9 and the lowest value is 280.00 mg/l at GWS-1. However, the total dissolved solids values at GWS-7,8, 9 are found to be more than the permissible limits being prescribed in (BIS2012) for drinking water. In the water

samples, most of the matter is in dissolved form and mainly of organic salts, a small amount of organic matter, and dissolved gases, which contributes to TDS. Based on the TDS values, groundwater is classified as follows: <1000-nonsaline; 1000 to 3000-slightly saline; 3000 to 10000- moderately saline; >10000-very saline [21]. A higher concentration of TDS produces gastrointestinal irritation in the human body. A water sample from this spot consists of high amounts of minerals, both anions & cations.

The chlorides in groundwater fluctuated generally, from 51 to 361 mg/L in pre-rainstorm season, and 68 to 401 mg/L in post-storm season, during the two seasons 10.15% (pre-rainstorm season) and 34.9% (post-rainstorm season) groundwater tests were found surpassing the adequate furthest reaches of BIS 2012). Chlorides are found in regular water because of the filtering of chloride-containing rocks and soils releases of effluents from substance enterprises, frozen yogurt plant emanating, sewage removal, water system seepage, utilization of blanching specialists by launderer, and washing of materials. Higher grouping of chloride is hurtful to heart and kidney illnesses of the people groups, acid reflux, taste, tastefulness, and consumption are likewise influenced.

Sulfate in the groundwater samples of the study area varied from 13.2–31.1 mg/L in pre-monsoon season and during the post-monsoon season, it varied from 15.1–57.1 mg/L. Contaminated water and wastewater have high sulfate concentrations. Gastrointestinal irritation is produced due to a high concentration of sulfate. The highest sulfate value is observed to be 57.1 mg/l at GWS-9 and the lowest value is 13.2 mg/l at GWS-1. However, the sulfate values at all locations are found to be below the allowable limits being prescribed in (WHO, 2012) for drinking water. The values of DO in the sampling stations are 6.3 - 7.9mg/l in pre-monsoon season and during the post monsoon season, it varied from 6.1–7.4 mg/L. The lowest amount of DO (6.1 mg/l) was estimated at the GWS-2. This could be because of the heavy oxygen demand due to organic pollutants closer to the city.

The values of nitrate in the study stations are well below the permissible limits (0.01 to 0.47

mg/l). The most important source of nitrate is the biological oxidation of organic nitrogenous substances. Recorded values showed that the groundwater has not been adversely affected with respect to this (nitrate) parameter. Nitrate is found in groundwater due to the leaching of nitrate with the percolating water to the soil. Infant methemoglobinaemia is produced at very high toxic nitrate concentrations. It also affects the cardiovascular system and nervous system and also produces gastric cancer. Also, nitrate in Buddha Nullah may result from point and non-point sources such as sewage disposal systems, faulty septic tanks, soil erosion, livestock wading, parks and gardens of the picnic spot, bathing, and washing clothes in river banks.

3.2 Bacteriological parameters

During the study period, the abundance of coliforms (indicators of recent fecal contamination) was determined for various groundwater sources. Despite the fact that odds of their essence were exceptionally less, the open burrowed well, especially those without any barriers were seen to be helpless against pollution by coliform species. Total coliform bacteria include a wide range of aerobic and facultative anaerobic, non-spore-forming bacilli fit for filling within the sight of generally high convergences of bile salts with the aging of lactose and creation of corrosive or aldehyde inside 24 h at 35–37 C. During the pre-rainstorm season complete coliforms changed from 15.5 to 34 CFU/100 ml, while during the post-storm season, their number in similar water tests showed a huge increment and fluctuating somewhere in the range of 25 and 145 CFU/100 ml (Table 3). This outcome shows that the groundwater assets are normally tainted during the storm season, which frequently and very often takes the waste present on the surface to the water body through surface runoff. During the pre-storm season, the thickness of waste coliforms fluctuated somewhere in the range of 1 and 4 CFU/100 ml, while during post-rainstorm, it was somewhere in the range of 1 and 34 CFU/100 ml. The relative appraisal didn't demonstrate any surprising contrast in waste

coliform thickness between seasons. Taking into account the information, the pre and post-rainstorm assessments of coliforms showed different examples, i.e., the change in waste coliform thickness was not harmonious to that recorded for the all-out coliforms; henceforth, it very well might be noticed that the huge expansion in the coliform thickness post-monsoon could be the capacity of coliforms of different beginnings. From above observations, it would be prudent to devise policies and procedures for making people aware of the good practices involving the activities of cattle feed as well as movement in the vicinity of water resources.

4. Water quality index Analysis

The WQI is a reliable means for understanding the overall water quality of water resources. The assurance of WQI helps in choosing the reasonableness of different groundwater sources for designated usage. The WQI values of all the samples collected during this study are presented in Fig. 2. In general, during the pre-rainstorm season the WQI fluctuated from 69 to 93, while during post-storm, it was somewhere in the range of 55 and 86 presented in Table. 4. The upsides of WQI showed the higher level of poor people classification was found in the post-rainstorm season as compared with summer. The water quality rating analysis reveals that 60% of samples were poor category while in post-monsoon it becomes 70%. Increment of poor category by 10% in post-monsoon as compared to the summer season indicates the groundwater quality in the study area is slowly getting to degradation. It demonstrates viable ionic filtering, over-exploitation, and anthropogenic exercises, for example, the release of effluents from industrial, agricultural, and domestic uses. In the late spring season, the groundwater is stale and the source of contamination was only the natural source of rock-water interaction while anthropogenic activities are additionally adding to the contamination load on groundwater quality during post-rainstorm. The variations of WQI values every month in all stations are due to the fluctuations in the quantity of water.

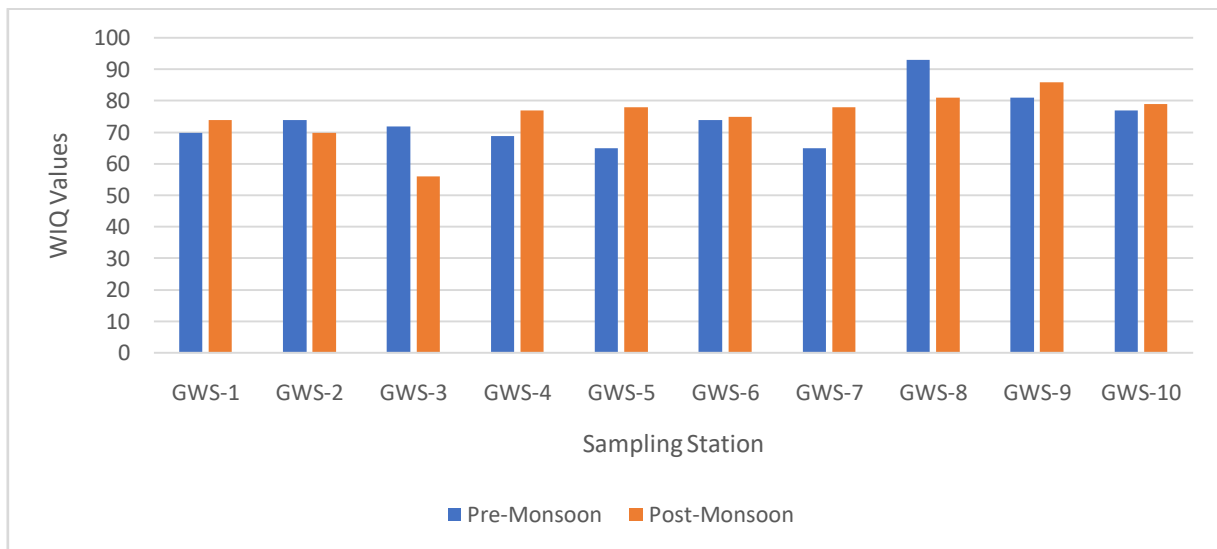


Fig 2. WQI for various ground water sampling location of the study area

Table 4. Water quality index of Buddha Nullah during pre and post-monsoon season

Parameter	Season	Min	Max	Mean	±SD
Water quality index	Pre-monsoon	69	93	83	±8
	Post-monsoon	55	86	71	±7

5. Conclusion

In Ludhiana (India), groundwater is the major source of water for achieving the day-by-day needs and the quality of this source of water has deteriorated by human and industrial activities. In order to sustain agricultural development with a minimum of environmental pollution, it is important to survey the current nature of different water assets dependent on ordinary strategies, like different Physicochemical and organic boundaries and certain newer techniques like WQI. Temporal variations in the quality of groundwater are due to external input as a result of surface runoff following seasonal rainfall events. However, in contrast to the eastern part of the district, the groundwater quality of the locations that fall in the western region is low, which can credit to the closeness

of the examining stations to the Ludhiana Industrial city which has brought about the disintegration of the nature of Buddha Nullah river. This confirms urbanization along the river banks to be the cause of river water pollution. Groundwater in the entire study area can be categorized as very hard. Further studies are required to understand whether the deterioration in groundwater quality is temporary or a progressive phenomenon. This would help to prevent irreparable damage to the overall groundwater system. Remediation measures ought to be taken on to re-establish the generally sullied groundwater locales. A general audit and assessment of the industrial belts with respect to the disposal of waste effluents should be given the highest priority; otherwise, these regions would be left endlessly as dirtied groundwater basins.

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RECENT DEVELOPMENTS IN ECO- FRIENDLY COOLING/LUBRICATING METHODS FOR SURFACE GRINDING - A REVIEW

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ABSTRACT

Surface grinding is globally used for machining and of finishing of hard materials. Historically the animal and plant based oils were used for lubrication and cooling purposes. With the discovery of petroleum and its use as lubrication and cooling along with improvements in machining technologies was the main cause of increased the environmental pollution. However, these cutting fluids have complex ingredients, which are toxic in nature and causes pollution and severe health problems to the workers. The effects of toxic contents in mineral oil based lubricants and restrictions in the environmental regulations have increased the development and use of eco-friendly cutting fluids in various types of manufacturing industries. The edible oil as a cutting fluids have a significant function in conserving the surrounding environment for sustainability. This paper makes an attention to the recent trends in the use of eco friendly, vegetable / non-edible oils and their performance as cutting fluids in surface grinding.

Keywords: Surface Grinding, Solid lubricants, Eco-Friendly Cutting Fluids, Vegetable oil lubricant

Nomenclature and abbreviation	
CBN	Cubic boron nitride
MQL	Minimum quantity lubrication
NDM	Near dry machining
PAO	Polyalphaolefin Oil
CAOM	Cold air and oil mist
CAMQL	Cryogenic air minimum quantity lubrication
SQCL	Small quantity cooling lubrication
CA	Cryogenic air
NMQL	Nanofluids minimum quantity lubrication
CNMQL	Cryogenic air nanofluids minimum quantity lubrication

1. Introduction

Grinding is known as an oldest material removing process. Thermal damage, production rate are the major factor in grinding method. Coolants are mostly used to minimize the friction and wear among tool and workpiece surfaces. Mannekote et al. (2017) investigated that the lubricant reduces the friction and wear in addition with other functions such as removal of heat, prevention of corrosion. More than 50% of all cutting fluids used globally mixed with environment due to spills, faulty disposal and accidents. Liew et al. (2015) found that the use of mineral or petroleum oil for cutting fluids causes the increasing the toxicity issues and their rising cost lead to renewed significance in the

progress of eco-friendly oils as cutting fluids. The rising awareness for green manufacturing and customer focus on eco-friendly products has put the stress on firms to shift for eco-friendly cutting fluids. The various cutting fluids/lubricants based techniques such as the use of high pressurized coolants (HPC), cooling under cryogenic conditions, use of solid lubricants, and minimum quantity lubrication (MQL) investigated by the different researchers around the globe were reviewed. Mannekote et al. (2017) also make use of different vegetable oil like fatty acids, coconut oil, groundnut oil, palm oil, sunflower oil, soybean oil, rapeseed oil and castor oil as cutting fluids for surface grinding in manufacturing industries. This paper reviewed the use of eco-friendly, vegetable and non-edible oils, and use of compressed air, chilled air and solid lubricants/coolants as cutting oils/lubricants in grinding.

2. Review of Literature

The detailed research was conducted on web science and Google scholar. The intend of this work was to conclude all the research areas regarding grinding of tougher material and to review tall the technological aspects used during the past. The period taken for reviewing the literature was from 2002 to 2020. A total 102 paper based on surface grinding only were

surveyed along with online data included from most of the journals available on Science Direct, Springer, ASME, Taylor Francis and Google Scholar websites. The main aim of this study was to find the recent developments in the use of eco-friendly cutting fluids for surface grinding and the recent technological researches used to discover eco-friendly cutting fluids for surface grinding along with the suggestions the new areas of research needed to for the creditability of the eco-friendly cutting fluids for surface grinding.

3. Use of vegetable oils as cutting fluid/lubricants

Liew et al. (2015) investigated that the vegetable-based oils are mostly in use, because these are considered as cost-effective, less harmful to environment, therefore acting as replacing agent to synthetic fluids, but these oils due to easily oxidation as well as poor thermal conductivity have lower tribological properties. A novel cutting fluid based on Sulfonate-castor oil to be used for surface grinding to achieve a balance the technological and ecological aspects. Quality of new cutting fluids was tested on the basis of pH, Viscosity, Corrosion and Biodegradability. No occurrence of corrosion was observed with new cutting fluid. Grinding evaluation of newly developed cutting fluid was made with existing synthetic fluids in the market and grinding performance was analysed in terms of radial wheel wear as well as specimen outer roughness. Alves et al. (2006) tested a new formulation of cutting fluid in different concentrations tested presented an intermediate behaviour for wheel wear. For newly developed cutting fluid at low wt % (15% and 21%) produced lower roughness of ground surface while at higher concentration (at 32%) roughness value was high. Further results of the experimentation indicated conflict between high lubrication ability and roughness of the ground surface. Sadeghi M H et al. (2010) evaluated MQL grinding performance under vegetable, mineral oils with wet and dry grinding. They found MQL grinding under the use of edible oils owing to the presence of fatty oil produced less forces and friction at the cutting zone. Under the dry grinding, the workpiece surface damaged due to plastic deformation, wheel loading as well as wheel

clogging. Emami et al.(2014) in their study investigated that mineral oil has more surface finishing as compared to other coolants such as hydrocracked oil, synthetic oil and vegetable oil respectively. They finally concluded that lubrication with MQL could reduce ecological hazards of cutting oils by the using of eco-friendly oils. Kumar et al. (2014) used selected palm oil and sunflower oil, for finding lubricity of oils in SQL surface grinding. Both the vegetable oils performed well to improve the lubricity at the sliding interface. Sunflower oil shown better lubricity and wettability pronounce outperformance over its counterpart that is palm oil. Sunflower also protects the grit sharpness by its additional cooling capability in SQL mode, it achieve an average reduction of 45% in tangential force component in fine grinding and 26% in aggressive grinding when compared to soluble oil and same with normal force component. Higher G-ratio was observed by using sunflower oil improved machinability owing to efficient cooling action and lubrication at the grinding zone. Higher roughness value was observed for sunflower by other two vegetable oils may indicate the retention of grit sharpness during grinding. Awale et al. (2020) observed minimum forces, low grinding temperature and surface roughness along with excellent ground surface quality, insignificant microhardness disparity by using vegetable-based groundnut as a lubricant to ground tool steel under MQL mode. The optimised parameters for the same was reported; air pressure 4 bar, lubricant flow rate 200 ml/h, nozzle angle of 12°, standoff distance 50 mm and average droplet size 51.03 µm under MQL mode

4. Grinding with solid/paste lubricants and dry grinding

Shaji et al. (2002) used a graphite powder and water soluble oil based (1:1 by weight) a paste as lubricant in surface grinding and compare its performance with dry, flooded coolant. The tangential as well as normal components of grinding forces were reduced by using graphite medium as compared to two flood water and dry grinding. They found that excess supply of graphite could entrap at the grinding zone increased normal components of the grinding force. The ratio of tangential force to normal

force and heat generated was also lowered in all environments of graphite used grinding with respect to other grindings. Because of low hardness and brittleness of medium carbon steel the grinding wheel was quickly loaded with graphite, resulted higher surface roughness was observed under graphite environment. Wheel wear rate initially was less with graphite environment in contrast to the dry as well as coolant conditions and then increased due to wheel pore were filled with graphite powder and chips. Previously the graphite and chips were clogged in the surface pores of the grinding wheel and in the absences of suitable flushing and non-uniform supply of lubricant caused the undesirable results. Shaji et al. (2003) developed grinding wheel on which the graphite and calcium fluoride was useful in a paste form on the wheel, with a special attachment. The lesser normal and tangential forces was reported with the lubricant moulded wheels in contrast to the standard wheel, due to a proficient mode of lubricant supply, and the minimizing the wheel clogging grinding swarf. Higher wear rate in resin wheel was reported, so more fresh grains normally get nearer with the workpiece on subsequent passes, results the lower grinding forces. Out of these two wheels, the CaF₂-moulded wheels were reported lower wheel wear when compared to the standard wheel. Very minute scratches were formed on the surface of the work pieces under the dynamic conditions, surface roughness not varied widely for various wheels. Agarwal et al. (2007) designed and developed a new experimental set-up for the injection of fine graphite and molybdenum disulphide powder at the required flow rate by using hopper, rotary valve vane and stepper motor. The fine solid lubricant powders of graphite and molybdenum disulphide with 2 micron average particle size were used to ground sintered SiC workpiece. It was observed that, tangential forces decreased as the flow rate graphite powder increase and thereafter, there is no considerable alteration in the tangential force with additional increment in the flow rate. Sinha et al. (2016) compared two different traditionally used grinding wheels green SiC and white Al₂O₃ to ground inconel 718 in dry conditions. SiC wheel produced lower normal

grinding forces as compared to Al₂O₃ wheel due to rise in temperature and chemical reaction between SiC abrasives and work surface which leads to a decrement in the hardness of the contacting surfaces in the grinding zone. The relatively higher tangential forces were observed in grinding with SiC wheel in comparison with Al₂O₃ wheel. The smaller coefficient of friction in grinding by the alumina wheel resulted lower heat generation and eventually no burning marks on the ground surface produced with alumina grinding wheel. High value of surface roughness and higher surface hardness was observed on burnt workpiece by grinding with SiC wheel.

5. Use of soap water as lubricants

Babic et al. (2005) mixed small amounts of liquid (water/soap) with different concentrations of soap into the highly compressed air flow and injected into the workpiece/grinding wheel inter face. With 21-23% drop in temperature and 30-40% lesser tangential force than with liquid cooling was reported with the highest 25% (water/soap) concentration. The temperature reduction was due to the enhanced lubrication as well as maintenance of the wheel. With further increase in the amount of soap in the mist jet, the lesser heat dissipation rate was reported. Dry and SQL with drop by drop application of soap water (Clinic plus shampoo and water solution in 1:20) was used to investigate by Kundu et al. (2005) observed that the performance of soap water as a lubricant and coolant. The lower tangential and normal forces were reported in case of SQL drop by drop application method in comparisons to dry grinding due to enabling high slipping of the abrasive grit tips against the wheel-workpiece contact surface and effective lubrication. Surface cracks and lay marks and damaged surface and chip redeposition was reported in ground workpiece by SQL drop by drop application method due to inadequate temperature control by the liquid soap. Only 6% increase in Ra value was reported in dry grinding than SQL method. Elevated grinding temperatures and high wheel loading, due to absence of any lubrication in dry grinding

caused higher wheel material removal leads to lower G-ratio.

6. Use of Cryogenic and Chilled air jet

Nguyen et al. (2003) used compressed cold air at minus 20°C and olive oil mixture (CAOM) an eco-grinding system was developed by the investigators to suppress surface burning, lowering the grinding forces and cleaning of crammed chips by using MQL system. A vortex tube was used to distribute the chilled air to the cutting zone. Chilled air grinding generated good surface quality hardened stability and no surface burning was reported as compare to the soluble coolant and CAOM at a small depth of cut. But at higher at depth of cut 15 microns the surface burning were seen on the dry and cold air coolant system. The cold air gave the better results using small depth of cuts up 10 microns. More wheel wear rate was observed for higher depth of cuts 15 microns. Daisley et al. (2012) investigated the impact of liquid carbon dioxide (LCO₂) on grinding of stainless steel was investigated and compared its results with dry and emulsion coolant by varying the depth of cut, table speed. The nozzle was used to supply the LCO₂ and emulsion as a coolant. LCO₂ was considerably more effective at controlling the temperature variations at the grinding zone than the others (dry and emulsion) under the changes in table speed and depth of cut. Drastically reduction grinding forces were reported by both the emulsion and LCO₂. Manimaran et al. (2013) used the liquid nitrogen (LN₂) with varying its release pressure was analysed and the grinding forces as well as surface roughness measured by and observed the smaller grinding forces were reported with cryogenic cooling as compared to dry and wet cooling. Better lubrications and vanishing of the LN₂ supplied at the grinding zone lead the control of the grinding temperature, increased the mechanical strength of the grits, and result the low grinding forces. The cryogenic cooling was effectively controlled the grinding zone temperature, generated quality surfaces in comparison to the other environments at optimised 5 bar pressure coolant supplied. The performance of cryogenic cooling with liquid nitrogen jet was also investigated in surface grinding and compared its results with dry, wet

(soluble oil, 1:20 ratio) grinding under the same parameters. Setti et al. (2014) found that the grinding forces, grinding temperature under the cryogenic environment were drastically reduced due the presence of cooling spray about the wheel exterior, which provided the better slip action of the grits in opposition to the workpiece surface. The reduction in diffusion and adhesion wear in cryogenic application results the reduction in the grinding zone temperature. The flood cooling with soluble oil offered the best surface finish because of effective cooling and lubrication. Due to the enhancement in heat transfer rate and retaining sharpness of the grits and during cryogenic cooling with liquid nitrogen jet, the considerable enhancement in surface finish were reported.

7. Use of nanofluids with vegetable oil base

Shen et al. (2008) used different fluids in grinding at 5 vol. % concentration, pure water, water-based Al₂O₃ nanofluids and water-based diamond nanofluids. The thermal conductivity of nanofluids increased with increase in volume percentage of nano particle in the base water. On other hand the thermal conductivity was decreased by increasing the concentration synthetic fluid in the base water. In the beginning (up to 35 passes), all the forces using pure water MQL and water-based nanofluids were comparable. With increasing passes, MQL grinding using different fluids exhibited different performances. As the concentration of Al₂O₃ was increased from 2.5 vol % to 4.0 vol %, produced the excessive load on the vitreous bond grinding wheel, resulted the increase in grinding forces. Molybdenum disulphide nanoparticles were added by Shen et al. (2008) in three eco-friendly base oils; paraffin oil, CANMIST oil (high purity fatty alcohol based oil) and soybean oil with different concentrations. These nano fluids used as coolant by MQL system. Least lubrication and the lowest tangential grinding forces were offered by using soybean oil among all the base oils. The grinding force generated by using paraffin oil was slightly lower than CANMIST oil at beginning. Due to good penetration of MoS₂ nanoparticles and their entrapment at the grinding interface lead to the reduction in the grinding forces as well as the

friction between the wear flats and the workpiece offered by the CANMIST and paraffin oils. The durable tribofilm was formed which improved the slipping of grains between the wheel and the workpiece offered advanced lubrication under extreme pressure. High G-ratio for high concentration of MQL nano molybdenum disulphide was reported for all the base oil, because of lower grinding forces, retention of grit sharpness and lower plastic deformation at reduced temperature. Lee et al. (2010) prepared cutting fluid by adding nano-diamond particles mixed with paraffin oil as cutting fluid by MQL technique by varying nano particles sizes (30-150nm) and volume concentration (2%-4% vol.) for surface grinding. The reduction ratios of the normal and tangential grinding forces in the case of pure MQL were 11.4 and 11.7 % respectively when compared with dry grinding. Whereas the 33.2% and 30.3% reduction ratios of the normal and tangential grinding forces were reported in case of nano-fluid MQL grinding when compared with dry grinding. Spherical shaped nano diamond and nano- Al_2O_3 particles (2-4 % volume, sizes of 30 and 150 nm) were added into the base paraffin oil by Lee et al. (2012) due to their non-toxicity and better and tribological properties for surface grinding. With pure and nanofluid MQLs both the tangential and normal grinding forces were increased with an increase in number of passes due to the increase in wheel wear. The grinding forces were also lowered by both the nanofluid MQL using nano diamond and nano- Al_2O_3 particles. This reduction was because of the excellent load-carrying capacity of nanoparticles. Setti D. et al used 1:40 concentration of castor oil, pure water and water based nano Al_2O_3 cutting fluids under MQL mode were investigated for their different grinding capabilities. The excellent load-carrying capacity of nanoparticles, prevent the destruction of the film in the grinding interface, the smaller grinding forces and friction with nano Al_2O_3 cutting fluids under MQL mode was reported. The superior lubrication effects of nanoparticles played an important role in lowering the grinding forces. No reduction in grinding forces was observed with higher volumetric concentration of Al_2O_3 nanoparticles fluid MQL grinding. Nano Al_2O_3

cutting fluids under MQL mode the finest surface finishing was observed because the nanoparticles itself dressed the grinding tool during grinding process by tearing off material from wheel and exposed the fresh active grits into the grinding zone. Mao et al. (2012) used water based Al_2O_3 nanofluid and pure water was applied for the grinding hardened steel with MQL technique. The Al_2O_3 nanofluid was prepared by dispersing Al_2O_3 nanoparticle (mean diameter 40nm, 1.2% conc.) in the deionised water. Due to better lubrication of Al_2O_3 nanofluid, the 40°C lesser temperature in the contact zone was recorded with nanofluid MQL grinding than the pure water MQL grinding. Zhang et al. (2014) used MoS_2 nano powder mixed in the base oils liquid paraffin, palm oil, rapeseed oil, and soybean oil by applying MQL technique for the surface grinding of hard material. The grinding forces and workpiece surface roughness properties were investigated for nano MoS_2 nanofluid MQL grinding for each above said base oils, also compared their results with dry grinding and flood lubrication (5% water-soluble grinding fluid). As reported by the other several investigators, the similar results, the lowest coefficient of friction under the flood grinding condition were reported by these investigators also. The lowest value of the coefficient of friction (0.28) under flood lubrication condition was observed. The satisfactory performances of oil based MQL jet grinding in comparison with flood grinding process was observed, because as the jet speed increased proportion of grinding liquid for lubrication also increased. In comparisons with the smallest coefficient of friction 0.28 under flood lubrication condition, the nano MoS_2 at 2% mass, jet MQL grinding, the coefficient of friction with liquid paraffin and palm oil as base oil was 0.35 and 0.30, respectively observed. The addition of nano MoS_2 in cutting fluids significantly increase the thermal conductivity results the improvements in the lubrication properties in both mineral oil and vegetable oil based lubricants under jet MQL grinding. The increase in MoS_2 concentration from 2% to 6%, the grinding property shows a downfall. With excessive nanoparticle of MoS_2 , the nano agglomeration occurred. Setti et al. (2014) used Al_2O_3 nanofluid - compressed

air MQL for investigation and observed the reduction of 12% in normal grinding forces and 28% tangential grinding forces when compared with wet grinding condition. Same with the average of 15% and 27% NGF and TGF were reduced when compared with MQL soluble oil grinding conditions. This reduction was credited due to the formation of a tribofilm on work surface, improved lubrication and cooling properties of nanofluid. The lubricating /cooling performance of Al_2O_3 nanofluid under MQL by using cryogenic air (CNMQL) was evaluated by Zhang et al. (2018) for the surface grinding of titanium base workpiece. The grinding performances, specific grinding energy and friction coefficients under CNMQL were compared under nanofluid MQL (using compressed air) and cryogenic air conditions. The lowest specific grinding energy (51.96 J/mm³) under CNMQL, which was 12.3% lower than nMQL and the maximum (87.84 J/mm³) was observed under cryogenic air condition respectively. The highest surface roughness ($R_a=0.535 \mu\text{m}$, $R_{Sm}= 0.078 \text{ mm}$) and the minimum ($R_a =0.375 \mu\text{m}$, $R_{Sm}=0.059 \text{ mm}$) under CNMQL was observed, because of the optimal lubricating effects under CNMQL. Hosseini et al. (2018) applied three nanofluids of MoS_2 , graphite, and Al_2O_3 nanoparticles (1 wt% and 3 wt% conc.) dispersed in two different base oils- paraffin and sunflower oils for surface grinding of tungsten carbide workpiece. The performance of all the cutting fluids on the basis of specific energy, cutting force, and surface quality was compared with the grinding outputs under different environment such as dry, wet, and MQL (pure paraffin and sunflower oil). The smaller tangential and normal grinding forces were observed with pure vegetable oil base cutting fluid under MQL condition, than the conventional wet grinding due to higher lubrication of the non-soluble vegetable neat oil and the efficient lubricant delivery in MQL condition than with water-based emulsion used for flood grinding. The grinding forces were further reduced by adding nanoparticles in the base oils and as a function of the increase in their concentration. Further the lubrication performance was significantly improved with the use of vegetable based nano cutting fluids under MQL except graphite nanofluid. MoS_2

nanofluid performed better in comparison Al_2O_3 nanofluid with vegetable base. The highest reduction, 51.1% and 46.99% of tangential and normal forces was observed with MoS_2 nanofluid with a 3 wt% concentration in mineral base oil, compared to dry grinding. Choudhary et al. (2018) developed and prepared two deionised water based nanofluids by mixing hexagonal boron nitride (hBN) and Al_2O_3 nanoparticles. The highest specific tangential grinding force, highest specific grinding energy and lowest specific normal grinding force values was observed with straight cutting oil under MQL condition in comparison with the all other testing grinding environments, which lead to better contact among grinding grits and work material, hence the ground surface morphology. The highest specific normal grinding forces and apparent friction coefficient (ratio of tangential to normal force), the lowest values of tangential grinding force, apparent friction coefficient and specific grinding energies, was observed with nMQL condition. The high normal forces lead to increase the fracture on the ground surface which laterals increased cracking and chipping. Al_2O_3 nanofluid MQL in grinding was the best suitable for grinding the hardened nickel-based alloy, as it reduced force ratio 0.38 and specific grinding energy 62.20 J/mm³, finally concluded that Al_2O_3 nanofluids was most suitable lubricants for machining materials with high strength and hardness. The highest reduction in force ratio was observed with Al_2O_3 nanofluids due to its good rolling effects, formation of tribofilm on ground surface, high hardness, heat resistance, and wear resistance of Al_2O_3 nanoparticles. The highest G-ratio was found with MoS_2 nanofluids followed by the Al_2O_3 nanofluids and pure palm oil under MQL mode. Al_2O_3 nanofluid was the most suitable for grinding Inconel 718 workpiece. It was found that MoS_2 nanofluid was the most suitable for grinding the soft material 45 steel under MQL with the highest G ratio value (43.16) and low surface roughness R_a (0.14 μm). Wang et al. (2017) observed that workpiece materials exhibited the greatest effect on force ratio specific grinding energy, and surface roughness at 94.69%, 79.44%, and 50.65% contribution rate respectively.

Nanofluid MQL formed a chemical tribofilm on the workpiece surface during grinding, which efficiently reduced the friction in the grinding area even at high temperature, on other side palm oil MQL form a poor anti friction and anti wear performance under harsh grinding environment grinding environment. Singh et.al prepared different types of nanofluids by dispersing 3-8 nm sized nanoparticles of graphene, graphite and MoS₂ in canola oil base. They observed lesser values of grinding forces under MQL mode with the use of all the three fluids. This was mainly due to development of lubrication film and retained at higher temperature and low oxidation behaviour. The canola oil outperformed than olive oil and soybean oils under MQL mode due to good thermal conductivity and shearing action of graphene. The lowest values of surface roughness, cutting forces, specific grinding energy and coefficient of friction were observed with canola oil based graphene nanofluid under MQL mode in comparison with the MoS₂ and graphite nanofluids. The surface grinding experiments performed on Ti-6Al-4V-ELI workpiece under various conditions using 3 types of fluids such as canola oil, sunflower oil and olive oil (with and without graphene nanoplatelets). They found that canola oil has shown the superior tribological performance than the other selected vegetable oils due lower content of polyunsaturated fatty acid molecules, moderate dynamic viscosity and high specific heat capacity. The largest contents 65.7% of polyunsaturated fatty in the sunflower and the lowest 10.5% in canola oil were found, more responsible to auto-oxidation, and the canola oil is the minimum liable to auto-oxidation. Mukhopadhyay et al. (2019) evaluated the cooling/lubricating performance of delivery technique with water soluble coolant for surface grinding Ti-6Al-4V workpiece under dry, flood cooling and MQL (drop by drop) conditions with identical process parameters. The least grinding force, least roughness value and greater G-ratio was observed in SQL drop by drop (SQL DBD) condition because of superior lubrication and improved shearing action, generated small sized chips due to the successfully penetration of cutting fluid into the grit-work interaction

zone in contrast to dry as well as flood cooling conditions. Viridi et al. (2019) evaluated the grinding of Ti-6Al-4V alloy workpiece using graphene mixed in palm oil, nanofluid as cutting fluid. The use of the nanofluid was compared with commercially available cutting fluid LB2000 under MQL mode, dry and conventionally flood cooling (water based cutting fluid). The lowest grinding force and surface roughness was observed with nanofluid (GNPs >0.03 wt. %) under MQL mode in comparison to the all others grinding modes. The formation of nanofluid under MQL mode (PG0.1/MQL) significantly reduced the specific energy by 91.87, and 80.25% compared to the flood and LB2000/MQL lubrication techniques respectively [31]. Scholars used two nanofluids by dispersing 1 wt %, 0.5 wt % Al₂O₃ nano-particles in sunflower and ricebran base oils. The better surface finishing performance was observed with low concentration of Al₂O₃ nanofluid in MQL mode, because of higher viscosity of nanofluid, it forms a proper fluid film, which improved the lubricity and better surface finishing performance. The higher G-ratio was observed at higher nanoparticles volume concentration under MQL mode due to the fact that high concentration nanofluids lead to smooth surface. Due to better lubrication, retaining the cutting ability over a long time, sunflower based nanofluid generated the lower values cutting forces with MQL, moreover spherical shape and abrasive ability of the nanoparticles reduced the grinding forces. The lower low value of surface temperature and grinding energy at 1 wt% was reported because of the higher viscosity, better lubrication than rice bran oil and flood cooling Sunflower oil has lower values of grinding forces.

8. Conclusion

The performances of vegetable oil based eco-friendly cutting fluids and lubricants depend on the machining processes and working conditions. So, it's not possible to rank the different vegetable based cutting fluids and lubricants. By using MQL technique for vegetable based eco- friendly cutting fluids and lubricants in different machining processes offer best alternate to eliminate environmental related problems as posed by other petroleum

and mineral oils. Genetically modified and hybridized non edible vegetable oils are successfully used as cutting fluids in surface grinding for different environmental conditions. The mist particle was investigated and characterized for different machining processes under different environments as the nano particles mixed with mixture of two or more than two vegetable based cutting fluids used for surface grinding, it enhanced the lubrication,

cooling and oxidation stability of these oils. The mist of this mixture is not the environmental issue used under MQL technique. Further from the literature, it was observed that the eco-friendly bio based cutting fluids when used with MQL technique stands out among other latest techniques used for surface grinding. The hybrid machining approach also used vegetable-based cutting fluids.

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INTERPRETING ALICE AS A DREAM: PSYCHOANALYTIC READING OF LEWIS CARROLL'S *THROUGH THE LOOKING-GLASS*

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ABSTRACT

Dream sequences in the text under study are fissures that give the readers a peek into the inaccessible part of the psyche of the author and characters. The author is interpreted as an agent who plants thoughts and ideas into the head of young Liddell, who is a passive consumer of tales Carroll has to offer. This work primarily examines the aspect of dream element, imageries, repressed fears and desires of the author in the text under research. Alice's dream, and Alice herself as a dream, will be studied in this work in detail. This paper closely examines the connection of the Carroll's dream world with Dodgson's real world.

Keywords: *Psychoanalysis; Dream Interpretation; Children's Literature; Alice; Unconscious*

Introduction

'The 'royal road' to the unconscious is dreams', to quote Terry Eagleton. (*Literary Theory: An Introduction* 136) Dreams have as their contents unresolved fears and conflicts, repressed thoughts, unsatisfied desires, traumatic past events and day's residue. Dream content is mixed 'in events which took place during the day or sensations felt during sleep with images drawn deep from our childhood.' (137) They are the symbolic fulfillments of unconscious wishes, and give glimpses of unconscious, which otherwise cannot be accessed easily. Joseph Campbell in his "A Study of the Unconscious Processes at Work in Dreams". Writes about the Jungian take on dream symbolism, 'Dreams...arise spontaneously without our assistance and are representations of a psychic activity withdrawn from our arbitrary will.' He adds, 'Therefore the dream is, properly speaking, a highly objective, natural product of the psyche, from which we might expect indications, or at least hints, about certain basic trends in the psychic process.' (*The Portable Jung* 75) '...the contents of a dream are like the sounds produced when "the ten fingers of a man who knows nothing of music wander over the keys of a piano"'. (*Introductory Lectures on Psychoanalysis I* 105) However, dreams of children differ from that of adults. In his "Essays on Dreams", Freud writes, 'the dreams in children...are short, clear, coherent, easy to understand and unambiguous.' (*Introductory Lectures on*

Psychoanalysis I 148) Alice's dream passes off as a child's dream as per Freudian dream theory. Freud adds, 'the dream is the reaction of the child's mental life in his sleep to this experience of the previous day.' (149) *Through the Looking-Glass* gives evidence of the same to its readers. In the opening chapter, Alice tells Kitty, "how nice it would be if we could only get through into Looking-glass House! I'm sure it's got, oh! Such beautiful things in it! Let's pretend there's a way of getting through into it somehow, Kitty. Let's pretend..." (*Looking-Glass* 8, 9) Right after expressing her wishes, she enters into a dream world. The piano analogy does not apply to children. Hence, Alice's dream is not difficult to interpret. There is very little presence of condensation, displacement and other dream-work processes in it. Her desires and fears are out there.

Dream in *Through the Looking-Glass* is a question of 'being', Christopher Lane suggests. He writes, "Which Dreamed it?" is indeed the fascinating ontological question that concludes *Looking-Glass*, with implications for our understanding whether Dodgson or Carroll should- even can- claim authorship of the whole madcap fantasy." (*The Literary Lacan* 121) Carroll tactfully frames the last chapter title as "Which Dreamed It?" Alice asks Kitty, who can only "purr" or "meow" whose dream it was all this while, in vain. She asks, "...let's consider who it was that dreamed it all. This is a serious question...it must have been either me or the Red King. He was part of my dream, of course- but then I was part of his dream, too!

Was it the Red King, Kitty?" (*Looking-Glass* 97) The last sentence of the last chapter is itself a question, "Which *do you* think it was?" with '*do you*' emphasized through the use of italics, implying that the question is posed directly to the reader. (97)

It is not very difficult to guess from where the thought of being part of Red King's dream sprang in Alice's head. It was her encounter with the Tweedles, both Dee and Dum, that planted this idea in her head. Tweedledee suggests that Alice is in his dream, and if he stops dreaming about her, she would either disappear, or go off to an unknown place. He reduces her identity as "a sort of thing in [Red King's] dream." (40) Tweedledum further adds, "If that there King was to wake, you'd go out- bang! - just like a candle!" This is ironical, as Tweedle brothers blow out like a candle after the dream sequence ends, not Alice. (40) There is dream within dream in the text, or meta-dream. Tweedledum makes Alice question her being in her own dream. He says, "Well, it's no use *your* talking about waking him, when you're only one of the things in his dream. You know very well you're not real." (40) Both brothers emphasize on Alice being a "thing", stripping her of her human identity. Even Unicorn in "The Lion and the Unicorn" reduces her to a thing, by asking "What- is- this?" Lion and Unicorn do not use personal pronouns for her, but rather go for "this" and "it", reducing her to mere objects or to a "fabulous monster". Unicorn, itself being a symbol of fantasy, questions her identity. Lion too asks Alice an absurd question, "Are you an animal- or vegetable or mineral?" (70) On Tweedledum's question on her existence, she begins to cry, as a defense mechanism, shouting, "I *am* real!" (40)

Another instance of meta-dream is in the eighth chapter "It's My Own Invention", when she thinks she was dreaming all this while about the Lion and the Unicorn. The presence of plum-cake dish makes her think, "So I wasn't dreaming, after all, unless- unless we're all part of the same dream. Only I do hope it's *my* dream, and not the Red King's! I don't like belonging to another person's dream. (71) Alice, who does not want to be a part of anybody else's dream, is in Carroll's "dream-child", as he called her in a letter that he sent to

M. E. Manners. (*The Life and Letters* 199) Her dream is not hers, but Carroll's, who manages to fit himself into the story in the form of the White Knight. The two knights do not get along well for obvious reasons.

Dreams represent lot many things. It is used colloquially for aspirations. The other linguistic usage of dreams is that in figures of speech. People often use phrases like, 'as lovely as a dream', 'I shouldn't have dreamt of such a thing', 'I haven't imagined it in my wildest dreams' and so on. (154) Freud points out that in ancient Greek and "oriental nations", dream interpretation is often confused with superstitions. According to Freud, study of dreams helps in study of neurosis. Dream interpretation ought not to be abused by associating it with superstition. (*Introductory Lectures* 101, 105) By interpreting Alice's dreams, one can study Carroll's unconscious. Dreams, which are predominantly visual images, have secondarily senses and thoughts too. They represent, what Freud calls, 'the wishes fulfilled as a hallucinatory experience.' (152) Dreamers usually say they can draw their dreams but cannot articulate them into words. Carroll takes up the task of penning down the impossible. He creates a fable out of dream narration. One cannot read a work of Literature that has a dream sequence in it without thinking of Franz Kafka's *Metamorphosis*. Alice's dreams are no less nightmarish than Kafkaesque tales. For a little girl of seven years, the dreams are too dark. In Alice in Wonderland, she gets trapped in a room, changes into different sizes, sometimes feeling like a Lilliputian and sometimes a Brobdingnagian of Jonathan Swift's *Gulliver's Travels*. She shrinks and expands to enter various 'ontological realms', as Christopher Lane suggests. (*The Literary Lacan* 123) Though in a dream, Alice is constantly made aware of her being in one, though she chooses to ignore it. She 'hardly noticed this. There were so many other curious things to think about.' (*Looking-Glass* 51) In the text, there is a sharp distinction drawn between dream world and real world. In "Wool and Water", the 'dream-rushes' melted away even faster than the 'real scented rushes'. (51) Brinda Bose in her critical edition of *Through the Looking-Glass* annotates dream-rushes as symbolic of

Carroll's child-friends, who were destined to grow up. This shows Carroll's anxiety over fleeting nature of all beauty. (51)

Alice dreams whatever she already knows. Being a schoolgirl, she dreams of characters from nursery rhymes. Solves Mathematics puzzles, learns Geography and Grammar lessons. 'The Walrus and the Carpenter', 'Tweedledum' and 'Tweedledee', 'Humpty Dumpty', 'the Lion and the Unicorn' are all nursery rhyme characters. She could even guess at various instances what was to happen next. Before she becomes a queen from a pawn, she must pass a test. The questions however remain absurd, as one would expect in a dream. Red Queen tells Alice to solve Addition problem- "What's one and one and one and one and one...?" She is made to subtract "nine from eight", divide "a loaf by a knife" and subtract a "bone from dog". (*Looking-Glass* 83) These weird questions have weird answers. The answer to division of loaf by a knife is "bread-and-butter". (83) Alice's Mathematics lessons anxiety is visible in *Alice in Wonderland* too, where the Mock Turtle names a few branches of Arithmetic which are distorted versions of the actual ones. Addition becomes Ambition, Subtraction-Distracted, Multiplication-Uglification, Division-Derision and so on. History becomes

Mystery, Geography becomes Seaography, Drawing- Drawling, Sketching- Stretching and Painting- Fainting. (*Alice in Wonderland* Loc. 1012). The dreams about kings and queens also hold significance in the text. In the book, there are two kings and two queens, Red and White respectively. Sigmund Freud believed, 'One's parents appear in dreams as the *Emperor* and *Empress*, the *King* and *Queen* [loc. cit.] or other honoured personages... children and brothers and sisters... are symbolized as *small animals* or *vermin*'. (*Introductory Lectures* 180) In *Wonderland* and *Looking-Glass*, kings, queens and duchess are persistent. In fact, Alice aspires to become a queen, and is finally queened in the eighth square in *Looking-Glass*. The queens and kings are hostile towards Alice, which depicts her conflicts with her parents in the waking life. Poems about fishes also have a psychoanalytical significance. Freud notes, 'Among the less easily understandable male sexual symbols are certain *reptiles* and *fishes*, and above all the famous symbol of the *snake*.' (182, 183) In the chapter "Which Dreamed It?", Alice tells the kitten about the "quantity of poetry said to [her], all about fishes." (*Looking-Glass* 97) Cats love fishes, but here they are phallic dream symbols. Alice is upset that Kitty woke her out of "such a nice dream!" (96)

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TENSION AND INTERFACE BETWEEN NATIVE LANGUAGES AND ENGLISH IN CHIMAMANDA ADICHIE'S HALF OF A YELLOW SUN

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ABSTRACT

African novels in English often dramatize the conflict and interface between the native/tribal languages and English. They also contextualize the cultural milieu of these languages even while playing out the effects of linguistic imperialism. Chimamanda Adichie's Half of a Yellow Sun is one such narrative that generates a discourse wherein the colonial, post-colonial and neo-colonial language politics gets reflected. This paper analyses Adichie's use of English to show how she encodes the narrative by using it with tribal expressions and metaphors. The paper also explains how she carves out a native sensibility in English and uses her brand of English to critique the colonial tendencies. The paper also examines various discourse situations in the narrative that reveal the tension between a colonial language and native sensibility.

Keywords: *linguistic imperialism, conflict, interface*

Imperialism is a western enterprise that entails military and political control over the subordinate – people or territory. Along with acquiring territories, language of the conquerors emerged as a companion that ensured the consolidation and validation of power. The colonial governments brought policies that not only favoured their foreign language but also helped in authorizing the social control over the acquired geographical region, through the agency of language. These policies guaranteed a linguistic hierarchy in which the native languages were subordinated and marginalised. English, as a language, introduced the culture of the West to the colonised and was successful in charming the elite groups of the target nation. The metamorphosis of English can be seen through examples where the colonised people, especially elites, actively started learning the language because of the social, political, cultural and economic doors that it opened. To do away with the complex marginalization of race, colour and ethnicity, speaking English emerged as a ray of hope and a chance to stand equal with the white community. Though now imperialism does not exist in political terms, English language continues to control and reinstate the world order with the help of colonial memories.

Taking a cue from Robert Phillipson's work, *Linguistic Imperialism*, the paper highlights how linguistic imperialism interlocks with imperialism in culture, media and communication. Also, it exposes the

inequality, hierarchy and privilege offered to those able to use the dominant language. It considers language as an ideological platform where beliefs, attitudes and imagery either glorify the dominant or tarnish the subordinates. Language helps in amalgamating hegemony by adopting and normalising it. Also, linguistic imperialism, as noted by Phillipson, is invariably contested, and resisted. He has pointed few tenets built by the colonisers on learning English as a foreign language, especially in a non-English speaking country. He denotes them fallacy or misbelief: "English language education as propagated by the British and Americans builds on five tenets, each of which is false: the monolingual fallacy, the native speaker fallacy, the early start fallacy, the maximum exposure fallacy, and the subtractive fallacy. (Phillipson 1992, pp. 183–218). The monolingual fallacy holds that English is best taught mono-lingually. The native speaker fallacy reveals that the ideal teacher of the language is the native speaker and is authentic and authorised to do so. The early start fallacy suggests that the person can be moulded easily to speak the language if English is taught at an early age to its learners. The maximum exposure fallacy, the more a person is taught and exposed to English, the better he learns. Subtractive fallacy hints that standards of English may drop owing to much use of other languages over it.

This paper also explains the linguistic tensions encountered in the interfaces between various characters in *Half of a Yellow Sun*. This novel

can be termed as a protest narrative addressing the issue of linguistic imperialism that holds on to the minds of the previously colonised people. The paper presents the instances wherein the language –English, is established through different fallacies, and normalised thus approving hegemony. As a mark of dissent, Adichie demonstrates Nigerian culture through songs, culinary data and native information such as African herbs and African festivals through her brand of English that reflects her native sensibility. She deliberately refrains from explaining the meanings of certain words used in African context in the entire narrative, thus compelling the readers to acquaint and educate themselves with the Nigerian cultural essence.

Half of a Yellow Sun is a seminal work of Adichie that is set in the politically charged Nigeria in the context of Biafran war, that persisted between 1965-67. The protagonists Odenigbo, a Mathematics Professor at University of Nsukka, Olanna, his partner, Kainene the twin sister of Olanna is among the Igbo elites who belong to the privileged class and can speak English in the post-colonial Nigeria, a case of maximum exposure fallacy, where the elites have a privilege and exposure to speak English. In contrast, Ugwu, the houseboy of Odenigbo and Harrison, the houseboy of Richard, a British writer, represent the deprived section in Nigeria who internalise the belief of superiority that is established based on language. In the instance of Ugwu, who adores English and judges the person according to his ability to speak fluent English displays his Anglo-mania. He finds Olanna's speech flawless and hence is impressed with her instantly:

He has always thought that Master's English could not be compared to anybody's, not Professor Ezeka, who's English one could hardly hear, Okeoma, who spoke English as if he were speaking Igbo, with the same cadences and pauses, or Patel, whose English was a faded lilt. Not even the white man Professor Lehman, with his words forced out through his nose, sounded as dignified as Master. Master's English was music, but what Ugwu was hearing now, from this woman was magic. Here was a superior tongue, a luminous language, the kind of English he heard on

Master's radio, rolling out with clipped precision. (HYS 22)

Harrison, similarly, is obsessed with English and the culture it represents. To seek the job of a houseboy at Richard's place, he boasts his ability of cooking English cuisine for his English masters where he worked prior to joining Richard. This is a clear instance of beliefs and attitudes of the colonised towards the whites that remain as glorifying memories:

He bowed extravagantly at the beginning of each conversation. He told Richard with unconcealed pride that he had formerly worked for the Irish priest Father Bernard and the American Professor Land. 'I am making very good beet salad, he said that first day and later Richard realised that he was proud not only of his salad but also cooking with beets, which he had to buy in the 'speciality vegetable stall because most Nigerians did not eat them. (HYS 72)

Susan, the white lover of Richard, underlines the hierarchical arrangement of the Europeans and the Igbo-Yorubans with the assistance of language. She authorises herself to comment on the status of tribes in Nigeria. She believes that the civilization of these tribes depends upon the association with the already civilized superior whites: "There are lots and lots of Igbo people here...with their being so clannish and uppity and controlling the markets. Very Jewish, really. And to think that they are relatively uncivilised; one couldn't compare them to Yoruba, for example, who have had contact with Europeans on the coast for years (HYS 154)."

Aunt Elizabeth's flimsy airmail editions of newspapers with articles sent to Richard about the Nigerian pogroms are the instances of the linguistic exploitation in the neo-colonial Nigerian context. These are evidence of how culture of the subordinate nations is assassinated and targeted through the agency of media and communication:

...the articles annoyed him. 'Ancient tribal hatreds,' the *Herald* wrote was the reason for the massacres. *Time magazine* titled its piece MAN MUST WHACK, an expression printed on a Nigerian lorry, but the writer had taken *whack* literally and gone to explain that Nigerians were so naturally prone to violence

that they even wrote about the necessity of it on their passenger lorries. (HYS166)

The above-mentioned instances clearly show how the agencies of culture, media, and communication function in establishing authority over the colonised. The influence of linguistic imperialism projecting the tenets, as proposed by Phillipson, are marked in the narrative as follows. The instance when Olanna, amidst the chaos of Biafran war, decides to start a school for children in a makeshift arrangement, is a case of early start fallacy and maximum exposure fallacy. Here, English is selected as one of the important subjects amongst the few, by her team to be learned at an early age to have maximum exposure of the language. This is indicative of the linguistic hegemony that is still palpable in the post-colonial milieu of Nigeria, where the children are made to learn English at an early age so as to win the comfort of using the language in a globalised world where English has consolidated its significance: "We will teach mathematics, English and civics every day," Olanna said to Ugwu and Mrs Muokelu a day before the classes began. We have to make sure that when the war is over, they will all fit back easily into regular school. We will teach them to speak perfect English and perfect Igbo, like His Excellency (HYS 291)."

The monolingual fallacy is vividly represented in one such instance when Odenigbo decides to enrol Ugwu in one of the reputed staff primary schools, where the language of instruction is English. He orients him about the monolingual policy of the colonisers that is evident in the school as a colonial memory. As language is the product of culture that originates from the historically influenced nodal points, Odenigbo alerts Ugwu about this politics of language: "I will enrol you in the staff primary school, Master said... "They will teach you that a white man called Mungopark discovered River Niger. That is rubbish. Our people fished in the Niger long before Mungo Park's grandfather was born. But in your exam, write that it was Mungo Park (HYS 11)."

The subtractive fallacy is evident in the narrative when Ugwu, who believes English as a medium to become a privileged one, starts speaking the language fluently. He not only

learns English but also prefers to speak it more over Igbo:

I cannot cook bush meat here!' Ugwu said in English, laughing. Jomo turned to look at him. 'Dianyi, you speak English just like the children of lecturers.'

Ugwu nodded, happy to hear the compliment, happier because Jomo would never guess that those children with their cream-pampered skin and their effortless English sniggered whenever Mrs Oguike asked him a question because of how he pronounced his words, how thick his bush accent was. (HYS 93)

The native speaker fallacy is marked in an instance when Jomo appreciates Ugwu's English over Harrison's, who wrongly believes that he might learn to speak better English for the reason that he stays with his English master, Richard: "Harrison should come and hear good English from somebody who does not brag about it," Jomo said. 'He thinks he knows everything just because he lives with a white man. *Onyenzuzu!* Stupid man (HYS 93)!"

Adichie registers her protest against this linguistic imperialism by training her readers to understand the meanings of certain Igbo words such as *kedu*, *nkem*, *adaanyi*, *Onyenzuzu*, *umunna* and the like. The repetitive references of these make the words and their related meaning, familiar to the recipients. She complements this linguistic information with certain culinary orientations for the readers such as *jollof* rice, *arigbe*, *moi-moi*, *ofensala*, *ugwu* without their semantic references. She presents couplets in the form of songs sung by the Igbo characters such as Ugwu and Odenigbo's mother. The following song sung by Ugwu can be noted to address the problem of dominance of language and the related culture: "*Nzogbonzogbo enyimba, enyi...*" He sang in a low voice first, but Master tapped his pen on the table and said 'Louder!' (HYS 12)."

Adichie does not shy away from presenting the African culture in the context of evil spirits and witchcraft. She mentions some African herbs such as *arigbe* (23), *uguleaves* (95) and *dibia* (215). She facilitates the understanding of African cultural space by asserting the importance of *ofori-okpa* festival in Nigerian tradition. She also counters the western prejudice about the festival: "Maybe Mr Richard wants to write about the devil," Ugwu

said. Of course, the *ori-okpa* was not a devilish festival, but he would not disagree with Harrison (HYS 209).”

Moreover, Adichie profiles the narrative with pleasing interfaces, wherein she shapes Richard's, Eurocentric white saviour image to a shy and accommodative mouthpiece of Nigeria who not only loves Igbo-Ukwu art but learns to speak Igbo language. Richard's character helps in locating the importance of mutual admiration, respect in promoting cultural exchange in a globalised world: “Nnaemeka's father was small and albino,

copper-coloured, his eyes a greyish-hazel that brightened as soon as Richard spoke Igbo (HYS 164).”

Thus, Adichie's narrative is loaded with interfaces depicting linguistic tensions. She does not fail to record her resistance towards the linguistic imperialism. She depicts the dynamic field of linguistic interface in post-colonial Nigeria and shows that this field generates both exchange and tension between the native language culture and the culture of English.

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FOLKLORE AND MODERN INDIAN DRAMA: THEMATIC REFLECTIONS IN GIRISH KARNAD'S HAYAVADANA

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ABSTRACT

Indian drama written in English and translated in English by Indian playwrights has registered a remarkable growth with recent decades. Contemporary Indian drama in English has made bold innovations and fruitful experiments in terms of both thematic concerns and technical virtuositities. Above all it is marked by its increasing allegiance to history, legend, myth and folklore, which in turn have contributed towards the revival of indigenous texts, scriptures as well literary works of Sanskrit abound with precious ancient knowledge systems which under the overpowering influence of new modern western knowledge had almost lost its essence. GirishKarnad has been regarded as the leading Indian dramatist so far as the use of myth and history is concerned and his plays vividly represent this trend. The aim of this paper is to attempt a critical examination of Karnad's 1972 play Hayavadana which addresses a host of prominent modern issues such as identity crisis, human's struggle for perfection and his inability to attain it, a renewed insight into female consciousness to name a few. The paper at the same time also aims to locate and assess Karnad's skillful use of folk elements and myth in the delineation of the themes in the play.

Keywords: Modern Indian drama, Folk theatre, mythology, identity, modern issues, folk tales, legends.

I. Introduction

Myths and folklores have always gained considerable significance in Indian literary history. Ramayana and Mahabharata, the two most prominent epics, as well as the Puranaremain till date an incessant source of inspiration for a large body of Indian literature. However as British rule came to an end in India, Indian literature, particularly drama, saw a sea change in terms of themes due to increased access to knowledge of other resources other than myth, and drama moved its concentration towards social and political themes. However there was a revival in this trend in what can be called the 'second renaissance' period of Indian drama when Indian dramatists turned once more to myth. In her essay "Folk Theatre Strategies in Hayavadana" Savita Goal (1999) states "their return to and discovery of tradition was inspired by a search for roots and a quest for identity. This was part of the whole process of decolonization of our life-style, values, social institutions, creative forms and cultural modes." (Goal, 1999:204)

Indian drama written in English and translated in English by Indian playwrights has registered a remarkable growth with recent decades. Contemporary Indian drama in English has made bold innovations and fruitful experiments in terms of both thematic concerns and

technical virtuositities. Above all it is marked by its increasing allegiance to history, legend, myth and folklore, tapping their springs of vitality which in turn have contributed towards the revival of indigenous texts, scriptures as well literary works of Sanskrit abound with precious ancient knowledge systems which under the overpowering influence of new modern western knowledge had almost lost its essence.

GirishKarnad has been regarded as the leading Indian dramatist so far as the use of myth and history is concerned and his plays vividly represent this trend. *Hayavadana* is influenced by Thomas Mann's 'The Transposed Heads'. Karnad builds on Mann's line to explore the theme of identity in a world of confused relationships. The play aims at demystification of traditional values and concepts and presents multiple viewpoints that promote a dialogue on the basic accepted tenets of life. This is enhanced by the merging of three levels of experience—the divine, human and the animal as well as the bringing together of the animate and the inanimate on a common plane.

The aim of the paper is to attempt a critical examination of the play *Hayavadana* which addresses a host of prominent modern issues such as identity crisis, human's struggle for perfection and his inability to attain it, a renewed insight into female consciousness to

name a few. The paper at the same time also aims to locate and assess Karnad's skillful use of folk elements and myth in the delineation of the themes in the play.

II. Discussion

The play opens with an invocation or a prayer to Lord Ganesha, or Ganeshvandana as it is the custom in folk plays, by Bhagvata who acts as the 'Sutradhar' or the Commentator. This worship of Lord Ganesha, the incomplete and imperfect God becomes very important thematically in a play which deals with human being's striving for perfection. Here Ganesha introduces the theme of imperfection and incompatibility. Bhagvata asks the reason for the exaltation of Ganesha as the lord and master of perfection in spite of his animal head and human body:

"How indeed can one fathom the mystery that this Vakratunda-Mahakaya, with his crooked face and his distorted body, is the Lord and Master of Success and Perfection?" (Act I, p.73).

Bhagvata's query on Ganesha certainly undermines the straightforward acceptance of the norm that head rules over the body. Moreover, it subverts and debunks the conventional belief that a human head on a human body signifies symmetry which is essential for considering a personality complete or perfect. No one can be perfect and even gods have not escaped the scrutiny of Karnad. In this way, the play using myth and elements of folk theatre questions some traditional beliefs. The mythical character Hayavadana with his horse head, the two friends Devadatta and Kapila, depicting two complementary facets viz, the intellect and the body- all are subjected to change in course of the play. This also draws our attention to the fact that human identity is not something coherent and fixed. The subject is a malleable structure; open to change, moulding and remoulding by various factors. This 'openness' of subjects is another prominent modern issue that is addressed in the play.

According to the critic R.S. Sharma, the use of the myth of Hayavadana and the transposition of the heads has many important implications- that completeness is a humanly impossible idea is suggested first in the story of Hayavadana

and later in the transposition of heads, further the play suggests at a socio-cultural level that the Apollonian aspect always asserts itself subduing the Dionysian in our socio-cultural life. The body is associated with animal instincts or the Dionysian aspect and subordinated to intellectual matters- the Apollonian aspect. This means that our behavior is mostly regulated by our rationality and knowledge which are derived from the collective wisdom of society. In this way, through the use of myth the play opens up a new perspective for the readers to think how society dominates over the individual, constructing a specialized identity for them. This is depicted in the scene where the 'three unfortunate friends'- Devadutta, Kapila and Padmini go to a rishi to seek solution for the problem as to who would be Padmini's husband after the switching of Devadutta and Kapila's heads. The rishi says,

'As the heavenly KalpaVriksha is supreme among trees, so is the head among human limbs. Therefore the man with Devadutta's head is indeed Devadutta and he is the rightful husband of Padmini.' (Act II, p.110)

This shows how despite the ambiguity and confusion of individual identities, it is the society's judgement over the individual that gets the upperhand.

Another element of folk theatre used in this play is the Sutradhar. The Sutradhar in traditional theatre is well acquainted with mythological stories. With the help of gestures and voice modulations, he creates different characters. He also improvises the dialogues, quotes from the scholarly Sanskrit texts and explains their meaning with apt illustrations from contemporary experiences. Karnad has used this character to comment on the conflicts going on between the minds and bodies of Devadutta, Kapila, Padmini and Hayavadana, the chief characters of the play. Devadatta and Kapila are the closest of friends—'one mind, one heart', as the narrator Bhagvata describes them. Devadatta is a man of intellect, Kapila a 'man of the body'. Their relations get complicated when Devadatta marries Padmini. Kapila falls in love with Padmini and she also gets attracted towards him. In the tussle that follows the two friends kill themselves; and in a scene full of dramatic implications, Padmini

transposes their heads, giving DevadattaKapila's body and KapilaDevadatta's: the result is a confusion of identities which reveals the ambiguous nature of human personality.

This theme of incompleteness is further accentuated by the sub-plot of Hayavadana, the man with a horse-head which is again a mythical character. The personality of Hayavadana itself highlights the conflict between the body and the mind. He wants to shed off his horse head and become a complete human. There is a conflict shown between Devadatta's head and Kapila's body and vice versa till the end when his search for completeness ends comically with his becoming a complete horse. The animal body triumphs over what is considered the best in man i.e. the human head.

Apart from the non-human character Hayavadana, Karnad also uses elements of folk theatre. One of them is the use of two talking dolls to highlight Padmini's conflict between the traditional acceptance of her destiny and individual choice of going beyond the marital bond to satisfy her desires. The dolls allow Karnad to introduce the voice of 'society' into an otherwise three-character story. Karnad also gives ample scope to the use of masks in this play. Mask is an excellent device to represent the conflicts going on and without the dramatic personage. In traditional Indian Theatre, the mask is not only the face writ large since the character represents not a psychological entity but an ethical archetype; the mask points in enlarged detail to its moral nature. And this is why, the characters in Hayavadana have no real names. The heroine is called Padmini after one of the six categories of women into which Vatsyana classified all women. Her husband is Devdatta, the name meaning a formal mode of addressing a stranger and Kapila simply means 'the dark one'. The characters act as powerful metaphors. Devadutta stands for the head, Kapila—the body and Padminiserves to elaborate on the relationship between the head and the body.

Another novel element that Karnad works upon in the play is the seminal treatment of the female character. Generally, myths and folktales in a patriarchal society are male oriented patriarchal constructs, which chiefly

represents the male unconscious fears and wishes. In these stories the women's experiences and inner feelings are not given importance. But in Hayavadana, the female character Padmini's unconscious emerges as an interesting area of study. She is a woman who goes against the patriarchal order of command and contentment. Although she is a married woman, it is shown that she too can dream about fulfilling her dreams and aspirations. She is clearly attracted to Kapila's well-built body and even Devadatta realizes it. He says, 'there's nothing wrong in it. It's natural for a woman to feel attracted to a fine figure of a man...' (Act I, p.10) Padmini also finds herself happy in the beginning when she transposes the two friend's heads and gets her desired combination of body and intellect. But her end by committing sati-suicide portrays the subjugation of women wherein they have to time and again prove their chastity.

The ironic presentation of the most powerful Indian Goddess, Kali is another significant aspect of the play. Initially the goddess is found sleeping, when both Devadatta and Kapilacut each other's heads. She wakes up from her sleep when Padmini's turn for suicide comes. The Goddess puts all three unfortunate beings through a series of cruel difficulties and then finally drives them to death. This ironic presentation of the divine intervention seeks to portray a delusional image of religion in the modern Indian society as a whole.

III. Conclusion

Karnad has very successfully employed the folk drama form in Hayavadana to present the perennial problem of identity and search for completeness. He reveals the impact of Brecht's theatrical teachings on him especially with regard to his use of indigenous dramatic forms. Karnad comments, —I read the basic Western canon – the Greek plays, Shakespeare, Shaw, O' Neill, Anouilh, Brecht, Beckett, Sartre, Camus. Brecht's technique influenced me a great deal in the earlier years. An old story gives the dramatist the opportunity to elaborate his thesis to focus on a hitherto unnoticed aspect. The dramatist is able to expose outdated notions and, in the process, create a contemporary consciousness. Karnad recognizes such a principle and uses familiar

tales in all his plays. Hayavadana most effectively subverts the accepted notion of the superiority of head over body, brain over brawn, while making a critique of futile and unreasonable human hopes and aspirations.

Karnad makes a selection of myths/folktales relevant and suitable for his dramatic purpose and strips them of their spatio-temporal bearings. His mythical characters emerge as archetypes, manifestations of general human characteristics, placed in a contemporary context and dealing with contemporary situations. What can thus be observed in Karnad's plays is a reworking of myths on contemporary lines, the myth serving as a parallel and a contrast not limited to the individual characters but encompassing entire epochs. Karnad therefore carefully edits out those aspects of myth not conducive to his purpose and makes deviations in detail. Karnad says that the use of myths and folk techniques allow for complex seeing. Although the myths have traditional and religious sanction, they pave the way for the questioning of human values. The play reveals the essential ambiguity of human personality which is apparently shaped or shattered by the human environment. Fundamentally incomplete and imperfect, human beings search and yearn for attaining the unattainable ideal of completeness and perfection. They usually tend to seek the support of some supernatural beings or the other to succeed in their endeavour. However, these external agencies, in their effort to help, seem to cause and complicate the identity crisis of the seekers further. It leads the seekers to tragic or comic ends. Padmini, for instance ruins herself and all her relations. Even the child that she leaves under the Bhagavata's care is not normal because of her own compulsions. Hayavadana, for another instance, does not bring destruction to himself as Padmini does, but suffers the drastic consequences of his search for completeness by going down the ladder of existence from man to horse.

Borrowing a phrase from Bertolt Brecht, Karnad says that use of myths and folk techniques allow for "Complex Seeing", although the myths have traditional and religious sanction, they have the means of questioning these values. Added to this

Karnad believes that the various folk conventions like the chorus, the music, the mixing of human and nonhuman worlds permit a simultaneous presentation of alternate points of view. Thus, the myth acquires new dimensions in the creative hands of Karnad, and the play unfolds rich strands of meaning. What Karnad tries to do in this play is to reveal the archetypal structure of the society. Myths and folktales always interpret human life, and in the contemporary context they interpret modern sensibility or the modern consciousness. In this way by exploiting myth and folktale in Hayavadana, Karnad presents various problems of contemporary society. As M. K. Naik says, "Hayavadana presents the typical existential anguish, but does not stop at the existential despair, going beyond it, the play suggests a strategy for the achievement of integration in a world inevitably cursed with absurdity and irrationality". Prof. G. S. Amurpin says that "Karnad's reworking of myths relates him to Kailasam and Adya Rangachary as much as to these European dramatists who remake their myths, particularly Karnad and Adya loved to evolve. A symbolic form out of a tension between the archetypal and mythical experience and a living response of life and its values." He further finds that contemporaneity in Karnad's plays manifests itself through the operative sensibility. "If Adya's attempt is to discover the usable past to make sense of the challenging present, Karnad's attempt is to give new meanings to the past from the vantage point of the present."

Thus, Karnad while using religion, tradition and culture in Hayavadana also goes beyond them and alludes implicitly to some of the issues of modern-day society. His portrayal of Padmini shows the unconscious female desires and feelings that were hardly given importance in folk tales. His ironic representation of Gods and Goddesses also seem to subvert the validity of religion that has a strong hold over our minds. Uniting the narration of the Bhagavata with the characteristic masks of the characters and talking puppets, Karnad has also very successfully utilized the various facets of folk theatre to present a world of incomplete individuals, unfulfilled desires and consequent frustration.

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A CRITICAL ANALYSIS OF FICUS PAX PRIVATE LTD. & ORS. VS. UNION OF INDIA & ORS. (WRIT PETITION (C) DIARY NO. 10983 OF 2020)**N.H. Sawant¹ and D. Hake²**

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¹ngsh.swnt@gmail.com, ²damodarhakellb@gmail.com**ABSTRACT**

The COVID 19 has devastated the lives of many including the labour class. In order to meet the exigencies created by the pandemic, the Central Government and the State governments came up with varied measures. To safeguard the rights of labour class, the Ministry of Home issued an order during the pandemic and mandated all the employers to make payment of wages to employees/workers without any deductions. The motive of the Ministry was to give solace to the working class in difficult times. However, the employers felt aggrieved with the order of the Ministry, hence, they challenged the order in different courts. The Supreme Court clubbed all the petitions and passed an interim order in the present case. The order issued by the Ministry and the order passed by the Court left many questions unanswered. In this article, the authors touched upon those unanswered questions in light of the present legal framework and the rulings by the court of the country.

Keywords: Covid 19, Labour class, Payment of wages, Supreme Court Interim Order

Introduction

Labour class in India facing one or the other problems in recent times. The COVID 19 posed new challenges for the employees. The forced lockdown, due to the pandemic, threatened the right to livelihood of labour class. During the first lockdown, the private establishments/ industries/ companies were shut for 50 days and some of them closed on a permanent basis which led to uncertainty of jobs, non-payment for working and non-working days, deprivation from social security benefits, etc. The formal and informal labour class suffered a lot because of the policies “No work no pay” and “No work, half-pay” adopted by the employers. In view of this, the Secretary, Ministry of Labour and Employment released an advisory to safeguard the rights of the employees. As a result, the Home Ministry, Government of India issued an order. Both, the advisory and the order, were not well received by the employers and the pleas were filed in the Supreme Court and the High Courts. The Supreme court clubbed all these petitions and passed an order. The order resolved the issue of the payment of wages favouring employees but at the same time left the workers at the mercy of the employers. In this backdrop, this article evaluates the factual matrix involved in the instant case, issues and contentions of the parties, and the judicial determination. Finally, it critically examines the legality and constitutionality of delegated power exercised

by the executive which formed the subject matter of the case.

Factual Matrix

In the advent of the CORONA virus, a national lockdown was declared on 24th March 2020. Barring the essential services, all the public/private establishments were shut. Due to this, the economic cycle in India collapsed all of a sudden, creating a long-lasting impact on the different sectors. The workers in all these sectors affected severely because of loss of jobs, no work no payment, deduction in payments, denial of social security benefits, etc. Keeping in mind the interest of workers in the unprecedented and difficult times, the Secretary, Ministry of Labour and Employment, Government of India circulated an advisory for all the establishments in public/private sector through Chief Secretaries of the State. The employers were advised not to sack their workers, mainly casual or contractual workers or reduce their wages. Discussing the consequences of the termination of an employee from the job or reduction in wages, the advisory states that it would heighten the predicament and not only it would enfeeble the economic condition of the employee but also hinder their confidence to fight this pandemic. Following the footsteps of the Ministry of Labour and Employment and the Home Secretary, Ministry of Home Affairs issued an order as per Section 10 (2) (1) of the Disaster Management Act, 2005. Para 3 clause (iii) of

the order states “All the employers, be it in the industry or shops and commercial establishments, shall make payment of wages of their workers, at their workplaces, on the due date, without any deduction, for the period their establishments are under closure the lockdown”. In case of violation of the order, the powers to take action were given to the respective State/ UT Government.

In pursuance of the order of Home Ministry, State of Maharashtra, State of Punjab, State of Uttar Pradesh and the State of Haryana issued orders in their respective states.

Issues

The order issued by the Home Ministry under the Disaster Management Act, 2005, the advisory furnished by the Labour Ministry, and the orders issued by the different State Governments have been challenged by the Employers and Employers’ associations on the following grounds:

- a) The orders issued are violative of Articles 14 and 19 (1) (g) of the Constitution as they are arbitrary, illegal, irrational, and unreasonable.
- b) During the lockdown, some establishments were allowed to work. Some workers were working and some were not. However, the orders did not make difference between working and non-working workers.
- c) The employers plead to permit to pay wages of 50% of basic pay and dearness allowance to its employees (without making payment of provident fund and employees state insurance contribution, as they do not come under wages), pending the final disposal of the present petition. Further they also pleaded that the employees or workers should forgo the PF and the ESI because there was no work done by the workers throughout the lockdown period and the payment deposited by the employers for the month of March and April 2020 be returned;
- d) The orders were issued by the Home Secretary, Government of India, invoking Section 10 (2) (1) and other provisions of the Disaster Management Act, 2005. The petitioners challenged the authority of the Home Secretary that stating that imposition of financial obligation on the private sector by the Home Secretary does not come under the purview of the authority.

e) The Central Government cannot shift the liability on the employers as the Disaster Management Act, 2005 empowers the Government to allot funds for relief, rehabilitation, emergency, mitigation, and response to disaster.

f) Instead of compelling the employers, the Governments should utilise the funds collected by Employees State Insurance Corporation (ESIC) to make periodical payments to workers or they can utilise the PM Care Funds or any other Government funds/schemes.

g) The petitioners should be allowed to make 50 percent of the payment of basic wages and dearness allowance to its employees during the pendency of the writ petition and without contributing to PF and ESIC. The contribution made towards PF & ESIC for the month of March and April 2020 be refunded to the petitioner and waive the PF and ESI as there was no work rendered by the workers during the lockdown.

h) Another major issue raised was with the regards to the formulation of a policy by the Central Government to mitigate the unprecedented conditions created by the lockdown resulting in laying off employees in the private sector.

i) If any establishment is economically not sound to support the employees, the Central Government should maintain the employees and their families.

j) The Governments should negotiate between the interest of Ministry of Micro, Small & Medium Enterprises (MSMEs) and the concerns of employees and workers observing that neither is disproportionately prejudiced.

k) The order issued by the Home Ministry is meant for State/ Union Territory Governments and not for the employers.

l) The order grouped all industries and private establishments when they are not homogenous in their financial capacity and circumstances.

By taking into consideration the issues raised by the petitioners, a counter affidavit was submitted by the Government of India, stating that all orders issued under Section 10 (2) (1) of the 2005 DMA were taken back on 18th May 2020. Though the order was withdrawn, it was in full conformity with the scheme of the Disaster Management Act 2005. The Order was released in the interest of public so it was

neither unjustifiable nor fickle. The action of the Government was a benevolent and for economic and welfare measure. The Government also offered a financial incentive for all SMI (Small and Medium Industries) so that they can help the workers and employees. With regards to the application of other laws, Section 72 of the 2005 DMA provides for an overriding effect so there is no question of violation of other laws.

Further, justifying its stance, the Attorney General stated before the Court that “the right to wages is a pre-existing right which flows inter alia from the contract of employment as well as broader constitutional and statutory scheme flowing from Articles 14 and 21 of the Constitution and encompassing the Payment of Wages Act 1936, the Minimum Wages Act 1948, the Contract Labour (Regulation and Abolition) Act 1970, and the Industrial Disputes Act, 1947”.

Employees and the different trade unions also submitted an application for intervention and claimed that the Union Government has power to pass such orders. Further, they also stated that the measures taken by the Government of India are as per the provisions of the Constitution and other labour laws.

Courts Analysis and Findings

The Apex court opined that “the issues raised by the petitioners and the respondents have to be decided together and the piecemeal consideration is no warranted and stated that Union of India may submit a detail counter affidavit, within a period of four weeks”.

The Court referred its order passed on 4th June 2020 asking the Governments not to take coercive actions against the employers. Further, the Court highlighted the fact that, “nature and capacity including economic capacity of different industries/establishments are different so applying one rule for all industries/establishments would be detrimental because some of them may not be able to bear the entire burden”. Moreover, the Court stated that “a balance has to be struck between these two competitive claims through a via medium”. Additionally, the Court opined that, “efforts should be made to sort out the differences and disputes between the workers and the employers about the wages for 50 days through

any settlement or negotiation”. Discussing about the State obligation, the Court stated that “the State needs to ensure smooth running of the industrial establishments and make sure that the disputes between the conflicting parties may be conciliated and sorted out”. The court opined that, “the said step may restore congenial work atmosphere”.

The Court suggested the following interim measures which can be used by all the stakeholders i.e., the private industries, factories, establishment, employees’ associations and workers trade unions or etc.

- 1) There were two options given to the employers with regard to making payment for 50 days or for any other period which includes:
 - a) To initiate negotiation process and take up a settlement, or
 - b) If they are not able to settle the issue, they may request the concerned labour officer to conciliate the dispute by calling the concerned workers or the trade union or the workers association for conciliation, negotiation, and settlement on a date.
- 2) The steps indicated in direction No. (1) can be initiated by the employers’ industries, establishments, and factories who were doing job throughout the lockdown not with full strength.
- 3) Without undermining the interests of the employees/ workers with regard to outstanding wages of above 50 days, the employers shall allow the employees /workers to work in their respective industries. The employers who move to initiate steps as per directions (1) and (2) shall publish and transmit to their employees about the steps and submission of reply or involvement in the process.
- 4) The Court directed the respective governments to circulate and publicise this order through their Ministry of Labour for the employers and employees in all private establishments and factories.

Critical Analysis: In this case, the Supreme Court has an opportunity to settle the law pertaining to the pertinent issues about the application of the DMA. The court listed the matter in the last week of July, 2020 and had asked Union of India to submit the responses.

As of now, no progress happened, therefore, there are no answers to the multiple issues raised by the petitioners. The issues raised by the petitioners can be summarised under three important heads, i.e., application of the advisory and order to the private establishments/employers/ institutions, exercise of delegated authority by Home Secretary, and the workers and employees' rights concerning payment for non-working days and the rights conferred under different labour laws. These issues are discussed in detail as follows:

Firstly, the petitioners challenged the constitutional validity of the advisory and the order. While issuing the advisory, Secretary, Ministry of Labour and Employment has not specifically mentioned law which confers the power to issue advisory. It was just an advisory without any legal mandate. Therefore, it was not obligatory on the employers of private establishments/employers/institutions to observe the advisory. Further, the advisory also denotes that it means that the employers are free to terminate the services or to reduce the pay of the workers, therefore, the petitioners' contention does not have any legal stand. Hence, there is no question of contravention of Articles 14, 19 (1) (g), and 21 of the Indian Constitution,

With regards to the order, by referring to Section 10 (2) (1), Home Secretary, Ministry of Home Affairs issued the order. As per the Section 10 (2) (1), "Home Secretary, as Chairperson of the National Executive Committee, may lay down guidelines for, or give directions to, the concerned Ministries or Departments of the Government of India, the State Governments and the State Authorities regarding measures to be taken by them in response to any threatening disaster situation or disaster;" Literal interpretation of the clause indicates that its purview is limited to the Ministries or the Departments of Governments and their authorities. The Sub-clause, nowhere, mentions anything about the private establishment/employers/institutions. On the contrary, the clause (iii) of the order mandates, all the employers, be it in the industry or in the shops and commercial establishments. The clause is of a wider amplitude and applicable to all private establishments. So question arises, whether the ministry can issue such mandatory

orders for the private entities? Neither the DMA adequately supports this exercise of power of the ministry as there is no precise legal provision in this regard nor the ministry justifies its stance. Hence, the Apex Court needs to clarify the legal ambiguity about the extension of the DMA to private entities.

The petitioners challenged the Labour Ministry's advisory and the Home Ministry's order claiming they are arbitrary, illegal, irrational, and unreasonable, hence, against Articles 14 and 19 (1) (g) of the Indian Constitution. In this context, the Apex court has settled the law for the purposes of Article 14 in *Air India v/s Nargesh Mirza* stating that Article 14 can be used to test arbitrariness or unreasonableness of any law & action, rules, regulations, etc. Reasonableness is the standard used to construe the Act and to distinguish what the statutory authority may or may not be authorised to do. "Unreasonableness" is one of the grounds of judicial review available to test validity of delegated legislation. If a delegate intends to impose a condition, which is unreasonable, it cannot be held legal or valid. Same analogy can be applied to the advisory and the order. When it comes to the advisory, it is a mere advice without any obligation so question remains about the order. The court only needs to clarify whether the order was contrary to Article 14.

As far as Article 19 (1) (g) is considered, the State has constitutional power to laid down reasonable restrictions in the interest of public under Article 19 (6). The order of Home Ministry can be justified on the ground of public interest. In this regard, the highest court has explicated scope and extend of Article 19 (1) (g) and Article 19 (6).

In *Mohd. Faruk v. State of M.P.*, the Court held that "A prohibition on the fundamental right to carry on occupation, trade or business is not regarded as reasonable if it is imposed not in the interests of the general public but keeping in view the susceptibilities and sentiments of a section of a community." In *Municipal Corp. v. Jan Mohd. Usmanbhai*, the court stated that the expression "in the interest of public", is of wide magnitude and it includes public health, morals, public order, public security, economic wellbeing of the community and the objects mentioned in Part IV of the Constitution. By

referring to the rulings of the Court, the State can justify its stance. On the contrary, the employers/private establishments need to substantiate its claims on solid grounds whereas the apex court has one more opportunity to uncover the fathom of Articles 19 (1) (g) and Article 19 (6) in view of application of the DMA to private entities/ establishments.

Secondly, COVID 19 was an emergency declared under the DMA by the State. So questions arise about what corollary responsibilities State bears towards such emergency and what is the scope and extent of the delegated authority exercised by the Home Secretary and whether it is constitutionally valid. If it is discussed in light of the separation of powers system, then the system empowers the legislature to laid down a decision-making framework. By using this framework, a lot of residual decision-making powers are conferred on the executive. Along with the residual powers, the executive also employs discretionary powers. In the instances of de facto "states of emergency", like the COVID, 19, the executive expands the discretionary powers and also justify those power on the ground of public good. Utilising the residual powers and the discretionary powers, for smooth governance of the country, the executives release advisories, pass orders, issue ordinances, make regulations etc. Here, John Locke's insight remains true: there needs to be a power "to act according to discretion, for the public good, without the prescription of the Law, and sometimes even against it". It is to be noted that "the executive branch is not completely 'unbound' either in ordinary times or in times of crisis." Though, they do perform a lot of functions, they need to work within the constitutional limits and all other legal frameworks, interpret law in right spirit. Unfortunately, it does not happen. Laws are misinterpreted leading to usurpation of powers and creating a threat to the rights of persons. In light of this, the Home Secretary's order can be criticised on the grounds of misinterpretation of the powers given under the DMA. Whereas it could be justified on the ground of exercise of the residue powers. However, it is necessary to see its application to the private entities.

The Indian judiciary has pondered upon the powers of the executives in many cases. In Narendra Kumar v/s Union of India , the Apex Court made it clear that "even if the enabling Act is intra vires, the constitutionality of delegated legislation can still be considered because the law cannot be presumed to authorise anything unconstitutional". However, in Manasukhlal Vithaldas Chauhan v/s State of Gujarat , "while determining whether the administrative authority has exceeded its power, the Apex Court states that the court does not sit as a court of appeal but merely reviews the manner in which the decision is permitted, it will be allowing the judge to substitute his own wisdom to that of the administrative authority which itself may be fallible". When it comes to exercise of the discretionary powers, the administrative authorities use their wisdom. On many instances, the authorities misused the discretionary powers on the directions of the political bosses or for own purposes. In this regard, Aziz Z. Huq rightly states that "the exercise of executive discretion, especially in emergencies, may have troubling distributional consequences". The highest court needs to clarify the scope and extent of the DMA and the limits on the powers of the Home Secretary.

Thirdly, the workers and employees are the beneficiary in this case. Their main concerns are payment for non-working days and protection of the rights conferred under different labour laws. In this context, the Apex Court, instead of passing a conclusive judgment or giving a concrete order, reminded obligation of the State with regards to smooth functioning of the industrial establishments and resolving the disputes between the employer and the employees through conciliation. However, the conciliation process in India is not viable option from the point of workers/employees. According to N. K. Jetli "the Conciliation Machinery is more eager to consider problems of employers and today consider issues like increase in productivity, competition, market fluctuations, etc." So directing the issues relating to payment of wages to the conciliation machinery is rather advantageous for the employers than employees.

Bearing in mind, the recent developments in labour market, it seems difficult that the workers/employees are in position to fight for their rights relating to wages. Jetli states that, "there is a trend to resolve major disputes through negotiation at bipartite level. The nature of disputes or demand is changing. Instead of demanding higher wages, allowances or facilities, trade unions now demand job security and some are even willing to accept wage cuts or wage freezes in turn for job protection. Disputes relating to non-payment of wages or separation benefits are on the rise". The Covid 19 created a similar kind of situation wherein the trade unions and employees/workers are insisting job protection and also fighting for wages and other benefits. It is an open secret that the employer, in majority of the cases, had an upper hand at the negotiation table whereas the labour unions or organisation are not that much strong that they would succeed convincing the employer to their terms. Jetli claims that "recovery proceedings against employers who could not pay heavy dues to workers are not being pursued seriously by the relationship machinery, if the financial position of the employer is very bad."

The Apex court, in its order, suggested if the negotiation fails the parties may request to labour officials to conciliate and settle the issue. As the labour offices are already understaffed so any additional work may result into delay in handling the issues. Moreover, the labour adjudication machinery is not always a viable option for the employees as there is no assurance that they would get justice. After one year of the order of the highest court, there is no data available pertaining to conciliation of the disputes, related to non-payment or half-payment of wages to workers/employees, by way of conciliation or with the help of the labour authorities.

Contemplating the prevailing trends in the industrial circle, the court ordered the employers and employees to settle the issues regarding payment of wages amicably through negotiation, conciliation and settlement. While

doing so, the Court bypassed the existing legal framework to ensure the rights of the workers/employees. The Apex Court was silent about the execution of numerous labour laws including the Payment of Wages Act, 1936, the Minimum Wages Act, 1948, the Industrial Disputes Act, 1947, the Employees State Insurance Act, 1948, the Employees' Provident Funds and Miscellaneous Provisions Act, 1952, the Contract Labour Act, 1970, the Inter-State Migrant Workmen Act, 1979, etc.

One of the important way to maintain the employer- employee relation is the system of retaining allowance. In this system, the employer could pay retaining allowance (RA) to its employees. RA is for all purposes treated on par with basic wage and dearness allowance as borne out by Section 6 of the EPFA, notwithstanding the fact that it is not a remuneration payable if the terms of the contract, express or implied, were fulfilled. RA is neither reflected in the order of the Home Ministry nor in the order of the Apex Court.

Conclusion

Due to delay in a final judgment of the Apex Court of India in this case, there are many questions which are unanswered. The issues regarding application of the DMA to private employers, powers of the executive to furnish mandatory orders, application of the different labour laws in the pandemic and the rights of the employees/ workers needs a holistic approach. The Court, in its order, emphasised on an amicable settlement of disputes with the help of the State machinery. Now, many private establishments/ institutions are working like normal routine, however, the issue of payment of wages have been side-lined. The workers or employees seem silent because of getting or continuing job has become difficult due the pandemic. Therefore, there are no strong views about the pending payment of wages. As there are speculations about the third wave, resolution of different legal issues and clarification about the laws is a need of hour.

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9. Clause (iii) of the order states that “All the employers, be it in the industry or in the shops and commercial establishments, shall make payment of wages of their workers, at their work places, on the due date, without any deduction, for the period their establishments are under closure during the lockdown.”
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ACCEPTANCE OF MOBILE BANKING SERVICES IN KERALA: AN APPLICATION OF TECHNOLOGY ACCEPTANCE MODEL (TAM)

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ABSTRACT

This study using a Classical Technology Acceptance Model (CTAM), investigates the factors influencing the customer's acceptance of mobile technology in banking. For the empirical testing of the model, data was collected from 400 banking customers in Kerala, and the hypotheses were tested through variance based Structural Equation Modeling (SEM) framework and the results confirm the usefulness of TAM in predicting customer's mobile banking acceptance behaviour. The TAM model has been used since 1980s in research mainly for uncovering the intentions of users in adopting and using new technologies. The exogenous constructs from the original TAM, Perceived Usefulness (PU), and Perceived Ease of Use (PE) emerged out as significant antecedents of the customer's acceptance towards the use of mobile banking services in Kerala. The statistical results also support the significant association of Perceived Usefulness (PU), Perceived Ease of Use (PE), Behavioral Intentions (BI), and Social Influence (SI) with Customer Acceptance (CA) to mobile banking services. The study found that all the variables (all five dimensions mentioned in this study) have significant impacts on customers' acceptance for the use of mobile banking technology in Kerala.

Keywords: Mobile Banking, Customer Acceptance, Perceived Usefulness, Perceived Ease of Use, Behavioral Intentions, Social Influence and TAM

Introduction

As developments of technologies both financial institutions and consumers are occupying advantages of the efficiencies which they bring. On the one hand the cost of financial transactions have become lower when using an electronic device than a bank branch and the modern technologies provide for consumers the convenience to obtain a financial service wherever they may find themselves where mobile communication exists (The World Bank, 2009). If consumers value this mobility, it is possible that consumers, who have presently used electronic transactions via PCs, may accept adaptation transactions via mobile devices. After all, consumers prefer (evidence suggest) to obtain their services from various channels rather than a single one.

When technological revolution is at its peak, one of the important sectors of the economy where technology is at its helm of affairs with respect to customer service is banking. Financial institutions and consumers are occupying advantages of the efficiencies of technological advancement which they bring. On the one hand, the cost of financial transactions has become less when using a gadget than at a bank's branches. Modern technologies provide for consumers the

convenience to obtain a financial service wherever they may find themselves where mobile communication exists. When consumers value this mobility, it is possible that consumers, who have presently used electronic transactions via PCs, may accept financial transactions via mobile devices. Consumers prefer to obtain their services from various channels rather than a single one.

The Technology Acceptance Model (TAM) by Davis in 1986 is one of the models that attempted to address the process of acceptance of the technology and the uses by consumers. This model includes five factors: perceived ease of use, perceived usefulness, behavioral intention, social influence and customer acceptance. Many attempts to adapt the TAM in various fields were found in literature, such as, Alsamydai (2014) Chau & Lai (2003), Dillon & Morris (1997), Saji & Paul (2018) and Venkatest (2000).

Study Objectives

This study focuses on the TAM model and how to accept to the smart phones and varied financial activities electronically. In the same direction, this study sheds the lights on the acceptance of this model and its uses and also deals with the model of mobile banking services within the following objectives:

1. To measure the effect of perceived ease of use, perceived usefulness, behavioral intentions and social influence on the customer acceptance of mobile banking services in Kerala.
2. To formulate a model for the acceptance of technology for using the mobile banking services in Kerala.

Review of Literature

The aim of the current study is to structure the Technology Acceptance Model (TAM) to the customer acceptance of Mobile Banking Services. The TAM is very popular as a framework for examining intentions to adopt mobile banking. This model has been used in a variety of studies to explore the factors affecting customer's use of new technology. The literature, which are related to the mobile banking and the model are listed as follows:

According to T. G. Saji & Deepa Paul (2018) using an extended version of Classical Technology Acceptance Model (CTAM), investigates the factors influencing the adoption behavior of mobile technology in banking. Perceived Usefulness (PU), and Perceived Ease of Use (PE) along with two additional constructs in the extended model, Perceived Credibility (PC) and Perceived Self Efficacy (PSE), emerged out as significant antecedents of the behavioral intention of customers.

According to Mostafa, A. A. N & Eneizan, B. (2018) the researcher aimed to investigate factors influencing the acceptance of mobile banking in Libya. The findings revealed facilitating conditions, Perceived Self Efficacy (PSE), Perceived Ease of Use (PE), and Perceived Usefulness (PU), and have significant impacts on consumer's behavioral intentions for the acceptance and usage of mobile banking technology in Libya.

According to F. Mehrad, D., & Mohammadi, S. (2017) the factors affecting the adoption of mobile banking, including Perceived Usefulness (PU), Perceived Ease of Use (PE), Social Norms, Word of Mouth, Trust, and Attitude which were identified and tested in the context of Iran. According to the findings, all tested factors had significant effects on the adoption of mobile banking and individuals

adopt. For instance, Perceived Usefulness (PU) and Perceived Ease of Use (PE) were identified as the most effective factors in the sample. Results of this study are also in line with the findings of other studies. Structural Equation Modeling (SEM) and path analysis were employed to test the research model.

Theoretical Framework

1. Customer Acceptance (CA)

Customer acceptance is defined by Davis (1989) as the willingness of an individual to use a new technology; considering perception, expectation and intention of the decision. In this study regarding mobile banking we define customer acceptance as the perceptual and emotional decision of an individual that direct to the acceptance of an innovative products or services. When the customer has the intention to use mobile banking, the likelihood that the customer will accept and finally use it will be high. Thus, this study is mainly based on a prevalent theory, the Technology Acceptance Model (TAM), for investigating the customer's acceptance of using mobile banking services.

2. Perceived Ease of Use (PE)

Perceived ease of use is defined as the degree in which a person believes that using a particular system would be free from effort. Davis (1989) argued that perceived ease of use also influences, in a significant way, the attitude of the individual through two main mechanisms: self-efficacy and instrumentality. The Self-efficacy term, which was introduced by Bandura (1982), explains that the more the system is easy to use, the greater should be the user's sense of efficacy. Many researchers have studied the relationship between perceived ease of use and perceived usefulness. Perceived ease of use can also contribute in an instrumental way in improving a person's performance. Due to the fact that the user will have to deploy less effort with a tool which is easy to use, they will be able to spare efforts to accomplish other tasks.

H1: Perceived ease of use (PE) has a positive effect on behavioural intention (BI)

H2: Perceived ease of use (PE) has a positive effect on customer acceptance (CA)

3. Perceived Usefulness (PU)

Perceived usefulness is defined as the extent to which an individual believes that he or she would benefit from using mobile banking service. The importance of perceived usefulness has been widely recognized in the field of electronic banking. Previous studies have consistently argued that there is a positive relationship between perceived usefulness of mobile banking intention and attitude toward mobile banking and mobile banking usage. For example, Chau and Lai's (2003) examined the contributing factors towards the consumers' adoption of mobile banking and determined that perceived usefulness was found as an important factor in creating a positive attitude towards accepting the mobile banking services. Moreover, many researches assumed that the perceived usefulness is an important factor to refine the Technology Acceptance Model (TAM). Therefore, perceived usefulness will influence their intention to accept and use mobile banking services

H3: Perceived usefulness (PU) has a positive effect on behavioural intentions (BI)

H4: Perceived usefulness (PU) has a positive effect on customer acceptance (CA)

4. Behavioral Intentions (BI)

According to Fishbein and Ajzen the behavior intention is defined as a measure of strength of one's intention to perform a specific behavior. Behavioral intention refers to an individual's willingness to perform not to perform a specific future behavior. It has been considered as an important predictor of an individual's behaviors. Behavioral intention is considered to be an important mediator in the relationship between the independent variables and the use of specific system. Taking into account the

intentions towards the acceptance of mobile banking services, it is reasonable to consider the variables of the Technology Acceptance Model (TAM) in predicting the behavioral intentions for mobile banking services.

H5: Behavioral intentions (BI) has a positive effect on social influence (SI)

H6: Behavioral intentions (BI) has a positive effect on customer acceptance (CA)

5. Social Influence (SI)

Social Influence (SI) is directly correlated to the degree to which outcomes from using new products or innovations are noticeable to friends and relatives. If consumers observe others deriving pleasure from the use of new products or innovations, those products are more likely to be distributed faster among customers. This construct is comparable to modeling. Several researchers, including Venkatesh forwarded that SI has a significant impact on the BI.

H7: Social influence (SI) has a positive effect on customer acceptance (CA)

Research Model

The model of this study is based mainly on the technology acceptance model presented by Davis 1989. Factors influencing the customer acceptance of Mobile banking services in India were structured with this model. TAM model would be in more comprehensive manner to understand the acceptance behavior toward Mobile banking services, hopefully, the restructure of this model would provide us with higher explanatory power to examine the customer acceptance rate. This model in Mobile banking services is indicated in Fig1. Accordingly, the hypotheses are presented in the Table 1.

Figure 1. Research Model

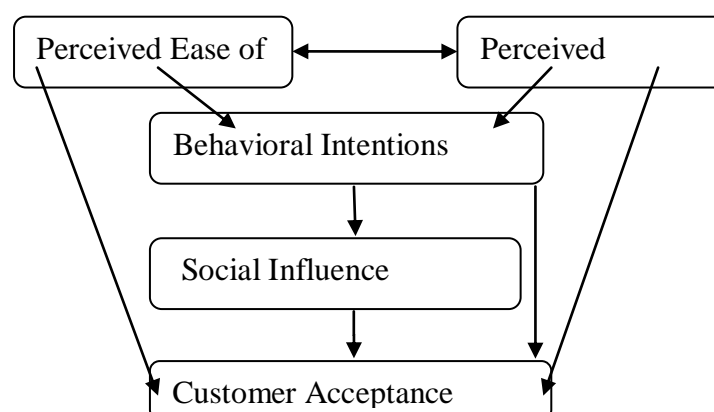


Table 1. Hypotheses of the Study

Variables	Relationship	Hypotheses
Perceived Ease of Use(PE)	PE → BI	H1:PE has a positive effect on BI
	PE → CA	H2: PE has a positive effect on CA
Perceived Usefulness (PU)	PU → BI	H3:PU has a positive effect on BI
	PU → CA	H4:PU has a positive effect on CA
Behavioral Intentions (BI)	BI → SI	H5:BI has a positive effect on SI
	BI → CA	H6: BI has a positive effect on CA
Social Influence(SI)	SI → CA	H7: SI has a positive effect on CA

Observed endogenous variables are Behavioral Intentions (BI), Social Influence (SI) and Customer Acceptance (CA) and Observed exogenous variables are Perceived Ease of Use(PE) and Perceived Usefulness (PU). Exogenous variables Perceived Ease of Use(PE) and Perceived Usefulness (PU) have significant positive effect on each other.

Framework of the Study

Subsequent to a comprehensive review of literature on mobile banking services, researcher developed an interactive, multidimensional mobile banking conceptual model. This model predicts the correlation pertaining to the dimensions (Five Dimensions) considered for this study. Figure 1 shows the effect of PE, PU, BI, and SI on the Customer's Acceptance (CA), in relation to the mobile banking services.

Methodology

1. Data Source

The current study methodology is mainly based on two types of data sources:

1.1. Secondary Sources: Data and information obtained from reviewing the literature and research findings related to this study and its objectives. Also used in the designing and development of the study's model.

1.2. Primary Source: The data necessary to develop the final questionnaire of the study that was distributed to bank customers. To determine the appropriateness of the instrument and identify the most relevant items to be included in the final questionnaire, final drafting which included (28) questions distributed over fifth dimensions.

2. Data Collection

The study population was made up of Kerala customers who are familiar with mobile banking services. The sample was ascertained in accordance with the table of sample determination. Data was collected from 400 respondents. Variance based structural equation modeling was employed for the analysis.

3. Data Analysis Technique

The data analysis was conducted with the help of Partial Least Squares Structural Equation Modeling (PLS-SEM), which is an approach developed by Hair. According to him, this technique maximizes the explained variance of endogenous constructs. Although covariance based SEM remains the more popular approach, variance based PLS-SEM is rapidly gaining ground in a variety of management science disciplines. In this paper the researcher opted for the variance-based PLS-SEM for the data analysis, as it comes with the capacity to manage complex models, the non normality of data and small sample sizes.

Analysis

Data was subject to Correlation analysis, Independent Samples t-test, ANOVA, and Regression analysis.

1. Measurement of the Constructs (PU, PE, BI, SI & CA)

H₀1: There is no significant difference between sample mean and population means relating to PU, PE, BI, SI and CA of Mobile banking services.

Table 2. One Sample t Test

Construct	N	Mean	Std. Deviation	t value	P value
Perceived Usefulness	152	3.8125	.99679	10.049	<0.0001**
Perceived Ease of Use	152	3.8263	.94643	10.764	<0.0001**
Behavioural Intentions	152	3.6237	.89233	8.617	<0.0001**
Social Influence	152	3.4518	.66822	8.335	<0.0001**
Customer Acceptance	152	3.5013	.83086	7.439	<0.0001**

Source: Primary Data

**significant @ 1% level

The null hypotheses have been rejected at 5% level of significance and it is concluded that Perceived Usefulness (PU), Perceived Ease of Use (PE), Behavioral Intentions (BI), Social Influence (SI) and Customer Acceptance (CA) of mobile banking have the mean more than the population mean, ie.the mid value 3.

It is inferred that all these constructs are positively existed among population.

Model Measurement

The measurement explains the relationship of independent variables such as PE, PU, BI and SI on the dependent variable customer acceptance (CA).

1. Regression Analysis

Table 3. Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.746 ^a	.556	.544	.56102	2.111

Source: Primary Data

a. Predictors: (Constant), Perceived Usefulness (PU), Perceived Ease of Use (PE), Social Influence (SI), & Behavioral Intentions (BI)

b. Dependent Variable: Customer Acceptance

Adjusted R square is 54.4% of Customer Acceptance (CA) of mobile banking services.

It has been explained by Perceived Ease of Use (PE), Perceived Usefulness (PU), Behavioral Intentions (BI) and Social Influence (SI). Independent variables (PU, PE, BI, & SI) have no significant auto correlation based on Durbon Watson statistic value (2.111) ranging from 1.5 to 2.5, which indicate the model explained here is fit to the study.

2. Model ANOVA

Table 4. Model ANOVA

Model	Sum of Squares	df	Mean Square	F Ratio	P Value
Regression	57.972	4	14.493	46.047	<0.0001**
Residual	46.267	147	.315		
Total	104.240	151			

Source: Primary Data

a. Dependent variable: Customer acceptance

b. Predictors: (Constant), Perceived Usefulness (PU), Perceived Ease of Use (PE), Social Influence (SI), & Behavioral Intentions

The table 4 shows that the independent variables have significant difference among themselves. The null hypothesis has been rejected at 5% significant difference. Hence, there is significant difference among independent variables.

3. Coefficient Metrics

Table 5. Coefficient Metrics

Model		Coefficients ^a					Collinearity Statistics	
		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Tolerance	VIF
		B	Std. Error	Beta				
1	(Constant)	.540	.252		2.144	.034		
	Perceived Usefulness	.219	.077	.263	2.855	.005	.356	2.806
	Perceived Ease of Use	.180	.110	.205	1.632	.105	.191	5.235
	Behavioural Intentions	.210	.107	.226	1.963	.052	.228	4.388
	Social Influence	.195	.083	.157	2.357	.020	.679	1.472

a. Dependent Variable: Customer Acceptance

Source: Primary Data

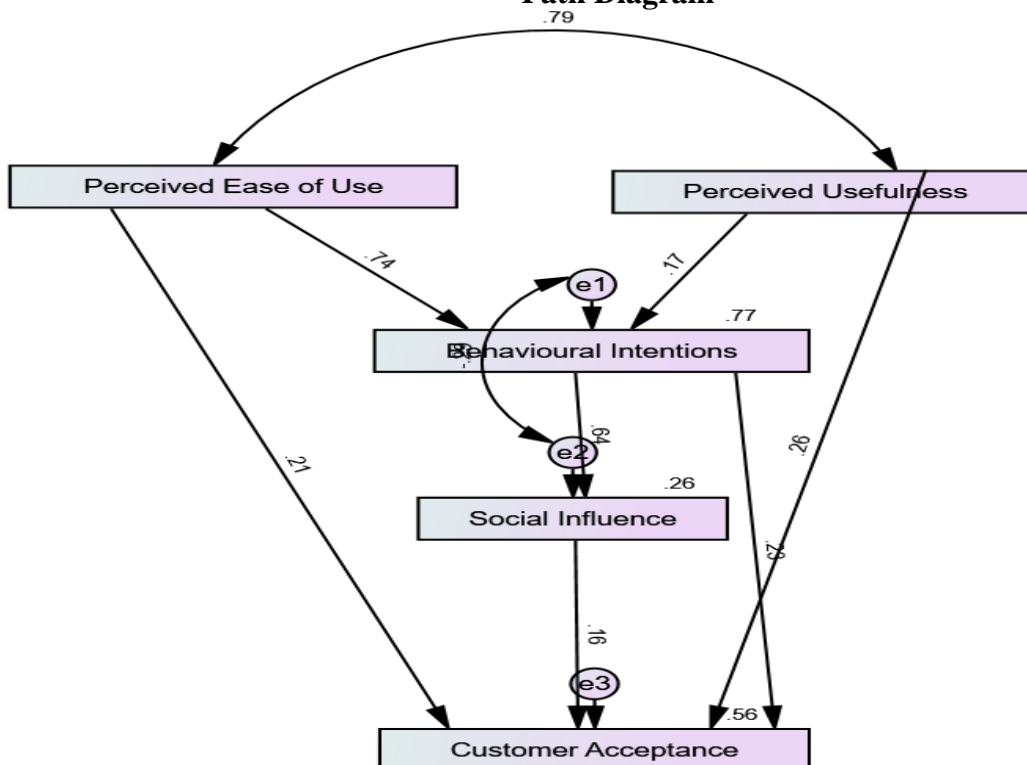
Table 5 shows that one unit of CA is influenced by 0.263 PU, 0.205 PE, 0.226 BI and 0.157 SI. In which PE is not significant. Tolerance Factor and VIF factor here are within the limit. As the statistical tests VIF and Tolerance factor are within the limit, there is no inter correlation among independent variables. This model explains 54.4%

Structural Equation Model (SEM) Analysis

Structural Equation Modeling (SEM) was performed to observe interrelationships among

various dependent and independent constructs simultaneously. In the present study, a two-step approach of SEM (assessment of measurement model and assessment of structural model) was used to assess the proposed theoretical framework. The reliability and validity of the constructs as well as model fitness were tested by the measurement model and path analyses were performed between exogenous and endogenous variables by the structural model.

Figure 2. Antecedents of Customer Acceptance to Use Mobile Banking Services: Path Diagram



1. Analysis of Measurement Model

Table 6. Goodness of Fit Measures

No	Fit indices	Obtained values	Criteria
1	Chi Square/df	.458	< 3.00
2	Goodness of Fit (GFI)	.999	≥ .90
3	Adjusted Goodness of Fit (AGFI)	.982	≥ .80
4	Normed Fit Index (NFI)	.999	≥ .90
5	Comparative Fit Index (CFI)	1.000	≥ .90
6	Root Mean Squared Error of Approximation (RMSEA)	.000	< .05

Source: Primary Data

Content validities should be relatively acceptable since the various parts of questionnaire were all adapted from the literature and have been reviewed carefully by practitioners. Next, confirmatory factor analysis in AMOS software was used to analyse construct validities, basically the analytical procedure including three stages as described below. First, a measurement model should be assessed for goodness-of-fit. The

literature suggested that, for a good model fit, chi-square/ degrees of freedom should be less than 3, adjusted goodness-of-fit index (AGFI) should be larger than 0.8, goodness-of-fit index (GFI), normed fit index (NFI), and comparative fit index (CFI) should all be greater than 0.9, and root mean square error (RMSE) should be less than 0.10 (Henry and Stone, 1994). Second, convergent validity is assessed by three criteria.

2. Assessment of Structural Model

Table 7. Report of the Hypothesis Testing

Hypothesis	Relationship	Beta (B)	Standardized regression coefficients	Critical ratio or (t value)	Supported (** = $P < 0.05$) (*** = $P < 0.001$)	Result
Hypothesis1 (H1)	PE → BI	0.694	.058	11.949	Yes***	Accepted
Hypothesis1 (H2)	PE → CA	0.180	.109	2.898	No	Rejected
Hypothesis1 (H3)	PU → BI	0.154	.055	2.824	Yes**	Accepted
Hypothesis1 (H4)	PU → CA	0.219	.076	1.655	Yes**	Accepted
Hypothesis1 (H5)	BI → SI	0.479	.060	8.009	Yes***	Accepted
Hypothesis1 (H6)	BI → CA	0.210	.106	1.990	Yes**	Accepted
Hypothesis1 (H7)	SI → CA	0.195	.082	2.393	Yes**	Accepted

Source: Primary Data.

The structural model is used to test the relationships of the proposed hypotheses set in the model among the exogenous and the endogenous latent variables. It is a method used to investigate the direct or indirect influence of the constructs in the proposed theoretical framework. In the present study, IBM SPSS Statistics v.21 and IBM SPSS Amos v.21 software have been used for the

assessment of the structural model. Table 7 shows that the six hypothetical relationships, H1 (PE → BI), H2 (PU → BI), H3 (BI → SI), H4 (SI → CA), H5 (PU → CA) and H7 (BI → CA) were statistically significant at the threshold level (i.e., $P < 0.05$ or $P < 0.001$). Therefore, these hypotheses were supported; while one hypothetical relationship H6 (PE →

CA) was not statistically significant. Hence, this hypothesis was not supported.

Discussion on the Findings

The study measures the constructs by using Structural Equation Modeling (SEM) and AMOS. This study validates the efficiency of TAM in predicting mobile banking acceptance of customers in Kerala. Both of the exogenous variables from original TAM, PU and PEU come out as significant determinants customer acceptance to use Mobile Banking Service. Statistical significance of constructs in the model establishes usefulness of TAM to make out the intention of the customers towards the acceptance of mobile technology in banking. In this study chi-square (0.458), and level of probability (0.499) are less than 5 and the degree of freedom is 1. Here, RMR (root mean square residual) is 0.004, it is near to 0. Hence it indicates possibility of error is less in this study. All these contribute to the model fit.

In the study model, factor influence is explained with the dependent and independent variable. One unit of dependent variable, Behavioral Intention (BI), is influenced by independent variables, perceived ease of use (0.74) and perceived usefulness (0.17). One unit of dependent variable, Social influence (SI), is influenced by Behavioural intentions (0.64) as independent variable. One unit of Customer Acceptance (CA) is influenced by perceived ease of use (0.21), perceived usefulness (0.26), behavioural intentions (0.23) and social influence (0.16). This is further explained as one unit of BI (dependent variable) is influenced by 0.91 unit of independent variables PE and PU. One unit of SI (dependent variable) is influenced by 0.64 unit of BI as independent variable. Next, one unit of customer acceptance (dependent variable) is influenced by 0.86 unit of PE, PU, BI and SI as independent variables

As shown in Table 6, the preliminary measurement fit indices were found as such: chi-square 0.458, Degree of Freedom 1, and level of probability 0.499 was significant; CMIN/DF = 0.458; goodness-of-fit index [GFI] = 0.999; adjusted goodness-of-fit index [AGFI] = 0.982, root mean square error of approximation [RMSEA] = 0.000; normed of-

fit index [NFI] = 0.999; comparative fit index [CFI] = 1.000. From this measurement it is clear that the model seem to have adequate fit to data.

As seen in Table 7, the all research hypotheses proposed were supported except one hypothesis (H2: perceived ease of use → customer acceptance). This means that those participants, who perceive using mobile banking could comprise further intrinsic utilities to them, are more likely to be motivated to accept such technology. By the same token, there are several instances in the prior literature that have examined and approved customer acceptance or its similar factors (e.g. perceived trust, perceived self efficacy, perceived risk and perceived entertainment) on the customers' intention to use technology. In other words, MB was found to be highly perceived as useful and having a price value among those customers who perceive using such channel comprising of further updating.

Such a finding carries valid insights to banks on the need of designing a mobile banking platform that warrants usefulness, social updates, and behavioral intentions of customers for fast and convenient banking operations. PU and PE have direct effects on behavior intention. This construct's direct effect is evident through its statistically significant casual linkage with SI, which further has strong correlation with PU and PE. Designing a mobile technology platform in service delivery process can increase convenience and reduce supply side costs. Similarly, investing resources to organize training and awareness programmes for better customer education on enhanced utilities and also to develop a learning curve for tech adoption that can bring value to customers with continuous innovation of the mobile banking channel and due response to their demand for secure banking. Such initiatives will give technology updates to the customer's reflections in the behavioral intention to use mobile banking services. The TAM has significantly larger explanatory power to make out the behavioral intention of individuals to accept mobile banking services in India.

Conclusion

This study, using TAM structure, examines the antecedents of the acceptance of mobile technology banking in Kerala. Collecting 400 responses from different parts of the state, under an SEM framework, the research model developed in this study regresses the

endogenous construct, customer acceptance against four exogenous constructs: PE, PU, BI, and SI. The study finds statistically significant influence of all the constructs relatively at high level on the customer acceptance of this mobile technology in banking transactions.

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INFORMATION LITERACY AND ACHIEVEMENT IN CHEMISTRY A STUDY AMONG HIGHER SECONDARY SCHOOL STUDENTS**Minikutty A.¹ and Lekshmy Priya S.²**^{1,2}School of Pedagogical sciences , Mahatma Gandhi University , Kottayam**ABSTRACT**

The twenty-first century has been named the information era, owing to the explosion of information and the information sources mainly through the internet. This information comes to individuals in unfiltered formats, raising questions about its authenticity, validity, and reliability. The uncertain quality and expanding quantity of information pose large challenges for society. Information literacy is a set of abilities requiring individuals to "recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information." The study is aimed at finding the effect of information literacy skills on the achievement of chemistry of higher secondary school students. The study was conducted among 128 total students in experimental and control group in the plus one level in a higher secondary school in Ernakulam district. A pre test post test non equivalent group design was employed in the study. The experimental group was taught using an information literacy instruction module whereas the control group was taught through Activity oriented method of teaching. The study utilised different statistical methods like t test, ANOVA and ANCOVA for the analysis of the data. The result of the study indicated that the achievement in chemistry of students taught through information literacy instruction module is significantly higher than students taught through activity oriented method of teaching.

Keywords: Information literacy, Academic Achievement

Introduction

The twenty-first century has been named the information era, owing to the explosion of information and the information sources. We live in the Information Age, and "information" is increasing at a rapid pace and finding high-quality information is now harder than ever, not easier! Beyond the basic literacy skills, the students of 21st century needs complex analytical skills to cope with the information explosion.

The sheer abundance of information raises questions about its authenticity, validity, and reliability. The uncertain quality and expanding quantity of information pose large challenges for society.

It require the ability to assess information, to communicate the acquired information effectively, and also to improve one's level of understanding by updating knowledge through different media especially the digital ones. All these elements demands the competency in information literacy in order to navigate in the endless ocean of information found in books, media and the internet. Information literacy has even been called 21st century's new key competency.

Information Literacy -Definition

According to the American Library Association, information literacy is the ability to "recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information" {ACRL,2000}

Information literacy is a set of abilities requiring individuals to recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information. Information literacy also is increasingly important in the contemporary environment of rapid technological change and proliferating information resources.

Significance of Information Literacy

Information literacy--and the resource-based learning programs that foster it--counteracts the information dependency created by traditional schooling, where students must rely on the teacher to dispense information. It requires active learning. Students take more control and responsibility for their learning, and they retain more of the information they have gathered for themselves. It enables learners to master content and extend their investigations, become more self-directed, and assume greater control over their own learning. It forms the basis for lifelong learning. It is common to all

disciplines, to all learning environments, and to all levels of education.

Information Literacy is the set of skills needed to find, retrieve, analyze, and use information. In other words information literacy skills empower the people with the critical skills which will help them to become independent lifelong learners. These skills will enable people to apply their knowledge from the familiar environment to the unfamiliar. Information literacy equips them with the critical skills necessary to become independent lifelong learners. As the American Library Association Presidential Committee on Information Literacy (1989) explains, "Ultimately, information literate people are those who have learned how to learn. They know how to learn because they know how knowledge is organized, how to find information, and how to use information in such a way that others can learn from them. They are people prepared for lifelong learning, because they can always find the information needed for any task or decision at hand."

Basically, everybody in the society is in need of information literacy skills. Information literate individuals improve the society's quality of life in general and academically. Information literacy skills are of prime importance in order to achieve every body's academic goals. Truly information literacy is the foundation of the democratic society. A society that is capable to access, evaluate, use and communicate information in an effective and efficient manner is called an information literate society. When we educate our children with the necessary information literacy skills, consequently, the society becomes information literate.

The investigators felt that most of our adolescents lack skills to analyse the information gathered. We conducted an Information Literacy Test in order to understand the extent of skills they possess to analyse the information, to check the authenticity, accuracy and currency of information, and to understand their awareness about the ethical and legal issues related to the use of information.

Information Literacy Competency Standards For Higher Education

Information Literacy Competency Standards for Higher Education provides a framework for assessing the information literate individual. Students also will find the competencies useful, because they provide students with a framework for gaining control over how they interact with information in their environment. It will help to sensitize them to the need to develop a metacognitive approach to learning, making them conscious of the explicit actions required for gathering, analyzing, and using information. All students are expected to demonstrate all of the competencies described in this document, but not everyone will demonstrate them to the same level of proficiency or at the same speed.

Objectives

1. To develop an information literacy instruction module
2. To find out the effectiveness of information literacy instruction module on the achievement in chemistry of higher secondary school students taught through information literacy instruction module and those taught through activity oriented method for the total sample and sub samples based on gender
3. To compare the effectiveness of information literacy instruction module on the achievement in chemistry of higher secondary school students taught through information literacy instruction module and those taught through activity oriented method for the sub samples based on gender

Hypothesis

1. The achievement in chemistry of higher secondary school students taught through information literacy instruction module is significantly higher than that of those who taught through activity oriented method
2. The achievement in chemistry of higher secondary school students taught through information literacy instruction module is significantly higher than that of those who taught through activity oriented method for the subsamples based on Gender - Boys / Girls.

Methodology

The study utilised a pre testpost test non equivalent group design. A sample of 128 students were used in this study . The experimental group consisted of 65students and control group consisted of 63 students. An organic chemistry integrated information literacy module was prepared to develop information literacy skills related to organic chemistry among the learners. An information literacy test was used to assess the information literacy skill prior and after the treatment. The achievement in chemistry was assessed using an achievement test. The obtained data was analysed using t test and ANOVA.

Analysis And Interpretation Of Data

The data collected was subjected to different statistical analysis. The details of the de statistical analysis conducted is given in the following headings.

1.Nature of the pre test scores of achievement in chemistry of both experimental and control group.

An achievement test in Chemistry was administered to both experimental and control groups prior to the experiment. To understand the nature of pre test scores of both experimental and control groups , the mean, median ,standard deviation, skewness and kurtosis of the pre test scores were calculated. The summary of analysis is given in table 1

Table 1 summary of descriptive statistical analysis of pre test scores of achievement in chemistry of experimental and control group

group	N	mean	median	Standard deviation	skewness	kurtosis
Experimental	65	11.307	12	2.606	0.71	0.832
Control	63	11.17	11	2.26	-0.032	0.574

The mean scores of pre tests of achievement in chemistry of students at higher secondary school level for experimental group is 11.307 and that of control group is 11.17. The standard deviation of the experimental group is 2.606 and that of control group is 2.26. The indices of skewness indicates that the distribution of

pretest scores of achievement in chemistry for experimental group is positively skewed and that of control group is negatively skewed. The value for kurtosis for the distribution of pretest scores for experimental and control groups are greater than 0 .263 indicating the distribution is platykurtic

Table 2: Comparison of pre test scores of of achievement in chemistry of both experimental and control group.

Group	Mean	Standard deviation	t
Experimental	11.307	2.606	0.53
Control	11.17	2.26	

The obtained t value ($t=0.53$, $p> 0.01$) is less than the the value required for significance at 0.01 level of significance. It indicates that there is no significant difference between

experimental and control group in terms of pre test scores of achievement in chemistry of students at higher secondary school level.

Table 3: Descriptive statistics of the post test scores of Achievement in chemistry of experimental group and control groups

Group	Mean	Median	Standard deviation	Skewness	Kurtosis
Experimental	40.8	42	3.981	-1.428	0.912
Control	30.176	29.5	5.107	0.574	-0.639

The obtained mean scores of the post test of Achievement in Chemistry of higher secondary school students for the experimental group is f 40.8 and that of control group is 30.176.The

standard deviation for the experimental and control groups are 3.981 and 5.107 respectively. The skewness of the distribution of posttest scores of the experimental group is -

1.428 resulting in a negatively skewed graph and that of control group is 0.574 resulting in a positively skewed graph. The values of kurtosis for the distribution of posttest scores of Achievement in Chemistry for the

experimental and control groups are 0.912 and 0.639 respectively. Both the scores are greater than 0.263, hence the distributions are platykurtic.

Table 4: Comparison of post test scores of achievement in chemistry of both experimental and control groups

group	mean	Standard deviation	t
Experimental	40.8	3.981	14.148**
Control	30.167	5.107	

** $p < 0.01$

The obtained t value ($t=14.148, p < 0.01$) is greater than the value required for the significance at 0.01 level of significance. The result suggests that the experimental group and control group differ significantly in terms of

mean scores of achievement in chemistry of higher secondary school students. The analysis of data also reveals that mean scores of experimental group is greater than that of the control group.

Table 5: Summary of ANOVA of achievement in chemistry of higher secondary school students taught through information literacy instruction module and activity oriented method of teaching using ANOVA

Source of Variation	df	SSx	SSy	MSx	MSy	Fx	Fy
Among means	1.00	0.35	5074.0	0.35	5073.96	0.06	167.33
Within groups	126.00	752.39	3820.7	5.97	30.32		
Total	127.00	752.74	8894.7				

** $p < 0.01$

x: Pre test y: Post test

The obtained F ratios were subjected to test of significance. The obtained Fx value ($F_x = 0.06, df(1, 126), p > 0.01$) is less than the table value required for significance at 0.01 level of significance. The result indicates no significant difference between the experimental and control groups in the pre test scores of Achievement in Chemistry of students at higher secondary school level.

The obtained Fy value ($F_y = 167.33, df(1, 126), p < 0.01$) is greater than the table value required for significance of F with degrees of freedom (1, 126). Hence it can be tentatively concluded that there exists a significant difference in the post test scores of the students of higher secondary school level taught through information literacy instruction module and through Activity oriented method

Table 6: Summary of ANCOVA of achievement in chemistry of higher secondary school students taught through information literacy instruction module and activity oriented method of teaching using ANCOVA

SOURCE OF VARIANCE	DF	SSx	SSy	SSxy	SSyx	MS xy	SD y.x	Fyx
AMONG MEANS	1	0.35	5073.96	42.41	5081.00	5081	5.52	166.64**
WITHIN GROUPS	126	752.39	3820.7	5081.0	3811.42	30.49		
TOTAL	127	752.74	8894.68	5123.41	8892.42			

** $p < 0.01$

The obtained $F_{y,x}$ ratio is greater than the value required for significance at 0.01 level of significance ($F_{yx}=166.64$, $df=1, 126$), $p < 0.01$). This indicates a significant difference in

the adjusted mean scores of Achievement in Chemistry between higher secondary students taught through Information literacy instruction module and Activity oriented method.

Table 8: Adjusted mean scores of Achievement in Chemistry obtained by the Experimental group and Control group.

Groups	N	M _x	M _y	M _{y_x} (adjusted)	SE _M	t
Experimental	65	11.18	40.8	40.44	0.98	12.17**
Control	63	11.08	28.2	28.56		

** $p < 0.01$

The results from table 8 clearly indicates that the obtained value of t ($t=12.17$, $p < 0.01$) is greater than the table value required for significance at 0.01 level of significance. This indicates that the students of Experimental and Control group differ significantly in the Post test scores as they were adjusted to Pre test scores. It is also evident that the Mean score of

Experimental group ($M=40.44$) is greater than that of Control group ($M=28.56$). The analysis leads to the inference that teaching through Information Literacy instruction Module is more effective than Activity Oriented method in enhancing Achievement in Chemistry among students of higher secondary school level.

Effectiveness of Information Literacy Instruction Module on the Achievement in Chemistry of students at Higher secondary school level for subsample gender.

Table 9: Descriptive statistics of the pre test scores of Achievement in chemistry of students of higher secondary school level for the subsample Gender.

	group	N	Mean	median	Standard deviation	skewness	kurtosis
Boys	Experimental	34	11.5612	12	2.476	0.186	1.699
	Control	30	11.33	12	2.353	-0.209	-0.055
Girls	Experimental	31	10.77	11	2.871	1.135	0.278
	Control	33	10.848	11	2.002	0.793	0.752

The mean Pre-test scores of Achievement in Chemistry of boys at higher secondary school level for Experimental group is 11.561 and Control group is 11.33. The values of standard deviation for experimental and control groups are 2.476 and 2.353 respectively. The skewness of the distribution of pretest scores of experimental group is 0.186 and control group is 0.209, indicating that both the groups are positively skewed. The values of Kurtosis for the distribution of pre test scores for experimental group is 1.699 and hence platykurtic and that of control group is -0.055 and hence leptokurtic.

The mean Pre-test scores of Achievement in Chemistry of girls at higher secondary school level for Experimental group is 10.77 and Control group is 10.848. The indices of standard deviation for experimental and control groups are 2.871 and 2.002 respectively. The skewness of the distribution of pretest scores of experimental group is 1.135 and control group is 0.793, indicating that both the groups are positively skewed. The values of Kurtosis for the distribution of pre test scores for experimental group and control group are 0.278 and 0.752 respectively. Since both the scores are greater than 0.263, both the distributions are platykurtic.

Table 10: Comparison of pre test scores of achievement in chemistry of both experimental and control group for the sub sample gender

sample	group	mean	Standard deviation	t
Boys	Experimental	11.561	2.476	0.523
	Control	11.33	2.353	
Girls	Experimental	10.77	2.871	0.120
	Control	10.848	2.002	

The obtained t value, ($t=0.523$, $p>0.01$) for the boys is less than the value required for significance at 0.01 level of significance. This indicates that there is no significant difference between Experimental and Control groups in the mean pre test scores of Achievement in chemistry of boys at higher secondary school level.

The obtained t value, ($t=0.120$, $p>0.01$) is less than the value required for significance at 0.01 level of significance. This indicates that there is no significant difference between the mean pre test scores of Experimental and Control groups in Achievement in chemistry of girls at higher secondary school level.

Table 11: Descriptive statistics of the post test scores of Achievement in chemistry of students of higher secondary school level for the subsample Gender.

	group	N	mean	median	Standard deviation	skewness	kurtosis
Boys	Experimental	34	40.235	41	4.199	-1.353	1.247
	Control	30	30.433	29.5	5.237	0.526	-0.457
Girls	Experimental	31	41.419	42	3.694	-1.589	3.59
	Control	33	26.696	24	5.671	1.0680	0.253

The obtained mean scores of the post test of Achievement in Chemistry of boys higher secondary school level are as follows. The experimental group has a mean score of 40.235 and the control group has a mean score of 30.433. The standard deviation for the experimental and control groups are 4.199 and 5.237 respectively. The skewness of the distribution of posttest scores of the experimental group is -1.56 resulting in a negatively skewed graph and that of control group is 0.565 resulting in a positively skewed graph. The value of kurtosis for the experimental group is 0.28 and for control group is 0.35. Since the values are greater than 0.26, both the distributions are platykurtic.

The obtained mean scores of the post test of Achievement in Chemistry of girls higher secondary school level for the experimental group is 40.819 and that of the control group is 27.815. The values standard deviation for the experimental and control groups are 3.165 and 6.52 respectively. The skewness of the distribution of posttest scores of the experimental group is -0.975 resulting in a negatively skewed graph and that of control group is 0.895 resulting in a positively skewed graph. The value of kurtosis for the experimental group is 0.245 and for control group is 0.195. Since the values are lower than 0.26, both the distributions are leptokurtic.

Table 12: Comparison of Post test scores of Achievement in Chemistry of students of higher secondary school level based on the subsample Gender .

Sample	group	mean	Standard deviation	t
Boys	Experimental	40.235	4.199	8.301**
	Control	30.433	5.237	
Girls	Experimental	41.419	3.694	12.219**
	Control	26.696	5.671	

** $p<0.01$

For boys the obtained t value ($t=8.301$, $p<0.01$) is greater than the required value for significance at 0.01 level. This suggests that the experimental and control group differ significantly in terms of posttest scores in Achievement in Chemistry. The results also indicates a greater mean score for Experimental group in terms of Achievement in Chemistry of boys at higher secondary school level .

For girls the obtained t value ($t=12.219$, $p<0.01$) is greater than the required value for significance at 0.01 level. This indicates that the experimental and control group differ significantly in terms of post test scores in Achievement in Chemistry. The results also infers a greater mean score for **Experimental group in terms of Achievement in Chemistry of girls at higher secondary school level.**

Table 13: Comparison of the effect of teaching through information literacy instruction module over activity oriented method of teaching using ANOVA for the sub sample Gender.

Sample	Source of Variation	Df	SSx	SSy	MSx	MSy	Fx	Fy
Boys	Among means	1.00	0.81	1531.3	0.81	1531.25	0.14	68.92
	Within groups	62.00	363.05	1377.5	5.86	22.22		
Girls	Among means	1.00	0.09	3464.6	0.09	3464.59	0.01	149.32
	Within groups	62.00	375.66	1438.5	6.06	23.20		

**P<0.01

The obtained F ratios were tested for significance. The obtained value of Fx (Fx= 0.14, p>0.01) is lower than the table value required for significance at 0.01 level. The result revealed that the experimental and control group does not differ significantly in the pre test scores of Achievement in chemistry of boys at higher secondary school level.

The obtained Fy value is 68.92 (Fy= 138.54, df(1,62), p<.01) is greater than the table value at 0.01 level of significance . This indicates that there is significant difference in the means scores of achievement in chemistry of Higher Secondary School boys taught through information literacy instruction module and activity orientation method of teaching.

For girls the computed value of Fx (Fx= 0.01, p>0.01) is lower than the table value required for significance at 0.01 level. The result revealed that the experimental and control group does not differ significantly in the pre test scores of Achievement in chemistry of girls at higher secondary school level.

The obtained Fy value is 149.32 (Fy= 149.32, df(1,62), p<.01) is greater than the table value at 0.01 level of significance . This infers that there is significant difference in the means scores of achievement in chemistry of Higher Secondary School girls taught through information literacy instruction module and activity orientation method of teaching

Table 14: Comparison of achievement in chemistry of students of Higher Secondary school level taught of through Information literacy instruction module and activity orientated method using ANCOVA for the subsample gender.

sample	Source of variation	df	SSx	SSy	SSxy	SSyx	MSyx	SDyx	Fyx
Boys	Among group	1.00	0.81	1531.25	35.23	1537.69	1537.69	4.74	68.45
	Within Groups	61.00	363.05	1377.5	1537.7	1370.37	22.47		
Girls	Among group	1.00	0.09	3464.59	-17.48	3463.17	3463.17	4.86	146.87
	Within Groups	61.00	375.66	1438.5	3463.2	1438.40	23.58		

** P<0.01

For boys ,the obtained Fyx ratio (Fyx= 68.45 ,df(1,61), p<0.01) is greater than the table value at 0.01 level of significance. There is

significant difference in the adjusted mean values of experimental and control group in the

achievement in chemistry of boys of higher secondary school level.

The obtained F_{yx} ratio ($F_{yx}= 146.87, df(1,61), p<0.01$) is greater than the table value at 0.01 level of significance. There is significant

difference in the adjusted mean values of experimental and control group in the achievement in chemistry of girls of higher secondary school level.

Table 15: Comparison between Experimental and control groups in the adjusted mean scores of Achievement in chemistry of students of higher secondary school level for the subsample gender.

Sample	Groups	N	M_x	M_y	$M_{y.x}$ (adjusted)	SE_M	t
Boys	Experimental	34	11.56	40.2	39.76	1.19	7.45**
	Control	30	11.33	30.4	30.91		
Girls	Experimental	31.00	10.77	41.4	41.76	1.21	12.69**
	Control	33.00	10.85	26.7	26.35		

** $p < 0.01$

The analysis of data indicates that, the obtained value of t ($t=7.45$ $p<0.01$) is greater than the required value at 0.01 level of significance. This indicates that the experimental and control groups differ significantly in the post test scores of achievement in chemistry of boys of higher secondary school level. The result also indicates that the mean post test value of experimental group ($M=39.76$) is greater than the mean post test value of the control group ($M=30.91$). This leads to the inference that teaching through information literacy instruction module is more effective than activity oriented method in enhancing achievement in Chemistry in boys of higher secondary school level.

From the table 15, it is clear that the obtained value of t ($t=12.69$ $p<0.01$) is greater than the required value at 0.01 level of significance. This indicates that the experimental and control groups differ significantly in the post test scores of achievement in chemistry of girls of higher secondary school level. The result also indicates that the mean post test value of experimental group ($M=41.76$) is greater than the mean post test value of the control group ($M=26.35$). This leads to the inference that teaching through information literacy instruction module is more effective than activity oriented method in enhancing achievement in Chemistry

Major findings of the study

The major findings of the study are as follows

1. There is significant difference in the Achievement in Chemistry of Higher Secondary School Students taught through information literacy instruction module than students taught through activity oriented method .
2. There is significant difference in the Achievement in Chemistry of Boys of Higher Secondary School Level taught through information literacy instruction module than those taught through activity oriented method.
3. There is significant difference in the Achievement in Chemistry of Girls of Higher Secondary School Level taught through information literacy instruction module than those taught through activity oriented method.

Discussion of result

The study was intended to find the impact of information literacy instruction on the academic achievement of boys and girls of higher secondary school level. The result indicates a positive influence. The information literacy instruction has helped the students to have higher academic performance than students taught through activity oriented method this result is in acceptance with the findings of Bowels-Terry (2012), Mery, Newby & Peng (2012)

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PERSONAL VALUES AND MOTIVATION: THEIR IMPACT ON JOB SATISFACTION AND JOB PERFORMANCE

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ABSTRACT

This paper reviews and integrates past research on personal values and motivation among employees, seeking to portray the role personal values and motivation play in shaping the performance and satisfaction of people in work settings. We start by tending to the work of qualities within the work execution of people. We then, at that time survey research on the connections of individual qualities and inspiration. We proceed with examining the various ways through which individual qualities influence work fulfillment among representatives. within the last segment, we address the interaction between these ideas, and mention the congruency between on the brink of home estimations and inspiration and its suggestions for associations and their representatives. Together, the exploration checked on demonstrates how the broadness and security of qualities and solid inspirations make them a big indicator of conduct at different levels of the association. We end by examining proposal to bosses on values in organizations.

Keywords: Job Performance, Job Satisfaction, Motivation, Personal Values

1. Introduction

Human life has become very complex and problematic in now-a-days. In modern society the requirements and requirements of the people are ever increasing and ever changing. Change in life additionally builds the interest of people, they have to an ever increasing extent and when requests aren't getting satisfied, they become disappointed. Disappointed individuals are likely to contribute little or no for any reason. Occupation fulfillment and execution are perhaps the foremost mainstream and broadly explored points within the field of authoritative neuroscience (Spector, 1997). Locke (1976) characterizes work fulfillment as an enjoyable or positive passionate state happening due to the evaluation of one's work or professional adventures. Occupation fulfillment has been contemplated both as a results of numerous people and workplace attributes and as a precursor to numerous results. Representatives who have higher occupation fulfillment are typically less missing, more averse to go away, more useful, sure to show hierarchical responsibility, and sure to be proud of their lives (Lease, 1998). Job satisfaction of commercial workers is extremely important for the industry to function successfully.

Researchers reported that various variables can impact representative fulfillment with their work areas, including building configuration,

air quality and temperature, commotion and lighting, capacity of representatives to customize their work areas and work area plan and therefore the executives then on As within the investigation of H. N. Ismail, et al (2019) shows individual worth sorts that are emphatically, or contrarily, identified with conduct and attitudinal leads to various occupation classes. some of the positions like money, bookkeeping, promoting, deals, (HR), activities and data innovation (IT) different kinds of individual qualities were related with various specialist results. Individual qualities are the general articulation of what's generally significant for you. a worth expresses the price of something, and during this case what you categorical like and dislike.

Predominant values, reactivity, and their association impact the importance of labor viewpoints. The qualities influence by and enormous work fulfillment and fulfillment with Conditions. Reactivity doesn't influence generally occupation fulfillment, yet it emphatically impacts the development of fulfillment with work viewpoints, and low-responsive contrasted with high-receptive are better off with 4 out of the 7 considered perspectives. Among the high-responsive, associations between by and enormous work fulfillment and fulfillment with work viewpoints depend on their prevalent qualities. A. M. Zalewska(1999)concluded that reactivity can adjust regulative elements of individual

qualities towards generally speaking position fulfillment: The qualities have a reasonably revelatory person for low-receptive, however meeting yearnings related to their qualities are vital for high-responsive' job satisfaction.

2. Literature Review

2.1 Personal Values and Job Performance

Zare, E., and Beheshtifar, M. (2013) in their study stated that a lot of scholars have reported a gentle increase of interest in spirituality at work issues among management researchers and practitioners. Although the concept of spirituality within the workplace has increasingly gained popularity in the past few years nevertheless, this literature review recognizes that the term spirituality means various things to several people. Otherworldliness characterizes as communicating our cravings to look out importance and reason in our day to day routines and could be a cycle of experiencing out one's bunch of profoundly held individual qualities. Working environment otherworldliness includes the problem to look out one's definitive reason throughout lifestyle, to foster a robust association with colleagues and individuals identified with work, and to possess consistency or arrangement between one's center convictions and upsides of their association. The otherworldliness at work field by coordinating three alternate points of view on how otherworldliness empowers or leads to hierarchical execution: Human assets viewpoint: Spirituality upgrades representative prosperity and private satisfaction; Philosophical point of view: Spirituality gives workers a way of direction and which suggests at work; Interpersonal point of view: Spirituality gives workers a way of interconnectedness and native area. Indeed, it's been suggested that organizations that encourage spirituality experiences improved their organizational performance and profitability.

2.2 Motivation and Job Performance

Alonso, P., and Lewis, G. B. (2001) in their study stated that researchers, Perry and Wise (1990) contended that folks with high open help inspiration (PSM) are almost certain than others to settle on government

occupations, to perform better on the work, and to answer more to nonutilitarian motivations once in government. Utilizing numerous relationship and logit examinations on reactions by 35,000 government, bourgeoisie workers to the 1991 Survey of Federal Employees and along these lines the 1996 Merit Principles Survey, this content tests the connection among PSM and occupation execution inside the executive assistance. there's blended proof on whether PSM decidedly influenced grades and execution evaluations, more clear proof that workers who expected to urge a cloth award for outstanding execution achieved higher grades and execution appraisals, and no proof that the connection between material prizes and execution made a difference any less to those with high PSM.

Salleh, F., Dzulkipli, Z., Abdullah, W. A. W., and Yaakob, N. H. M. (2011) in their study stated that the majority of the sooner research on performance has been conducted in the area of job performance. This examination is to research the association between inspirations towards government representatives. Applying closeness on the inspiration inside the prior research on work execution, this examination broadens this exploration by watching the connections between generally occupation execution and inspiration measurements of and their work execution. A positive relationship, as estimated by have yearly compensation movement, was found between connection inspiration and execution. The outcomes recommend that association inspiration and occupation execution is decidedly related. Conclusions, management strategies particularly are often formulated consistent with motivation level of employees.

2.3 Personal Values and Job Satisfaction

Lan, G., Okechuku, C., Zhang, H., and Cao, J. (2013) conducted a study which explored the effect of job satisfaction and personal qualities on the work direction of bookkeeping experts in China. Fulfillment with work changes across people and therefore the manner during which people see work (i.e., work direction) may depend not only on satisfaction with various facets

of their work but also on their beliefs and values.

Kumar, N. (2012) conducted a study as a part of a bigger study during a public sector organization with an all India presence. This investigation investigated the association of personal and hierarchical qualities with work fulfillment. 220 members from an outsized public area association were approached to rate on a 7-point scale the 24 things esteem scientific categorization created by McDonald and Gandz (1991, 1992) once on how significant these are to them as a rule out their life and once as what extent they see their association to showcase these qualities. Results reveal that perceived organizational values emerge as potent predictor of all the three components of job satisfaction as compared to non-public values.

2.4 Motivation and Job Satisfaction

Tietjen, M. A., and Myers, R. M. (1998) in their study expressed that the event of laborers to act during a perfect way has consistently burned-through the considerations of chiefs. Somely, this objective has been reached through motivator programs, corporate motivational speeches, and different sorts of restrictive managerial strategy. However, on the grounds that the specialists change their conduct in light of something like one among the previously mentioned boosts, is figure fulfillment realized? The ingraining of fulfillment inside specialists could be a pivotal errand of the board. Fulfillment makes certainty, dedication and eventually worked on quality inside the yield of the utilized. Fulfillment, however, is not the direct consequences of a motivator plot. Representatives will probably not take any longer drawn out pride in their work yet they win the top of the week escape for having absolutely the best deals. This paper surveys the writing of persuasive scholars and attracts from their ways to affect work fulfillment and thusly the work of inspiration inside work fulfillment. The hypotheses of Frederick Herzberg and Edwin Locke are introduced sequentially to mention how Locke's hypothesis was a reaction to Herzberg's hypothesis. By understanding

these hypotheses, chiefs can represent considerable authority in procedures of creating position fulfillment. this is often frequently trailed by a speedy assessment of Kenneth Blanchard and Paul Hersey's hypothesis on initiative inside administration and therefore the manner during which this workmanship is changing through time.

Moynihan, D. P., and Pandey, S. K. (2007) wrote an article which drew on a sample of state government prosperity and human help chiefs to make and test a model of work motivation. The makers break down the effect of individual credits, work characteristics, and progressive elements on three pieces of work motivation: work satisfaction, definitive obligation, and occupation consideration. They find that managers have changing degrees of effect over these different pieces of work motivation, with most vital effect over work satisfaction and least effect over work commitment. A number of variables are important for work motivation, including public service motivation, advancement opportunities, role clarity, job routineness, and group culture.

Bishay, A. (1996) in his study estimated the degrees of occupation fulfillment and inspiration by review in an example of 50 educators. An illustration of 12 instructors was then considered using the Experience Sampling Method (ESM). Teachers were discretionarily motioned by exceptional pagers multiple times every day for 5 days and completed surveys on perspective and development for each boom, achieving 190 reports of instructors' step by step experiences. Standard investigation data contrasted and ESM data. Occupation satisfaction and motivation connected by and large with commitment levels, sex, subject, age, extended lengths of showing experience, and activity. For this social occasion of teachers who work in a school with a particular understudy body, as a rule motivation and occupation satisfaction levels were high. Considering the disclosures, clearly joy of higher-demand needs is for the most part critical for job satisfaction.

3. Methodology

a. Objectives

- 1) To study about job satisfaction.
- 2) To determine the impact of personal values and motivation on job satisfaction.
- 3) To study about job performance.
- 4) To determine the impact of personal values and motivation on job performance.

b. Aim

The focus of this work is to explore the issues associated with satisfaction and performance among employees. The aim of this study is to serve as a platform for employers as well as employees to deal with how to move forward and address these issues in a better way.

c. Data Collection

The nature of the data collected for this review paper would be purely secondary. The sources would range from other papers, theses, web articles, reports etc.

4. Conclusion

This study addressed the relationship between personal values and motivation in relation to the work outcomes. As discussed above, despite the fact that force and authority were viewed as an extraneous work esteem, it's qualities of both characteristic and outward qualities. Our outcome recommends that a few group accentuated this specific work esteem not on the grounds that legitimate positions can deliver major league salary and a delightful life, but instead on the grounds that it can add to a method of satisfaction, practically like natural prizes. This investigation likewise uncovered various impacts of work esteems on work results upheld work class. On the off chance that we essentially look at the observational outcomes found the middle value of across work classifications, we'd handily reason that particular jobholders are by and large more joyful than others. Notwithstanding, separate relapse investigations for different occupation classes uncover that the connections between work esteems and work results contrast between work classifications and are more convoluted than we originally assumed.

Employees of companies are pretty satisfied with their job and well-motivated as well as personal values are getting enhanced results in moving forward for growth. Personal value types that are positively, or adversely, related with social and attitudinal results in a few occupation classes. Workers assembled on the possibility of sexual orientation, lawful status and length of administration have even level of occupation fulfillment while those isolated on the possibility of legitimate status show indistinguishable degree of inspiration. Representatives with lesser instruction and pay and individuals in lower unit show lesser level of occupation fulfillment while those with lesser work administration, age, training, pay and framework and consequently the male workers have somewhat lower level of inspiration. Extremely less representatives are least persuaded and malcontented with their work. Further, this examination has uncovered that inspiration applies huge positive effect on work fulfillment. the degree of occupation fulfillment and inspiration is at low for not many workers who have lesser schooling, age, administration, pay and unit. Henceforth, it are normal said that development rouses representatives, prompting great degree of occupation fulfillment. Since inspiration applies solid positive effect on work fulfillment of representatives, the administration ought to genuinely think about spurring its representatives, which can decidedly affect usefulness of representatives, eventually prompting better benefit for the corporate. As we've talked about not most are fulfill because of low compensation and heaps of prompts low close to home estimations and low occupation fulfillment It is necessary to give a proper motivation if an organization wants success as satisfied worker leads to extend more effort to job performance, then works harder and better as well as can improve personal values. Thus, every association attempts to make a fulfilled work force to operate the well- being of the organization.

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A REVIEW ON THE INNOVATIVE PRACTICES IN TRADE MARKETING AND DISTRIBUTION BY FMCG DURING COVID 19

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ABSTRACT

Crisis brings opportunities, this proverb was well leveraged by FMCG sector in INDIA during COVID phase. While most of the sectors grappled with the impact of the pandemic, FMCG sector innovated, companies resumed operations in no time and now looking forward to new financial year with lot of positivity and confidence. COVID 19 crisis has changed a large part of our lifestyles, this pandemic also opens up scope for newer avenues of growth. FMCG sector companies have made lot of changes in their trade marketing and distribution space to cope up with current working environment. FMCG sector in INDIA is divided in 3 broad heads which is household & personal care (50%), Foods (19%) & healthcare (31%). FMCG industry saw a negative growth in 1st half of 20-21 however industry saw a positive recovery in 2nd half of 20-21. Within FMCG, Health & Hygiene, Ayurvedic products & Immunity based categories outperformed than other segments. Companies operating in FMCG space made significant changes on front of communication, digital payments, E-Commerce, quick turnaround on new launches. Major companies such as HUL, ITC also launched/scaled their business to business and business to consumer apps during these times to deal with COVID 19 impact. With this research paper we tried to study key process led changes which FMCG sector adopted in field of trade marketing & distribution space. In this research paper we will provide an information on process changes which have become a work practice & companies benefitted by these changes at an overall level.

Keywords: E-Commerce, FMCG, COVID 19, ITC, HUL, Digital payments

Introduction

FMCG industry keep changing on account of evolved consumer preferences towards product & categories. However, changes which happened during pandemic were more from trade marketing & distribution front. All major FMCG companies changed their supply chain from a standard one to agile supply chain model -

Standard Model:

Raw materials > Supplier > Manufacturer > Company Warehouse > Distributor > Retailer > Consumer

Supply chain Agility during Pandemic:

During pandemic all major FMCG companies tried to work with unconventional supply chain models which can help in getting company products directly to consumer. This led to an unprecedented surge in E-Commerce business. E-Commerce business grew at three major fronts –

- Surge in established E-Commerce companies such as Amazon etc.

- FMCG companies started their own Apps to cater trade & consumer requirements. ITC started E-Store which was consumer centric whereas HUL started Humara Shop. Both companies also launched a business-to-business app to take care of trade requirements Shikhar was introduced by HUL & Unnati by ITC.

- Specialized E-Commerce solutions at local level also saw huge surge in adoption. FMCG companies also adopted unconventional models to reach out to consumers, ITC made a tie up with Dominos to ensure essential products are supplied to a greater number of consumers. At this time lot of government agencies also came forward to ensure distribution of essential products. All these unconventional models helped in getting a new distribution model.

All FMCG companies digitalized possible communication to ensure faster turnaround time & effective implementation at market place. This intervention helped all companies in significant cost savings.

FMCG Companies also pushed retailers/consumers towards getting digital payments at an overall level. There has been

good adaption of digital payments across outlet types & class in urban markets.

In order to summarize while there have been lot of innovations & changes in FMCG industry, Key changes which happened during pandemic were as follows –

- (1) Surge in Digital Payments
- (2) Digitalized Team Communication
- (3) Surge in Local E-Commerce apps
- (4) FMCG Companies started their own B2B & B2C platforms

Rationale of the study

The basic reason behind selecting this topic of my research is to document key shifts which happened in FMCG industry in India on front of trade marketing & distribution owing to pandemic. In the immediate to medium term, there are lot of changes in consumer preferences, due to this FMCG companies will be forced to adapt new models for trade marketing & distribution for customer acquisition and retention. The product/brand mix has changed due to COVID and some of these changes will be more permanent than others FMCG industry has done lot of innovation on product & process front during this phase. Pandemic also made the FMCG sector carve opportunities out of the pandemic crisis. Key shifts which happened in FMCG industry has led to improved efficiency & sizable cost savings. Key learning's of this industry will be useful for other sectors as well. While doing this study key focus has been kept on two major FMCG companies namely ITC & HUL to get necessary details.

Review of Literature

Ritter J.B. (1992) International electronic commerce is not merely defined by the absence of paper documents. Indeed, though an important objective of many commercial and administrative users is the eradication of paper, most users will also admit that current implementation endeavors remain heavily inter-dependent upon the continued use of paper document. Eppler (2006) maintains that factual, high-quality information is sufficient for user's needs. Park et al. (2007) also measures the quality of information communicated by e-WOM from its content. He suggests four measures of information quality:

relevance; understandability; sufficiency; and objectivity. Hasan (2010) pointed out that nowadays electronic commerce industries have increasingly become a necessary component of business strategy and a strong catalyst for economic development. Ray (2011) "As a logo of globalization, E-Commerce represents the cutting edge of success in this digital age and it has changed and is still changing the way business is conducted around the world". Awis Muhammad and samin Tanzalia (2012) indicate that use of internet has made the world a global village. The use of Internet has reduced the distances and brought the people tools in which electronic commerce plays a vital role. The important feature in E-commerce is privacy which not only increases competitive advantage but confidence level also. E-commerce brings sellers and potential buyers at the distance of one click and it saves time as it is cost effective, as Electric commerce is becoming key to success. Internet banking, one among the innovative and significant internet-based services has experienced explosive growth and led to transformation of traditional banking practice. Online people and saves a lot of time for its customers. The traditional way of standing in the queues and filling up all the forms are well solved and now it is no hassle for making any transaction with the banks by virtue of internet banking. The financial institutions which operated traditionally are now able to lower their operational costs and increase the consumer retention by virtue of technology. Internet banking as a latest and potential means for banking now holds a similar importance as that suggest that an internet banking strategy may be effective, with reports of more profitable, loyal and committed consumers compared with traditional banking consumers. Scholars plausibly derive information quality by means of a content analysis. Nanekharam Y.A (2013) found Electronic commerce is a powerful concept and process that has fundamentally changed the current of human life. Electronic commerce is one of the main criteria of revolution of information technology and communication in the field of economy. Mitra Abhijit (2013) suggests electronic commerce has unleashed yet another revolution, which is changing the way

businesses buy and sell products and services. New methodologies have evolved. The role of geographic distances in forming business relationships is reduced. Electronic commerce is the future of shopping. Das and Ara (2015) With an increase in the number of players in the business to consumer segment, competition for the first position is set to intensify, making it imperative for the firms to enhance service quality and to invest in logistics, so as to derive benefits from increase in disposable income of households, rise in internet subscriptions and infiltration of mobile commerce. Gao et al. (2017) For online consumers, strong emotional and cognitive reactions can enhance consumers' purchase intention.

Objectives of the study

The basic objectives are as under:

1. To List key sustainable changes which happened on front of trade marketing & distribution front for FMCG companies
2. To establish key benefits of all such shift for FMCG sector

Research Methodology

The research used during the study comprises of the following tools:

1. **Methods of Data Collection:** Data collection was done through primary method where in company executives, distributors, retailers and salesman were contacted personally. Apart from primary sources, some of the data points were collected from the published government manuals, reports, books, and journals.
2. **Sampling Designing:** Sample size was of 100 (Retailers, Salesman, Distributors & Company representatives) to get to final data points. The convenience sampling and purposive sampling were used for the present study.

Discussion

Surge in Digital Payments

To curb the spread of Covid-19 Corona virus the Reserve Bank of India (RBI) urged citizens to use more electronic payments so that exposure to crowded places like ATMs or banks is reduced. Digital payment gained momentum during Covid to reduce social

contact and counter any concern of the novel corona virus spreading via currency notes.

Considering the same situation, FMCG companies like ITC, HUL, Nestle & Mondelez started an initiative to facilitate digital payment across the value chain. FMCG companies took an initiative to promote digital payments. The objective for this Initiative were:

- To maintain social distancing and making Salesmen safe.
- To ensure money rotation and funds available with the distributor.
- To make sure no fear of losing cash or getting fake currency.
- To tracks and maintains the digital record of every transaction.
- To ensure efficiency & time-saving.

The platforms which were used to make digital payments- UPI Bharat Pay, Google Pay, Phone Pay, Paytm, Amazon Pay. NPCI speaks on digital payments: Digital payment helps maintaining social distancing

- NPCI enabled UPI payments without any interface hindrances
- PM care support has been launched on UPI
- Due to lockdown, there is a drop in discretionary purchases
- UPI ID is the most popular method for merchants
- NPCI strengthened the security tools and procedures
- NPCI launched: India stays safe, India Pay Safe
- NPCI launched: UPI Chalega

FMCG distributors followed below process to drive digital payments:

- Proper cascading to each Salesman.
- QR Code scan image has been given to every salesman on his phone.
- Salesman can accept payments from retailers' viz. Phone Pay, Paytm, Google Pay, etc.
- Retailers scan the QR Code and make these payments.
- These payments will directly go to the account of the distributor.
- Salesmen check the payment send details of retailers.
- Salesmen then call the operator and confirm the receiving of payment.

- The operator checks the payment receipt in the Bank account of the distributor.
- The operator confirms the Salesmen.
- Then after, Salesmen confirm this to Retailers.
- Salesmen then visit another outlet.

Digitalized Team Communication

Due to covid, it was imperative to practice covid appropriate behaviors including not stepping out of home unless necessary, maintaining social distancing, practicing lockdown guidelines. In such times, frontline sales staff was on duty to serve the customers and teamcommunication was crucial as there were new launches and it was imperative to sustain the team motivation anddo the job with sustained momentum. Innovative ways were devised to cascade all necessary information to team, practiced by all FMCG companies. FMCG companies digitalized communication at below levels from distribution view point.

Salesman: All companies moved daily physical gate meetings (Day objective setting) to virtual mode. All major FMCG companies followed below points.

- Salesman instructed to report to distributor point once a day

- Salesman to proceed to market directly and leverage Apps for order booking
- Daily objective setting was done through a WhatsApp Virtual video call on a daily basis
- Target setting, new launch cascade happened through WhatsApp Video call.

HUL conducted online training workshops for their DS through their hand-held terminal by a module called “Pathshala” which taught covid appropriate safety behavior, new launches, sales pitch and support that DS required to carry on.

Company Executives: On this front also, companies moved complete physical meetings to virtual meetings on Zoom & MS teams platforms. Monthly agenda discussion & new launch discussion were done virtually. In case of Marico company employee appraisals also happened through virtual platforms. Almost all companies used virtual platforms for employee training as well

Distributors & Retailers: Earlier frequency of such meetings were on a quarterly basis to cascade major schemes, incentives or important new product launches. Companies moved all such meetings to virtual platform. ITC recently concluded a retailer meet where 3000+ retailers joined over a web application & this was a gunnies book record.

Head	ITC	HUL	MARICO	P&G
Salesman Virtual Meetings	Y	Y	Y	Y
Salesman Training	Y	Y	Y	
Employee Meetings	Y	Y	Y	Y
Employee Appraisals			Y	
Employee Training	Y	Y	Y	Y
Retailer Meet	Y			
Distributor Meet	Y	Y	Y	Y

Surge in local E-Com Apps:

In Covid scenario, there were restrictions on delivery and commute, supply chains of companies were impacted and thus organized delivery apps were impacted. In such a scenario, local E-Commerce apps gained prominence due to their local network and tie-ups, this momentum has also sustained post Covid as well. A snapshot of two Local grocery chains in Delhi that run E-commerce apps for delivery across Delhi NCR: **Modern Bazaar**

- Total no. of stores in Delhi NCR- 14 outlets
- Approx. 4500 sqft. Avg store size
- Daily Footfall- Min 500, 500-1400 heads per day per store average
- Industry monthly business- 1.5-2Cr / outlet.
- Types of Promos available- Banner ads, home page display, Search rankings, Modern Bazar Magazines
- App contribution increased to store sales by 15%, App also saw 200% increase in traffic.

ATCOST

5-6 ISS outlets across Gurgaon

- Launched app in 2019- Around Rs 3k for banner Ads for 15 days
- 2k sq ft store size
- Customer base 400-500
- Total biz size: 1 Cr+
- App contribution increased to store sales by 35%, App also saw 500% increase in traffic.

During Covid context, FMCG companies undertook the following initiatives:

- ✓ Terms of trade closure on Local E-Comm apps on pricing & portfolio listing
- ✓ Banner visibility for focus portfolio
- ✓ ITC, HUL & P&G were among top companies to reach out to all such local E com Apps.
- ✓ All major FMCG companies also started extending large packs & specific consumer offer on such platforms.
- ✓ Growth of these apps will bring a balance in organized E-Commerce space

FMCG Companies Own B2B & B2C Platforms:

In Covid, during initial phases of lockdown and post that, there were government restrictions and unclear guidelines which lead to impacted supply chains for all FMCG companies. Thus, FMCG companies had to adopt innovative ways to undo the disruption caused in supply chain and serve the consumer needs:

- Britannia partnered with Dunzo to delivery essential items.
- Marico partnered with Swiggy for hyperlocal delivery.
- PepsiCo partnered with Dunzo.
- ITC partnered with Dominos.
- Coca-Cola tied up with Swiggy.

Companies also focused heavily on B2B solutions to reach out to trade and amped up with the available technology solutions: Below is the summary of available solutions of FMCG companies in B2B and B2C space, which was heavily amped up during Covid:

FMCG Company	B2B Solution	B2C Solution
HUL	Shikhar	Humara shop
ITC	Unnati, Viru	E-Store
Nivea	-	Website
Marico	Telecaller	-
P&G	Link+Telecaller	-

Business to Business(B2B) Solutions: It gives an option to trade- to place order through an App even when salesman is not visiting store. The order is serviced by distributor itself. These apps make

distribution more cost efficient. Both Shikhar (HUL) & Unnati (ITC) apps work on below principles –

- Order recommendation basis purchase history
- One Click Order
- Live tracking on order status
- Scheme & other necessary details
- Outlets which are currently serviced by these companies are able to use these apps
- App usage is high across large format stores
- Both companies are working towards getting a digital payment through app itself

Business to Consumer (B2C) Solutions

Large FMCG companies introduced their own consumer interface apps. These apps help companies to get a consumer understanding which is used in decision making. These apps have seen limited success owing to selective range availability. Key driver of traffic on such apps in special promotions which are being run by specific companies.

Results & Way Forward

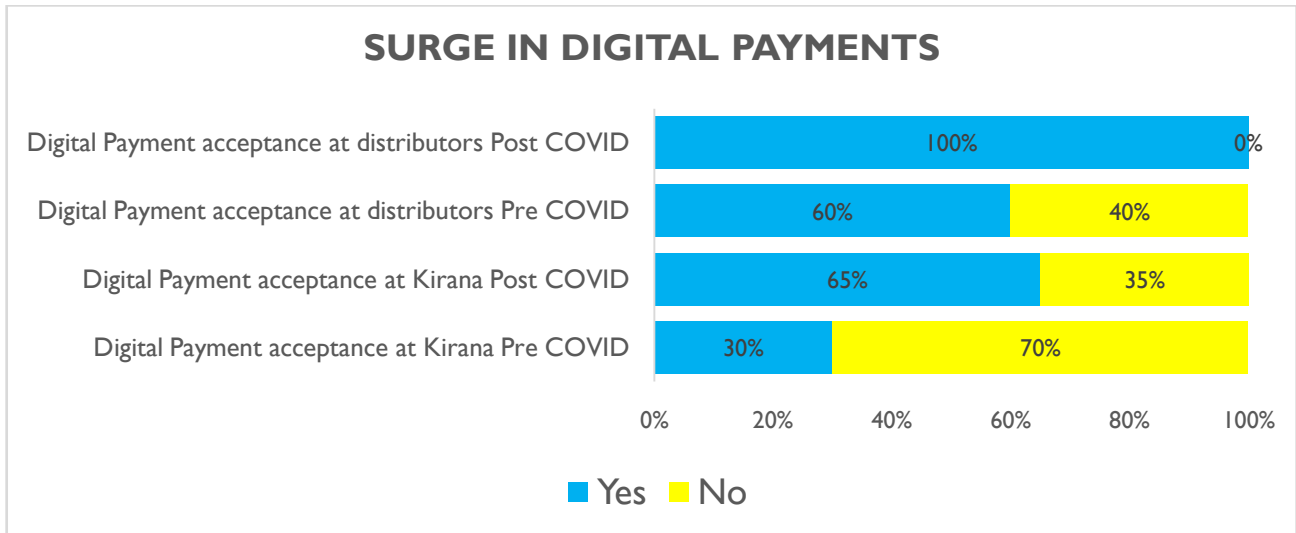
(1) There has been a surge in digital payments across FMCG industry. Below are the key findings basis interaction with retailers & distributors. Post covid all distributors started accepting the digital payments.

Retailers who are accepting digital payment has gone up to 65% which is greater than 2X of pre covid level. These levels will grow from here onwards as FMCG companies/distributors are pushing this from their side as well. By driving digital payments distributors also save

on bank charges which is a cost head for these parties.

Market – Delhi NCR & Lucknow

Respondents – Retailers (50 Nos), Distributors (6)

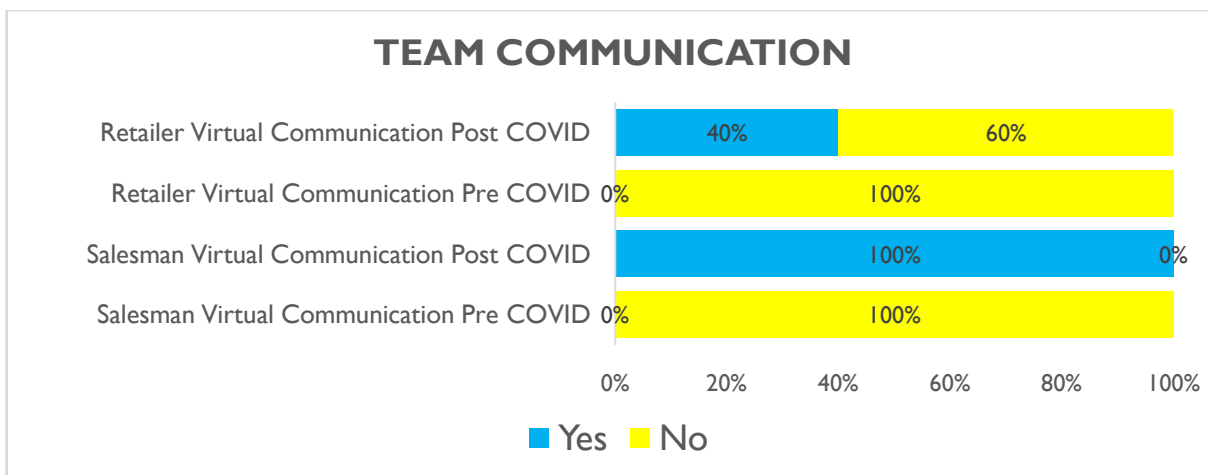


(2) Digital communication has increased across FMCG industry. Everyone in chain has started using digital medium of communication to conclude daily business activities. Technology usage at Kirana & salesman has started at last mile in form of salesman & kirana stores. This trend of technology usage is

going to remain in FMCG industry even after covid. Companies have saved sizeable cost & manhours which use to be there on account of physical meetings.

Market – Delhi NCR & Lucknow

Respondents – Retailers (50 Nos), Salesman (20)



(3) There are lot of new users who used local E com apps for the very 1st time owing to market disruptions. Basis interaction with manager of Atcost app they confirmed 2500 new users joined platform for ordering of fruits & vegetables after lockdown. This base of new users is almost 5X of pre covid base.

Consumers also started using FMCG company apps which started during phase 1 of lockdown. This trend of local apps will continue even when covid is over. Critical success factor for these apps will be consumer promotions.

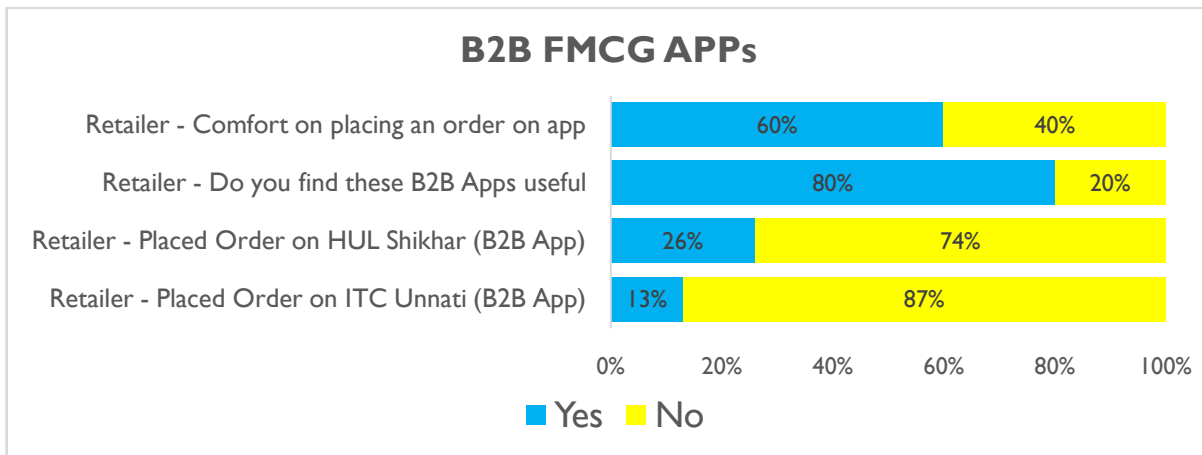
(4) All major FMCG companies introduced B2B & B2C apps to digitalize entire process of order booking. Kind of investment which is being done by these companies on

education/incentivizing retailers & consumers will benefit these companies to optimize distribution cost in long run.

(5)

Market – Delhi NCR & Lucknow

Respondents – Retailers (50 Nos)



All in All, these key trends will further grow from here onwards. These interventions will help in optimizing distribution & cost for all major FMCG companies. Pandemic has given required push to these critical interventions which FMCG companies initiated while dealing with COVID challenges.

Limitation of study: This research study has got below limitations –

- Sample size is limited & from urban centers only.
- Within FMCG space major focus has been on large scale companies such as ITC HUL, Marico etc., this leaves local companies out of this study.
- Correlation of these points with other functions of FMCG was also not available owing to data limitations.

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ROLE OF SOCIAL MEDIA INFLUENCERS ON COLLEGE STUDENTS' BUYING DECISION

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ABSTRACT

Influencer marketing is a highly recognized and renowned advertising approach that has been adopted by a number of businesses in order to market their products. According to several researches, influencers have a significant impact on customer purchasing decisions and their perceptions towards a product. This research was conducted among a highly significant and influential group of customers, college students, in order to better understand the impact of influencer marketing on their purchase decisions. A convenience sample approach was used to survey 200 college students in Tirunelveli, with 142 students stating that they had been exposed to social media influencers, and their responses were taken into consideration for the data analysis. Co-variance Based Confirmatory Factor Analysis and Structural Equation Modelling have been used to analyse the data and obtained results shall support the marketing companies to plan their strategies.

Keywords: *Influencer Marketing, Social Media Influencers, Social Media Marketing, Product Influencer, Influencer Advertising*

Introduction

Advertising in the social media platforms by companies is increasing in many folds day by day. Among several strategies employed by companies to advertise on social media platforms, influencer marketing is gaining more importance. Particularly in this pandemic situation, people have been forced to stay at home and the time usage of social media has increased by several folds which has given more scope for social media advertising.

Influencer marketing is a kind of social media marketing that relies on product and brand promotions by influencers, who have huge followers in any social media platform (Chen, 2020). The success of influencer marketing verily depends on approaching a right influencer who can provide accurate suggestions through their feeds and stories in order to create a good customer engagement (Chopra et al., 2021)

The consumer's purchase decision making is largely influenced by influential individuals like sports/cinema stars and other celebrities (Belch & Belch, 2003). While the celebrities and sports stars appeared in TV commercial ads to promote a brand, in the recent time they take the place of influencers in social media platforms. Similarly, time spent on digital media has considerably outpaced time spent on traditional media, with 395 minutes per day vs.

315 minutes per day (Influencer Marketing Statistics, n.d.) The factors that make influencer marketing successful includes celebrities being already known figures to consumers is one of the biggest reason for the success of influencer marketing as it easily creates trust in consumer's mind. Several studies have stated that influencer marketing is effective compared to other means of advertising and it yields better return on investment (ROI). Brands may earn up to \$5.78 for every \$1 invested on influencer marketing (Geysler, 2021). Figures from a recent report show the influencer marketing industry has grown from 6.5 billion to 13.8 billion U.S. dollars in only three years (Statista Research Department, 2021) Influencers can be categorised based on the number of followers in social media and the celebrities with more than a million followers are called as mega influencers, followers of macro influencers range between 1,00,000 to 1 million where as influencers with 1000 to 1,00,000 followers are called as micro influencers and the ones with less than 1000 followers are termed as nano influencers (The Power of Influencer Marketing With Today's Youth, 2020).

Section 79 of the Information Technology Act requires social media companies with over five million users in India to not only provide end-to-end encrypted message tracing, but also to set up local law enforcement and user

complaint offices with senior executives (Bolor& Kumar, 2021, Chapter 11, p. 69). This protects the customer from exploitation by social media influencers.

Review of literature

Sudha and Sheena (2017) performed a study with certain objectives including knowing how influencer marketing is being employed by fashion industry, to study the impact on influencers on consumer buying decision in fashion industry and also to identify the influencer marketing techniques used. Sampling size was determined to be 200 women. Consumers may discover the need for a product by following celebrities on Facebook, Instagram, and Twitter. Consumers utilize blogs to learn more about products they were anticipating buying. Blogs also improve consumer communication before a purchase. Through blogs, the phenomenon of message delivery is illustrated. The findings report that young women love reading blogs not only because they have a reliable source offering them their thoughts on items and information, but also because they enjoy reading writings by someone they connect to. Notably, many fashion businesses have discovered an effective approach to advertise their products by valuing and recognising the influence that bloggers may have on their target clients. Trust and customer loyalty may be established by investing in relationship building with a blogger and indirectly engaging the company's target client base, resulting in greater sales and lucrative long-term customer relationships.

Zak and Hasprova (2020) conducted a study in Slovak Republic to understand how customer purchase decisions are influenced by influencer marketing. A total of 430 respondents from a variety of age groups and geographical locations took part in the survey to express their opinions. They concluded that when a business uses influencer marketing, it may reap a wide range of benefits, the most significant of which is a boost in product sales. A quality product and a trustworthy influencer are thus essential for a successful marketing effort.

Nurhandayani, Syarief and Najib(2019) investigated the role of social media influencers and brand image on customers' purchasing behaviour among the millennial

females in Jakarta. According to the findings of the study, social media influencers play a key role in the development of brand images, although they were unable to significantly impact the purchase decision. Companies, on the other hand, can increase sales by influencing consumers' purchase decisions through the creation of a positive brand image. Nagori (2020) studied 99 respondents who were active social media users with awareness towards influencer marketing related to health and beauty products. The primary goal of this study is to better understand the impact of influencer reputation, reliability, competence, sponsored content and physical awareness in generating sales through influencer endorsements, as well as the factors that influence these factors. These factors had a significant influence on purchasing, as predicted. This study also looked at if there is a link between gender and online behaviour and influencer perception. Again, there was no noticeable difference in behaviour between genders. This demonstrates that male and female groups may be targeted using comparable techniques.

Several studies have been steered associated to influencer marketing on consumer purchase decisions, but there is a research gap to identify the effect on college students, who are a highly significant and demanding category to deal with.

Methodology

The study is conducted among 200 college students in Tirunelveli out of which 142 students has exposure towards social media influencers. The responses of this sample have been gathered and analyzed to answer the research questions. Having employed convenience sampling techniques, primary data has been collected using a structured questionnaire. The questions related to awareness and perception have been adopted from the questionnaire of Noora Puotiniemi (2018) where as questions related to purchasing decision have been adopted from the questionnaire of VirendraChavda (2015). Co-variance Based Confirmatory Factor Analysis (CB-CFA) and Structural Equation Modelling (SEM) techniques were employed with the help of IBM SPSS AMOS 21 software package to analyze the results.

Objectives

- To study the social media usage behaviour and awareness level of college students towards influencer marketing
- To explore the influence of social media influencers on purchase decision making of college students.

Results and analysis

Table No 1. Socio-demographic profile of respondents

Socio-Demographics		Frequency	Percentage
Gender	Male	56	39.4
	Female	86	60.6
	Total	142	100
Stream of study of respondents	Arts	62	43.7
	Science	6	4.2
	Management studies	60	42.3
	Medical science	10	7.0
	Engineering	2	1.4
	Others	2	1.4
	Total	142	100
Family income of respondents	Up to Rs 10000	78	54.9
	Rs 10001 to Rs 25000/month	24	16.9
	Rs 25001 to Rs 40000/month	18	12.7
	Rs 40001 to Rs 60000/month	18	12.7
	Rs 60001 to Rs 100000/month	4	2.8
	Total	142	100

Males account for 39.4 percent of college students, while females account for 60.6 percent. From the data presented above, it is clear that the number of female students is more than the number of male students.

In terms of academic background, 43.7 percent of students are arts majors, 4.2 percent are science majors, and 42.3 percent are management majors. 7% of students are in the medical science stream, 1.4% is in engineering, and the remaining 1.4% is from other courses, mostly polytechnic diploma. Hence, it is understood that more students under study belongs to arts stream and only few students belongs to engineering stream and others. 54.9 % earn up to Rs 10,000, while 16.9 % earn between Rs 10001 and Rs 25000. 12.7 percent of students had household incomes between Rs 25001 and Rs 40000. , 2.8 percent of them earn between Rs 60001 and Rs 100000 monthly. So, more than half of the students had a monthly household income of up to Rs 10,000. Only a few percent are from income level between Rs 60001 and Rs 100000.

Table No.2: Activeness in the usage of social media platform by respondents

Social Media	Frequency	Percentage
Face book	2	1.4
You tube	38	26.8
Twitter	2	1.4
Instagram	66	46.5
Whatsapp	34	23.9
Total	142	100

Facebook is used by actively used by 1.4% of college students. 26.8% use YouTube, while 1.4% uses Twitter. While 46.5% use Instagram and 23.9% use WhatsApp. As shown above, more college students actively use Instagram than Facebook and other applications.

Table No 3. Time spend on social media platform on a single day by respondents

Time spend on social media	Frequency	Percentage
I don't use daily	2	1.4
Less than an hour	10	7.0
Between 1 to 2 hours	46	32.4
Between 2 to 3 hours	36	25.4
Between 3 to 4 hours	48	33.8
Total	142	100

14% of students say they don't use social media everyday, 7% say they use it for less than an

hour, and 32% say they use it for 1 to 2 hours per day. While 25.4 percent of students spend 2 to 3 hours on social media and 33.8 percent spend 3 to 4 hours each day. Thus, more students spend 3-4 hours each day on social media, and just a handful say they don't use it regularly.

56.3 percent of the students surveyed follow social media influencers. 43.7 percent of them, on the other hand, are not following any social media influencer. As a result of the facts provided above, it is clear that the majority of college students under study are following social media influencers.

Table No 4: Willingness to follow social media influencers

Awareness	Frequency	Percentage
Yes	80	56.3
No	62	43.7
Total	142	100

Objective: To explore the influence of social media influencers on purchase decision making of college students.

Section – A

Co-variance based Confirmatory Factor Analysis for the reliability and validity for the research instrument

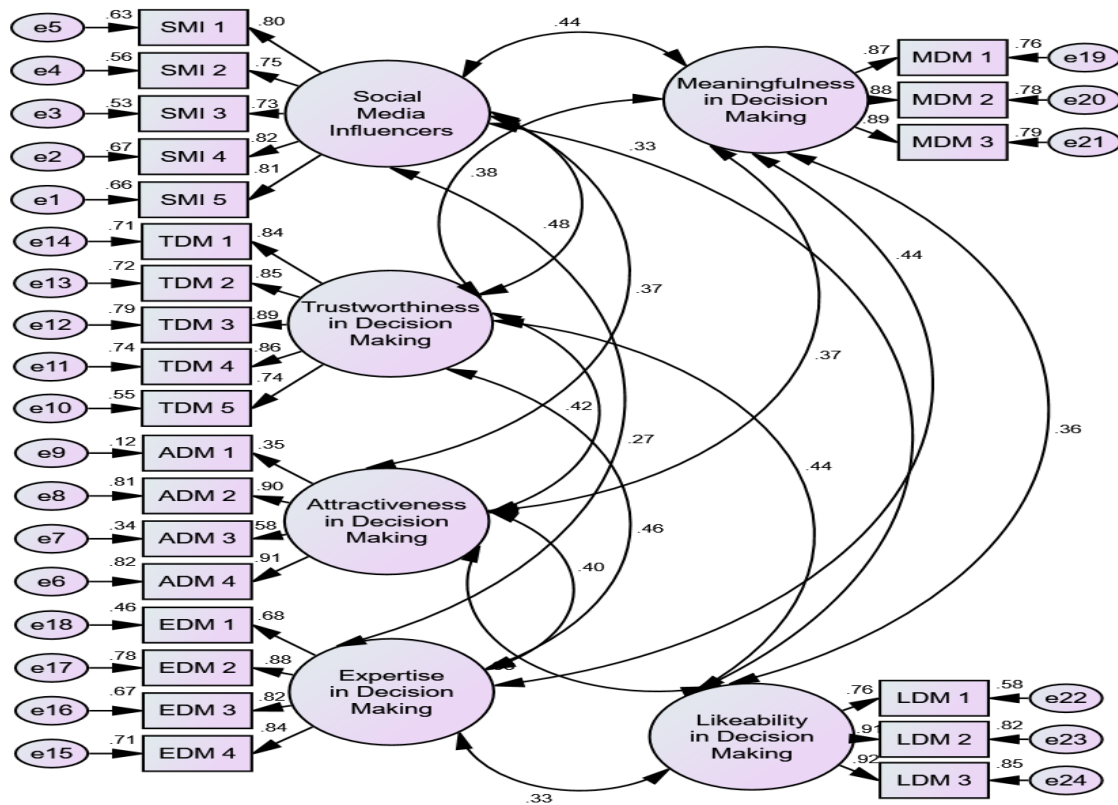


Figure 1: Confirmatory Factor Analysis for social media influencers and purchase decision making constructs

Table 5: Model fit indices for CFA Model

ATTRIBUTES	CMIN/DF	P-VALUE	GFI	AGFI	CFI	RMSEA
Study model	4.12	0.000	0.948	0.933	0.952	0.047
Recommended value	Acceptable fit [1-5]	Greater than 0.05	Greater than 0.9	Greater than 0.9	Greater than 0.9	Less than 0.08
Literature support	Hair et al., (1998)	Barrett (2007)	Hair et al. (2006)	Hair et al. (2006)	Hu and Bentler (1999)	Hair et al. (2006)

The value of Chi-Square to the degrees of freedom ratio for an acceptable ranges that less

than 5. The RMSEA score is 0.047, which is below the accepted threshold score of 0.08.

Moreover, the GFI and AGFI and CFI values are above 0.9 which indicates exact fit. Thus,

the model is a good fit and can be considered for further analysis.

Table 6: Final Reliability and Validity of CFA Model

Social media influencers and purchase decision making constructs	Item code	Factor loading	Cronbach's Alpha Final	AVE	Composite Reliability
Social Media Influencers (SMI)	SMI 1	0.80**	0.89	0.61	0.88
	SMI 2	0.75**			
	SMI 3	0.73**			
	SMI 4	0.82**			
	SMI 5	0.81**			
Trustworthiness in Decision Making (TBD)	TBD 1	0.84**	0.92	0.70	0.92
	TBD 2	0.85**			
	TBD 3	0.89**			
	TBD 4	0.86**			
	TBD 5	0.74**			
Attractiveness in Decision Making (ABD)	ABD 1	0.91**	0.88	0.68	0.89
	ABD 2	0.78**			
	ABD 3	0.90**			
	ABD 4	0.68**			
Expertise in Decision Making (EBD)	EBD 1	0.84**	0.90	0.73	0.91
	EBD 2	0.82**			
	EBD 3	0.88**			
	EBD 4	0.87**			
Meaningfulness in Decision Making (MBD)	MBD 1	0.87**	0.90	0.78	0.91
	MBD 2	0.88**			
	MBD 3	0.89**			
Likeability in Decision Making (LBD)	LBD 1	0.76**	0.89	0.75	0.90
	LBD 2	0.91**			
	LBD 3	0.92**			

** denotes significant at 1% level

From the above table, it can be inferred that all the factor loadings are above the threshold level of 0.5 which establishes the item validity of the constructs. The values of Cronbach's Alpha are found to be greater than 0.9 which confirms the reliability of the constructs. The Composite Reliability values are found to be greater than 0.9 which indicates that all the constructs have a good level of internal

consistency reliability. The Average Variance Extracted (AVE) values are also found to be above the recommended threshold value of >0.5. Therefore, it can be interpreted that the all constructs have high levels of convergence. As all the parameters meet the recommended value, the data is suitable for further analysis and model building.

Table 7: Discriminant Validity among the constructs

Constructs	SMI	TDM	ADM	EDM	MDM	LDM
SMI	(0.78)					
TDM	0.48	(0.84)				
ADM	0.37	0.42	(0.82)			
EDM	0.27	0.46	0.40	(0.85)		
MDM	0.44	0.38	0.37	0.44	(0.88)	
LDM	0.33	0.44	0.36	0.33	0.36	(0.87)

The table displays the square root of AVE values and inter construct latent constructs correlations. Values in brackets are the square root of AVE scores which must be greater than the inter construct latent variable correlation

values to establish the non-existence of any relationship. In this study, it can be observed that no relationship exists among the constructs and discriminant validity among the constructs are established.

Section- B

Co-Variance Based Structural Equation Modelling

Table No. 8 shows the Hypotheses for model building

Hypotheses No.	Hypotheses of model building
SM.H1	Social media influencers positively influence the meaningfulness in decision making among college students.
SM.H2	Social media influencers positively influence the trustworthiness in decision making among college students.
SM.H3	Social media influencers positively influence the attractiveness in decision making among college students.
SM.H4	Social media influencers positively influence the expertise in decision making among college students.
SM.H5	Social media influencers positively influence the likability in decision making among college students.

SM.H1 to SM.H5 indicates Structural Model Hypotheses

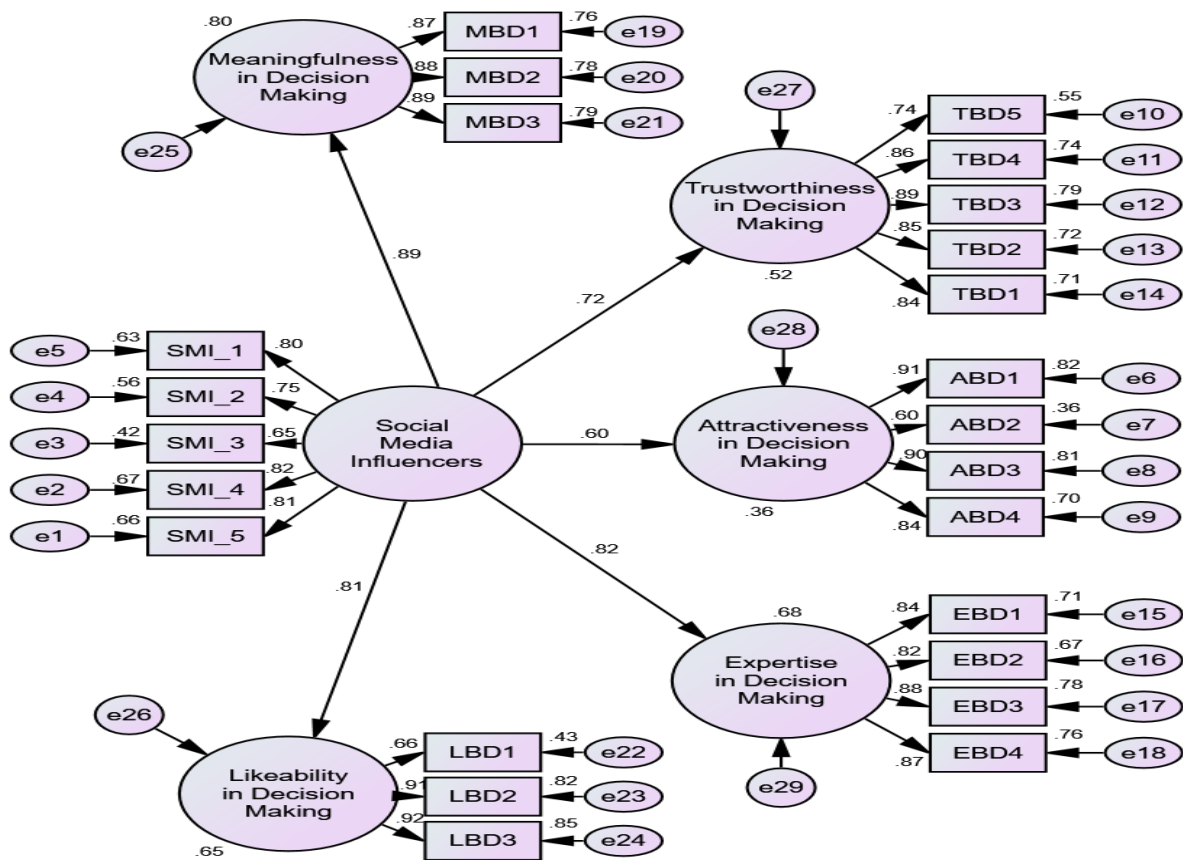


Figure 2: Structural Equation Model for the influence of social media influencers on purchase decision making of college students

Table 9: Model fit indices for Structural Equation Model

MODEL	CMIN/DF	P-VALUE	GFI	AGFI	CFI	RMSEA
Study model	4.74	0.000	0.937	0.923	0.940	0.051
Recommended value	Acceptable fit [1-5]	Greater than 0.05	Greater than 0.9	Greater than 0.9	Greater than 0.9	Less than 0.08

The value of Chi-Square to the degrees of freedom ratio, RMSEA GFI and AGFI values

are meets the recommended threshold level. So, in can be inferred that model is good fit.

Path analysis**Values of path analysis and R² for the SEM**

Constructs path index			Standardized co-efficient (Beta)	R ² Value	Critical Ratio	P value
Meaningfulness in Decision Making	←	Social Media Influencers	0.89	0.80	4.72	<0.001**
Trustworthiness in Decision Making	←	Social Media Influencers	0.72	0.52	4.71	<0.001**
Attractiveness in Decision Making	←	Social Media Influencers	0.60	0.36	3.98	<0.001**
Expertise in Decision Making	←	Social Media Influencers	0.82	0.68	4.17	<0.001**
Likeability in Decision Making	←	Social Media Influencers	0.81	0.65	4.10	<0.001**

** indicates significant at 1% level

Results of path analysis, hypotheses testing and explanations of R² values

SM.H1: Social media influencers positively influence the meaningfulness in decision making among college students.

The standardized beta coefficient of social media influencers on meaningfulness in decision making is 0.89 represents the partial effect Social media influencers on meaningfulness in decision making among college students, holding the other path variables as constant. The estimated positive sign implies that such effect is positive and meaningfulness in decision making among college students would increase by 0.89 for every unit of standard deviation increase Social media influencers and this coefficient value is significant at 1% level. Therefore, the hypothesis is supported.

80% of the variation in meaningfulness in decision making of the college students is explained by the social media influencers. It means 80% of meaningful decisions are taken by the college students with the support of social media influencers. This value also leads to the conclusion that other independent variables are necessary for predicting meaningfulness in decision making besides this independent construct.

SM.H2: Social media influencers positively influence the trustworthiness in decision making among college students.

The standardized beta coefficient of social media influencers on trustworthiness in decision making is 0.72 represents the partial

effect of social media influencers on trustworthiness in decision making, holding the other path variables as constant. The estimated positive sign implies that such effect is positive and trustworthiness in decision making among the college students would increase by 0.72 for every unit of standard deviation increase in social media influencers and this coefficient value is significant at 1% level. Therefore, the hypothesis is supported.

52% of the variation in trustworthiness in decision making of the college students is explained by the social media influencers. It means 52% of trustworthiness perceived by the college students in their decisions are because of the support of social media influencers. Other independent variables are necessary for predicting trustworthiness in decision making besides this independent construct.

SM.H3: Social media influencers positively influence the attractiveness in decision making among college students.

The standardized beta coefficient social media influencers on attractiveness in decision making is 0.60 represents the partial effect of coefficient social media influencers on attractiveness in decision making among the college students, holding the other path variables as constant. The estimated positive value implies that such effect is positive and attractiveness in decision making among he students would increase by 0.60 for every unit of standard deviation increase in social media influencers and this coefficient value is

significant at 1% level. So, the hypothesis is supported.

36% of the variation in attractiveness in decision making of the college students is explained by the social media influencers. The students perceive 36% of attraction in their purchase decision because of the influence of social media influencers. Other independent variables are necessary for predicting attractiveness in decision making besides this independent construct.

SM.H4: Social media influencers positively influence the expertise in decision making among college students.

The study depicts that the Social media influencers has a positive effect on expertise in decision making. The standardized beta coefficient of Social media influencers on expertise in decision making is 0.82 represents the partial effects of Social media influencers on expertise in decision making, holding the other path variables as constant. The estimated positive value implies that such effect is positive and expertise in decision making would increase by 0.82 for every unit of standard deviation increase in Social media influencers and this coefficient value is significant at 1% level. Thus, the hypothesis is supported.

68% of the variation in expertise in purchase decision making of the college students is explained by the social media influencers. It indicates that college students

getting 65% of expertise through social media influencers for taking apt purchase decision. This value also leads to the conclusion that other independent variables are necessary for predicting expertise in decision making besides this independent construct.

SM.H5: Social media influencers positively influence the likability in decision making among college students.

The study reveals that Social media influencers have a positive effect on likability in decision making. The standardized beta coefficient of Social media influencers on likability in decision making is 0.81 represents the partial effects of Social media influencers on likability in decision making, holding the other path variables as constant. The estimated positive value implies that such effect is positive and the likability in decision making would increase by 0.81 for every unit of standard deviation increase in Social media influencers and this coefficient value is significant at 1% level.

65% of the variation in likability in purchase decision making of the college students is explained by the social media influencers. It shows that college students feel 65% likeable in their purchase decision due to the influence of social media influencers. For predicting remaining 35% of variation in likability in students' decision making, it necessary to bring other independent constructs.

Table No 10: Result summary of hypothesis testing

Hypotheses No.	Hypotheses of the model developed	Result of Hypotheses testing
SM.H1	Social media influencers positively influence the meaningfulness in decision making among college students.	<i>Supported</i>
SM.H2	Social media influencers positively influence the trustworthiness in decision making among college students.	<i>Supported</i>
SM.H3	Social media influencers positively influence the attractiveness in decision making among college students.	<i>Supported</i>
SM.H4	Social media influencers positively influence the expertise in decision making among college students.	<i>Supported</i>
SM.H5	Social media influencers positively influence the likability in decision making among college students.	<i>Supported</i>

SM.H1 to SM.5 indicates Structural Model Hypotheses

Five hypotheses were tested and a model developed for social media influencers based on the results of the hypotheses testing. All the five hypotheses are supported in the model. The fit indices show that both all CFA and

SEM models are a good fit. Overall results indicate that social media influencers have positively influencing the purchase decisions of college students.

Conclusion:

Above study results state that the majority of college students are following influencers through their social media channels. Publishing advertisements and endorsing the brands through by employing social media influencers can help companies reach out to target customers with ease and also improve sales. The advantages of influencer marketing is many that includes increasing brand awareness, expanding the reach, gaining credibility and trust, least expensive compared to traditional advertising methods, generate real sales and increased return on investment (ROI), targeting

niche communities, providing fresh and relevant content (Schaffer, 2021). Influencer marketing, according to 71% of marketers, is more successful at producing quality engagement and leads (Barker, 2021) One of the challenges in employing influencer marketing strategy is to have a good knowledge on which influencer to use for which brand. Working with wrong influencers can do harm and damage your brand's reputation and if the influencer is not skilled then it is waste of money for the company (Barker, 2021).

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ENVIRONMENTAL IMPACT ASSESSMENT (EIA), SOCIAL IMPACT ASSESSMENT (SIA) AND THE SUSTAINABLE DEVELOPMENT: SCIENCE IN MODERN ENVIRONMENTAL JURISPRUDENCE.

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ABSTRACT

An issue of Pandemic is faced and addressed globally. Likewise, an issue of global warming and climate change is faced by the globe since many years, unfortunately has not gained much attention. As per CNN report even in developed country like America, Trump Government did not pay heed to it. With this paper here is an attempt to draw attention to the environment protection processes for the next generation. Environmental Impact Assessment (EIA) is a process of predicting and evaluating an action's impact on the environment, the conclusions of which are to be used as a tool in decision making. Social Impact Assessment (SIA) as an exercise, by and large, relates to development and change in societies and cultures. The concept of sustainable development in essence attempts to balance the scale between the quantity of development and quality of environment.

Keywords: *global warming, environment, environmental impact assessment, social impact assessment.*

Introduction

The protection of the environment is a global issue. In order to achieve sustainable development, environment protection constitutes an integral part of the developmental process which cannot be considered in isolation. If quality of life is to be assured to the present generation and if the future generation is to be preserved from an environmental catastrophe, then it is our duty to preserve the environment.

Environmental Impact Assessment

Environmental Impact Assessment (EIA) is a process of predicting and evaluating an action's impact on the environment, the conclusions of which are to be used as a tool in decision making. It is an important management tool for ensuring optimal use of natural resources for sustainable development. In India EIA's for development projects first started in 1977-78 when the Department of Science and Technology took up environmental appraisal of river valley projects. It was, however with the enactment of the Environment Protection Act, 1986, that there was a broad move towards institutionalizing environmental procedures. The Central Government then under Section 3(1) and section 3(2) of the Environment Protection Act, 1986 and under Rule 5(3) (a) of the Environment Protection Rules, 1986 issued a draft notification 1992 laying down drafts and procedures for impact assessment. This

was followed by a final notification in 1994¹ and two other notifications amending it.

EIA is the procedure used to examine the environmental consequences or impacts, both beneficial and adverse, of a proposed development project and to ensure that these effects are considered while project designing. The EIA is therefore based on analysis and predictions. These impacts can include all relevant aspects of the natural, social, economic and human environment. The study therefore requires a multidisciplinary approach and should be done in the beginning, at the feasibility stage of a project.

The Environment Impact Assessment process:

The environment impact assessment consists of eight steps with each step equally important in determining the overall performance of the project.

The eight steps of the EIA process in brief are as follows:

- Screening: First stage of EIA, which determines whether the proposed project, requires an EIA and if it does, then what would be the level of assessment required.
- Scoping: This stage identifies the key issues and impacts that should be further investigated. This stage also defines the boundary and time limit of the study.
- Impact analysis: This stage of EIA identifies and predicts the likely environmental and social impact of the proposed project and evaluates the significance.

- **Mitigation:** This step in EIA recommends the actions to reduce and avoid the potential adverse environmental consequences of development activities.
- **Reporting:** This stage presents the result of EIA in a form of a report to the decision-making body and other interested parties.
- **Review of EIA:** It examines the adequacy and effectiveness of the EIA report and provides for the necessary information required for decision-making of any particular project.
- **Decision-making:** It decides whether the project is rejected, approved or needs further change.
- **Post monitoring:** This stage comes into play once the project is commissioned. It checks to ensure that the impacts of the project do not exceed the legal standards and implementation of the mitigation measures are in the manner as described in the EIA report.

Environment Impact Assessment should therefore be viewed as an integral part of the project planning process.

Social Impact Assessment

Social Impact Assessment (SIA) as an exercise, by and large, relates to development and change in societies and cultures. In India, SIA is generally carried out as a part of the Environmental Impact Assessment clearance process. SIA thus refers to the thorough and methodical study of human trauma associated with the rapid exploration of natural resources and during project-induced displacements. It is a tool that can help decision-makers to foresee the likely negative impacts of their actions so that steps necessary to prevent or at least to contain them can be taken in time.

A Social Impact Assessment must be made mandatory where large numbers of families are going to be affected due to rapid exploration of natural resources and they should be provided with all the required infrastructural facilities and amenities in the resettlement area. More particularly, where the people of the Scheduled Tribes are being displaced in sizeable numbers, a well thought out Tribal Development Plan must be put in place.

In the past, SIA have been carried out for a variety of projects, such as for construction of

dams, sanitation and health, mining, urban transport systems, pastoral development programs and livelihood support projects.

Whenever it is desired to undertake a new project or expansion of an existing project, which involves involuntary displacement of four hundred or more families en masse in plain areas, or two hundred or more families en masse in tribal or hilly areas, DDP blocks or areas mentioned in the Schedule V or Schedule VI to the Constitution, the appropriate Government shall ensure that a Social Impact Assessment study is carried out in the proposed affected areas.

The most important outcome of a SIA is to develop mitigation plans to overcome the potential negative impacts on individuals and communities, and the society at large and hence it now becomes imperative to define the term 'social impact'. Social Impacts are the changes that occur in communities or to individuals as a result of an externally induced change. There are a number of alterations that take place in the ways in which people live, work, play, relate to one another, organize to meet their needs, and to cope as members of society. Thus, while undertaking a social impact assessment; it is the duty of the appropriate Government to take into consideration the impact that the project will have on public and community properties, assets and infrastructure; particularly, 'roads, public transport, drainage, sanitation, sources of safe drinking water, sources of drinking water for cattle, community ponds, grazing and, plantations; public utilities, such as post offices, fair price shops, etc.; food storage godowns, electricity supply, health care facilities, schools and educational/training facilities, places of worship, land for traditional tribal institutions, burial and cremation grounds, etc. These impacts can be positive or negative or both. Such changes may affect employment, income, production, way of life, cultural practices, community participation, political systems, environment, health and well-being, individual rights as well as property rights, fears and aspirations as well as change in ethnic composition.

The main advantages of conducting a systematic SIA include the following:

- Identifying Affected Groups: It helps in identifying people and groups who are going to be affected by the proposed project.
- Avoiding Adverse Impacts: It provides the basis for preparing mitigation measures to avoid, reduce and manage adverse impacts.
- Enhancing Positive Impacts: SIA preparation also helps identify measures to maximize/share project benefits.
- Reducing Costs: Addressing social impacts at an early stage helps to avoid any costly errors which might take place in the future.
- Faster Government Approval: A well prepared SIA demonstrates that social impacts on individuals and communities are taken into consideration seriously which ultimately helps in getting a project clearance faster.

A Social Impact Assessment should therefore be specific and need based. Thus, the concept of SIA broadly envisages as to how the social and cultural fabrics of populations inhabiting in different ecological surroundings get affected as well as disrupted due to the growth-centric development initiatives. Therefore, there is a need to develop an action plan for development projects in such a way that the social and cultural ethos of the people are least violated, and people are allowed to live with dignity and honour within their traditional social and cultural milieu with immediate the environment.

Sustainable Development

“Sustainable development” as a concept came to be known for the first time in the Stockholm Declaration of 1972. Thereafter, in 1987 the concept was given a definite shape by the World Commission on Environment and Development in its report called “Our Common Future”. The Commission was chaired by the then Prime Minister of Norway, G.H. Brundtland and as such the report is popularly known as the “Brundtland Report”.

The concept of sustainable development in essence attempts to balance the scale between the quantity of development and quality of environment. The definition of sustainable development comes from the report of the Brundtland Commission, in which it was

suggested that the phrase covered, “development which meets the needs of the present without compromising the ability of future generations to meet their own needs”. While applying the concept of sustainable development one has to keep in mind the “principle of proportionality” based on the concept of balance. It is an exercise in which the Courts have to balance the priorities of development on one hand and environmental protection on the other hand.

Sustainable Development is required to be implemented taking a pragmatic view and not on ipse dixit of the Court.² The Supreme Court of India in T.N. Godavaram Thirumulpad v. Union of India³, said “as a matter of preface, we may state that adherence to the principle of sustainable development is now a constitutional requirement”.

India being a developing country, where economic progress is essential; at the same time, care has to be taken of the environment. Sustainable development, with economic progress and without environmental regression, can be achieved only through the implementation of good legislation. As India is a developing country, certain ecological sacrifices are deemed necessary, while keeping in mind the nature of the environment in the area, and its critical impact on the community.

The Supreme Court of India, in recent years, has been adopting a holistic approach towards environmental matters. This is usually done through detailed orders that are issued from time to time, while committees appointed by the Court monitor the ground situation⁴.

Objectives of Sustainable Development:

1. It refers to commitment to preserve natural resources for the benefit of the present and future generations.
2. To appropriate standards for exploration of natural resources based upon use.
3. An equitable use of natural resources suggests that the use by any State must take account of the needs of the other States and people.
4. If required environmental consideration can be integrated into economic and other development plans, programs and project and that the development needs to be taken into account in applying environmental objectives.

Guiding Rules for Sustainable Development Principle and guiding rules for sustainable development depends upon accepting a duty to seek harmony with other people and with nature. The guiding rules are as under:

- a. People must share with each other and care for the earth.
- b. Humanity must take no more from nature than man can replenish and
- c. People must adopt lifestyles and development paths that respect and work within nature's limits
- d. Sustainable development means a development which can be sustained by nature with or without mitigation. It is to maintain delicate balance between industrialization and ecology.

Salient Principles of Sustainable Development:

Some of the salient principle of "sustainable development", as culled out from the Brundtland Report and International documents, are the Precautionary principle, inter-generational equity, use and conservation of natural resources, environmental protection, Polluter Pays principle, Obligation to assist and co-operate, eradication of Poverty and Financial Assistance to the developing countries.

The Precautionary Principle:

In the context of municipal laws the precautionary measures means-

1. Environmental Measures- by the State Government and statutory authorities must anticipate, prevent and attack the causes of environmental degradation.
2. Where there are threats of serious and irreparable damage, lack of scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.
3. The "onus of proof" is on the actor or developer industrialist to show that the action is environmentally benign.

Inter-generational equity

The central theme of the theory of inter-generational equity is to see that the present generation utilizes the resources in a manner which is beneficial to the future generations and what the future generations inherit should

be useful cultural and natural inheritance. The concept requires the conservation of biodiversity and quality of biological resources and also of renewable resources such as forest, water and soil. The right of development has to be fulfilled, so as to equitably meet developmental and environmental needs of the present and the future. It is the duty of the State under the Constitution of India to devise and implement a coherent and coordinated program to meet its obligation of sustainable development based on inter-generational equity.

Use and Conservation of natural resources:

In order to meet the needs on sustainable basis, it is absolutely necessary to use the Earth's natural resources carefully and the natural resource base must be conserved and enhanced as it is a part of our moral obligation to other living beings and future generations. These resources must be conserved to meet the needs of the growing population. The idea that, for the benefit of future generations, present generation should be modest in their exploitation of natural resources has found widespread international approval since the Maltese Proposal at the UN General Assembly of 1967 which contended that there was a common heritage of mankind which required legal protection by the international community.

Environment Protection

The protection of the environment is an essential part of sustainable development. Development should not be at the cost of the environment and there must be harmonization between the two needs. In *Citizen, Consumer and Civic Action Group v. Union of India*, the Court observed that while the courts have social accountability in the matter of protection of environment, there should be a proper balance between the same and development activities.

Polluter Pays principle

As interpreted by the Supreme Court of India, means that the absolute liability for harm to the environment extends not only to compensate the victims of pollution but also the cost of restoring the environmental degradation. Thus, it includes environmental costs as well as direct

costs to people or property. However, this principle does not mean that the polluter can pollute and pay for it. The nature and extent of cost and circumstances in which the principle will apply may differ from case to case. Remediation of the damaged environment is a part of the process of “sustainable development” and as such the polluter is liable to pay the cost to the individual sufferers as well as the reversing the cost of the damaged ecology.

Obligation to assist and cooperate

The environmental problem is not the problem of an individual or that of one country. It is a global problem, and it can only be tackled with the assistance and co-operation of all countries. Principle 27 of the Rio Declaration expects the people and the States to co-operate in good faith and in a spirit of partnership in the further development of international law in the field of sustainable development. Thus, the obligation to assist and cooperate is also one of the important principles of sustainable development.

Eradication of poverty

Most of the developing countries are under the stress of poverty. The problem that needs to be addressed is of those larger numbers of people who live in poverty and cannot satisfy their basic needs. At the Stockholm Conference in 1971, our former Prime Minister Mrs. Indira Gandhi said: “Of all pollutants we face, the worst is poverty”. It has been rightly pointed out in the Brundtland Report that poverty reduces people’s capacity to use the natural resources in a sustainable manner and hence intensifies the pressure on the government. It is necessary that growth must be revived in the developing countries because it is in these developing countries where the links between economic growth, the alleviation of poverty and environmental conditions operate directly.

Financial Assistance to Developing Countries

Financial Assistance to the developing countries was one of the major demands of developing countries at the “Earth Summit” of 1992. In the developing countries people strain their natural resources and over exploit them to meet their basic needs. The developing countries also do not have the finances and modern technology to follow the path of sustainable development. Therefore, financial assistance and transfer of technology from the developed countries is a must if the goal of sustainable development is to be achieved.

Conclusion

Environmental Impact Assessment (EIA), Social Impact Assessment (SIA) plays vital role in reaching sustainable developments goals. It would not be exaggeration that developed countries have already utilized sources from the environment for their own development and played a vital role in deteriorating the resources. In developing countries as well, because of industrialization and increasing population, natural resources are being rapidly utilized and the environment is being increasingly degraded by human activities and thus there is an alarming need to protect the environment.

The role of mass media such as newspapers, radio and television is also very important to make people aware regarding environment protection. There are various institutions, which are playing positive role towards environment to make people aware regarding environment like the Botanical Survey of India, 1890, the Zoological Survey of India, 1916 and the Wildlife Institute of India, 1982, Indian Institute of Forest Management etc.

It is not only the duty of government but also the duty of the people to take an active role for the protection of the environment as protection of the environment is economically more viable than cleaning it up once it is damaged.

A holistic approach needs to be taken towards the sustainable development of the environment and importance should be given towards its due preservation.

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9. Karnataka Industrial Areas Development Board v. C. Kenchappa, (2006) 6 SCC 371
10. See Meinhard Schroder, “Sustainable Development – A Principle for Action and an Instrument to Secure the Conditions for Survival for Future Generations”, 101, Law and State, Vol. 51 (1995)
11. AIR2002 Mad. 298. In this case the proposed construction f a multistoried complex was held legal and the builder was entitled to a “building permit”.
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THE USE OF SOCIAL MEDIA ON POLITICAL AWARENESS AMONG DELHI WOMEN**Divyshikha and B. Shankar**Department of Mass Communication, Galgotias University, Greater Noida, UP, India
Guptashikha014@gmail.com, bhawani.shankar@galgotiasuniversity.edu.in**ABSTRACT**

People's lives have become increasingly dependent on the Internet. Undoubtedly, technology has made our lives easier. The way individuals and voters participate in the political process has changed dramatically as a result of the Internet. Lately, the Internet, particularly social media, seems to be setting the global political agenda. The prevalence of hashtags on other types of electronic and print media, which soon become a hot topic of discussion for society, is an example. Social media is increasingly being used in political contexts. Political leaders use social media as a platform to reach their supporters, promote policies, and advertise without paying for advertising. The role of social media has been investigated in many areas & it has also become very popular in the area of politics.

The goal of this study was to evaluate the role of social media in creating political awareness among women. To find out, the researcher has gathered fresh research information. The researcher has selected 20 social media users from Delhi. The study results show that social media plays an important role in spreading political awareness and influencing the voting behaviour of women.

Keywords: *Internet, Social media, politics*

Introduction

When the terms "social media" and "social networking site" are used, pictures like Facebook, Twitter, WhatsApp, and YouTube come to mind. The quick transition of the globe from a local to a global scenario has boosted the use of networking sites via the internet. Unlike interpersonal, group, and public communication, mass communication does not have a quick feedback loop. It gives a platform through which users can share their views, spread information, enhance knowledge digitally. In recent years, social media has become more prevalent in political campaigns. In today's world, social media is commonly used for daily communication. Citizens, leaders, and political parties have all used it for political communication. Social media is an important tool for political information, and it has the ability to enhance people political interest by indirectly affecting it. According to Russo and Stattin (2017), "political interest is a key for the survival and development of democracies." Political interest can simply be defined as how much someone finds politics appealing (Dostie-Goulet, 2009). The following are a few examples of social media applications: Blog- A blog is a personal online diary that includes text, photographs, and links to other blogs on the Internet. Instagram is a photo and video-sharing social networking website that can be linked to other social media

channels such as Facebook(FB) & Twitter. Facebook is a website for social networking. As of July 2021, India had over 340 million Facebook users, making it the most populous country on the platform. To put this in context, if India's Facebook audience were a country, it would be the third most populous in the world. Twitter- This microblogging service is ideal for disseminating information, forming political opinions, and expressing viewpoints. Twitter is notably popular in the United States, where the microblogging site boasted a 73 million-strong user base as of July 2021. With 55.55 and 22.10 million users, Japan and India were ranked second and third, respectively. WhatsApp - A Facebook-owned social media tool for making phone calls, sending messages, and sharing photos and videos on mobile phones through the Internet. YouTube: A service and application that allows users to upload and share videos over the Internet. The usage of the Internet as well as other e-activities increases internet users' political understanding & encourages political engagement and participation.

Literature Review

“Knowledge Gap Hypothesis in the context of the political participation of the youth with reference to social media users” in this study researcher provides a framework for understanding the uneven distribution of

knowledge. Technological progress may add to the differences in awareness between social segments in the present context. In terms of youth political engagement, this conceptual study evaluates both old and new media that are more credible, socially concentrated and powerful, and examines the explanation behind the increase in the gap in political knowledge in society. It assesses the economic, educational, cultural and social factors that are responsible for assessing the gap in society & awareness. It also clarifies the exposure of youth to human interests and news conflict frames due to the use of social media. The result is the emergence of a gap in young people & awareness of policy facts.

Christian Fuchs (2014) addresses social media from a critical standpoint in his book "Social Media: A Critical Introduction." Fuchs defines critical as expressly referring to Marxism and neo-Marxism, with power and resource distribution as the central concerns. By researching both the political economy and political communication of social media, a Marxist approach to social media explores exploitation and dominance. This critical viewpoint examines who controls the means of production in both the financial and attention economies, as well as how various media sustain, reflect, or potentially upend an essentially exploitative capitalism.

The book "The Internet in the 2016 Presidential Campaign," by Jody C Baumgartner and Terri L. Towne (2017), examines how, though Internet campaigns are now normal fare, there were a number of unique innovations in 2016. This book aims to provide a detailed overview of Internet campaigning advances. How are campaigns organizing and mobilizing their ground game using the Internet? The book also looks at how citizens used Internet resources to stay informed, follow campaigns, and participate in elections. Contributions also look at how the Internet has influenced traditional and non-traditional media coverage of the campaign.

Deelan's article, "(R)evolutionizing Political Communication through Social Media (2016)," discusses how social media has influenced political communication. This book also

includes case studies of the elections in Mexico, Greece, and Europe.

Taylor & Francis' *An Introduction to Political Communication* (2011) examines the connections between politics, the media, and democracy. The influence of social media in political campaigns is examined in this book.

Objectives

- To evaluate women's political awareness in social media.
- To analyze the attitude of women towards social media.
- To find the most preferred platform of social media for political awareness of women.

Methodology

The study relies on both primary and secondary sources of information. Insight was gained from an in-depth interview with 20 women ranging in age from 18 to 30 years. They were invited to use various technologies to demonstrate how to use social media during the interviews, which were conducted through an online video conference.

Political awareness of women in social media

The first question of the interview inquired about political awareness. An interviewee said that: "Political awareness is briefly associated with the development of people's acknowledgement and recognition of specific laws & regulations." 18 participants accepted that they share, like, dislike or comment on political issues. Only 2 respondents don't engage in any political activity on any social media platform.

Attitude of women towards social media

Social Media tools are the Platforms to Discuss Hot Topics. People can communicate their views & emotions through social media. Another question in the interview segment concerned the significance of social media. In response to this question, the interviewee stated, "Social networking is the ultimate form of communication since it is widespread, affordable, and quick. The media is thought to play a vital role in raising public awareness.

Social media is responsible for delivering comfort and ease in practically every aspect of human life." 17 women Internet users think that social media influence can lead to greater political knowledge.

Most preferred social media platform for political awareness

Facebook is the most preferred social media platforms for political awareness among women. Facebook has grown to be one of the important forums for internet users to discuss and participate in politics online. Respondents opine Facebook as their favourite social media form, and then they like YouTube as second popular form of social media. while Only 2 social media users use Twitter. from local to global scenario, the rapid transformation of the world, the uses of sites through online medium are also increased. It gives a platform through

which users can share their views, spread information, enhance knowledge digitally.

Conclusion

The present study, "THE USE OF SOCIAL MEDIA ON POLITICAL AWARENESS AMONG DELHI WOMEN" sheds light on how women use social media to stay engaged to politics. It is being used by top Indian politicians to communicate with their constituents directly. It can be concluded that social media trends are beneficial in increasing people's overall knowledge and participation. To be more explicit, social media is actively helping to raise political awareness among women. According to the findings of the study Facebook is the most preferred social networking site to get and access political information among youth. Most Facebook users visit the site daily for political updates.

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EFFECT OF MEDIA TRIAL UNDER THE INDIAN JUDICIAL SYSTEM**T. Goma and B. Shankar**Department of Mass Communication, Galgotias University, Greater Noida, UP, India
tarun.goma4@gmail.com, bhawani.shankar@galgotiasuniversity.edu.in**ABSTRACT**

Courts and media are the two most important foundations of democratic governance. The term "freedom of the press" means the freedom granted to the media. The media began to publish articles collected through interviews with whistleblowers and other participants in the legal process. The court is required to deliver an impartial verdict based on anecdotal evidence, but the media's tendency to influence judges' opinion causes the judge to rule in favor of the accused, even if the accused is innocent. The research focuses on the impact of such "media tests" on the ongoing conflict between Article 19 of the Indian Constitution's "Freedom of the Press" and Article 21 of the Indian Constitution's "right to a fair trial".

Keywords: Media Trial, Judiciary, Free and Fair Journalism, Article 19

Introduction

The press has long been seen as the watchdog of society. There is a large presence of a free and fair press in every country. Given that the media frequently assumes the role of the opposition, it must function without partiality or prejudice in any form. "Media is backbone of Indian democracy". The media in India has a long and illustrious history. Media has a big role in the society. The media plays an important role in shaping public opinion and it can change people's perspective on certain events. Politics, violence, government policies and development are some of the issues that the media covers.

"Press trial is a violation of law" and journalists should be punished. However, this is completely legitimate anecdotal reporting in the country. Even before the court rules, the media trial can be seen as a warning of genuine innocence. On High publicity court cases, The press has also been accused of causing public panic, making it nearly impossible to achieve a fair trial. Even if the accused is declared innocent, sometimes it is impossible for the defendant to spend his whole life without frequent public investigations. In Criminal case law "accused has rights to a "fair trial and innocent", unless there is reasonable doubt that they are found innocent. Exclusive access media coverage goes a long way to reporting and publishing witness interviews, family and victims' statements, legal fraternity etc. The judicial mind in particular can be detrimental to the trial process.

Literature Review

"Media Trial: A Threat to Fair Trial" Mahecha (2016) the outcome shows that the role of the media is changing from the last so many years. Media intervenes illegally in judicial proceeding. Most of the times, in the high-profile cases media tries to influence the judiciary. The media often handled themselves as judges and ruled in media hearings. Finally, the freedom to write honestly and the right to a fair prosecution dispute.

"Impact of Media on Trial", Kapoor (2020) explain the impact of media trial on a judicial decision. Some cases, which are considered high profile, have been given more intent by the media, this is called media trial. In public consideration of a particular view in society, media plays a major role. Media does not show Positive aspects of society but it hindered the society with its negative opinion.

"Media Glare or Media Trial Ethical Dilemma between two Estates of India Democracy Ray & Dutta" (2015) this analysis is empirical. Results suggest that often judges are obliged to take decisions according to media public opinion. Most of the times Media don't obey the Article 19(2). The research aims at exploring the importance of the participation of the mass media. It reveals that mass media play a leading role in the establishment of Justice People.

"Kumar & Saxena Human Rights Media Freedom and Media Trial in India". The findings show that the media operates on human rights and for the country's constitution.

The outcome reveals that privacy regulation competes with freedom of expression and speech. The study concluded that media play an important role in protect to the constitutional right.

The media may portray a suspect or allegation as if he or she has been proven "guilty" long before the "court room". While the offender is eventually acquitted in court after a fair trial, this acquittal does not allow the accused to repair his damaged reputation in the society.

Judiciaries are not "impervious" to "criticism" of their legal decisions or actions only in a personal context. However, there is a fear that baseless or completely baseless judgments may jeopardize public confidence in the court. Such demands must be defended by a judge. Unsurprisingly, media publication can have effects on judges and jurors, regardless of whether humans are vulnerable to those indirect effects.

Objective

The aim and the Objective of the present research is ultimately through the following interpretation. (i) To study the impact of media trial on Victim and Judiciary. (ii) To study the Violation of Human Rights and Fair Trial. Hence the objective of study that, media is influential mode to utterance of public opinion and its impact on Fair Media Trial.

Methodology

In this study I selected content analysis and case study, the research question has been analysis through content and case study. The analysis of media is critically influential mode to utterance of public opinion, the various new report, Information and dispersal & media trial on "sub-judice" cases have been study comparatively, hence the literature of reviewed has been considered during drawing the conclusion, Suggest action to improve media efficiency as the "Last pillar of democracy".

Case Study in the Indian Scenario

Aryan Khan was legally arrested on 3 October at around 2:00 pm. The other two people were taken into custody.

On 3 October, Aryan Khan was detained in connection with the Narcotics Control Bureau cocaine raid. NCB's Mumbai headed by Sameer Wankhede. Aryan Khan was detained along with several others and charged with

consuming and 'planning' among other things, NCB file the charges under NDPS Act Narcotic Drugs and Psychotropic Substances (NDPS) Act.

Section 8(c): This section prohibit the transport, import, export, manufacturing, selling, store, to from India Except for medicinal or scientific grounds, no narcotic drug or psychotropic substance may be transported.

Section 20(b): If the offender is in charge of a 'small amount', he can be imprisoned for up to 6 months, If the amount is less than 'commercial' but more than 'small', the punishment can be extended to 10 years, If the amount in question is 'commercial', the sentence must be at least 10 years but may extend to 20 years.

Section 27: The intake of any narcotic drug or psychotropic substance is illegal.

Section 35: This section assumes that the defendants were aware of their actions. Consequently, until the accused are proved innocent, they will be presumed guilty.

NCB has requested to keep Aryan in jail till October 11. The court turned down the request and instead kept him in judicial custody for 14 days. The morning after, Aryan was shifted to Arthur Road Jail in Mumbai. Till then he was being kept in the NCB office.

Bombay High Court begins hearing on Aryan Khan's bail application on 26 October. The NCB rejected the plea, but former Attorney General Mukul Rohatgi and several others lobbied for Aryan Khan's bail. Court will resume at 2.30 pm on Wednesday. Meanwhile, two defendants in the case were released from custody by a special NDPS court.

On 30 October, the Bombay High Court granted Aryan Khan Bail after a few days of court proceedings on the grounds of drug use and storage. Released from jail after completion of documents this case under the sub-judies.

Discussion and Conclusion

Every democracy recognizes freedom of expression as a fundamental right. The media also has the same right, and they are also working for the betterment of the society in general. The news sensation is not a new phenomenon, but the role of the police and the

judicial system in investigation, information gathering and decision making is important. The criminal justice system in India is based on the premise that an accused person has the

right to a "fair trial" and is innocent "until proven guilty" beyond a "reasonable doubt".

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