STATUS OF WOMEN IN MEDIEVAL INDIA: ROOTS OF CRUELTY AND KEY TO EXCELLENCE

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ABSTRACT

In ancient times women were treated with respect and dignity. During this period, there were women rishis, sages and experts of Vedas. They were held in high esteem. In royal households women were given respect and they even rendered a significant involvement in the making of decisions and administrative purpose. With the passage of time position changed andduring the Middle Ages, women's status began to deteriorate. The Muslim era was prevalent throughout this time period. Women's lives were drastically altered during this time period. They were seen to be less capable than their male counterparts. The birth of a female child was frowned upon. During this time, the women were forced to deal with a variety of issues. Child marriage, sati, the purdah system, Jauhar, and restrictions on girls' education were among the challenges that women faced, leading to a decrease in their status. Main objective of this paper is to study medieval period in perception of factors related to deteriorating their status in this period.

Keywords: *Medieval, Communities, improvements, problems, status, women*

Introduction

Medieval India spans centuries from the collapse of the last major ancient state, the Gupta dynasty, through the creation of the massive Mughal Empire in the 16th century. The subcontinent's culture saw significant transformations throughout this time. The primary movements it witnessed included the rise of contemporary Hinduism, the decline of Buddhism, and the establishment of Islam as the dominating force in the region.In connection with these changes in the religious composition of Indian society, there have been significant developments in politics, society, economics, arts, architecture and literature. In Indian history medieval India is divided into two eras as early medieval period and late medieval India. The "early Middle Ages," which spanned from the sixth to the thirteenth centuries, and the "late Middle Ages," which spanned from the thirteenth to the sixteenth centuries and ended in 1526 on establishment of the Mughal Empire. Era of Mughal, spanned 16th-18thcenturiesreferred to as the early modern period or late medieval period. Furthermore, elements were implemented that resulted in improvements in their status. These include education, job possibilities, and skill and ability enhancements, all of which would make a substantial contribution to improving their lives. As a result, it is vital for leaders and reformers to establish policies that will help to eliminate the issues and impediments that women face. The key problems faced by females in medieval India causes accentuating the situation of women and advancements made in the condition of women in this period in India are all addressed in this research study.
The steady fall of the Gupta Empire from around 480 to 550 CE which marked the end of the "classic" era and ancient India is usually believed to be the commencement of the period. There were no big and powerful states in North India until the Sultanate of Delhi or more likely the Mughal Dynasty but there were many dynasties that ruled significant territories for a long period as well as many others who ruled minor areas and were expected to pay tribute to the larger nations. Eventually, after the conquest of the Indian subcontinent by Muslims and the decline of Buddhism, the Delhi Sultanate and the Indo-Islamic architecture were founded followed by the Bengal Sultanate which became the world's largest trading nation. The changes in the social environment of India in the middle ages were primarily the resultant outcome of economic developments like decline of trade and commerce, religious activities and cultural changes, not equal distribution of land, traders &power.During this period the growing birth pridewhich is a feature of feudal societies,& accompanying economy of self dependent provinces, has hampered both spatial and occupational movements, creating many castes in country. It leads to the downfall in trade as well as commerce which led to downfall in

Vaishya's status too. The process of caste expansion and proliferation was another characteristic of social life at that time. In the area of art & architecture this phase signalled the arrival of a new era characterized by the regional style of sculpture and temple architecture, which was apparent in southern India since the 8th century. The iconography ofPost Gupta clearly shows the hierarchy of God that reflects the pyramidal rank in society. *Mahayajna* and *danas* (donations) were gradually replaced by a system known as *puja*.*Puja* was associated with the Bhakti doctrine that became a hallmark of medieval religion. The medieval cultural development of India is referred to as an era of cultural integration. During this time, a new era of cultural development began. With the Mughal Empire brought fresh ideas and helped and created new features in the Religion, philosophy and thought, language. Literature, architectural style,painting and visual arts also had played a vital role in deteriorating as well as in improvement of the condition of women. They were the patterns of music and performing arts. In all aspects of culture, India already has a long and illustrious history. Almost all cultures have developed new religious and philosophical traditions, concepts, and forms, styles as a result of cross-cultural synthesis. During this time, marriage and the condition of women begin to deteriorate. Smriti Chandrika and Smrityarthasara also provide information about this.. Marriage across castes is forbidden in the Kali Yuga, according to the former. Marriage is required for religious rites in Savarna, whereas wedding in Asavarna is of a lesser character and is decided by desire. Later states that Brahmin marriage to Shudra women of other castes is not prohibited. Polygamy was common among royalty in *Vaijayanti* and it was thoroughly documented. Since the beginning, women's status has deteriorated dramatically. Spouses and other male cousins must first put in place measures to ensure that their wives don't become self-sufficient.

Major Problems faced by Women in Medieval Period

Women's status began to deteriorate in mediaeval India, according to popular belief. Discriminatory treatment was the main issue that women had to deal with (Nitisha, N.D.). The*purdah* practice was widely used at homes. They were denied public scrutiny as a result of this arrangement. Individuals of all communities, categories and origins seek to improve their overall quality of life by maintaining their high living standards in an effective way. They must socialise and engage with others in order to reach this goal. When women are restricted within screens, enclosures and the *purdah* it is obvious that they will face a slew of issues and obstacles in maintaining their high living standards in an effective way. Women's isolation from public scrutiny has long been acknowledged as one of the most significant obstacles they face as they progress. As a result, the loss of women's right to privacy was a serious issue for women in medieval India.

People must satisfy the three fundamental requirements of food, clothes, and shelter in order to lead a productive life and improve their mental and physical health. Women were barred from obtaining further education and working in numerous occupations. As a result, females were completely reliant on the males of the family. In natal households they were entirely reliant on their spouses and fathers. Husbands and sons on the other hand are responsible for addressing the needs of the housewives in married households. When women are supposed to engage in any procedure or event they need to obtain prior permission from father if single and their spouses in married homes. The ladies believed that their dads and spouse would not force them to contribute to any project or activity that would be harmful to them. As a result, women followed the rules and heeded their male family members' demands. They provided them with all of the goods and resources they needed to keep their living conditions stable.

Main factors affecting status of women in medieval India

1) **Child Marriage**: - Child marriage occurs when both the girls and the boys are under the age of eighteen. The girls' birth was not well received. They were trained in the implementation of household tasks and taking care of wants and needs of family

members from an early age. The practice of child brides was viewed as one of the most serious societal issues, since it prevented girls from participating in a variety of occupations and activities that would effectively improve their quality of life. Childhood is the age at which children begin to enrol in educational institutions in order to obtain an education, play, engage in leisure and recreation, and engage in social, religious, and cultural activities. When females are married off when they are young, they are robbed of the opportunity to participate in these activities. Furthermore they are intended to put home obligations into effect as well as to meet the desires and requirements of family members. Girls are required to hold the items used in the preparation of meals, rather than books in beginning of childhood. It was very is sad because it is seen as one of the greatest impediments to girls' advancement. As a result child marriage is seen as one of the key issues that robs girls of their childhood.

2) ***Purdah* System: -** *Purdah* was encouraged to be followed by women (veil). They had to conceal their identities. They were denied the freedom to live their life according to their aims and wishes as a result of the *purdah*regime. Women were not permitted to move around freely. They were instructed to remain within the confines of the house. The *purdah* practice refers to the usage of clothes, as well as elevated enclosures, screens and curtains in women's dwellings to keep them hidden from public view. *Purdah* is a religious activity that originated in European culture and was embraced by Muslims during the Muslim conquests of what is now Iraq in the 7th century C.E. Northern India's Muslim dominance was affected by Hinduism's religious practise. Purdah observance was carefully observed by the Muslim minority and was prevalent. This system has vanished from Hindu civilization since then. Though, in today's world, it is still widespread in Islamic countries (*purdah*, 2020). As a result of the widespread use of this system, it is understandable that when women are not subjected to public scrutiny, they may face difficulties in their development.

3) **Sati: -** Sati was the practice of burning widows alive on their husbands' funeral pyres. The practice of sati according to ancient Hindu rituals signified the end of the marriage. It was a consensual act in which wives accompanied their spouses to the hereafter. This behaviour is indicative of a responsible wife. Widows' circumstances have deteriorated significantly. As a result, they were forced to offer up their own lives on their husbands' funeral pyres. There were a number of sati events in Bengal between 1815 and 1818. They ranged in number from 378 to 839. In some arthodoxsituations it was thought that wives were supposed to help and support their spouses even after they die which led to the practice of sati. However, one of the most significant findings was that when women practised sati, they had not shown any signs of anxiety or apprehension. They were self-assured enough to carry out this crime. Thousands of women, however, died as a result of this practice. Women desired to survive and did not even want to sacrifice their lives on their husbands' funeral pyres. To put it another way, they didn't want to end their lives. As a result it was easy to see why the practice of sati was viewed as one of the primary issues and barriers to women's advancement.

4) ***Jauhar*: -** *Jauhar* was a Hindu ritual of mass female self-immolation or self killing by the women itself on the defeat of their husbands, fathers or brothers during war. It was started to due in fear of facing exploitation by the troops of enemy after the death of mail member'sof the family. This technique has been witnessed in India's northwest. During fights between Hindu Rajput kingdoms and Muslim troops this method was well-known. The sati rite gave rise to the practice of *jauhar*. The *jauhar* burning and the *saka* ceremony are typically associated with the term *jauhar*. Rajput women tried to commit suicide with their kids and possessions in the enormous fire during the *jauhar* ceremony. In the face of military defeat and capture, the major

goal of this approach is to avoid torture and incarceration. Muslim histories of the Mughal Dynasty and the Empires have documented *Jauhar* by Hindu kingdoms. Women, children, and others who were reliant on a besieged fort or town participated in the Indian ceremonial of self known as *Jauhar*. When it became evident that battling the invaders was no longer a viable option, death looked to become the only respectable option. The ringed fort's surviving combat warriors would then practise *jauhar*, charging bravely into the battleground one more time (*Jauhar*, 2020). As a result, *jauhar* was considered as a hurdle in the development of the women in the society.

5) **Education regarding Restriction: -** Education was a serious concern for development of women and lack of which no society can be developed mentally and socially. Attending school and obtaining an education was discouraged for the girls. The reason for this is that kids will not be able to obtain training in the application of many types of domestic tasks if they attend school. The main reason for this is that their parents are concerned that they will be unable to utilise their educational credentials, skills, and abilities in their married households. Obtaining a degree needed financial investment. The parents thought that squandering money on education and training would be a waste, so they budgeted and set aside money for their daughters' weddings. Students are taught not just academic content and lesson plans in educational institutions, but also morals, ethics, norms, and values. These would go a long way toward improving their standard of living. In addition, recreational and creative activities training are provided. As a result, it is commonly acknowledged that restricting the education of females is viewed as one of the biggest challenges that they would face during their development.

Improvements in the Status of Women

It is commonly acknowledged that efficient growth in the fields of homes, cities and the country as a whole is impossible unless females are treated with respect and dignity. They must be given chances to improve their lives and themselves. Women will be able to make a significant contribution to the effective development and growth of families, communities, and the nation as a whole if they are permitted to voice their thoughts and perspectives. Individuals in homes and communities must understand that females should not be restricted to their houses or kept in purdah, but rather should be observed in public. The following are some of the factors that indicate that women's status is improving:

Acquisition of education - Individuals can improve their comprehension and knowledge of techniques and procedures to lead better lives and achieve personal and professional goals by acquiring education. As a result when women are educated they will be able to make a significant contribution to the well-being of their communities and families. Therefore women needed to be encouraged to pursue higher education. As a result, it is widely recognised that obtaining an education not only enhances one's skills and knowledge, but it is also viewed as a significant aspect in demonstrating that women's standing is improving.

Employment Opportunities Participation – Individuals in rural villages were mostly engaged in agricultural and farming operations. Women were encouraged to participate in art, handicraft, pottery, silk spinning, agriculture, raising livestock and other occupations in addition to agriculture and farming. Girls have been urged to participate in the events throughout early childhood in order to contribute to the well-being of their communities and families. As a result, it's easy to see why women's involvement in career opportunities is seen as a crucial aspect in demonstrating that their status is improving.

Involvement in Decision-Making Processes – Individuals should make judgments about many issues of their life, including education, employment opportunities, household management, child development, and many more. If women are allowed freedom of sharing their ideas and thoughts, when their male colleagues listen to them, and when they are able to advance in their careers, only then any society can grow. As a result, women's participation in decision-making processes in

their personal and professional relationships might be considered as a sign that their status is increasing on a large scale.

Participation in Various Activities - Women's engagement in social, cultural, economic, and religious activities is widely acknowledged as one of the most important aspects in their growth. Both natal and marital households should foster this. The main reason for this is that by completing this activity, individuals will not only increase their knowledge, abilities, and aptitude, but they will also be able to successfully contribute to the advancement of their position.

Practising Creative Skills- Art works like painting, handicrafts, glassmaking, silk weaving, culinary production, musical instrument playing, singing, dancing, and role acting should all be possible for women. If women concentrate on honing their talents and abilities in one or more of these areas, they will be able to use them to create better economic opportunities. They will be able to improve their status if they are able to successfully raise the competences and abilities necessary to sustain their living settings. As a consequence, it can be stated that nurturing creative talents is a crucial part of showcasing women's advancement.

Conclusion

The entry of Muslim conquerors in India marks the beginning of the middle ages in India. The period lasted around 500 years from the era of the Delhi Sultanate to the Mughal era. Women's situation began to degrade during the Muslim era. They had to deal with a variety of issues that posed barriers to their effective growth and development. Women's life was drastically altered during this time period. In comparison to their male counterparts, women were thought to be inferior. Women faced a number of issues which resultant to a great fall in their condition in the society which include child marriage, the *purdah* system, sati, *Jauhar*, and restrictions on girls' education.

Participation in employment practises, education, participation in decision-making processes, and participation in various activities, encouraging liberation possibilities, addressing societal issues, promoting assertiveness, and practising creative skills are some of the indicators that women's status is improving. Finally, it can be claimed that women's status in mediaeval India deteriorated but with the passage of time it was improved with the execution of reforms by great kings and leaders.

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GENERALIZED FORMULAE FOR LUCAS-LIKE SEQUENCE OF 6TH TO 9TH ORDER

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ABSTRACT:

In this paper, explicit formula for sixth, seventh, eighth and ninth orders were derived for Lucas-like sequence from the pattern of coefficients. The derived for the same were further authenticated by Principal of Mathematical Induction

Key words: *Lucas-like sequence, generalized of higher order, hexannacci numbers, heptannacci numbers, octannacci numbers, enneanacci numbers and Principal of Mathematical Induction.*

I. Introduction

Fibonacci sequence generalizations have been thoroughly investigated in a variety of methods.

The Fibonacci recurrence, coupled with different initial conditions is the Lucas sequence, named after the Francois Edouard Anatole Lucas and each Lucas number is defined to be the sum of its two immediate previous terms with first and second term 2 and 1 respectively. So the similar interpretation also exists for Lucas sequence as Fibonacci sequence. The recurrence relation [4] of Lucas sequence with $L_0 = 2$ *and* $L_1 = 1$ is defined as;

$L_n = L_{n-1} + L_{n-2}$ where $n \geq 3$

Horadam [13] noted that that Fibonacci sequences can be generalised in two ways, as mentioned by Waddill [10], by introducing arbitrary initial terms and changing the recurrence relation. These generalizations are known as Fibonacci sequences, such as tetranacci, pentanacci, and so on. Natividad and Policarpio [6] find a formula for finding the nth terms of Tribonacci like sequence and followed by Singh [9] who discusses a formula for finding the nth terms of Tetranacci like sequence. Noeand Post [8] presented Fibonacci and Lucas sequences with n-Step respectively.Further research was continued by Natividad [5], to find the nth term of Fibonacci sequence for Tetranacci, Pentanacci and Hexanacci like sequences.Parindeni and Gemawati[12] derived Lucas like sequence for fourth and fifth order.

Definition I.1: For $n \geq 7$, the sequence $\{L^*\}_r \in \mathbb{R}$; $r = \{1, 2, 3, 4, 5, 6, ...n\}$ defined by $\{L^*\}_n = \sum_{r=1}^{6} L^*_{n-r}$ is a generalized sixth order of Lucas-like sequence and the sequence follows the hexannacci sequence. The first few terms of hexannacci sequence are0, 0, 0, 0, 0, 1, 1, 2, 4, 8, 16, 32, 63, 125, 248, 492, 976, 1936, 3840,…….A001592 (OEIS) [11]

Definition I.2: The sequence $\{L^{**}\}_t \in \mathbb{R}$; $t = \{1, 2, 3, 4, 5, 6, 7\}$ defined by $\{L^{**}\}_n = \sum_{t=1}^{7} L^{**}_{n-t}$ is a generalized seventh order of Lucas-like sequence and the sequence follows the heptannacci sequence. The first few terms of heptanacci sequence are 0, 0, 0, 0, 0, 0, 1, 1, 2, 4, 8, 16, 32, 64, 127, 253, 504, 1004, 2000, 3984,…A122189 (OEIS)

DefinitionI.3: The sequence $\{L^{***}\}_o \in \mathbb{R}$; $o = \{1, 2, 3, 4, 5, 6, 7, 8\}$, defined by $\{L^{***}\}_n = \sum_{o=1}^{8} L^{***}_{n-o}$ is a generalized eighth order of Lucas-like sequence and the sequence follows the octannacci sequence. The first few terms of octanacci sequence0, 0, 0, 0, 0, 0, 0, 1, 1, 2, 4, 8, 16, 32, 64, 128, 255, 509, 1016, 2028, 4048, 8080, 16128,… (OEIS)

Definition I.3: The sequence $\{L^{****}\}_p \in \mathbb{R}$; $p = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$, defined by $\{L^{****}\}_n = \sum_{p=1}^{9} L^{****}_{n-p}$ is a generalized ninth order of Lucas-like sequence and the sequence follows the enneanacci sequence.The first few terms of enneanacci sequenceare0, 0, 0, 0, 0, 0, 0, 0, 1, 1, 2, 4, 8, 16, 32, 64, 128, 256, 511, 1021, 2040, 4076,…A104144 (OEIS)

II. Main Result

Theorem 1: For $L^*_r \in \mathbb{R}, r = \{1,2,3,4,5,6\}$, the formula for the nth term of generalized Lucas-like sequenceof order six is:

$$L^*_n = H_{n-2}L^*_1 + \sum_{r=2}^{3} H_{n-i}L^*_2 + \sum_{r=2}^{4} H_{n-i}L^*_3 + \sum_{r=2}^{5} H_{n-i}L^*_4 + \sum_{r=2}^{6} H_{n-i}L^*_5 + \sum_{r=2}^{7} H_{n-r}L^*_6$$

Where $L^*_r; r = \{1,2,3,4,5,6\}$ are first to sixth terms of Lucas-like sequence respectively and $H_{n-r}; r = \{1,2,3,4,5,6,7\}$ are the hexannacci number, corresponding to Lucas numbers of order six.

Proof: By definitionI.1 for $n \geq 7$, $L^*_n = \sum_{r=1}^{6} L^*_{n-r}$ we have coefficients of $L^*_r; r = \{1,2,3,4,5,6\}$ for nth term of Lucas-like sequence in Table 1.1a

Table 1.1A

Number of terms	nth term of hexannacci-like sequence	Coefficients					
		L^*_1	L^*_2	L^*_3	L^*_4	L^*_5	L^*_6
7	L^*_7	1	1	1	1	1	1
8	L^*_8	1	2	2	2	2	2
9	L^*_9	2	3	4	4	4	4
10	L^*_{10}	4	6	7	8	8	8
11	L^*_{11}	8	12	14	15	16	16
…	…	…	…	…	…	…	…
N	L^*_n	(n-2)	(n-2)+(n-3)	…	…	…	(n-2)+…+(n-7)

So, the coefficients follow hexannacci sequence which can be further verified by Principal of Mathematical Induction.

Proof: To authenticate the above theorem for any values of n, we shall prove it by using Induction for $n \geq 7$.

$$L^*_n = H_{n-2}L^{(6)}_1 + \sum_{r=2}^{3} H_{n-r}L^*_2 + \sum_{r=2}^{4} H_{n-r}L^*_3 + \sum_{r=2}^{5} H_{n-r}L^*_4 + \sum_{r=2}^{6} H_{n-r}L^*_5 + \sum_{r=2}^{7} H_{n-r}L^*_6$$

For n=7,8 and 9 result is true by using Table 1.1A

Assume the result is true for L^*_m ;

$$L^*_m = H_{m-2}L^*_1 + \sum_{r=2}^{3} H_{m-r}L^*_2 + \sum_{r=2}^{4} H_{m-r}L^*_3 + \sum_{r=2}^{5} H_{m-i}L^*_4 + \sum_{r=2}^{6} H_{m-r}L^*_5 + \sum_{r=2}^{7} H_{m-r}L^*_6$$

So we will show for L^*_{m+1} also holds true:

$$L^*_{m+1} = H_{m-1}L^*_1 + \sum_{r=1}^{2} H_{m-r}L^*_2 + \sum_{r=1}^{3} H_{m-r}L^*_3 + \sum_{r=1}^{4} H_{m-r}L^*_4 + \sum_{r=1}^{5} H_{m-r}L^*_5 + \sum_{r=1}^{6} H_{m-r}L^*_6$$

Now add $\sum_{r=1}^{5} L^*_{m-r}$ to L^*_m on both sides we have

$$\sum_{r=1}^{5} L^*_{m-r} + L^*_m = L^*_m + \sum_{r=1}^{5} L^*_{m-r} \quad 1.11$$

By assumption we have

$$L^*_{m-1} = H_{m-3}L^*_1 + \sum_{r=3}^{4} H_{m-r}L^*_2 + \sum_{r=3}^{5} H_{m-r}L^*_3 + \sum_{r=3}^{6} H_{m-r}L^*_4 + \sum_{r=3}^{7} H_{m-r}L^*_5 + \sum_{r=3}^{8} H_{m-r}L^*_6 \quad 1.12$$

$$L^*_{m-2} = H_{m-4}L^*_1 + \sum_{r=4}^{5} H_{m-r}L^*_2 + \sum_{r=4}^{6} H_{m-r}L^*_3 + \sum_{r=4}^{7} H_{m-r}L^*_4 + \sum_{r=4}^{8} H_{m-r}L^*_5 + \sum_{r=4}^{9} H_{m-r}L^*_6 \quad 1.13$$

$$L^*_{m-3} = H_{m-5}L^*_1 + \sum_{r=5}^{6} H_{m-r}L^*_2 + \sum_{r=5}^{7} H_{m-r}L^*_3 + \sum_{r=5}^{8} H_{m-r}L^*_4 + \sum_{r=5}^{9} H_{m-r}L^*_5 + \sum_{r=5}^{10} H_{m-r}L^*_6 \quad 1.14$$

$$L^*_{m-4} = H_{m-6}L^*_1 + \sum_{r=6}^{7} H_{m-r}L^*_2 + \sum_{r=6}^{8} H_{m-r}L^*_3 + \sum_{r=6}^{9} H_{m-r}L^*_4 + \sum_{r=6}^{10} H_{m-r}L^*_5 + \sum_{r=6}^{11} H_{m-r}L^*_6 \quad 1.15$$

$$L^*_{m-5} = H_{m-7}L^*_1 + \sum_{r=7}^{8} H_{m-r}L^*_2 + \sum_{r=7}^{9} H_{m-r}L^*_3 + \sum_{r=7}^{10} H_{m-r}L^*_4 + \sum_{r=7}^{11} H_{m-r}L^*_5 + \sum_{r=7}^{12} H_{m-r}L^*_6 \quad 1.16$$

Using 1.12 to 1.16 in 1.11 we have $\sum_{r=0}^{5} L^*_{m-r}$

$$= H_{m-2}L^*_1 + \sum_{r=2}^{3} H_{m-r}L^*_2 + \sum_{r=2}^{4} H_{m-r}L^*_3 + \sum_{r=2}^{5} H_{m-r}L^*_4 + \sum_{r=2}^{6} H_{m-r}L^*_5 + \sum_{r=2}^{7} H_{m-r}L^*_6$$

$$+H_{m-3}L^*_1 + \sum_{r=3}^{4} H_{m-r}L^*_2 + \sum_{r=3}^{5} H_{m-r}L^*_3 + \sum_{r=3}^{6} H_{m-r}L^*_4 + \sum_{r=3}^{7} H_{m-r}L^*_5 + \sum_{r=3}^{8} H_{m-r}L^*_6$$

$$+H_{m-4}L^*_1 + \sum_{r=4}^{5} H_{m-r}L^*_2 + \sum_{r=4}^{6} H_{m-r}L^*_3 + \sum_{r=4}^{7} H_{m-r}L^*_4 + \sum_{r=4}^{8} H_{m-r}L^*_5 + \sum_{r=4}^{9} H_{m-r}L^*_6$$

$$+H_{m-5}L^*_1 + \sum_{r=5}^{6} H_{m-r}L^*_2 + \sum_{r=5}^{7} H_{m-r}L^*_3 + \sum_{r=5}^{8} H_{m-r}L^*_4 + \sum_{r=5}^{9} H_{m-r}L^*_5 + \sum_{r=5}^{10} H_{m-r}L^*_6$$

$$+H_{m-6}L^*_1 + \sum_{r=6}^{7} H_{m-r}L^*_2 + \sum_{r=6}^{8} H_{m-r}L^*_3 + \sum_{r=6}^{9} H_{m-r}L^*_4 + \sum_{r=6}^{10} H_{m-r}L^*_5 + \sum_{r=6}^{11} H_{m-r}L^*_6$$

$$+H_{m-7}L^*_1 + \sum_{r=7}^{8} H_{m-r}L^*_2 + \sum_{r=7}^{9} H_{m-r}L^*_3 + \sum_{r=7}^{10} H_{m-r}L^*_4 + \sum_{r=7}^{11} H_{m-r}L^*_5 + \sum_{r=7}^{12} H_{m-r}L^*_6$$

$$= \sum_{r=2}^{7} H_{m-r}L^*_1 + \left[\sum_{r=2}^{3} H_{m-r} + \sum_{r=3}^{4} H_{m-r} + \sum_{r=4}^{5} H_{m-r} + \sum_{r=5}^{6} H_{m-r} + \sum_{r=6}^{7} H_{m-r} + \sum_{r=7}^{8} H_{m-r}\right] L^*_2$$

$$+\left[\sum_{r=2}^{4} H_{m-r} + \sum_{r=3}^{5} H_{m-r} + \sum_{r=4}^{6} H_{m-r} + \sum_{r=5}^{7} H_{m-r} + \sum_{r=6}^{8} H_{m-r} + \sum_{r=7}^{9} H_{m-r}\right] L^*_3$$

$$+\left[\sum_{r=2}^{5} H_{m-r} + \sum_{r=3}^{6} H_{m-r} + \sum_{r=4}^{7} H_{m-r} + \sum_{r=5}^{8} H_{m-r} + \sum_{r=6}^{9} H_{m-r} + \sum_{r=7}^{10} H_{m-r}\right] L^*_4$$

$$+\left[\sum_{r=2}^{6} H_{m-r} + \sum_{r=3}^{7} H_{m-r} + \sum_{r=4}^{8} H_{m-r} + \sum_{r=5}^{9} H_{m-r} + \sum_{r=6}^{10} H_{m-r} + \sum_{r=7}^{11} H_{m-r}\right] L^*_5$$

$$+\left[\sum_{r=2}^{7} H_{m-r} + \sum_{r=3}^{8} H_{m-r} + \sum_{r=4}^{9} H_{m-r} + \sum_{r=5}^{10} H_{m-r} + \sum_{r=6}^{11} H_{m-r} + \sum_{r=7}^{12} H_{m-r}\right] L^*_6$$

$$L^*_{m+1} = H_{m-1}L^*_1 + \sum_{r=1}^{2} H_{m-r}L^*_2 + \sum_{r=1}^{3} H_{m-r}L^*_3 + \sum_{r=1}^{4} H_{m-i}L^*_4 + \sum_{r=1}^{5} H_{m-r}L^*_5 + \sum_{r=1}^{6} H_{m-r}L^*_6$$

Theorem 2: For $L^{**}_t \in \mathbb{R}, t = \{1,2,3,4,5,6,7\}$, the formula for the nth generalized Lucas-like sequence of order seven is;

$$L^{**}_n = U_{n-2}L^{**}_1 + \sum_{t=2}^{3} U_{n-t}L^{**}_2 + \sum_{t=2}^{4} U_{n-t}L^{**}_3 + \sum_{t=2}^{5} U_{n-t}L^{**}_4 + \sum_{t=2}^{6} U_{n-t}L^{**}_5 + \sum_{t=2}^{7} U_{n-t}L^{**}_6 + \sum_{t=2}^{8} U_{n-t}L^{**}_7$$

Where $L^{**}_t; t = \{1,2,3,4,5,6,7\}$ are first to sixth terms of Lucas-like sequence respectively and $U_{n-t}; t = \{2,3,4,5,6,7,8\}$ are the hexannacci number, corresponding to Lucas numbers of order six.

Proof: By definition I.2 for $n \geq 8$, $L^{**}_n = \sum_{t=1}^{7} L^{**}_{n-t}$ we have coefficients of $L^{**}_t; t = \{1,2,3,4,5,6,7\}$ for nth term of Lucas-like sequence in Table 1.2B

Table 1.1B

Number of terms	nth term of hexannacci-like sequence	Coefficients						
		L^{**}_1	L^{**}_2	L^{**}_3	L^{**}_4	L^{**}_5	L^{**}_6	L^{**}_6
8	L^{**}_8	1	1	1	1	1	1	1
9	L^{**}_9	1	2	2	2	2	2	2
10	L^{**}_{10}	2	3	4	4	4	4	4
11	L^{**}_{11}	4	6	7	8	8	8	8
12	L^{**}_{12}	8	12	14	15	16	16	16
…	…	…	…	…	…	…	…	
N	L^{**}_n	(n-2)	(n-2)+(n-3)	…	…	…	…	(n-2)+…+(n-8)

So, the coefficients follow hexannacci sequence which can be further verified by Principal of Mathematical Induction.

Proof: To authenticate the above theorem for any values of n, we shall prove it by using Induction for $n \geq 8$.

$$L^{**}_n = U_{n-2}L^{**}_1 + \sum_{t=2}^{3} U_{n-t}L^{**}_2 + \sum_{t=2}^{4} U_{n-t}L^{**}_3 + \sum_{t=2}^{5} U_{n-t}L^{**}_4 + \sum_{t=2}^{6} U_{n-t}L^{**}_5 + \sum_{t=2}^{7} U_{n-t}L^{**}_6 + \sum_{t=2}^{8} U_{n-t}L^{**}_7$$

For n=8,9 and 10 result is true by using Table 2.1B

Assume the result is true for L^{**}_m ;

$$L^{**}_m = U_{m-2}L^{**}_1 + \sum_{t=2}^{3} U_{m-t}L^{**}_2 + \sum_{t=2}^{4} U_{m-t}L^{**}_3 + \sum_{t=2}^{5} U_{m-t}L^{**}_4 + \sum_{t=2}^{6} U_{m-t}L^{**}_5 + \sum_{t=2}^{7} U_{m-t}L^{**}_6 + \sum_{t=2}^{8} U_{m-t}L^{**}_7$$

So we will show for L^{**}_{m+1} also holds true:

$$L^{**}_{m+1} = U_{m-1}L^{**}_1 + \sum_{t=1}^{2} U_{m-t}L^{**}_2 + \sum_{t=1}^{3} U_{m-t}L^{**}_3 + \sum_{t=1}^{4} U_{m-t}L^{**}_4 + \sum_{t=1}^{5} U_{m-t}L^{**}_5 + \sum_{t=1}^{6} U_{m-t}L^{**}_6 + \sum_{t=1}^{7} U_{m-t}L^{**}_7$$

Now add $\sum_{t=1}^{6} L^{**}_{m-r}$ to L^{**}_m on both sides we have

$$\sum_{t=1}^{6} L^{**}_{m-t} + L^{**}_m = L^{**}_m + \sum_{t=1}^{6} L^{**}_{m-t} \quad 2.11$$

By assumption we have

$$L^{**}_{m-1} = U_{m-3}L^{**}_1 + \sum_{t=3}^{4} U_{m-t}L^{**}_2 + \sum_{t=3}^{5} U_{m-t}L^{**}_3 + \sum_{t=3}^{6} U_{m-t}L^{**}_4 + \sum_{t=3}^{7} U_{m-t}L^{**}_5 + \sum_{t=3}^{8} U_{m-t}L^{**}_6 + \sum_{t=3}^{9} U_{m-t}L^{**}_7 \quad 2.12$$

$$L^{**}_{m-2} = U_{m-4}L^{**}_1 + \sum_{t=4}^{5} U_{m-t}L^{**}_2 + \sum_{t=4}^{6} U_{m-t}L^{**}_3 + \sum_{t=4}^{7} U_{m-t}L^{**}_4 + \sum_{t=4}^{8} U_{m-t}L^{**}_5 + \sum_{t=4}^{9} U_{m-t}L^{**}_6 + \sum_{t=4}^{10} U_{m-t}L^{**}_7 \quad 2.13$$

$$L^{**}_{m-3} = U_{m-5}L^{**}_1 + \sum_{t=5}^{6} U_{m-t}L^{**}_2 + \sum_{t=5}^{7} U_{m-t}L^{**}_3 + \sum_{t=5}^{8} U_{m-t}L^{**}_4 + \sum_{t=5}^{9} U_{m-t}L^{**}_5 + \sum_{t=5}^{10} U_{m-t}L^{**}_6 + \sum_{t=5}^{11} U_{m-t}L^{**}_7 \quad 2.14$$

$$L^{**}_{m-4} = U_{m-6}L^{**}_1 + \sum_{t=6}^{7} U_{m-t}L^{**}_2 + \sum_{t=6}^{8} U_{m-t}L^{**}_3 + \sum_{t=6}^{9} U_{m-t}L^{**}_4 + \sum_{t=6}^{10} U_{m-t}L^{**}_5 + \sum_{t=6}^{11} U_{m-t}L^{**}_6 + \sum_{t=6}^{12} U_{m-t}L^{*8}_7 \quad 2.15$$

$$L^{**}_{m-5} = U_{m-7}L^{**}_1 + \sum_{t=7}^{8} U_{m-t}L^{**}_2 + \sum_{t=7}^{9} U_{m-t}L^{**}_3 + \sum_{t=7}^{10} U_{m-t}L^{**}_4 + \sum_{t=7}^{11} U_{m-t}L^{**}_5 + \sum_{t=7}^{12} U_{m-t}L^{**}_6 + \sum_{t=7}^{13} U_{m-t}L^{**}_7 \quad 2.16$$

$$L^{**}_{m-6} = U_{m-8}L^{**}_1 + \sum_{t=8}^{9} U_{m-t}L^{**}_2 + \sum_{t=8}^{10} U_{m-t}L^{**}_3 + \sum_{t=8}^{11} U_{m-t}L^{**}_4 + \sum_{t=8}^{12} U_{m-t}L^{**}_5 + \sum_{t=8}^{13} U_{m-t}L^{**}_6 + \sum_{t=8}^{14} U_{m-t}L^{**}_7 \quad 2.17$$

Using 2.12 to 2.17 in 2.11 we have $\sum_{t=0}^{6} L^{**}_{m-t}$

$$= U_{m-2}L^{**}_1 + \sum_{t=2}^{3} U_{m-t}L^{**}_2 + \sum_{t=2}^{4} U_{m-t}L^{**}_3 + \sum_{t=2}^{5} U_{m-t}L^{**}_4 + \sum_{t=2}^{6} U_{m-t}L^{**}_5 + \sum_{t=2}^{7} U_{m-t}L^{**}_6 + \sum_{t=2}^{8} U_{m-t}L^{**}_7$$

$$+U_{m-3}L^{**}_1 + \sum_{t=3}^{4} U_{m-t}L^{**}_2 + \sum_{t=3}^{5} U_{m-t}L^{**}_3 + \sum_{t=3}^{6} U_{m-t}L^{**}_4 + \sum_{t=3}^{7} U_{m-t}L^{**}_5 + \sum_{t=3}^{8} U_{m-t}L^{**}_6 + \sum_{t=3}^{9} U_{m-t}L^{**}_7$$

$$+U_{m-4}L^{**}_1 + \sum_{t=4}^{5} U_{m-t}L^{**}_2 + \sum_{t=4}^{6} U_{m-t}L^{**}_3 + \sum_{t=4}^{7} U_{m-t}L^{**}_4 + \sum_{t=4}^{8} U_{m-t}L^{**}_5 + \sum_{t=4}^{9} U_{m-t}L^{**}_6 + \sum_{t=4}^{10} U_{m-t}L^{**}_7$$

$$+U_{m-5}L^{**}_1 + \sum_{t=5}^{6} U_{m-t}L^{**}_2 + \sum_{t=5}^{7} U_{m-t}L^{**}_3 + \sum_{t=5}^{8} U_{m-t}L^{**}_4 + \sum_{t=5}^{9} U_{m-t}L^{**}_5 + \sum_{t=5}^{10} U_{m-t}L^{**}_6 + \sum_{t=5}^{11} U_{m-t}L^{**}_7$$

$$+U_{m-6}L^{**}_1 + \sum_{t=6}^{7} U_{m-t}L^{**}_2 + \sum_{t=6}^{8} U_{m-t}L^{**}_3 + \sum_{t=6}^{9} U_{m-t}L^{**}_4 + \sum_{t=6}^{10} U_{m-t}L^{**}_5 + \sum_{t=6}^{11} U_{m-t}L^{**}_6 + \sum_{t=6}^{12} U_{m-t}L^{**}_7$$

$$+U_{m-7}L^{**}_1 + \sum_{t=7}^{8} U_{m-t}L^{**}_2 + \sum_{t=7}^{9} U_{m-t}L^{**}_3 + \sum_{t=7}^{10} U_{m-t}L^{**}_4 + \sum_{t=7}^{11} U_{m-t}L^{**}_5 + \sum_{t=7}^{12} U_{m-t}L^{**}_6 + \sum_{t=7}^{13} U_{m-t}L^{**}_7$$

$$+U_{m-8}L^{**}_1 + \sum_{t=8}^{9} U_{m-t}L^{**}_2 + \sum_{t=8}^{10} U_{m-t}L^{**}_3 + \sum_{t=8}^{11} U_{m-t}L^{**}_4 + \sum_{t=8}^{12} U_{m-t}L^{**}_5 + \sum_{t=8}^{13} U_{m-t}L^{**}_6 + \sum_{t=8}^{14} U_{m-t}L^{**}_7$$

$$= \left[\sum_{t=2}^{8} U_{m-t}\right]L^{**}_1 + \left[\sum_{t=2}^{3} U_{m-t} + \sum_{t=3}^{4} U_{m-t} + \sum_{t=4}^{5} U_{m-t} + \sum_{t=5}^{6} U_{m-t} + \sum_{t=6}^{7} U_{m-t} + \sum_{t=7}^{8} U_{m-t} + \sum_{t=8}^{9} U_{m-t}\right]L^{**}_2$$

$$+\left[\sum_{t=2}^{4} U_{m-t} + \sum_{t=3}^{5} U_{m-t} + \sum_{t=4}^{6} U_{m-t} + \sum_{t=5}^{7} U_{m-t} + \sum_{t=6}^{8} U_{m-t} + \sum_{t=7}^{9} U_{m-t} + \sum_{t=8}^{10} U_{m-t}\right]L^{**}_3$$

$$+\left[\sum_{t=2}^{5} U_{m-t} + \sum_{t=3}^{6} U_{m-t} + \sum_{t=4}^{7} U_{m-t} + \sum_{t=5}^{8} U_{m-t} + \sum_{t=6}^{9} U_{m-t} + \sum_{t=7}^{10} U_{m-t} + \sum_{t=8}^{11} U_{m-t}\right]L^{**}_4$$

$$+\left[\sum_{t=2}^{6} U_{m-t} + \sum_{t=3}^{7} U_{m-t} + \sum_{t=4}^{8} U_{m-t} + \sum_{t=5}^{9} U_{m-t} + \sum_{t=6}^{10} U_{m-t} + \sum_{t=7}^{11} U_{m-t} + \sum_{t=8}^{12} U_{m-t}\right]L^{**}_5$$

$$+\left[\sum_{t=2}^{7} U_{m-t} + \sum_{t=3}^{8} U_{m-t} + \sum_{t=4}^{9} U_{m-t} + \sum_{t=5}^{10} U_{m-t} + \sum_{t=6}^{11} U_{m-t} + \sum_{t=7}^{12} U_{m-t} + \sum_{t=8}^{13} U_{m-t}\right]L^{**}_6$$

$$+\left[\sum_{t=2}^{8} U_{m-t} + \sum_{t=3}^{9} U_{m-t} + \sum_{t=4}^{10} U_{m-t} + \sum_{t=5}^{11} U_{m-t} + \sum_{t=6}^{12} U_{m-t} + \sum_{t=7}^{13} U_{m-t} + \sum_{t=8}^{14} U_{m-t}\right]L^{**}_7$$

$$L^{**}_{m+1} = U_{m-1}L^{**}_1 + \sum_{t=1}^{2} U_{m-t}L^{**}_2 + \sum_{t=1}^{3} U_{m-t}L^{**}_3 + \sum_{t=1}^{4} U_{m-t}L^{**}_4 + \sum_{t=1}^{5} U_{m-t}L^{**}_5 + \sum_{t=1}^{6} U_{m-t}L^{**}_6 + \sum_{t=1}^{7} U_{m-t}L^{**}_7$$

Theorem 3: For $L^{***}_o \in \mathbb{R}$; $o = \{1,2,3,4,5,6,7,8\}$, the formula for the nth generalized Lucas-like sequence of order eight is;

$$L^{***}_n = V_{n-2}L^{***}_1 + \sum_{o=2}^{3} V_{n-o}L^{***}_2 + \sum_{o=2}^{4} V_{n-o}L^{***}_3 + \sum_{o=2}^{5} V_{n-o}L^{***}_4 + \sum_{o=2}^{6} V_{n-o}L^{***}_5 + \sum_{o=2}^{7} V_{n-o}L^{***}_6 + \sum_{o=2}^{8} V_{n-o}L^{***}_7 + \sum_{o=2}^{9} V_{n-o}L^{***}_8$$

Where $L^{***}_o; o = \{1,2,3,4,5,6,7,8\}$ are first to eighth terms of Lucas-like sequence respectively and $V_{n-o}; o = \{2,3,4,5,6,7,8,9\}$ are the octannacci number, corresponding to Lucas numbers of order eighth.

Proof: In a similar way as proved theorem 1 & 2.

Theorem 4: For $L^{****}_{p} \in \mathbb{R}$; $p = \{1,2,3,4,5,6,7,8,9\}$, the formula for the nth generalized Lucas-like sequence of order nine is;

$$L^{****}_{n} = K_{n-2}L^{****}_{1} + \sum_{p=2}^{3} K_{n-p}L^{****}_{2} + \sum_{p=2}^{4} K_{n-p}L^{****}_{3} + \sum_{p=2}^{5} K_{n-p}L^{****}_{4} + \sum_{p=2}^{6} K_{n-p}L^{****}_{5} + \sum_{p=2}^{7} K_{n-p}L^{****}_{6} + \sum_{p=2}^{8} K_{n-p}L^{****}_{7} + \sum_{p=2}^{9} K_{n-p}L^{****}_{8} + \sum_{p=2}^{10} K_{n-p}L^{****}_{9}$$

Where $L^{****}_{p}; p = \{1,2,3,4,5,6,7,8,9\}$ are first to ninth terms of Lucas-like sequence respectively and $K_{n-p}; p = \{2,3,4,5,6,7,8,9,10\}$ are the enneanacci number, corresponding to Lucas numbers of order nine.

Proof: In a similar way as proved theorem 1 & 2.

III. Conclusion

An explicit formula was derived for the Lucas-like sequence for sixth, seventh, eighth and ninth order. These derivations may extend higher order of Lucas-like sequences for further expansion to innovative ways.

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EFFECTIVENESS OF E-LEARNING AND FUTURE PURCHASE INTENSION OF NEW STUDY COURSE THROUGH ONLINE LEARNING

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ABSTRACT

Though E-Learning is not new approach of learning but it has gained more momentum during last few months due to sudden situation of pandemic COVID 19. The present study intends to evaluate various factors related to E-Learning and further want to explore acceptance of E-Learning by students by evaluating the purchase intension of students for studying through online courses. Critical discussion of various findings such as impact and significance of factors contributing in expanding the horizon of E-Learning as also less significant or acting as barrier in adoption of E-Learning is made so as to helpful in making better or advancement in new learning strategies during pandemic and in future.

Keywords: *Adoption of E-Learning, Future of E-Learning, Future Purchase*

Introduction

Indian university education strength shape a considered variation from its existing learning scheme. They might take hold of the occasion of this exceptional circumstances and make much-needed procedure enhancement. Universities should produce sophisticated equipment to achieve the courses and greatest prepare their students for this self-motivated domain. To manage the primary objective, they must deliver a progressively progressive learning and teaching model with faithful assessments, individual lifelong learning, and face-to-face distribution attached with equipment in a multi-model distribution arrangement. As COVID-19 struck universities, they instantaneously transferred to inaccessible learning with modified teaching materials not obviously developed. In the postCOVID-19 context, universities will generate materials to provide hybrid multi-model distribution for better-quality student experience. We need a modification of perception in universities. The system wants to lose its fundamental difficulty and strong point to be more energetic. Experts and the commerce can cooperate to deliver training programs to make them both representative and application-based. It is predictable that in this new unpredictable environment, industries will shift, some will decline, and some will arise. Indian universities have a substantial role in education and developed adaptable, innovative, and strong workers to seize opportunities in these new emergent industries universal.

Materials and methods

S. Bell, B. & E. Federman, J (2013) [1] clarifies the prevalent practice of ICT in current and future years. Author's state that associating e-Learning's efficiency with a traditional classroom is an old investigation topic. Emphasis should now be removed towards making this method of learning supplementary operative and attractive its structures. Approaching investigation and progressions should adjust the proposal model of e-learning system to speechless prevailing barriers and prevalent the procedure and adoption of "online instruction" transversely traditional and environmental restrictions.

Cheung, R. & Vogel, D. (2013). [2] Categorizes fundamental influences that influence students' purposes to use new learning technologies connecting collective structures. The improved model announces peer stimulation, comfort of use, compatibility with current tools and practices significantly affect the adoption frequency.

Klasnja-Milicevic et.al (2011). [3] Recommends that e-learning can only be made modified with thoughtful exertions to appropriate in to the requirements, purposes, securities, and capabilities of a learner. This paper commends a involuntary online tutoring system which acclimatizes itself automatically to the securities and capabilities of the learners. For the determination, this modified e-learning arrangement accounts the information, learning

style, collections and objectives of an different leaner.

Beck and Rausch (2012). highpoint technical and individual necessities in the teacher measurement, such as: suitable unwritten directions, which can be interpreted as the technique of teaching; material to scholars everywhere their enlargement; reputable construction with the scholar; and confidence in the direction of the request for information accomplished. Regarding the measureable on the enlargement of scholars.

Chickering and Gamson (1991). mention that research associated to unconventional teaching has instigate an expectant construction between quick reaction and implementation and self-accomplishment of scholars, and the immediate observation, educational and absorbed at the significant foundations of miscalculations of students, one of the leading arguments of the learning progression. Between these discoveries, problems associated to the level of demand in assessments may be declared as glowing, dependable with what was specified in class, procedure of appropriate verbal in the classroom, among others. Complete affection to the deportment to be outwitted by educationalists in instruction to improvement the technique of teaching and learning.

Stout and Wygal (2010) incline the subsequent as the teachers' awareness: (i) negative or unresponsive attitudes towards understudies and / or class; (ii) deficiency of association and / or unsuitable research; (iii) lacking procedures; (iv) faults in the valuation and / or evaluation process; and (v) unapproachable / inflexible behavior.

Beck and Rausch (2012), in an equivalent investigation, but sighted the responsiveness of students, situation the succeeding objectionable locations: not investigate enquiries and / or not know how to solve doubts; lack of knowledge and / or mastery of the subject to be explained; lack of punctuality; not develop an appropriate educational plan; excess of audiovisual resources and lectures without complementation through exercise and examples.

Gil (2006) states that, in general, university professors, like at any other level of education needs, besides solid knowledge in the area where they want to teach, pedagogical skills that make the learning more efficient. But the problematic is that not completely teachers who communicate in accounting progressions obtain a teacher training procedure. A considerable portion is formed by accountants and accounting technicians with experience and expertise in the area who, in order to spread their knowledge, are directed towards the academic world (Andere& Araujo, 2008).

Littlefield (2018)described the synchronous learning condition is planned in the intelligence that students look live lectures, there are real-time influences between instructors and learners, and there is a chance of immediate response, whereas asynchronous learning environments are not appropriately organized. In such a learning situation, learning satisfied is not accessible in the form of live lectures or classes; it is available at dissimilar learning organizations and opportunities. Instantaneous reaction and direct answer are not probable under such condition.

Singh & Thurman, (2019). Online learning can be labelled as an instrument that can make the teaching–learning progression more student-centered, more ground-breaking, and even more elastic. Online learning is clear as "learning experiences in synchronous or asynchronous surroundings expending dissimilar strategies (e.g., mobile phones, laptops, etc.) with internet access. In these surroundings, students can be in all places (independent) to study and system with teachers and additional students."

Basilaia et al., (2020). Among this terminal computer program spread such online stages are desirable where (a) video conferencing through at least 40 to 50 students is probable, (b) considerations through students can be completed to preserve classes biological, (c) internet networks are worthy, (d) lectures are manageable in mobile phones also and not impartial laptops, (e) opportunity of inspecting already verified lectures, and (f) instantaneous response from students can be attained and assignments can be occupied.

Shehzadi et al., (2020).UNESCO commends distance learning courses and exposed educational presentations during school shutting produced by COVID-19 so that schools and teachers practice to teach their learners and destined the intermission of

education. Therefore, various institutes drive for the online courses.

Farooq et al. (2011). places of interest the students' theoretical performance is the main concern of all faculties. Moreover, the central substance of information ahead and development of skills is student's academic performance.

Bayham & Fenichel, (2020). The impact of the COVID-19 sickness on the education organization indications to schools and colleges' prevalent terminations worldwide. On March 24, India declared a country-wide lockdown of schools and colleges (NDTV, 2020) for stopping the programme of the coronavirus among the learners.

Many researchers opine that future purchase intention of Online Courses by students is influenced by the value and experience realized through the effectiveness of E-learning study courses. If student earns confidence by gaining good conceptual knowledge of the joined course, are expected to adopt their new academic courses through online.

H2 There is positive association between effectiveness of E-Learning and purchase intension of future online study courses.

Impact of Covid-19 and purchase intension of online course

The disease Covid-19 has range over whole world and required the human society to continue social separation. It has suggestively disturbed the education sector which is a dangerous determining factor of a country's economic future. February 11, 2020, the World Health Organization (proposed an official name of the virus as COVID reduction for Coronavirus disease 2019. It was first predictable in Wuhan, China on December 31, 2019. The first incident of the COVID-19 pandemic designated on 30 January 2020 in the state of Kerala and the precious had a travel history from Wuhan, China (Wikipedia). The first death due to COVID-19 was informed in India on March 12, 2020. It has precious additional than 4.5 million peoples worldwide (WHO).

Occurrence of COVI-19 has obstructed more than 120 crores of students and adolescences transversely the planet. In India, other than 32 crores of students have been precious by the various boundaries and the countrywide lockdown for COVI-19. By way of for each the UNESCO explosion, around 14 crores of primary and 13 crores of secondary students are precious which are two frequently affected stages in India**.** The COVID-19 pandemic has been the poorest shock wave to education systems in a period, with more than 1.6 billion children and youth not being bright to be present school for months, and many are motionless not back bone in school. UNESCO is occupied through sections of education, public and private associates and civil the community direction to confirm continuous learning for all children and adolescence.

Results and discussion

H1 Pandemic has no significant association with future purchase intension of online course

H2 Easy access of online material and purchase intention of online course

H2 Easy access of online study material significantly affects purchase intension of online course

- Instructors and beginners are receiving opportunities to interrelate with peers from about the world. Learners improved to an international communal.
- Around is an innovative opening where collaborative teaching and learning can take on new forms.
- Students are intelligent to achieve their time further efficiently in online education through sicknesses.

H2 Satisfaction level plays significant role towards acceptance of E-Learning

Various scholars are stressed to obtain the implements mandatory for online classes.

- Not all teachers/students are noble at it or on minimum not totally of them be situated organized for this impulsive conversion from face to face learning to online learning.
- Particular educated parents are able to conductor but certain might not have the acceptable level of education required to teach children in the house.
- The additional issue with the reserved learning is that certain of the stuff and students requirements to be qualified to

practice the technologies that they are been specified.

Research objectives

- To explore the underlying factors that influence purchase intension of E-Learning course
- To establish association between predictors effectiveness of E learning, Impact of COVID, convenient access of online learning material, Attitude and E Learning purchase intension.

Research Methodology

The contemporary study is descriptive education constructed on a primary data of 190 respondents from university students primarily in the cities of Chandigarh (UT), Ludhiana district of Punjab state of India. The organized survey was directed through survey mailing method. The study joints deep into preceding research literature to frame suitable questionnaire. The scale used is 5 points, scale having 1= strongly disagree to 5= strongly agree and 3=neutral. The respondents are chosen on the basis of random sampling method.

2.1 Data Analysis and interpretation

Factor Analysis of Green buying Behavior

To identify the factors influencing acceptance of E-Learning, EFA Method was used.

Table 1: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.893
Bartlett's Test of Sphericity	Approx. Chi-Square	1964.735
	Df	231
	Sig.	.000

Findings from Table 1 indicate the suitability of method as explained below in detail. From Table 1, the KMO value .893 is reasonably large and greater than the minimum required value of 0.5 which indicate sample size is suitable to conduct exploratory Factor analysis. Bartlett's test of sphericity was applied to test the significance of correlation among items and p value 0.00 which is less than 0.05, therefore null hypothesis that there is no correlation among variables is rejected. Hence the above tests support the suitability of conducting factor Analysis on normally distributed data. (Andy field, 2005). The Principal component analysis is used to extract factors and number of factors were decided using statistical criteria of eigen value greater than 1 as shown in Table 2. The five factors explained 73% of total variance of data on Acceptance of E-Learning. These components have also been shown through screen plot diagram in Figure 1. Further Table 3 shows factor loadings of various items distributed among the five factors. The items having poor factor loadings less than 0.4 were suppressed. This way optimizing factor structure for better pattern of factor allocation is obtained using Varimax Rotation Method.

Table 2: Total Variance Explained

Component	Initial Eigenvalues			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	10.167	46.213	46.213	4.931	22.412	22.412
2	1.912	8.691	54.904	3.650	16.590	39.002
3	1.548	7.036	61.940	2.895	13.158	52.160
4	1.380	6.271	68.211	2.346	10.665	62.826
5	1.154	5.244	73.455	2.338	10.629	73.455
6	.888	4.036	77.491			
7	.654	2.972	80.463			
8	.582	2.647	83.110			
9	.496	2.255	85.365			
10	.456	2.074	87.438			
11	.419	1.905	89.343			
12	.405	1.843	91.186			

13	.331	1.503	92.690			
14	.286	1.302	93.992			
15	.259	1.175	95.167			
16	.222	1.010	96.178			
17	.190	.864	97.042			
18	.167	.760	97.802			
19	.157	.715	98.517			
20	.136	.617	99.134			
21	.115	.522	99.656			
22	.076	.344	100.000			
Extraction Method: Principal Component Analysis.						

Table 2.1 Rotated Component Matrix [a]

	Component				
	Effective delivery	Covid- 19	satisfaction	Availability of quality content	Intension towards E-Learning adoption
VAR00001	.834				
VAR00002	.652				
VAR00003					.747
VAR00005					.768
VAR00006	.654				
VAR00007	.787				
VAR00008	.803				
VAR00009			.829		
VAR00010	.728				
VAR00011	.725				
VAR00013					.679
VAR00015		.741			
VAR00017		.693			
VAR00018		.721			
VAR00019		.736			
VAR00020		.780			
VAR00021				.605	
VAR00022			.800		
VAR00023					
VAR00024				.787	
VAR00025				.808	
VAR00012			.826		
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.					
a. Rotation converged in 7 iterations.					

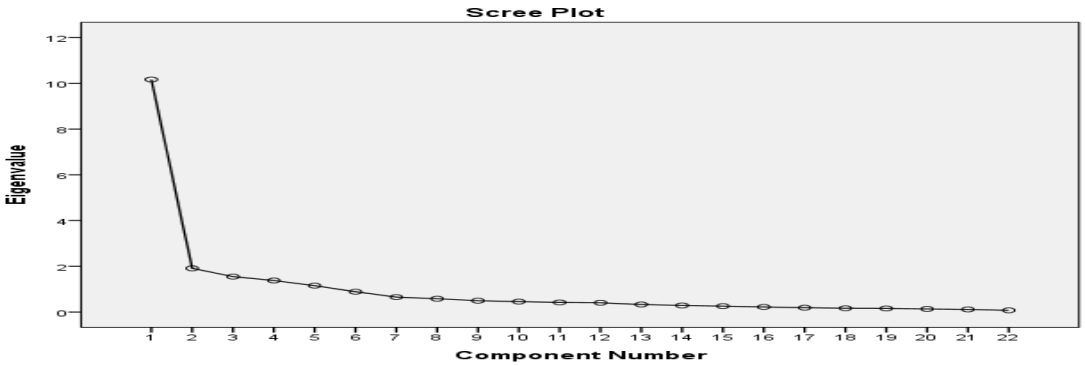

Figure 1: Factor loading through screen plot test

Multiple Regression analysis is applied for further analysis and testing of hypothesis.

Table 3 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.768[a]	.590	.576	.68089

a. Predictors: (Constant), COVID, Availability of quality content, effective delivery, Attitude

Table 4 ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	79.288	4	19.822	42.756	.000[b]
	Residual	55.170	119	.464		
	Total	134.458	123			

a. Dependent Variable: Intension

b. Predictors: (Constant), covid, Availability, satisfaction, effectiveness

Findings from Table 3 and Table 4 shows that acceptance and purchase intension of study through E-Learning mode is significantly affected by factors effective delivery, quality of content, Impact of pandemic and attitude of students. Thus null hypothesis is rejected.

Table 5 coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.290	.263		-1.102	.273
	effectiveness	.463	.085	.426	5.426	.000
	satisfaction	.175	.067	.180	2.593	.011
	Covid	.304	.074	.271	4.133	.000
	Availability of quality content	.129	.080	.121	1.613	.109

a. Dependent Variable: Intension

Further findings from Table 5 shows that effective delivery and Pandemic accelerated the acceptance and future purchase intension of E-Learning.

Conclusions

Sudden emergence of pandemic led to forced adoption of education through online mode. Acceptance of this new mode of education by the youth of India is influenced by a multitude of factors. The present study analyze various factors such as Role of effective delivery, Quality Content, Impact of Covid, and satisfaction level affecting E-Learning purchase intension. Although measuring adoption study through E-Learning by

consumers is difficult task, but still through a detailed analysis of various suitable techniques such as EFA and multiple regression analysis, it could be found that there is positive association between factors such as Pandemic, Effective delivery, satisfaction, availability of content and future purchase intension. Further it was observed that Pandemic and effective delivery are major contributors in massive rise in adoption E-Learning. The results of this study may be important in the context of Covid-19 pandemic that has raised their consciousness towards adoption of E-Learning and the pandemic situation induced persons to study and procedure digital technology and resulted in increasing the digital literacy. Though student satisfaction emerged as barrier in adoption of E-Learning. This may be due to less developed technology under sudden unprecedented situation which forced students to adopt technology but strategies need to be revised and refined for accelerating students' intension towards E-Learning acceptance.

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शोध परिणाम, निष्कर्ष, सुझाव एवं शैक्षिक निहितार्थ

महमूद खान, मो. सैफ
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सार

माता–पिता अपने बच्चों के जीवन में महत्वपूर्ण भूमिका निभाते हैं। माता–पिता की देखभाल की शैली का बच्चों के विकास पर अत्यधिक प्रभाव पड़ता है। साथ ही परिवार बच्चों को बढ़ने और उनकी दक्षता को बढ़ाने के लिए आवश्यक वातावरण प्रदान करता है। औपचारिक शिक्षा प्रणाली में छात्रों की उपलब्धियाँ और सफलता उनके द्वारा परिवार में प्राप्त सामाजिक शिक्षा और पालन–पोषण शैली पर निर्भर करती है। बच्चों में आत्म–सम्मान, आत्मविश्वास, ऊर्जावान, तनाव से निपटने की क्षमता, दूसरों के साथ सहयोग करने की क्षमता या भय, दुःख, शत्रुता, तनाव के प्रति संवेदनशीलता, आसानी से नाराज हो जाने की प्रवृति, आक्रामकता, अनपेक्षित उपलब्धि आदि जैसे विभिन्न व्यवहार समस्याओं के लिए माता–पिता के पालन–पोषण शैली को जिम्मेदार ठहराया जा सकता है। बच्चों में आत्म–सम्मान, आत्मविश्वास, ऊर्जावान, तनाव से निपटने की क्षमता, दूसरों के साथ सहयोग करने की क्षमता या भय, दुःख, शत्रुता, तनाव के प्रति संवेदनशीलता, आसानी से नाराज हो जाने की प्रवृति, आक्रामकता, अनपेक्षित उपलब्धि आदि पर भी पालन–पोषण की विभिन्न प्रकार की शैलियों काप्रभाव पड़ता है।साथ ही पालन–पोषण की विभिन्न प्रकार की शैलियों काछात्रों के अध्ययन और सामाजिक वातावरण में स्थापित होने केप्रयासों पर या तो अनुकूल या प्रतिकूल प्रभाव पड़ता है।

महत्त्वपूर्ण शब्दः *पालन–पोषणशैली,संवेदनशीलता,औपचारिक शिक्षा,आत्म–सम्मान,विश्लेषण, अध्ययन।*

वर्तमान अध्याय को तीन मुख्य भागों में वर्गीकृत किया गया है :–शोध के परिणाम, निष्कर्ष, सुझाव एवं शैक्षिक निहितार्थ। परिणामों को पहले भाग में 'अध्ययन के परिणाम' के तहत प्रस्तुत किया गया है।दूसरे भाग में अध्ययन से संबंधित संभावित निष्कर्षों को प्रस्तुत किया गया है और तीसरे भाग में 'सुझाव एवं शैक्षिक निहितार्थ' प्रस्तुत किए गए हैं।

मुख्य परिणाम

परिकल्पनाओं के प्रमुख प्रकारों के आलोक में अध्ययन के परिणामों का विश्लेषण करके पता लगाया गया कि वे परिकल्पना की पुष्टि करते हैं या नहीं।

(1) अध्ययन की पहली परिकल्पना के संबंध में परिणाम बॉमरिंड डायना (1971,1991), नागाइच (1987) के अध्ययनों के निष्कर्षों का समर्थन करते हैं कि अत्यधिकदेखभाल शैली अपनाने वाले माता–पिता के किशोर सामान्य एवं न्यून देखभाल शैली अपनाने वाले माता–पिता के किशोरों की अपेक्षा शारीरिक स्वास्थ्य और फिटनेस की समस्याओं पर उच्च अंक प्राप्त करेंगे। इसके अतिरिक्त माता–पिता अपने बच्चों के जीवन में महत्वपूर्ण भूमिका निभाते हैं और वे आम तौर पर अपने बच्चों के स्वास्थ्य का ख्याल रखते हैं, उन्हें संतुलित पौष्टिक आहार प्रदान करते हैं और उनके शारीरिक स्वास्थ्य और फिटनेस पर नजर रखते हैं। अतः उन्हें अपने बच्चों को शारीरिक स्वास्थ्य से संबंधित कम समस्याओं का सामना करना पड़ता है।

प्राप्तांकों से पता चलता है कि अत्यधिक देखभाल की शैली और सामान्य देखभाल की शैली की तुलना में न्यून–देखभाल की शैली सबसे खराब शैली है। निष्कर्ष के तौर पर हम कह सकते हैं कि अत्यधिक देखभाल करने वाले माता–पिता और सामान्य देखभाल करने वाले माता–पिता अपने बच्चों के स्वास्थ्य और शारीरिक फिटनेस के बारे में अधिक जागरूक होते हैं। संक्षेप में हम कह सकते हैं कि इस अध्ययन में उपर्युक्त परिकल्पना सही साबित होता है।

(2) अध्ययन की दूसरी परिकल्पना के संबंध में इस अध्ययन के परिणाम चौहान और खोकर (1985), बॉमरिंड (1971), साइमंड एल. ई (1974) द्वारा किए गए अध्ययनों के निष्कर्षों के अनुरूप है। परिणामों का मुख्य सार यह है कि पालन–पोषण की सामान्य देखभाल की शैली बच्चे के आत्म और स्वयं की छवि को प्रभावित करती है। अतः माता–पिता को अपने बच्चों के साथ मैत्रीपूर्ण संबंध बनाए रखना चाहिए। उन्हें पालन–पोषण की अपनी शैली को संयमित एवं सामान्य रखना चाहिए। उन्हें बच्चों को अपने मानकों में सुधार करना सिखाना चाहए और उन्हें सकारात्मक तरीके, विधि, गतिविधियों में सम्मिलित होने के लिए उत्साहित करना चाहिए। प्राप्तांकों से पता चलता है कि सामान्य रूप से देखभाल करने वाले माता–पिता अन्य दो शैलियों को अपनानेवाले मात–पिता की तुलना में अधिक जागरूक होते हैं और अपने बच्चों के आत्म एवं स्वयं की छवि का ख्याल रखते हैं। किशोरावस्था में बच्चे निर्भरता से स्वतंत्रता की ओर प्रवृत हो रहे होते हैं। इस स्तर पर, सभी संबंधितों को

उनका मार्गदर्शन करना चाहिए, उन्हें परामर्श देना चाहिए, उन्हें आत्म एवं स्वयं की छवि के विकास के माध्यम से जीवन के हर क्षेत्र में सफल बनाने के लिए प्रेरित करना चाहिए। इसलिए माता–पिता को अपने बच्चों के प्रति प्रेमपूर्ण, उत्साहवर्धक और सुरक्षात्मक शैली रखनी चाहिए।

(3) परिकल्पना के तीसरे आयाम में इस अध्ययन के परिणाम इस परिकल्पना की पुष्टि करते हैं कि सामान्य देखभाल की शैली अपनाने वाले माता–पिता की अपेक्षा अत्यधिक और न्यूल देखभाल की शैली अपनाने वाले माता–पिता के किशोर आर्थिक और भौतिक सुविधाओं से जुड़ी समस्याओं के संदर्भ में उच्च अंक प्राप्त करेंगे। अध्ययन के परिणाम बॉमरिंड (1991), स्टाइनबर्ग (1966), एरिकसन, के. (1974) द्वारा किए गए अध्ययनों के परिणामों के अनुरूप ही है। इस संदर्भ में अध्ययन के मुख्य परिणाम यह दर्शाते हैं कि अपने बच्चों की भौतिक आवश्यकताओं का संज्ञान लेने वाले माता–पिता ऐसा नहीं करने वाले माता–पिता की अपेक्षा कम समस्याओं का सामना करते हैं। अध्ययन के प्राप्तांकों से पता चलता है कि बच्चों के प्रति उपेक्षापूर्ण पालन–पोषण शैली किशोरों में अपराध की प्रवृति, जैसे चोरी की आदत, उग्र एवं हिंसक व्यवहार को जन्म देती है। ऐसे में माता–पिता को अपने बच्चों की मौलिक आवश्यकताओं का ध्यान रखना चाहिए। आर्थिक एवं भौतिक सुविधाएँ सामान्य देखभाल की शैली अपनाने वाले माता–पिता के लिए मानक के रूप में कार्य करती हैं। यह ध्यान में रखना चाहिए कि बच्चों को अत्यधिक आर्थिक या भौतिक सुविधाएँ प्रदान करना बच्चों के व्यवहार को नकारात्मक रूप से भी प्रभावित कर सकता है। इसलिए मध्यम और संतुलित मध्यम मार्ग समय की मांग है।

(4) परिकल्पना का चौथा आयाम यह है कि सामान्य देखभाल की शैली अपनाने वाले माता–पिता की अपेक्षा अत्यधिक और न्यूल देखभाल की शैली अपनाने वाले माता–पिता के किशोर परिवार, विवाह और यौन समस्याओं के संदर्भ में उच्च अंक प्राप्त करेंगे। वर्तमान अध्ययन के परिणाम मिश्रा (1993, 1994) और श्रीवास्तव (1990) द्वारा किए गए अध्ययनों के परिणामों के अनुरूप ही है। उन्होंने बताया कि अत्यधिक या न्यून–देखभाल वाले किशोर अपने दोस्तों के साथ अच्छे संबंध बनाने में असमर्थ होते हैं। चूंकि उनका व्यवहार आक्रामक होता है या वे अधिक शांत और अकेले रहना पसंद करते हैं, उन्हें दोस्त बनाने या उनके साथ घुलने मिलने में असहजता होती है। वे समूह में समायोजन करने में असमर्थ होते हैं। उनमें धैर्य की कमी होती है और वे असुरक्षा की भावना से ग्रस्त होते हैं। उन्हें यौन समस्याओं का भी सामना करना पड़ता है। अध्ययन के प्राप्तांकों से पता चलता है कि अनुशासन की कमी या बहुत अधिक अनुशासन का बच्चों पर नकारात्मक प्रभाव पड़ता है। यह बच्चों को चिड़चिड़ा और गुस्सैल बना सकता है। इसका परिणाम बच्चों के विघटनकारी व्यवहार में परिलक्षित होता है। अतः माता–पिता को अपने बच्चों के साथ मैत्रीपूर्ण संबंध रखना चाहिए। केवल माता–पिता ही नहीं, शिक्षकों को भी बच्चों को नैतिक मूल्यों की शिक्षा देनी चाहिए और उनसे मैत्रीपूर्ण संबंध रखना चाहिए। इन तथ्यों का अभिप्राय है कि सामान्य पालन–पोषण की शैली सबसे अच्छी होती है।

(5) परिकल्पना का पाँचवा आयाम यह है कि सामान्य देखभाल की शैली अपनाने वाले माता–पिता की अपेक्षा अत्यधिक और न्यून देखभाल की शैली अपनाने वाले माता–पिता के किशोर पारिवारिक समस्याओं के संदर्भ में उच्च अंक प्राप्त करेंगे। अध्ययन का निष्कर्ष दर्शाता है कि सामान्य देखभाल वाले किशोरों की अपेक्षा अत्यधिक एवं न्यून–देखभाल वाले किशोरों को बहुत अधिक पारिवारिक समस्याओं का सामना करना पड़ता है। बॉमरिंड, (1971), मार्टिन, (1983), जे. एम. गॉटमैन, (1996) द्वारा किए गए अध्ययन से पता चलता है कि पालन–पोषण की शैली बच्चे के सामाजिक, भावनात्मक और बौद्धिक विकास पर प्रभाव डालती है। उन्होंने साबित किया कि स्पष्ट व्यवहार मानकों के साथ समुचित देखभाल में पलने वाले बच्चे सक्षम, स्वतंत्र और परिवारिक समस्या से मुक्त रहते हैं। इस प्रकार माता–पिता को अपने बच्चे की रुचियों, क्षमताओं और आकांक्षाओं को समझना चाहिए और उन्हें वह सब कुछ करना चाहिए जो बच्चों की आकांक्षाओं को साकार करने में सहयोगी हो सकते हैं। इस प्रकार बच्चे अपने व्यक्तित्व का निर्माण कर सकते हैं। कलह, कटुता और प्रतिशोध का वातावरण न केवल पारिवारिक वातावरण को अप्रिय बनाता है बल्कि आगे अप्रिय भावनात्मक अवस्थाओं को भी जन्म देता है। यह बच्चे को दूसरों के साथ बातचीत करने का अनुचित तरीका भी सिखाता है। यह सर्वविदित है कि परिवार बच्चे की पहली पाठशाला है जहाँ बच्चा पालन–पोषण शैली के अनुरूप सकारात्मक या नकारात्मक, किसी भी दिशा में अग्रसर हो सकता है। प्रतिदर्श के अध्ययन में यह भी पाया गया कि माता–पिता का प्यार और स्नेह पाने

वाले बच्चे अधिक जिम्मेदार, मुखर और आत्मविश्वासी होते हैं जबकि इसकी कमी वाले कुछ बच्चों ने इसके विपरीत व्यवहार प्रदर्शित किया।

(6) इस अध्ययन की परिकल्पना का अगला आयाम यह है कि सामान्य देखभाल की शैली अपनाने वाले माता–पिता की अपेक्षा अत्यधिक और न्यून देखभाल की शैली अपनाने वाले माता–पिता के किशोर सामाजिक समस्याओं के संदर्भ में उच्च अंक प्राप्त करेंगे। बॉमरिंड (1977), लुईस, डब्ल्यू. जे. (1945), एरिकसन (1963), ए. जैन (1986) आदि के अध्ययन उपरोक्त परिकल्पना का समर्थन करते हैं। अतः माता–पिता को बच्चों को प्यार से पालना चाहिए जिससे कि वे अपने समूह में दूसरों के साथ व्यवहार करने और विभिन्न संवेगों को समझ सकें, उनका मुल्यांकन कर सकें और तदनुरूप समूह में व्यवहार कर सकें। पालन–पोषण की विभिन्न शैलियाँ समाजीकरण की प्रक्रिया को अपने तरीके से प्रभावित करती हैं। माता–पिता की स्वीकृति का खेलकूद के क्षेत्र में उपलब्धि के साथ–साथ बच्चे के भावनात्मक क्षमता से सकारात्मक संबंध पाया जाता है। जबकि माता–पिता की अस्वीकृति बच्चों को भयभीत, असुरक्षित, अपनी ओर ध्यान आकर्षित करने वाले, ईष्यालु, आक्रामक, शत्रुतापूर्ण और एकाकी बना देती है। ऐसे बच्चे समाज में आसानी से समायोजन करने में असमर्थ होते हैं, जिसके कारण उन्हें कई सामाजिक समस्याओं का सामना करना पड़ता है। कभी–कभी अतिसंरक्षण बच्चों को स्वार्थी, अपेक्षापूर्ण, अधिकार के प्रति विद्रोही और गैर–जिम्मेदार भी बना देता है। इस प्रकार, वर्तमान अध्ययन के निष्कर्षों से पता चलता है कि जिन बच्चों के माता–पिता सामान्य देखभाल करने वाले होते हैं, वे बेहतर व्यवहार और बेहतर सामाजिक समायोजन प्रदर्शित करते हैं। इस प्रकार संक्षेप में हम कह सकते हैं कि यह परिणाम अध्ययन की उपर्युक्त परिकल्पना को सही सिद्ध करता है।

(7) सातवीं परिकल्पना के परिणाम एस. आर. एस. सेंगर (1990), श्रीवास्तव, (1990)बॉमरिंड(1991), मैमन (2000) द्वारा किए गए अध्ययनों के परिणाम के अनुरूप प्राप्त हुआ है। अध्ययन में पाया गया कि सामान्य देखभाल की शैली अपनाने वाले माता–पिता की अपेक्षा अत्यधिक और न्यून देखभाल की शैली अपनाने वाले माता–पिता के किशोर शैक्षिक समस्याओं के संदर्भ में उच्च अंक प्राप्त करेंगे। माता–पिता का अपने बच्चों पर बहुत प्रभाव होता है और बच्चे आजीविका की योजना बनाने और शैक्षणिक लक्ष्यों की पूर्ति में मदद के लिए किसी और की तुलना में सहयोग के लिए अपने माता–पिता पर सर्वाधिक भरोसा करते हैं। सामान्य देखभाल करने वाले माता–पिता अपने बच्चों को खुश रखने का हर संभव प्रयास करते हैं। वे बच्चों की शैक्षणिक गतिविधियों और उनकी भलाई में भी रुचि लेते हैं, जिसके कारण इस पालन–पोषण के पालित बच्चों को कम शैक्षिक समस्याओं का सामना करना पड़ता है। जबकि बच्चे के प्रति माता–पिता की उदासीनता या लापरवाही विभिन्न शैक्षिक समस्याओं को जन्म देती है जिससे बच्चे अकादमिक रूप से पिछड़ जाते हैं। कभी–कभी माता–पिता द्वारा अति–अपेक्षा या अत्यधिक प्रतिबंध भी विभिन्न समायोजन समस्याओं को जन्म देते हैं। न्यून आय वर्गों के कुछ माता–पिता आमतौर पर अपने बच्चों की शिक्षा की उपेक्षा करते हैं। कई मामलों में, माता–पिता विद्यालय में बच्चों की उपस्थिति के नियमों की अवहेलना करते हैं और अपने बच्चों को विद्यालय भेजने में विफल रहते हैं। वे निम्न आर्थिक स्थिति के कारण घर में शिक्षा प्रदान नहीं कर पाते हैं जिसके कारण वे अपने व्यवहार की परिणति के बारे में चिंतित नहीं दिखते हैं। इस प्रकार सामान्य या मध्यम देखभाल करने वाले माता–पिता सर्वोत्तम शिक्षा और बेहतर शैक्षणिक उपलब्धि को प्रोत्साहित करते हैं।

(8) आठवींपरिकल्पना के परिणाम ए. रो (1957), बी. डब्लू. वेस्टब्रूक, (1973), डी. जी. जाइतोव्स्की(1968) द्वारा किए गए अध्ययनों के परिणाम के अनुरूप प्राप्त हुआ है। उन्होंने भी यह बताया कि सामान्य देखभाल की शैली अपनाने वाले माता–पिता के किशोरों की अपेक्षा अत्यधिक और न्यून देखभाल की शैली अपनाने वाले माता–पिता के किशोरों को अधिक व्यावसायिक समस्याएँ होती हैं। हमारे अध्ययन के परिणामों के विश्लेषण से यह पाया गया है कि सामान्य या मध्यम देखभाल करने वाले माता–पिता अपने बच्चों की भावनाओं को महत्व देते हैं। लेकिन विषयों या व्यावसाय के चयन के संबंध में माता–पिता इस पक्ष में दिखे कि उनके बच्चे उनकी राय के अनुरूप ही विषय या व्यावसाय का चयन करें। यही कारण है कि अत्यधिक या न्यून देखभाल करने वाली शैली अपनाने वाले माता–पिता के बच्चों की तुलना में सामान्य या मध्यम देखभाल शैली अपनाने वाले माता–पिता के बच्चों को कम व्यावसायिक समस्याओं का सामना करना पड़ता है। उपरोक्त

अध्ययन से पता चलता है कि स्वस्थ और भावनात्मक रूप से स्थिर और समझदार माता–पिता के बच्चे के व्यवसायिक जीवन की शुरुआत अच्छी होती हैं। अतः माता–पिता को अपने बच्चों की चिंता करनी चाहिए और उन्हें व्यवसायिक स्थिरता प्राप्त करने में सहयोग करना चाहिए जिससे बच्चे जीवन में आत्मसंतुष्टि प्राप्त कर सकें।

(9) नौवीं और अंतिम परिकल्पना में यह उल्लेख किया गया था कि सामान्य देखभाल की शैली अपनाने वाले माता–पिता की अपेक्षा अत्यधिक और न्यून देखभाल की शैली अपनाने वाले माता–पिता के किशोर रीति–रिवाज, नैतिकता और धार्मिक समस्याओं पर उच्च अंक प्राप्त करेंगे। परिकल्पना के नौवें आयाम के परिणाम को डिंकमेयर (1967) द्वारा किए गए अध्ययन से भी समर्थन मिलता है। अध्ययन में पाया गया कि हमारे समाज के रीति–रिवाजों और विश्वासों को पहले परिवार के भीतर अपनाया जाता है। बच्चे पहले माता–पिता के माध्यम से सामाजिक, नैतिकता, रीति–रिवाजों और धार्मिक मान्यताओं से संबंधित मूल्यों का निरीक्षण करते हैं और तब उन्हें आत्मसात करते हैं। इसका अर्थ है कि माता–पिता का अत्यधिक सख्त रवैया या बहुत अधिक ढीला रवैया रीति–रिवाजों, नैतिकता और धर्म से संबंधित समस्याओं को जन्म देता है। यह पाया गया है कि माता–पिता की सामान्य देखभाल करने वाली शैली का किशोरों के पालन–पोषण पर बहुत सकारात्मक और स्वस्थ प्रभाव पड़ा है।

शैक्षिक प्रभाव

इसमें कोई शक नहीं कि किशोरों की समस्याएँ दिन–व–दिन बढ़ती ही जा रही हैं। वर्तमान अध्ययन के परिणामों से संकेत मिलता है कि न्यून देखभाल और अत्यधिक देखभाल यानि लाड़–प्यार या अति–संरक्षण दोनों ही, बच्चों के लिए हानिकारक हैं और वे विभिन्न समस्याओं (जैसे शारीरिक और स्वास्थ्य फिटनेस, आत्म और स्वयं की छवि, परिवार, शैक्षिक, व्यावसायिक, आर्थिक और भौतिक सुविधाओं, दोस्ती और यौन समस्याएँ आदि) को जन्म देते हैं। माता–पिता द्वारा बच्चे की अस्वीकृति बच्चों के विकास एवं समायोजन क्षमता पर सर्वाधिक नकारात्मक प्रभाव साबित हुई। यह उनमें मानसिक तनाव भी पैदा करता है। इसलिए, माता–पिता और शिक्षकों द्वारा बच्चों की जरूरतों और उनके दृष्टिकोण को समझकर ही उन्हें दूर किया जा सकता है।

परिवार बच्चों को बढ़ने और उनकी दक्षता को बढ़ाने के लिए आवश्यक वातावरण प्रदान करता है। औपचारिक शिक्षा प्रणाली में छात्रों की उपलब्धियाँ और सफलता उनके द्वारा परिवार में प्राप्त सामाजिक शिक्षा और पालन–पोषण शैली पर निर्भर करती है। बच्चों में आत्म–सम्मान, आत्मविश्वास, ऊर्जावान, तनाव से निपटने की क्षमता, दूसरों के साथ सहयोग करने की क्षमता या भय, दुःख, शत्रुता, तनाव के प्रति संवेदनशीलता, आसानी से नाराज हो जाने की प्रवृति, आक्रामकता, अनपेक्षित उपलब्धि आदि जैसे विभिन्न व्यवहार समस्याओं के लिए माता–पिता के पालन–पोषण शैली को जिम्मेदार ठहराया जा सकता है। पालन–पोषण की विभिन्न प्रकार की शैलियों का छात्रों के अध्ययन और सामाजिक वातावरण में स्थापित होने की आदतों पर या तो अनुकूल या प्रतिकूल प्रभाव पड़ता है।

अतः किशोरों पर माता–पिता और उनकी पालन–पोषण शैलियों के प्रभाव को ध्यान में रखते हुए, इस अध्ययन की अत्यधिक व्यावहारिक उपयोगिता और सामाजिक निहितार्थ हैं। इस प्रकार, यह अध्ययन माता–पिता और समाज के साथ–साथ शैक्षिक योजनाकारों, संस्थागत प्रमुखों और शिक्षकों के लिए बहुत काम का होगा।

आगे के शोध के लिए सुझाव

वर्तमान अध्ययन ''बच्चों की समस्याओं और उनकी शैक्षणिक उपलब्धियों पर माता–पिता के पालन–पोषण शैलियों का प्रभाव'' ने भविष्य के अध्ययनों के लिए नए क्षेत्रों पर प्रकाश डाला है। जिन क्षेत्रों और चरों को इस अध्ययन में शामिल नहीं किया जा सका है, उन्हें समझने के लिए अन्य सहयोगी कारकों सहित शोध किया जा सकता है। इस के लिए निम्नलिखित क्षेत्रों के बारे में विस्तार से विचार किया जा सकता हैः

1. यह अध्ययन एक जिले और राज्य के किशोर स्तर के विभिन्न वर्ग के छात्रों तक बढ़ाया जा सकता है।
2. छोटे बच्चों पर माता–पिता की प्रवृति के प्रभाव का पता लगाने के लिए शोध अध्ययन किया जा सकता हैं।
3. 5 से 10 वर्ष या 11 से 15 वर्ष के आयु वर्ग के पहली से पांचवीं या छठी से दसवीं कक्षा के छात्रों पर पिता और माता के अलग–अलग प्रभाव को जानने के लिए अध्ययन किया जा सकता है।
4. सरकारी और गैर–सरकारी विद्यालयों के बच्चों पर पालन–पोषण शैली के प्रभाव को जानने के लिए अध्ययन किए जा सकते हैं।

5. लड़के और लड़कियों पर अलग–अलग पालन–पोषण शैलियों के प्रभाव को जानने के लिए अध्ययन किए जा सकते हैं।
6. ग्रामीण और शहरी बच्चों के माता–पिता द्वारा अपनाई जाने वाली पालन–पोषण शैलियों का तुलनात्मक अध्ययन किया जा सकता है।
7. गरीब और अमीर बच्चों पर पालन–पोषण शैलियों के प्रभाव को जानने के लिए अध्ययन किए जा सकते हैं।
8. कामकाजी और गैर–कामकाजी माता–पिता की शैली से उनके बच्चों पर पड़ने वाले प्रभाव को जानने के लिए अध्ययन किया जा सकता है।
9. किशोरों की समस्याओं और उनकी शैक्षणिक उपलब्धि पर एकल माता–पिता के प्रभाव को जानने के लिए अध्ययन किया जा सकता है।

अध्ययन का परिसीमन

यथार्थ और आशा के बीच संतुलन बनाए रखना आसान नहीं है। लेकिन इस संभावना को नकारा नहीं जा सकता कि शैक्षिक विकास और सामाजिक सुधार दुनिया को बेहतर के लिए बदल सकते हैं। यथार्थवाद और आशा के बीच व्यापक अंतर को तभी कम किया जा सकता है जब व्यक्ति लक्ष्य को प्राप्त करने में अपनी सीमा और संभावनाओं के बारे में स्वयं को जागरूक करे और तदनुरूप व्यवहार करे। इन परिसीमनों को इंगित करने का यहाँ प्रयास किया गया है। इस अध्ययन के परिसीमन इस प्रकार हैं:

1. इसे तीन प्रकार के पालन–पोषण शैलियों (अत्यधिक देखभाल शैली, सामान्य या मध्यम देखभाल शैली, न्यून देखभाल शैली) तक सीमित रखा गया है।
2. वर्तमान अध्ययन को ग्यारहवीं कक्षा में पढ़ने वाले किशोरों तक सीमित रखा गया है।
3. किशोरों की शैक्षणिक उपलब्धि के साथ पालन–पोषण शैलियों की तुलना करने के लिए अध्ययन को सीमांकित किया गया है।
4. किशोरों की समस्याओं (आत्म और स्वयं की छवि, शारीरिक स्वास्थ्य और फिटनेस, आर्थिक एवं भौतिक सुविधाओं, पारिवारिक, सामाजिक, व्यावसायिक, शैक्षिक, रीति–रिवाजों, नैतिकता और धार्मिक, और दोस्ती, लिंग एवं विवाह) के साथ पालन–पोषण शैलियों की तुलना करने के लिए अध्ययन को सीमांकित किया गया है।
5. अध्ययन को मुजफ्फरपुर जिले के शहर में बिहार विद्यालय परीक्षा समिति, पटना और केंद्रीय माध्यमिक शिक्षा बोर्ड, नई दिल्ली के अधीन संचालित विद्यालयों तक सीमित कर दिया गया है।
6. अध्ययन अनुसंधान की सर्वेक्षण विधि द्वारा किया गया है।

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MICROCONTROLLER BASED SMART REAL-TIME HEALTHCARE MONITORING SYSTEM USING INTERNET OF THINGS (IOT): AN OVERVIEW

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ABSTRACT

Nowadays, Portable healthcare monitoring systems with emerging technologies are becoming of great concern to many countries worldwide. Healthcare monitoring system in hospitals and many other health centers has experienced significant growth. Healthcare industry has perpetually been on the fore front in the adoption and utilization of information and communication technologies (ICT) for the efficient healthcare administration and treatment. Recent developments in ICT and the emergence of Microcontroller (Arduino-uno) and Internet of Things (IoT) have opened up new avenues for research and exploration in the all fields including medical and health care industry. The Internet of Things (IoT) based monitoring system within hospital premises or remote server connected to sensor that can be used to gather real-time data from non-invasive sensors. The purposes of this article is to review a real-time smart healthcare system in IoT environment that can monitor a patient's basic health signs as well as the room condition where the patients are now in real-time. The healthcare monitoring system using IoT is proposed where the authorized persons can access this data stores using any IoT platform. On the basis of the values received diseases can be diagnosed by the doctor from a distance. The advent of Internet of Things (IoT) technologies facilitates the progress of healthcare from face-to-face consulting to telemedicine.

Keywords: *Internet of Things (IoT), Arduino-uno, healthcare-system, patients, ICT, security etc.*

Introduction

Health is a most important element of people's life. Healthcare is the extreme important now days in each country with the advent of corona virus (Covid-19). Health is major concern in every human to living better life. Now recently corona virus attack that has ruined the mismatched of human living are the example how healthcare has become of major importance. Healthcare monitoring system in hospital and many other health centers has experienced significance growth. In the rural areas, there is a lack of proper health treatment facilities for the people. They don't find proper quality of treatment. So, condition of patient becomes critical until she receive treatment. Unfortunately, global health problem is created a dilemma because of certain factors, such as poor health service and the presence of large gaps between rural and urban areas, physicians, and nurses unavailability during the hardest time. As of considering the cost of treatment as well many of the rural peoples cannot afford it. Doctors role is a very important but the process of check-up is quite lengthy like first a person need to register then he/she will get the appointment. Due to this lengthy process working people tend to ignore the checkups or postpone it. So, to make the first step of treatment process easier, proposed project is planned. This modern approach reduces time consumption in the process.

The Internet of Thing (IoT) is a new evolution of internet which is growing research area especially in the health care. IoT assume an imperative part in enhancing human services. Such that people by giving new and more productive methods for getting, imparting, and putting data. The IoT can help in giving data between the restorative experts and patients through the advancement of databases and different applications. The IoT is make any object internally connected in the recent decade and it has been considered as the next technological revolution to researchers. The tremendous use of IoTs are in Smart parking, smart home, smart city, smart climate, industrial site, agricultural field. The development of IoT is an important application domain in medical field that draws huge interest from industry, research field and public sector. The most exorbitant use of IOT is in healthcare management which provides health and environment condition tracking facilities.

Although present systems in hospitals or in-house ICUs allow continuous monitoring of patient vital signs, these systems require the sensors to be hardwired to nearby bedside monitors or PCs, and essentially confine the

patient to his hospital bed. The advent of Wi-Fi, Bluetooth and internet has facilitated breaking the cord between the non-invasive patient sensor and the bedside equipment. These systems do not require the patient to be confined to his bed and allow him to move around freely in his room or house but requires him to be within a specific distance from the bedside monitor. For example, the range of transmission for typical Bluetooth systems is about ten meters. Beyond this distance, it is not possible to acquire data. Patient mobility beyond his hospital room can be incorporated by using IoT at appropriate distances in order to transfer data to the monitoring station. Internet of Thing (IoT) is nothing but the linking computer to internet utilizing sensor and networks. This connected component can be used on device for health monitoring. Modern healthcare system introduces new technologies like wearable devices or cloud of things. It provides flexibility in terms of recording patients monitored data and send it remotely via IoT. For this connection, there is need of secure data transmission. The development of IoT is an important application domain in medical field that draws huge interest from industry, research field and public sector.

Review of literatures

A Review of past research helps in recognizing the theoretical and practical problems related to the study. This will assist the researcher to collect appropriate data and subject them to sound thinking and meaningful explanation. This study reviewed the literatures in journals, books and on the internet. Many healthcare centers has experienced significance growth are presented. While reviewing literature microcontroller based Smart Real-Time healthcare monitoring system.

Tamilselvi et al. (2020) [5] developed a health monitoring system that can monitor basic symptoms of a patient like heart rate, percentage of oxygen saturation, body temperature, and eye movement in IoT network. For this purpose, the system used Heartbeat, SpO2, Temperature, and Eye blink sensors as capturing elements and Arduino-UNO as a processing device. The developed system was implemented but no specifc performance measures are described for any patient.

Acharya et al. (2020) [6] introduced a healthcare monitoring kit in IOT environment. The developed system monitored some basic parameters of human health like Heartbeat, ECG, body temperature, and Respiration. The major hardware components which are used here are pulse sensor, temperature sensor, BP sensor, ECG sensor, and raspberry pi. The data were collected from sensors and sent it to raspberry pi for processing and again transmitted it to IoT network. The major drawback of the system is that no interfaces for data visualization are developed.

Banerjee et al. (2016) [7] proposed a pulse rate detection system based on a noninvasive technique. The proposed system used plethysmography process and correspondingly displayed the output digitally that made it a real-time monitoring device. The method has proved as reliable for the patient compared to other invasive techniques.

Devashri Deshmukh et.al (2017) [8] proposed an android based human services observing framework where the patient's essential sign, for example, circulatory strain, spo2, heart rate and so on are checked and remotely sent to the particular restorative expert. The fundamental point of the task is to send the data remotely through remote sensor systems. Acquired data by the sensor is sent to the arm controller and then remotely to the web-based interface which decreases hospitalization and help cost.

Prashant Salunke et.al (2017) [9] has proposed a system that reduces the risk of patient to visit the doctor every time. The real time data of the patient are collected by the doctor through the cloud platform and the suggestion are given by the medical professionals to the respective patients. The system is developed at the aim of reducing the cost, increasing the quality of life and to enrich the real time experience. The system is provided with Intel Edison which is a computer-on-module that was offered by Intel as a development system for wearable devices and IoT devices which provides multitasking capability and low power consumption thus by making it an effective system.

Higinio Mora et.al (2017) [10] proposed framework for health care monitoring system that can not only be applied for android

application but also for other mobile environments. The case study for the proposed application is given in the area of sports (football match).Here the system is composed of wearable devices, biosensors and cloud for storage and mobile environment for extracting the monitored data. Communication between the wearable and the different sensors takes place through Bluetooth and the next generation 802.11ah standard of WLAN is used for large range of communication between the wearable and the remote devices. The paper thoroughly explains how the datas are communicated and the framework for the proper transmission of data in the medical application.

Won-Jae Yi, Jafar Saniie et.al (2016) [11] introduced a system for a Patient Centered Mobile Health Monitoring system. The system uses multiple biosensors to make predictions on the signs of the patients so that they can easily get medicated. In addition to the biosensors the system makes use of the type of sensor called environmental sensor to improve the integrity and analysis.

Joon- SooJeong et. al (2016) [12] introduced an IoT healthcare to provide patients monitoring and diagnosis for prior detection of disease in needs intensive monitoring for health conditions. Medical data is gathered by sensors, the gathered data processes through mobile and intelligent network. The data goes to cloud computing for analysis with complex algorithms. Medical professionals can make diagnosis and treatment recommendations in a smart healthcare system such as IoT healthcare.

Expected outcomes of proposed system

- **Real time disease management:** In a connected healthcare environment with continuous remote monitoring, patients can get treated proactively before their condition becomes worst.
- **Cost reduction:** This not only helps patient's health, but also reduces the cost of care. The focus on shifted from 'treatment' to 'wellnesses'.
- **Reduce burdens of hospital:** Proposed micro-controller based smart home healthcare framework system, capable of reducing unnecessary burdens on the hospitals due to disease outbreak. To avoid unnecessary doctor visits, health of patients can be monitored on a real time basis.
- **Reduce visit Time:** Reduces hospital stay time, home care is possible. Caregivers can address common use cases and reach out to doctors only when needed.

Conclusion

The purpose of this review article is to study the existing technology of healthcare monitoring system. The proposed system used to make present technologies for real time monitoring. Also the study helps us to understand the various problems in existing healthcare monitoring system and blooming technologies in the healthcare such as ECG, EMG monitoring through IoT based. The objective of purposed microcontroller based smart real time health- care system is to introduce about new technologies like wearable devices or cloud of things. It provides flexibility in terms of patients monitored data and send it remotely via IoT.

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A STUDY ON SOCIAL CHANGE AND DEVELOPMENT IN THE MISING TRIBAL SOCIETY AND CULTUREWITH SPECIAL REFERENCE TO ASSAM

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ABSTRACT

From the ancient period, there has been advent of various people of different caste and tribe from various places of the north eastern and western India to Assam, at different times. At a time, such groups of people constituted the larger Assamese caste. This caste has a society, their culture reflects through the living style of this society's people. Each group of people entered into Assam with distinct culture and their culture is different from one another. Their rich cultural components enrich the Assamese culture. However, Social change is natural. Society has been witnessing changes at different times in different ways. Social change is an everlasting process which has no boundary. Social change is somehow linked with development in a society. Development simply implies over all progress, upgradation and imparting scientific knowledge in various living ways of people in a society. Sometimes, the concept of development is seen to be relative from person to person. For which, development bears different meaning for different people at different times. However, there have been changes in various aspects in the living style of the mising tribe inhabiting in Assam, in consequence of globalization and modernization process. So, thus, social changes and development that witnessed by the misng tribe in Assam, bear immense importance in discussion for unfolding various prospects.

***keywords**: Culture, Social change, Development, Mising Tribal, Assam*

Introduction

From the ancient period, there has been advent of various groups of people of different caste, religion and tribe from various places of north-eastern and western India to Assam. At a time, such group of people constituted the larger Assamese society and culture. Every ethnic group entered into Assam along with their own distinct culture which enriched the larger Assamese culture. The mising tribe is such a main tribe in Assam. Presently, the miri or mising tribal people that inhabiting in the plain areas of Assam, inhabited in the hills of the north-eastern region. The mising people are mongolianrace. The mising or miri people are the permanent resident of the Brahmaputra valley.

Specially, although they live in both sides of the Brahmaputra river, but at present, they are seen to be scattered at various places of Assam. Previously, the people of mising tribe lived on the bank of rivers but presently, they started settling in cities and they are seen to be changed in their lifestyle. In the past, they constructed sangghar, a traditional house for living but now those who live in villages, use to Construct houses of new model using bricks, tin instead of sangghar built of bamboo and wood etc. Likewise, there are seen changes in their habitation.

There is occurrence of changes in dressing style, food habit and other aspects in the mising tribal community. The mising people have their own traditional dressing identity. In the modern age, they are seen to wear dress in western style. In the same way, there are seen changes in their traditional food habits. Moreover, there is seen changes and transformation in different aspects such as their traditional festivals and celebrations, religion, folk-beliefs, folk-literature, marriage institution and traditional cultivation etc. Although, thereare seen social changes in the Mising society and culture but in some cases, these changes are approaching to decline the tribe's existence. On the other hand, some changes are fueling in bringing about massive development in the tribal society. The globalisation has also influenced the society and culture of the Mising tribe like other small and larger cultures across the world. At present, the people of Mising community have advanced in teaching and education. So, the educated class of the tribe is seen to take various initiatives for the upliftment of the tribe and they should also take measures to protect the existence of the Mising tribe. In this discussion, it is attempted to view the changes that brought about in the

mising tribal society and culture and how these changes are rendering development of the tribe. Moreover, it is mainly aimed to discuss various positive and negative effects or influences that brought by the social changes in the tribe and to examine various initiatives to eliminate negative influences in this research paper.

Objective of the study

The mising tribe is one of the biggest tribe in Assam. This discussion paper is prepared to uphold various aspects relating to social changes and development in the mishing tribal society and culture.

Importance of the study

There are many importances in preparing this discussion paper. These importances are as follows.

1. The importance of knowing about the mishing tribal society and culture.
2. The importance of knowing various changes occurring in the mising tribe's social aspect.
3. There is importance of the development that witnessed by the tribe and for knowing various measures for bringing such development.
4. The main objective of this study is to examine various positive and negative influences that brought in by the galloping globalization process.

Scope of the study

Every subject is confined to a certain scope. Scope refers to study on certain subject matters in a particular study. The scope of this discussion includes the mishing tribal society, culture, social change and development.

Methodology

In this discussion paper, analysis and descriptive methods are taken to study on culture, society, social change and development of the mising tribe.And secondary data such as reference books, Magazines and internet that are used as secondary sources for the collection of data in this discussion paper.

Main discussion

Introduction of the mishing tribal culture

The mising tribal culture is a part of the larger Mongolian race. Although, the mising tribal people have been adjusting and living in Assam's climate, nature, and ecological atmosphere from the ancient period but they are not detached from the main Mongolian culture in terms of distinct physical features and cultural aspects. In the mid nineteenth century, Some English observers and writers identified various Mongolian physical features in the mising tribal people physical formation and they defined the tribal people as the people of Mongolian race.

There is seen common culture among the Mongolian people inhabiting in Assam and its neighbouring states like Arunachal Pradesh, Mizuram, Meghalaya, Manipur, Nagaland etc. Some common cultures reflected among those Mongolian people are the uses of bamboos and wood in making house, making of sangghar a traditional type of house, fish, meat, apong or liquor, patriarchal social system and woman's monopoly in weaving and threading fabrics etc. These all features are seen in the mishing tribal society. So, it could be said that the Mising culture is a part of the larger Mongolian culture. Although, the mising culture is a part of the Mongolian culture, but in consequence of inhabiting in Assam for long time, the influences of language and religion stemmed from the Arya origin, abundantly touched the mising tribal society in Assam. No culture can be distinct and independent in a particular place without preventing the wave of outsider cultural influences. The mising tribal people also have been inhabiting in Assam for long time and accepting social norms, customs, language and religion of the larger Assamese society. Although, there is prevalence of the main Mongolian culture among the mising people but there is more or less prevalence of the arya culture among them. There is need to develop progressive thought and research on those subjects in higher level indeed.

However, the main aim of this study is to discuss on social change and development in the mising tribal society and culture. There are many aspects in the mising tribal culture. These various aspects of the mising culture are

extremely required to study and discuss. This study would put emphasis on incessant changes and transformation in various cultural elements of the tribe and on how these various elements of the tribe are affected by the globalisation process in the present society.

Introduction of cultural elements of the mishing tribe

Society: The mising tribal society is regulated by democratic social system. There is no evidence of the prevalence of king among the people in the mising tribal society, in the earlier time. In the mising tribal society, there is custom of constituting a head of the village. The Gam or head of the village is selected by the villagers in public meeting on the basis of merit. This post is not appointed on the basis of inheritance.

Murongghar or Dekasang: There is no definite source of information on how and when the murongghar came to existence in the mising society. But the murongghar is considered as an identity of the mising tribal culture. This murongghar of the mising tribal society for ensuring protection and security from various apprehensions and attacks from the wild animals and incursion of other tribal communities. The responsibility of ensuring security and protection of villagers entrusted to the youths through this murongghar.

Marriage institution: The mising society is a patriarchal society. In the context of marriage, the married daughter goes to her husband's home. The offspring of the newly weds gains the patriarch status. Marriage is not done within the same clan. There is prohibition of marriage between some different clans. For example, there can be marriage between the clans Doley and pegu. Although both the clans are different but there is prohibition of marriage between different clans like kutum, kuli and kaman etc.

There are different types of marriage prevailing in the mising society. These types are Midang marriage, Dugob marriage, Abduction marriage, Dugla: nam and kumsuz -Chu-sewa marriage, accomplished through rituals. Furthermore, there is prevalence of demonic marriage in the mising society. There is no prevalence of dowry system in the mising society. But somehow, there is seen prevalence of dowry in some cases.

Residence: At present, the mising tribal people are seen residing from Sodiya to Tezpur at large. Mainly, they live on the bank of river. There are seen villages on the bank of Brahmaputra and Subonsiri river.In addition to these two rivers, there is seen mising village on the bank of many tributaries in Assam. In ancient period, they choose riversides for residence due to availability of water, easy access to transportation and communication more production in low labour and cost and convenience for rearing cattles. They build sangghar a roof of bamboos and wood to get protection and security from heavy flood and wild animals.

Food: The mising tribal society is mainly agriculture based. So their main food is cooked rice moreover the mising society is non-vegetarian. Pork, chicken, fish and meat of other wild animals are favorite food of the mishing tribal people. In the context of liquor type food, Apong homemade liquor is an essential food. The apong liquor is used in various ritual functions, carnivals and in hospitality in the mushing society. In the mishing villages, this apong liquor is used as tea in the morning and evening. There are some local plants like Dhekia, kochu, Durun, Bonjaluk, Manimuni, Bashgaj, Betgaj, Nalgaj, Dimorupat, Pasala, etc. are various plants used as favorite food in the missing tribal society. These plants are remarked as medicinal quality plants by the experts. In case of reserved food, Namsang is one of the favorite food in the mising society .

Festivals and worships: Ali-ai-ligang is the racial agriculture based festival of the mishing tribe. It is celebrated on the first Wednesday of the Assamese month of Fagun. For plantation of new seeds and for praying to the goddess of the earth and to their ancestors. Thus, the Ali-ai- ligang is the main cultivation based festival in the mishing society.

Porag: Porag is another notable festival of the mishing society. specially this porag festival is celebrate after harvesting crops from the ground and for offering worship to the ancestors, in collaboration with the youths of

village. It is held for seeking blessings from the ancestors too. There is performance of dance in both the Ali-ai- ligang and porag festival. On the other hand, Duburpuja is a remarkable worship done by the mishing people. Duburpuja is found in deferent types. Deferent types of duburpuja is held in group by the villagers for preventing various type of disease, evils and for eliminating various ominous activities from the village and their cultivation.

Dressing: The missing tribal women compose heaven of dreams in fabrics. Among all other tribes in the north-east, there is seen abundant uniqueness and variety only in the fabrics of the mishing tribe. The mishing women fabricate various colorful picture of the charming nature in clothes.

Dresses that worn by the women of the mishing tribal society are Aige Ribi gaseng, sumir, potali or segbung, kebeing, pere, puchunggasor etc. Dresses that worn by men are the mising tribal society are as Mibugaluk, lukurgaluk and dumur etc. furthermore; the mishing tribal women fabricate some precious clothes like gadu ormirijam and tamumgasor etc.

Language: The tribal language of Assam is part of the larger Chinese Tibetan language. ThisChinese Tibetan group of language is divided into two branches. These two branches are Tibetonbarmi and Thaichin. The mising language is part of the Tibetan barmi language branch and it is a language of the north Assam. The mishing people have no own written script. They use amended form of the Romonscript. Earlier, the mishing language was only in spoken form. But in 1972, the mishing Agomkobangor the mishing language Association was constituted and through this association, the efforts for giving writing form to the mishing language has been going on . There are total seven vocal pronunciations in the mishing language. Although, the mishing language has no written literature but there is abundance of oral literature in the mishing language.

Religion: The mising tribe is one of the unique tribe among the diversed tribal groups in Assam. The main religion faith of the mishing people is Dai-a-pal the God sun-moon. They have been beliving themselves as the offspring of Dai-a-pal since the ancestral period. So, they commemorate the god daia-pal before holding all auspiciousrituals. Furthermore, the mishing tribal people have accepted the sankari religion in the influence of mighty personality of great sankaridev. Many educated people of the mishing tribal have accepted the Eka Haran nam Dharma.

Folk- beliefs: Folk-belief is an important component of the folk-culture. There is prevalent of various folk-beliefs as an important component of the folk-culture among the people of mishing tribal society. There is seen celebrating gena for various reasons among the mishing people. There is seen attribution of belief in various activities like cultivation, plantation, making house, seeing new land, harvesting crops, auspiciousness of journey and all other activities in the mising tribal society. So, the importance of folk-beliefs in the mising tribal society cannot be overlooked.

Social change and Development of the mising tribal culture

Change is a natural process. Time brings changes in both the society and culture. The changes of human life in the ancient time of the state of nature, intensified by the usage of fire and wheels. As the people used to live in caves in the ancient time. The uses of fire and wheels brought swift changes to their barbarian life.

The introduction of cultivation based life taught human to live in house and to make village for organized living instead of the barbarian life in caves and forests. Thus, changes come to all the societies across the world. Culture is closely linked with the society. So, change in society is change in culture. Cultural components do not remain stable like blocked water. Cultural components in society change its form with the passage of time on the basis of socio-economic development. But the changes brought by the globalization, make everything marketable. Culture the aesthetic activities of human that enrich the social life. Culture that provides vitality to human beings has now become material in the wave of globalization process. The mishing tribe is not also exception from these changes. The impact of globalization touches the mishing people's living style,

which naturally live in separate place from the common population. The impact of globalization has reached out all the socio-cultural aspects of the mishing tribal society.

The population of the mising tribe mainly lives in various regions of river side. They use to buildsangghar, the traditional roof house made of bamboos for ensuring security and protection from flood and wild animal's threats. Still, there is seen existence of sangghar. Although; they have started living in brick houses instead of sangghar, in the modern period.

Sangghar: Sangghar is a cultural identity of the mishing tribal community.Presently; the mishing tribal people are giving up of making sangghar. Consequently, A kind of apprehension stemmed in their culture.

Murangghar:-Murangghar is the educational and the cultural center for youths in themishing tribal society. So, Murangghar is called as Dekasang, house of youths. There is seen existence of this dekasang in all the ethnic societies in the north- eastern region. Murangghar is a symbol of unity and affinity in the missing society. The education of social responsibility is learned by the youths from this institution. There has been emergence of changes in our society along with the passage of time and these changes have poked our ancestral traditions and legacies. Presently, the wave of globalization has intensified this change in the society. For such changes, the institution of murongghar or dekasang has disappeared in all villages except one or two villages. It can be said that the expansion of modern education namghar and clubs have made the path for extinction of the institution of dekasang in the mising tribal society. At present, there is seen meeting hall or podium made by government scheme instead of murangghar in the mising villages.

There are seen changes in the marriage institution in mishing society. Previously, there was prevalence of marriage conducted by social norms and rules, abduction marriage and demonic marriage in the mishing society. Among these three types of marriage, the demonic marriage has totally vanished from their society. Under the umbrella of modernization, various cultural components of other culture have inducted in the mishing tribal culture. Presently, there is seen absence of polygamy although, and it was prevalent in the ancient time, seen in the mishing society.

Earlier, there was a principle of staying son-in-law at father-in-law's place for the purpose of developing mutual love and understanding between bride and groom in the mising society. And this tradition still exists in the mising society.

Very lately, the mising people who converted themselves into the religion of Hindu, cristian, sankarisangha, and other religions, they hold marriage ceremony according to those religious principles.

Food is an important basic need of human being. Food has been playing important role in the growing development of the human civilization.

There is no such tradition of having breakfast or in the mishing society. However, there are some places where people use to have breakfast in the missing society. The usage of parched paddy and cake was learned from the non-tribal or Assamese people in Assam. Thus, there are seen changes in the mising society.

They have given up weaving of diversed fabrics from the cotton in their own handlooms presently, a large number of women in the mising tribe do not know how to weave clothes from cotton. Furthermore, the tradition of weaving clothes in handloom has disappeared. Although, some old-age women are making efforts to preserve the culture of weaving various colorful fabrics in handloom but it is very limited. There is no doubt that one day the traditional weaving in handloom would be extinct from the mising tribal society. There is a reflected change in the case of various instruments of handloom. There is seen usage of Bobin and plastic wheel instead of bamboos wheel and ugha. Furthermore, there is seen usage of advanced technology for maximum production of clothes in minimum time. Likewise, there is seen changes in the textile culture of the missing society .Earlier, the mising tribal people cultivated cotton in the riverside that reflected in folk-songs. Although, they fabricated mirijam and other dresses from the cultivation of cotton but presently, they are making clothes from various colorful threads available in the market.

There is prevalence of cultivation of mulberry, silk, and muga for textile in the mising society since the ancient time. But this culture of rearing silkworms and cultivation of mulberry has disappeared in the mising tribal village at the present time. Nowadays, the availability of various threads likekesapat, tosmuga, and Eri threads in the market has pushed the tribal people to give up their tradition of spinning threads in wheels.

Men of the misingtribe started wearing long-pants, half-pants , coat and jackets etc. instead of old clothes like ugon (dhoti)and gadugaluk(coat). The mising tribe's cultural prestige like mibugaluk or gamikgaluk is worn nicely as waistcoat now-a-days.

In the same way there are seen changes in the woman's dresses in the missing society. At present, the young women of the tribe started wearing various colorful clothes like skirt, tunic, frock and pants that are available in the market instead of their traditional dresses like Aage (mekhala) and galuk (blouse). Women have started wearing saree instead of sadar mekhala. In the context of jewellery, it is seen that various homemade jewelleries like marpong, nograng, takpar, tadgadogni etc. made of cane, are not used by the mising tribal people,in the present time. However, they have left using of various traditional home made jewelleries.

The mising tribal people consider the Wednesday as sacred day and on this particular day, all the auspicious activities are started. In accordance to that faith, they celebrate the Ali-aye-ligang festival that involved with plantation of seeds, on the first Wednesday of fagun month of the Assamese calendar. At present, there is seen celebration of porag festival on any day in accordance to their convenience in the mising tribal society. In these festivals and celebrations of the missing tribe, dance and music like oi-ni-tom specially become very vital. There is seen melody of the missing musics in various lyrics composed by joytiprashad, Bishnu Rabha and Bhupen Hazarika. Presently, there is seen efforts made for popularizing the bihu songs along with the combination of the melody of Ali-aye-ligang. From the riverside to the podium, and from the podium to the form of product, this seamless journey of the mising tribal culture profoundly simplified by the globalization process.

In many places, there is noticed perofomac of Hindi songs in the night cultural programmes on the occasion of Ali-aye-ligang and porag festival. These kinds of changes are creating threats to the core cultural component in the mising tribal society. Globalization has been swallowing everything gradually and one day the traditional cultural components and its existence will be vanished. In the case of religion, there are seen changes in the mising tribal society. Religious faith of the mising tribal is not --- by any saint. They believed in Materialism. They worshiped various powers of the universe for will-being such as the sun, the moon, the air, the rain, the thunder and lightening etc. But presently, most of the mising people started following the religion of vaisnav. Many people have been continuing the ancestral traditions along with this vaisnav Dharma. But presently, the impact of the Christian religions has damaged their traditional faith. Many missing tribal people have followed the Christian religion. Consequently, there is seen lack of attention towards their own religion, culture and rituals. The mising tribal people are bilingual. Apart from samoguria, Bihia, Bangkual and temera, rest of the people use to speak the mising language. Furthermore, As a result of spreading English medium education, children are seen to speak the English, Hindi, and Assamese language. Consequently, the mising language is at stake. Although, the mising language is used in certain traditional activities but the usage of the mising language in various meetings relating festivals and celebrations is nearly limited. Through these changes, it can be said that the usage of the mising language has been declining day by day. The lifespan of a language depends upon the usage and the capability of publication of the language. Certainly, the mishing language is there in the list of 62 numbers of extinct languages in India. Modern technology and communication system have brought out the mising cultural components from the village boundary to the external worlds. Consequently, the various cultural components of the mising tribe like dance-song, food and dress have got publicity. There is seen flow of various native and

foreign to observe the naturally balanced living style along with those distinct cultural components of the missing tribe, and there is seen running of research on these topics. It is very good to see. But consequently, these cultural components are seen to be detached. This can not be a good sign for a culture. However, no folk- festival can survive in detaching from the soil. It is true that these cultural components are nicely embellished and magnified by the modern technologies for publishing in various means of mass-media for the purpose of common people's entertainment, for which, there is seen development in the tribe. But it can not be denied that this kind of development may lead to bring threats to the existence of the tribe. Culture enriches spontaneously in contact with local heritage, soil, air and water and Indeed, this course of culture reflects a society meticulously.

The impact of globalization on the mishing tribal culture

The process of globalization implies interdependence and uninterrupted flow of economy, labour, culture, capital, ideas, information, technology, goods and services and unity and cooperation among the people of various countries across the globe. In the beginning of the twenty first century, the information technology and communication swiftly intensified and this rapid advancement of technology played a crucial role in intensifying the globalisation process all over the world. For which, the entire world transformed into a global village. The revolution of information technology has not only influenced the economic life but also the socio-cultural life of people across the globe. There is also seen influences of the globalisation on the mising tribal society. It is known that literature-culture is the mirror for a caste. Literature and culture uphold the identity and the distinct characters of a particular caste in front of others. So, the development of language, culture, and literature represent the overall advancement of a caste. The the script of language preserve knowledge of a generation for the future generation of a caste. So, there is inevitable importance of language. There was seen apprehensions of losing the mising language due to lack of own script inspite of richness of the mising language. But the painstaking efforts and sacrifices of the mising national organisations advantaged the recognition of the mising language from the government and facilitated its study at schools. But the sad thing is that the interest and deference among the youths of the new generations to the language have been declining in the impact of globalisation. The mising language remained orally alive among the people since the ancestral time but in consequence of globalisation, there is seen occupancy of words of other languages in the usage of the mising language at their home. As a result, the mising language is in danger. So, there is need to encourage the mising people to practice and preserve the mising language that the mising language always remains alive.

In this context, although the mising national organisation Agom kebong is required to make planning but all the people should take initiatives for the enrichment of the mising language apart from the organisation like Mising Agom kebang,thus, the language will be alive forever and the tribe can also live with a united identity.

Meanwhile, it has already been cited that the culture is the mirror of a nation. Values and ideals of a caste are reflected in the culture. Our food habits, habitation, dress, social custom and living style all these aspects are reflected the culture. There was not seen any specific impact of the external cultural components on the mising culture upto the fifty decades of this century. But, presently, the increasing advancement of globalisation, information technology and other factors has put tremendous impact on the rich mising culture. For which, all these factors are swallowing the mising culture through infusion of various bizarre cultural elements. Nowadays, it is seen that the mising tribal people are following some specific customs and traditions of other castes. And these traditions were not complied by them before. Thus, the people of mising tribe are seen to practice changes and to imitate the influences of other cultures in the course of modernisation and globalisation, in their socio-cultural life. For which, it is observed that the culture and identity of the tribe are in danger.

Even in the context of social rules and regulation, many people are importing other

culture to the mising culture from the influence of watching television and movies. Although, there can be somewhat good but some bizarre cultural elements bring destruction to the identity of this distinct tribe. Therefore, there is requirement of all the people to come forward for their own tribe and culture before coming any calamity to the identity of their tribe. The educated people have to take various progressive initiatives to preserve the existence of the tribe.

Conclusion

It can be concluded that there is given introduction of various cultural elements along with the mising tribal socio-cultural life in the discussion paper. In this Study, various aspects of social change and development of the mising culture are discussed. There is also upheld discussion on various cultural elements like food habit, dress, habitation, folk-beliefs, music, festival, jewellery, language and religion of the mising tribal culture in this study. Furthermore, there is given outlook on the changes taken place in those cultural components in the mising tribe.

There is upheld discussion on how these changes in various aspects of the mising society are playing role and on how these changes coming from external cultural components are influencing the existence of the tribe. Moreover, In this study, it is viewed that how the globalisation and modernisation process are swallowing the rich mising society and culture. It can be Said that the educated class of the mising tribe should come forward and they have to take some progressive initiatives and activities for the preservation and advancement of literature, language and culture of the mising tribe. There is no doubt that there are many aspects and prospects in the mising tribal society and culture for doing further research and study for exploring unexplored things and for protecting the rich and distinct tribal cultural components and heritage existing in Assam and North-eastern region of India.

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A STUDY ON STRATEGIC ANALYSIS OF ANALYTICS REPORTING TOOLS WRT TO MULTI-NATIONAL COMPANIES IN PUNE CITY

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ABSTRACT

New developing technologies are transforming the world today. Analytics reporting tools assist businesses in completing their tasks more quickly. The purpose of this research article is to investigate the awareness, use, and efficacy of analytics reporting tools among managers in multinational companies. Researchers used a survey method and a well-structured questionnaire to obtain data from 100 respondents. The descriptive research design and non-probability convenience sampling method were determined to be appropriate for the research project by the researcher. Many businesses will benefit from the conclusions of this study in order to stay competitive.

Keywords: *Analytics Reporting Tools, Awareness, Usage, Effectiveness,Multi-national companies*

Introduction

The correct embedded reporting solution can give you the information you need to develop successful company plans. You can establish connections across sections of your organisation and improve your capacity to find new possibilities by identifying key trends and patterns in your data.

A firm can improve communication, productivity, accuracy, and timeliness by installing an effective reporting and analytics system. This will help to create a long-term climate in which management can make well-informed decisions in order to expand the company.

By studying measurements and creating reports, reporting analysts aid in the making of crucial business decisions. They report their findings to their bosses and frequently make recommendations based on their findings.

Literature Review

Business intelligence and analytics (BI&A) has become a popular topic of study for both practitioners and academics. and academics, representing the scope and importance of data-related issues that need to be addressed in today's businesses. (www.digitalprojectormanager.com)

H. Chen (2012), A reporting tool, sometimes known as a software reporting tool, is a system that collects data from a variety of sources and presents it in tables, charts, visual presentations, and other formats to make it easier to understand. Tableau reporting solutions, for example, offer data blending and drill-down to assist users in looking for variances and/or trends.

Research Methodology

Objectives of the study

- To study the awareness of analytics reportingtools amongst the managers in multinational companies in Pune city.
- To study the usage of analytics reporting tools amongst the managers in multinational companies in Pune city.
- To study the effectiveness ofanalytics reporting tools for multinational companies in Pune city.

Hypothesis of the Study

H1: Analytics reporting tools are highly effective for the companies.

Scope of the study

The present study is related to the perception of managers working in multinational companies only. The researcherhas selected only five analytics reporting tools in the present study as below;

1. Oracle Data warehouse
2. Qlick View
3. Quick Report
4. Tableau
5. Microsoft Power BI

Sampling

The data was acquired using a non-probability convenience sampling method from 100

respondents' managers working in international organisations in Pune.

Data Collection Methodologies

The original data was acquired by the researcher using a well-structured questionnaire and interviews with managers from international organisations in Pune. The secondary data was gathered from a variety of sources, including the internet, books, magazines, and articles.

Validity and Reliability

The researcher used SPSS to conduct a reliability test. The Cronbach's Alpha value is 0.720, which is higher than 0.700, indicating that the Questionnaire is reliable. Face and content validity were employed by the researcher to confirm that this research tool is appropriate for the study.

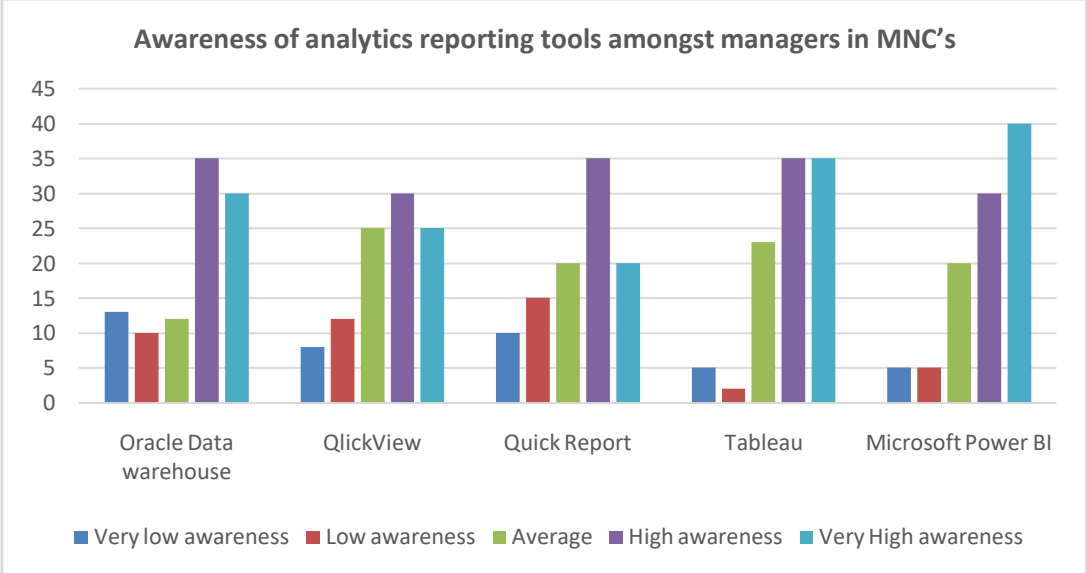
Research design

Type of Research Design	**Descriptive Research Design**
Sampling Technique	Non-Probability Convenience Sampling
Sampling Area	Pune City
Sample Size	100
Primary Data	Well-structured questionnaire
Secondary Data	Research papers, Articles, Books, Journals etc.
Data Analysis tools	IBM SPSS-20 and Ms Excel-2010

Data Analysis

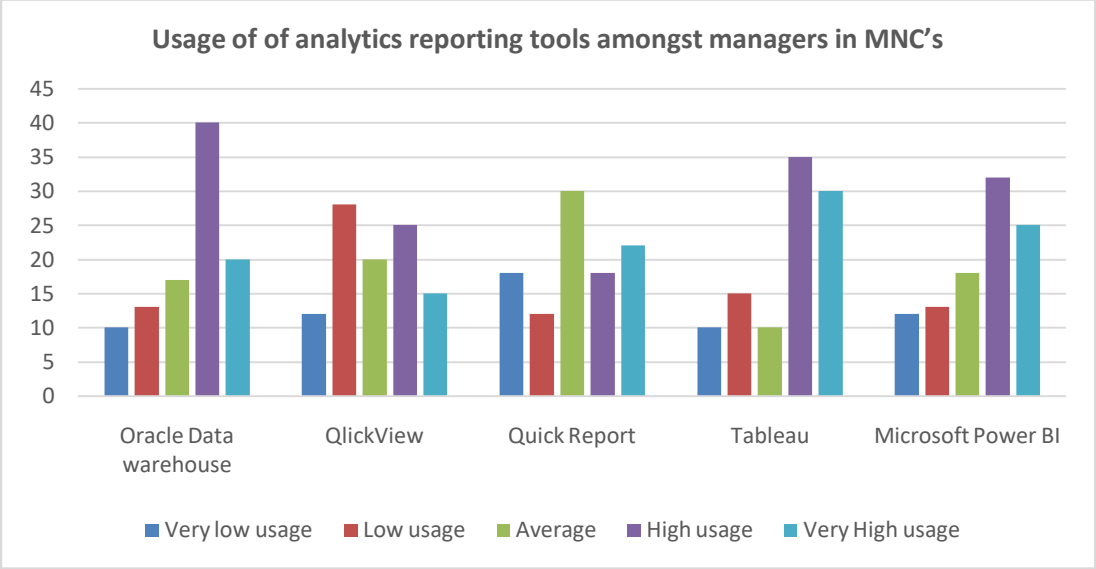
Awareness of analytics reporting tools amongst managers in MNC's

	Very low awareness	**Low awareness**	**Average**	**High awareness**	**Very High awareness**
Oracle Data warehouse	13	10	12	35	30
Qlick View	8	12	25	30	25
Quick Report	10	15	20	35	20
Tableau	5	2	23	35	35
Microsoft Power BI	5	5	20	30	40



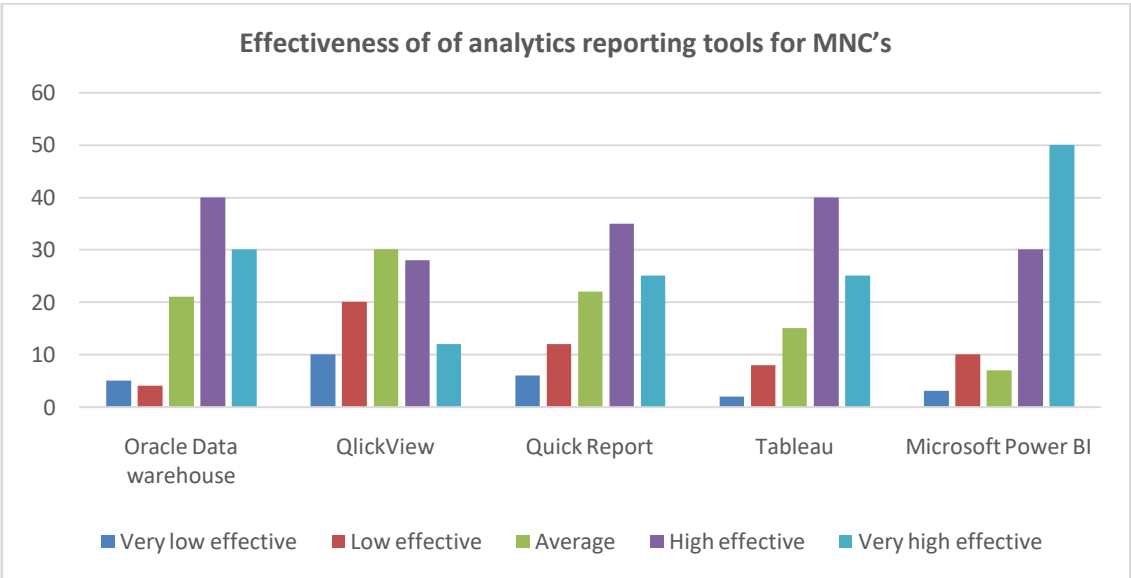
Usage of analytics reporting tools amongst managers in MNC's

	Very low usage	Low usage	Average	High usage	Very High usage
Oracle Data warehouse	10	13	17	40	20
Qlick View	12	28	20	25	15
Quick Report	18	12	30	18	22
Tableau	10	15	10	35	30
Microsoft Power BI	12	13	18	32	25



Effectiveness of analytics reporting tools for MNC's

	Very low effective	Low effective	Average	High effective	Very high effective
Oracle Data warehouse	5	4	21	40	30
Qlick View	10	20	30	28	12
Quick Report	6	12	22	35	25
Tableau	2	8	15	40	25
Microsoft Power BI	3	10	7	30	50



Ranking for Analytics Reporting Tools

	Awareness	Usage	Effectiveness
Oracle Data warehouse	3	3	3
Qlick View	4	5	5
Quick Report	5	4	4
Tableau	2	1	2
Microsoft Power BI	1	2	1

Hypothesis Testing

- Null Hypothesis (H0): Analytics reporting tools are not effective for the companies.
- Alternative Hypothesis (Ha): Analytics reporting tools are highly effective for the companies.
- The researcherhas tested the null hypothesis with the help of IBM SPSS 20. The researcherhas applied Z test to check the null hypothesis. The P value identified is 0.01 which is less than 0.05 so the null hypothesis is rejected and alternative hypothesis is accepted at 5% level of significance.

Findings

- Awareness about all analytics reporting toolsis high amongst managers in multinational companies. The awareness is higher about Microsoft Power BIfollowed by Tableau, Oracle Data warehouse, Qlick View and Quick Report.
- Most of the managers in multinational companiesare using various analytics reporting tools. The usage is higher about Tableau, followed by Microsoft Power BI, Oracle Data warehouse, Quick Report and Qlick View.
- As per the managers in multinational companies'analytics reporting tools are effective to improve the organizational performance. Microsoft Power BI followed by Tableau, Oracle Data warehouse, Quick Report and Qlick View.

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शैक्षिक तकनीकी एवं सूचना सम्प्रेषण तकनीकी विषय पर विकसित स्व-अधिगमसामग्री की प्रभाविता का बी. एड. विद्यार्थियों की उपलब्धि एवं लिंग के संदर्भ में अध्ययन

लक्ष्मण शिंदे[1] , निशा पंवार[2]

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सारांश

यह शोध पत्र शैक्षिक तकनीकी एवं सूचना सम्प्रेषण तकनीकी विषय पर विकसित स्व-अधिगम सामग्री की प्रभाविता का बी. एड. विद्यार्थियों की उपलब्धि एवं लिंग के संदर्भ में अध्ययन पर है। यह शोध प्रयोगात्मक शोध पर आधारित है। इस शोध अध्ययन हेतु न्यादर्श के रूप में देवी अहिल्या विश्वविद्यालय से संबद्धता प्राप्त पाँच शिक्षा महाविद्यालयों के 258 बी. एड. विद्यार्थियों का चयन किया गया था। न्यादर्श में 258 बी. एड. विद्यार्थियों में से 130 छात्राएं एवं 128 छात्रों को सम्मिलित किया गया था। न्यादर्श का चयन यादृच्छिक न्यादर्श विधि द्वारा किया गया। प्रदत्तों के संकलन हेतु शोधार्थी द्वारा निर्मित उपलब्धि परीक्षण का उपयोग किया गया। शोध का उद्देश्य विद्यार्थियों की शैक्षिक तकनीकी एवं सूचना सम्प्रेषण तकनीकी विषय में उपलब्धि पर उपचार, लिंग तथा उनकी अंतर्क्रिया में सार्थक प्रभाव नहीं है, जबकि पूर्व उपलब्धि एवं बुद्धि को सहचर के रूप में लिया गया है। प्रदत्तों के विश्लेषण के लिए द्विमार्गीय सह प्रसरण विश्लेषण सांख्यिकी का प्रयोग किया गया। शोध अध्ययन के परिणामों से ज्ञात हुआ कि बी. एड. विद्यार्थियों की शैक्षिक तकनीकी एवं सूचना सम्प्रेषण तकनीकी विषय में उपलब्धि लिंग से स्वतंत्र पाई गई। जबकि पूर्व उपलब्धि एवं बुद्धि को सहचर के रूप में लिया गया था।

प्रस्तावना

शिक्षा के द्वारा व्यक्ति के जीवन में अधिगम या सीखने की प्रक्रिया बराबर चलती रहती है। जिस प्रकार व्यक्ति के विभिन्न कार्यों के लिए विभिन्न क्षमताएँ प्रकृति प्रदत्त होती है। ठीक उसी प्रकार अधिगम की भी क्षमता मनुष्य को प्राप्त होती है। भिन्न-भिन्न व्यक्तियों में अधिगम की क्षमताएँ भिन्न-भिन्न होती है। अधिगम जीवन की एक आवश्यक क्रिया है। शिक्षा मनोविज्ञान में अधिगम को केंद्र माना जाता है। शिक्षा एक साधन है व अधिगम एक साध्य है। बर्टन के अनुसार ''शिक्षण अधिगम के लिए अभिप्रेरणा निर्देशन तथा प्रोत्साहन है '' अतः शिक्षण व अधिगम की प्रक्रिया को अलग-अलग न रखकर एक मिश्रित शिक्षण अधिगम प्रक्रिया का निर्माण किया जाना चाहिए, ताकि उसके द्वारा अच्छे से अच्छे परिणामों की प्राप्ति हो सके। आज छात्रों में रुचि जिज्ञासा , चिंतन वैज्ञानिक दृष्टिकोण , विश्लेषण, योग्यताएँ एवं स्व-अध्ययन आदतों के विकास करने की आवश्यकता है, जिससे विद्यार्थियों का सर्वांगीण विकास हो सके। शिक्षा प्रणाली और शिक्षण अधिगम के स्वरुप मे परिवर्तन लाने संबंधी भूमिका शैक्षिक तकनीकी के उद्गम एवं विकास से जुड़ी हुई है। जैसे-जैसे समुदाय व समाज में वैज्ञानिक , दार्शनिक, मनोवैज्ञानिक तथा तकनीकी नवाचारों, नवीन मान्यताओं, सिद्धांतों आदि के रूप में तकनीकी जागरुकता तथा परिवर्तन आते गए वैसे-वैसे ही इस तकनीकी समृद्धि का लाभ शैक्षिक तकनीकी के रूप में शिक्षा व्यवस्था तथा शिक्षण अधिगम को नया रूप प्रदान करने के लिए किया जाने लगा है। शैक्षिक तकनीकी शिक्षण अधिगम प्रक्रिया को उन्नत बनाने का क्रमबद्ध प्रयास है। शैक्षिक तकनीकी के माध्यम से शिक्षण तथा अधिगम प्रक्रिया को निश्चित रूप से सुदृढ़ बनाया जा सकता है। शैक्षिक तकनीकी के प्रयोग एवं प्रसार से राष्ट्रीय विकास के उद्देश्यों की पूर्ति सम्भव है।

अध्ययन का औचित्य

वर्तमान समय में शिक्षण अधिगम प्रक्रिया में शिक्षक की भूमिका सक्रिय व प्रभावी होती है। शिक्षक शिक्षण अधिगम प्रक्रिया के केन्द्र में होता है और सम्पूर्ण शिक्षण अधिगम प्रक्रिया को नियंत्रित करता है। शिक्षक छात्रों को सूचना प्रदान करने का कार्य करता है, यह कार्य अधिकांश परम्परागत विधि द्वारा किया जाता है और विद्यार्थी शिक्षक द्वारा दिये गये अनुदेशन के अनुरूप ही अधिगम करता है। जिसमें विद्यार्थी की भूमिका निष्क्रिय अधिगमकर्ता के रूप में होती है। परम्परागत विधि में विद्यार्थियों को स्व अध्ययन के अवसर प्राप्त नही होते है और इस विधि में परिवर्तनशीलता का भी अभाव होता है जिससे विद्यार्थियों में अधिगम के प्रति नीरसता आ जाती है। वर्तमान शिक्षण अधिगम प्रक्रिया को देखते हुए इस बात की आवश्यकता प्रतिपादित की जा सकती है कि

शिक्षण अधिगम प्रक्रिया के केन्द्र में विद्यार्थी को रखा जाए और विद्यार्थी की भूमिका निष्क्रिय अधिगमकर्ता के रूप में न होकर सक्रिय अधिगमकर्ता के रूप में हो। शिक्षण अधिगम प्रक्रिया को इस प्रकार नियोजित किया जाना चाहिए कि विद्यार्थी स्वयं प्रेरित होकर और स्वयं की इच्छा अनुसार अधिगम कर सकें। शिक्षक का कार्य एक अनुदेशक , एक पर्यवेक्षक व छात्र की अधिगम समस्याओं का समाधान करने वाला होना चाहिए। इस हेतु शिक्षकों को विभिन्न मनोवैज्ञानिक सिद्धांतों व शैक्षिक नवाचारों का समावेश शिक्षण अधिगम प्रक्रिया में करना चाहिए ताकि शिक्षण अधिगम प्रक्रिया में परिवर्तन कर , इसे और अधिक प्रभावी और रूचिकर बनाया जा सके। वर्तमान में ऐसी नवीन तकनीकियों व नवीन आयामों को अपनाये जाने की आवश्यकता है , जो शिक्षण अधिगम प्रक्रिया में विद्यार्थी को महत्व दे ताकि वे शिक्षण से प्रत्यक्ष रूप से संबंधित हो सके और अपनी रुचि व व्यक्तिगत विभिन्नताओं के आधार पर स्व अधिगम कर सके। इन सभी आवश्यकताओं की पूर्ति की दिशा में शैक्षिक तकनीकी शैक्षिक नवाचारों के रूप में नवीन शिक्षण विधियाँ प्रस्तुत करती है। स्व अधिगम सामग्री शिक्षण की समस्याओं के निदान एवं उपचार के लिए , छात्र को केन्द्र में रखकर व्यक्तिगत भिन्नता को ध्यान में रखकर एवं परंपरागत शिक्षण की अनुपयुक्तता को दूर करते हुए प्रभावी अधिगम करती है। स्व-अधिगम सामग्री के द्वारा विद्यार्थियों को अधिगम में सुविधा होती है , क्योंकि यह अनुदेशन सामग्री छात्र केन्द्रित होती है। स्व-अधिगम सामग्री की सहायता से शिक्षण करते समय विषय की विषयवस्तु विद्यार्थियों के लिए रुचिकर, सरल व स्पष्ट हो जाती है।

स्व-अधिगम सामग्री विद्यार्थियों को अपनी योग्यता और क्षमताओं के अनुसार व अपनी स्वयं की गति के अनुसार विषयवस्तु का अधिगम करने में सहायता करती है। स्व-अधिगम सामग्री इन कौशलों के विकास पर ध्यान केंद्रित करती है जो छात्रों को सरल , प्रभावी व स्व अध्ययन के लिए आधार प्रदान करती है।

वर्तमान परिप्रेक्ष्य में परंपरागत शिक्षण विधि अधिगम के कौशलों के विकास में सक्षम नहीं पाई गई है। अतः स्व-अधिगम सामग्री के अध्ययन की आवश्यकता महसूस की गई।

उद्देश्य

बी.एड. विद्यार्थियों की शैक्षिक तकनीकी एवं सूचना सम्प्रेषण तकनीकी विषय में उपलब्धि पर उपचार , लिंग तथा उनकी अंत:क्रिया के प्रभाव का अध्ययन करना, जबकि पूर्व उपलब्धि व बुद्धि को सहचर के रूप में लिया गया है।

परिकल्पना

बी.एड. विद्यार्थियों की शैक्षिक तकनीकी एवं सूचना सम्प्रेषण तकनीकी विषय में उपलब्धि पर उपचार , लिंग तथा उनकी अंतर्क्रिया में सार्थक प्रभाव नहीं है , जबकि पूर्व उपलब्धि व बुद्धि को सहचर के रूप में लिया गया है।

न्यादर्श

प्रस्तुत शोध देवी अहिल्या विश्वविद्यालय , इंदौर से सम्बद्धता प्राप्त शिक्षा महाविद्यालयों के बी. एड. विद्यार्थियों पर किया गया। न्यादर्श हेतु पाँच शिक्षा महाविद्यालयों का चयन उद्देश्यपरक न्यादर्श तकनीक द्वारा किया गया। पाँच में से दो महाविद्यालयों का चयन प्रायोगिक समूह के रूप में व तीन महाविद्यालयों का चयन नियंत्रित समूह रूप में किया गया। उपचार हेतु न्यादर्श के रूप में देवी अहिल्या विश्वविद्यालय से संबद्धता प्राप्त पाँच शिक्षा महाविद्यालयों के 258 बी. एड. विद्यार्थियों का चयन किया गया था। न्यादर्श में 258 बी. एड. विद्यार्थियों में से 130 छात्राएं एवं 128 छात्रों को सम्मिलित किया गया था। न्यादर्श का चयन यादृच्छिक न्यादर्श विधि द्वारा किया गया।

उपकरण

शोध अध्ययन में शैक्षिक तकनीकी एवं सूचना सम्प्रेषण तकनीकी विषय में बी. एड. विद्यार्थियों की उपलब्धि के आकलन हेतु शोधार्थी द्वारा मानदंड संदर्भ परीक्षण का उपयोग किया गया था। इस परीक्षण में 50 बहुविकल्पीय प्रश्न थे। इनमें प्रत्येक प्रश्न ' के उत्तर हेतु चार विकल्प दिए गये थे। प्रत्येक विकल्प के लिए बी. एड. विद्यार्थियों को दिये गये उत्तर पत्रक में निर्धारित स्थान पर सही विकल्प पर (✔)निशान लगाकर सही उत्तर का चयन करना होता था। प्रत्येक सही उत्तर के लिए 02 अंक प्रदान किए गये । प्रस्तुत परीक्षण की समयावधि 50 मिनट थी।

प्रदत्त विश्लेषण

प्रदत्तों का विश्लेषण द्विमार्गीय सहप्रसरण विश्लेषण द्वारा किया गया। विश्लेषण से प्राप्त परिणाम तालिका में दर्शाएं गये हैं-

तालिका 1.1 पूर्व उपलब्धि एवं बुद्धि को सहचर मानते हुए बी.एड. विद्यार्थियों के शैक्षिक तकनीकी एवं सूचना सम्प्रेषण तकनीकी विषय में उपलब्धि के सन्दर्भ में 2x2 कारकीय प्राकल्प द्विमार्गीय सहप्रसरण विश्लेषण का सारांश

विचरण के स्रोत	df	$SS_{y.x}$	$MSS_{y.x}$	$F_{y.x}$	LOS
उपचार	1	7059.92	7059.92	238.72**	0.00
लिंग	1	43.98	43.98	1.48- NS	0.22
उपचार एवं लिंग की अन्तर्क्रिया	1	10.03	10.03	0.33- NS	0.56
त्रुटि	252	7896.18	29.67		
योग	255				

**- 0.01 सार्थकता स्तर पर सार्थक

NS- 0.05 सार्थकता स्तर पर सार्थक नहीं

1.1 तालिका से स्पष्ट है कि उपचार के लिए समायोजित 'F' का मान 232.56 है , जिसके लिए स्वतंत्रता की कोटि (df)=1/255 सार्थकता का मान 0.00 है, जो सार्थकता के स्तर 0.01 से कम है , अतः उपचार के लिए समायोजित 'F' का मान सार्थकता के स्तर 0.01 पर सार्थक है। अर्थात् प्रायोगिक समूह एवं नियंत्रित समूह के विद्यार्थियों के शैक्षिक तकनीकी एवं सूचना सम्प्रेषण तकनीकी विषय में उपलब्धि के समायोजित माध्य फलांकों में सार्थक अंतर है , जबकि पूर्व उपलब्धि को सहचर के रूप में लिया गया है। अतः इस स्थिति में शून्य परिकल्पना 'प्रायोगिक समूह एवं नियंत्रित समूह के विद्यार्थियों के शैक्षिक तकनीकी एवं सूचना सम्प्रेषण तकनीकी विषय में उपलब्धि के समायोजित माध्य फलांकों में सार्थक अंतर नहीं है , जबकि पूर्व उपलब्धि को सहचर के रूप में लिया गया है' निरस्त की जाती है। अतः कहा जा सकता है कि 'प्रायोगिक समूह एवं नियंत्रित समूह के विद्यार्थियों के शैक्षिक तकनीकी एवं सूचना सम्प्रेषण तकनीकी विषय में उपलब्धि के समायोजित माध्य फलांकों में सार्थक अंतर है।

तालिका 1.1 से स्पष्ट है कि लिंग के लिए समायोजित 'F' का मान 1.48 है ,जिसके लिए स्वतंत्रता की कोटि (df)=1/255 द्वि-पुच्छीय सार्थकता का मान 0.22 है , जो सार्थकता के स्तर 0.05 से अधिक है , अतः लिंग के लिए समायोजित 'F' का मान सार्थकता स्तर 0.05 पर सार्थक नहीं है। अर्थात् छात्र एवं छात्राओं के शैक्षिक तकनीकी एवं सूचना सम्प्रेषण तकनीकी विषय में उपलब्धि के समायोजित माध्य उपलब्धि प्राप्तांकों में सार्थक अंतर नहीं है,जबकि पूर्व उपलब्धि एवं बुद्धि को सहचर के रूप में लिया गया है। अतः इस स्थिति में शून्य परिकल्पना छात्र एवं छात्राओं के शैक्षिक तकनीकी एवं सूचना सम्प्रेषण तकनीकी विषय में उपलब्धि के समायोजित माध्य प्राप्तांकों में सार्थक अंतर नहीं है,जबकि पूर्व उपलब्धि एवं बुद्धि को सहचर के रूप में लिया गया है ', निरस्त नहीं की जाती है। अतः निष्कर्ष रूप से कहा जा सकता है कि छात्र एवं छात्राओं की शैक्षिक तकनीकी एवं सूचना सम्प्रेषण तकनीकी में उपलब्धि समान रूप से प्रभावी पायी गयी,जबकि पूर्व उपलब्धि एवं बुद्धि को सहचर के रूप में लिया गया है।

शोध निष्कर्ष एवं विवेचना

बी. एड. विद्यार्थियों की शैक्षिक तकनीकी एवं सूचना सम्प्रेषण तकनीकी विषय में उपलब्धि लिंग से स्वतंत्र पाई गई। जबकि पूर्व उपलब्धि एवं बुद्धि को सहचर के रूप में लिया गया था। इस निष्कर्ष का संभावित कारण यह हो सकता है कि वर्तमान परिदृश्य में शैक्षिक सुविधाएं, परिवार, स्कूल और सामाजिक वातावरण के आधार पर पुरुष और महिला छात्रों में कोई अंतर नहीं किया जाता है, दोनों को समान वातावरण व आधुनिक सुविधाएँ प्रदान की जाती हैं। इसके कारण यह संभव है कि उनकी उपलब्धि समान रही।यह भी संभव है कि वर्तमान अध्ययन के लिए तकनीकी साधनों का उपयोग दोनों समान रूप से करते है यह तकनीकी साधन पुरुष और महिला छात्रों के प्रदर्शन में समान रूप से मदद करते है।

सन्दर्भ

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A STUDY OF INDIAN GOVERNMENT SCHEMES TOWARDS THE WOMEN ENTREPRENEURS OF SONIPAT

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ABSTRACT

Indian Government is offering various motivators and has acquainted different plans with advance ladies business venture. A new plan named Stand up India' declared by the public authority, which focuses on monetary advantages for ladies, licenses Women Entrepreneurs (WEs) to profit themselves of bank advances from Rs. 10 lakhs to Rs. 1 crore in the assembling and exchanging areas. The Government has additionally dispatched a Mudra Yojana Scheme for Women's, which broadens credits going from Rs. 50,000 to Rs. 10 lakhs for yearning Wes, who wish to set up private company undertakings. Furthermore, there are different banks that offer various plans to WEs dependent on their credit prerequisite and undertaking size. In India, various foundations are set up for the advancement of ladies business venture, specifically, Federation of Indian Women Entrepreneurs (FASME), Entrepreneurship Development Institute of India (EDII), District Financial Institutions (DFI) as a rule, World Assembly of Small and Medium Entrepreneur (WASME), National Institute for Entrepreneurship and Small Business Development (NIESBUD), National Bank for Agriculture and Rural Development (NABARD), Small Industries Development of Bank of India (SIDBI), and so forth Thus, this paper is centered around distinguishing Women Entrepreneurs familiarity with Government-advanced Women Entrepreneur plots in Sonipat area and proposing appropriate ideas to raise their mindfulness. The essential information have been gathered from 150 WEs by taking on accommodation examining technique. The devices utilized for the examination are basic rate technique and Weighted Average Rank. The discoveries of the review unveil that the greater part of the Women Entrepreneurs know about Muthra Yojana conspire, Industrial Finance Corporation of India Scheme of Interest Subsidy for Women Entrepreneurs, Annapurna Scheme and so forth.

***Keywords**: Women Entrepreneurs, Muthra Yojana, Annapurna Scheme, Financial Institutions.*

Introduction

These days Women Entrepreneurs start their undertakings by contributing a pitiful sum all alone, they anticipate money related help from the public authority for settling their business. The Government of India, thinking about the meaning of ladies business and their commitment towards nation's development and possibilities, has presented new plans for aiding ladies. The Government advances India's enterprising biological system by giving simple admittance to credits, organizations, markets and preparing. The Government of India has presented different plans for ladies like Prime Minister's Employment Generation Program, and Support Training and Employment Program for Women (STEP) who has had no admittance to formal abilities, particularly in country India. Despite the fact that, the public authority has presented various plans for the advancement of ladies business venture, just 14% comprise Women Entrepreneurs in India (Sixth Economic Sense), of which, 80% money their business all alone as per the state insightful examination of Women Entrepreneurs in the country. The fundamental justification for non-use of the Government Schemes is absence of familiarity with different business plans advanced by Central and State Government. Further, the public authority has just started in presenting the ladies business venture advancement plans, however not focused on proliferating them. Subsequently, a larger part of the Women Entrepreneurs don't know about plans advanced by the Government. Consequently, in this article a work has been made to recognize the Women Entrepreneurs attention to Government plots in Sonipat area and propose appropriate measures for bringing issues to light among ladies business visionaries.

Review of Literature

Paulmoni Geetha (2019) in her study reveals that lead banks of every district may create awareness of the schemes and subsidies offered by the Government by making use of SMS, mail and by other social media. From the literature review, it is ascertained that previous studies were carried out to assess the awareness of Government schemes among Women Entrepreneurs at various places in India.

Uma SN and Ramesh HN (2018) in their study have pointed out that emerging entrepreneurs are just like newborn babies. They cannot stand on their own feet. Hence, at least in the initial stages of their business necessary support may be extended by the Government for their survival and sustainability. Thus, both State and Central Government have to take necessary steps to reach the ultimate beneficiaries.

Raghuvanshi, Agarwal and Ghosh (2017) revealed that role of Women entrepreneur in economic development is inevitable. Now-a-days women enter not only in selected professions but also in professions like trade, industry and engineering. Women entrepreneurship must be built properly with entrepreneurial traits and skills to meet the changes in trends, challenges global markets and also be competent enough to sustain and strive for excellence in the entrepreneurial arena.

Danish (2016) presented that entrepreneurship for women development is an essential part of human resource. The progress is more visible among upper class families in urban areas. This paper focuses on current status of women entrepreneurs in India. Any understanding of Indian women‘s identity, especially for their contribution in emerging new paths, will be incomplete without a walk down the place of Indian history where women have lived. The paper talks about the status of women entrepreneurs and the problems faced by them. Purpose of this empirical study was to find out various motivating and demotivating internal and external factors of women entrepreneurship.

Junare and Singh (2016) highlighted that industrial policies of the Government announced from time to time, have laid considerable emphasis on promotion of women entrepreneurship, particularly among first generation women entrepreneurs, through various training and support services. Special attention is being given by organizing exclusive Entrepreneurship Development Programmes (EDPs) for women. Approximately 1500 women participated in these training programmes. The autonomous bodies under MSME-DO also conduct various short-term/long term training programmes in footwear technology, tool and dye-making and other allied industries. These bodies provided training to approximately 3775 women. No fee is being charged from women participants and MSME—DIs are also giving stipend @ Rs. 500/- per month to the participants belonging to disadvantaged groups including women Swarna Jayanthi FramSwarozgar Yojana and Swarna JyanthiSekhari Rozgar Yojana were introduced by government to provide reservations for women and encouraging them to start their ventures.

Parimala (2015) discussed that state Small Industries Development Corporations, national banks and NGOs are conducting entrepreneurship development programmes to cater to the needs of potential women entrepreneurs, who may not have adequate educational background and skills. Several other schemes such as other government at central and state level exist, which provide assistance for setting up enterprises for women to make them economically independent. Significant schemes are prevalent in the states of Kerala, Tamil Nadu, Goa and Haryana for the development of women entrepreneurs. The examples of women-specific schemes are: Scheme for Women Entrepreneurs to set up

Industrial Units: Kerala, Mahila Coir Yojana: Kerala, Entrepreneurship Development Programme for Women: Tamil Nadu, Women's Training-cum-Production Centres and Stipend: Haryana, Swayamsidha (Indira MahilaYojna): Haryana and Incentives to Women Entrepreneurs Scheme, 2003: Goa.

Nirmala (2015) explained the efforts of government and its different agencies which are ably supplemented by nongovernmental organizations that are playing an equally important role in facilitating women. At present, the Government of India has over 27 schemes for women operated by different departments and ministries. Various policies of MSME for women's entrepreneurship development play a major role in this process. After reviewing existing policies and the way they impinge on women enterprises, to meet the needs of women and children by adapting National Policy for Empowerment of Women (2001). The outlay of Rs. 4 crores (40 million) in the First Plan (1951-56) has increased to Rs. 7,810.42 crores in the Ninth Five-Year Plan, and Rs. 13,780 crores in the Twelth Five-Year Plan. In 2010, the National Resource Centre has been set up which functions as a national convergence centre for all schemes and programmes targeting women. Some of its focus areas are skill development, micro credit, vocational training, entrepreneurship and self-help group development.

Jyothi (2014) explained various schemes operated by different departments and ministries are: Management Development Programmes, Women's Development Corporations (WDCs), Marketing of Non-Farm Products of Rural Women, Assistance to Rural Women in Non-Farm Development (ARWIND) Schemes, Prime Minister's Employment Generation Programme (PMEGP) launched in 2008-09 also gives special attention to urban and rural women by providing them subsidy at the rate of 25 to 35 per cent of the project cost in urban and rural areas respectively.

Bharthvajan (2014) described that Government also announce from time to time Entrepreneurship Development Programme (EDP) especially for the first generation of women who desire to be entrepreneur. For the purpose of training and skill development there are three important institutions namely National Institute of MSME, Hyderabad, National Institute of Entrepreneurship and Small Business Development (NISESBUD, Noida and Indian Institute of Entrepreneurship (IIE), Guwahati and NISC, Delhi. All the institutions taken to gather had trained more than 20,000 women during the 2011-2012.

Shiralashetti, A. S. (2013) in their study has suggested that the Government has to organize necessary programmes for educating and spreading awareness about new schemes among women entrepreneurs.

Garba (2012) has suggested that Government or policy makers should conduct workshops and seminars among interested women entrepreneurs in order to create knowledge of new schemes offered by the government.

Sedamkar (2011) in his study has highlighted that rural women entrepreneurs are unaware of policies and schemes offered by Central and State governments. The government should take the initiative to create awareness of the schemes and subsidies among women.

Itani et al. (2011) in their study have observed that Government of India puts necessary efforts to encourage women entrepreneurs, but many women entrepreneurs are unaware of the schemes introduced for the promotion of business.

Brinda Kalyani (2010) in her study has rightly pointed out that the majority of the small-scale entrepreneurs are aware of the financial schemes offered by the government.

Rizvi and Gupta (2009) in their study have argued that government- supported advancement activities help only urban and

middle- class female members due to their information access and level of education.

Objectives of the Study

- To recognize the financial profile of the Women Entrepreneurs.
- To determine the mindfulness on Government plans accessible for Women Entrepreneurs.

Scope of the Study

The current exploration work has been taken up to investigate the consciousness of Government plans among Women Entrepreneurs in Sonipat area.

Research Methodology

Data

Essential information have been gathered utilizing survey and auxiliary information through different audits of writings and Women Entrepreneurs organizations.

Sampling

By utilizing advantageous inspecting information were gathered from 150 respondents in Sonipat area.

Structure of Analysis

To track down ordinariness of test, Kolmogorov-Smirnov test is utilized. The consequence of KS test unveils that populace isn't regularly conveyed. Thus, Simple rate and Weighted Average Rank are utilized.

Table No. 1

Tests of Normality[b,c]						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Annapurna Scheme	.524	150	.001	.379	150	.001
Bharatiya Mahila Bank	.536	150	.001	.300	150	.001
Stree Shakti	.536	150	.001	.300	150	.001
Orient Mahila Vikas Yojana Scheme	.541	150	.001	.194	150	.001
Udyogini Scheme	.541	150	.001	.194	150	.001
Mudra Yojana Scheme for Women	.351	150	.001	.720	150	.001
Credit Guarantee Fund Scheme	.536	150	.001	.248	150	.001
Thestand–upIndiascheme	.536	150	.001	.248	150	.001
Women Enterprise Development Scheme (WEDS)	.536	150	.001	.300	150	.001
Support to Training and Employment Programme forwomen (STEP)	.539	150	.001	.252	150	.001
Trade Related Entrepreneurship Assistance and Development (TREAD)	.537	150	.001	.121	150	.001
Rajiv Gandhi Mahila Vikas Pariyojana (RGMVP)	.501	150	.001	.454	150	.001
Industrial Finance Corporation of India Scheme of Interest Subsidy for Women Entrepreneurs	.537	150	.001	.121	150	.001

From the above table it is found out that determined P worth of the Kolmogorov-Smirnov and Shapiro-Wilk test is under 0.01, unmistakably demonstrating that the information are not regularly conveyed. Subsequently, we utilized non-parametric test.

Discussion

Demographic factors

The accompanying sections examine segment elements of select ladies business visionaries in Sonipat region.

Table No. 2

Area ofResidence	Numbers	Percentage
Urban	80	53.3
Rural	70	46.7
Total	150	100.0

Out of 150 women entrepreneurs 80 (53.3%) reside in urban, and the rest 70 (46.7%) in rural, areas. Thus, a majority of the women entrepreneurs reside in the urban area.

Table No. 3

Age(Years)	Numbers	Percentage
Upto30	28	18.7
31–40	66	44.0
Above40	56	37.3
Total	150	100.0

28 (18.7%) women entrepreneurs are in the age gathering of 30 years, 66 (44%) somewhere in the range of 31 and 40 years and the leftover 56 (37.3%) over the age of 40 years. In this way, the greater part of the women entrepreneurs age ranges somewhere in the range of 31 and 40 years.

Table No. 4

EducationalQualification	Numbers	Percentage
SSLC	51	34.0
H.Sc.	33	22.0
UnderGraduate	47	31.3
PostGraduate	19	12.7
Total	150	100.0

51 (34%) women entrepreneurs have SSLC capability; 33 (22%) Higher Secondary instructive capability; 47 (31.3%) graduate instructive capability and the rest 19 (12.7%) post alumni instructive capability. Hence, the vast majority of the ladies business visionaries have SSLC instructive capability.

Table No. 5

MaritalStatus	Numbers	Percentage
Married	144	96.0
Unmarried	6	4.0
Total	150	100.0

144 (96%) women entrepreneurs are hitched and the rest (4%) are unmarried. Consequently, it is seen that a larger part of the women entrepreneurs are hitched.

TableNo.6

TypeofFamily	Numbers	Percentage
Joint	62	41.3
Nuclear	88	58.7
Total	150	100.0

62 (41.3%) women entrepreneurs have a place with joint family and the excess 88 (58.7%) to family unit. Hence, a larger part of the women entrepreneurs have a place with family unit.

TableNo. 7

StatusinFamily	Numbers	Percentage
Head	22	17.7
Member	128	85.3
Total	150	100.0

22 (17.7%) women entrepreneurs are going about as tops of the family and 128 (85.3%) are individuals from the family. Hence, a larger part of the women entrepreneurs are individuals from the family.

TableNo.8

Monthly Income	Numbers	Percentage
Upto15000	47	31.3
15001-30000	61	40.7
Above 30000	42	28.0
Total	150	100.0

The month to month pay of 47 (31.3%) women entrepreneurs goes up to Rs. 15000, that of 61 (40.7%) from Rs. 15001 to Rs. 30000 and that of the excess 42 (28%) above Rs. 30000. Hence, the greater part of the women entrepreneurs month to month pay ranges between Rs. 15001 and Rs. 30000.

TableNo.9

FamilyIncome	Numbers	Percentage
Upto30000	60	40.0
30001-50000	40	26.7
Above 50000	50	33.3
Total	150	100.0

The month to month family pay of 60 (40%) women entrepreneurs goes up to Rs. 30000, that of 40 (26.7%) from Rs. 30001 to Rs. 50000 and that of 50 (33.3%) above Rs. 50000.

In this way, the month to month pay of the majority of the women entrepreneurs family goes up to Rs. 30000.

TableNo.10

FamilyExpenditure	Numbers	Percentage
Upto15000	54	36.0
15001-30000	52	34.6
Above 30000	44	29.3
Total	150	100.0

The month to month family use of 54 (36%) women entrepreneurs goes up to Rs. 15000, that of 52 (34.6%) from Rs. 15001 to Rs. 30000 and that of 44 (29.3%) above Rs. 30000. Hence, the majority of the women entrepreneurs family consumption runs up to Rs. 15000.

A. Business Profile

The respondents that follow talk about business profiles of ladies business people of Sonipat region.

Table No. 11

Nature ofBusiness	Numbers	Percentage
Production	31	20.7
Trading	50	33.3
Service	69	46.0
Total	150	100.0

31 (20.7%) women entrepreneurs are engaged with creation situated business, 50 (33.3%) carryout exchanging type of business and the excess 69 (46%) complete assistance arranged action. Along these lines, a larger part of the women entrepreneurs are associated with administration arranged action.

Table No. 12

LocationofBusiness	Numbers	Percentage
Urban	98	65.3
Rural	52	34.7
Total	150	100.0

98 (65.3%) WEs do their business in metropolitan regions and the excess 52 (34.7%) in rustic regions. Along these lines, a greater part of the women entrepreneurs do their business in the metropolitan region.

Table No. 13

ExperienceinBusiness	Numbers	Percentage
Upto5	47	31.3
6–10	65	43.4
Above10	38	25.3
Total	150	100.0

47 (31.3%) women entrepreneurs have five years of involvement with their business, 65 (43.4%) six to ten years and the excess 38 (25.3%) over ten years. Consequently, the vast majority of the women entrepreneurs business experience goes from six to ten years.

Table No. 14

First Generation	Numbers	Percentage
Yes	122	82.0
No	28	18.0
Total	150	100.0

122 (82%) ladies are original entrepreneurs while the leftover 28 (18%) are not. Along these lines, a larger part of the WEs are original entrepreneurs. The Indian Government should give additional consideration to the original entrepreneurs by making mindfulness among them of the plans sponsored by it.

Table No. 15

InitialInvestment	Numbers	Percentage
Upto100000	61	40.7
100001-500000	53	35.3
Above 500000	36	24.0
Total	150	100.0

The business speculation of 61 (40.7%) women entrepreneurs goes up to Rs. 100000, that of 53 (35.3%) from Rs. 100001 to Rs. 500000 and that of the excess 36 (24%) above Rs. 500000. Hence, a large portion of the women entrepreneurs business venture goes up to Rs. 100000.

Table No. 16

AmountofWorkingCapital	Numbers	Percentage
Up to10000	59	39.3
10001-20000	39	26.0
Above 20000	52	34.7
Total	150	100.0

As indicated by their own assertions, the business working capital of 59 (39.3%) women entrepreneurs goes up to Rs. 10000, that of 39 (26%) from Rs. 10001 to Rs. 20000 and that of the rest 52 (34.7 %) above Rs. 20000. Hence, the greater part of the women entrepreneurs concur that their business stirring capital ranges up to 10000.

Table No. 17

SourceofCapital	Numbers	Percentage
OwnSavings	54	36.0
AvailedLoan	96	64.0
Total	150	100.0

54 (36%), Women Entrepreneurs contribute from their own reserve funds as capital for advancement of their business and the excess 96 (64%) benefit themselves of advances for their capital. In this way, a greater part of the Women Entrepreneurs benefit themselves of credits for advancing their business.

B. Women Entrepreneurs Awareness on Government Schemes

Both Central and State Governments have presented various plans for the advancement of Women Entrepreneurship. To find out the plans that Women Entrepreneurs are profoundly mindful of, Weighted Average Rank is utilized. The accompanying table reveals the aftereffect of the review.

Table No. 18

Schemes	HighlyAware	Aware	NotAware	Score	Mean	Rank
AnnapurnaScheme	0	18	132	168	1.12	3
	0	36	132			
BharatiyaMahilaBank	0	12	138	162	1.08	5
	0	24	138			
StreeShakti	0	12	138	162	1.08	5
	0	24	138			
Orient Mahila Vikas YojanaScheme	0	6	144			
	0	12	144	156	1.04	7
UdyoginiScheme	0	6	144	156	1.04	7
	0	12	144			
Cent KalyaniScheme	0	0	150	150	1.00	9
	0	0	150			
Mudra YojanaSchemefor Women	12	54	84			
	36	108	84	228	1.52	1
Credit GuaranteeFundScheme	6	3	141	165	1.10	4
	18	6	141			
Thestand–upIndiascheme	6	3	141	165	1.10	4
	18	6	141			
WomenEnterpriseDevelopment Scheme(WEDS)	0	12	138			
	0	24	138	162	1.08	5
SupporttoTraining and Employment Programfor women (STEP)	0	0	150			
	0	0	150	150	1.00	9
Trade Related Entrepreneurship Assistance and Development (TREAD)	0	9	141			
	0	18	141	159	1.06	6
Rajiv GandhiMahila Vikas Pariyojana (RGMVP)	0	3	147			
	0	6	147	153	1.02	8
IndustrialFinanceCorporationofIndia Scheme ofInterestSubsidy for WomenEntrepreneurs	3	21	126	177	1.18	2

The consequence of Weighted Average Score uncovers a greater part of Women entrepreneurs know about Mudra Yojana Scheme for Women, Industrial Finance Corporation of India Scheme of Interest Subsidy for Women Entrepreneurs, Annapurna Scheme and so forth Thus, the Government needs to make attention to its plans among Women entrepreneurs by leading vital ladies business venture mindfulness camps, ads through online media and so forth Further, the state government might make separate ladies business person cell/relationship in each region so Women Entrepreneurs can get lucidity on, and admittance to, valuable plans.

Suggestions

Government should assume liability to connect with the ladies business visionaries through web-based media, public missions, the neighborhood offices of trade and so on Instructive organizations in Sonipat area should hold hands with the Government to make consciousness of business plans. Likewise, Lions and Rotary club individuals ought to likewise stretch out fundamental help to Government for advancing consciousness of business venture plans among ladies business visionaries. Banks in Sonipat area ought to conspicuously show different business visionary plans advanced by the Government at their branches.

Conclusion

The review uncovers that Women entrepreneurs mindful of Mudra Yojana Schemes to begin and extend of salons, educational cost places and fitting units. They are additionally mindful of Industrial Finance Corporation of India Scheme of Interest Subsidy for Women Entrepreneurs, Annapurna Schemes and so on Regardless of the Government drives, a couple of ladies business people are benefited. To expand the quantity of recipients, the state Government needs to embrace a steady checking framework. Further, instructive foundations and social clubs ought to stretch out essential help to Government authorities for making mindfulness among Women entrepreneurs.

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JOB SATISFACTION AMONG SCHOOL TEACHERS HAVING DIFFERENT STREAMS IN RELATION TO THEIR MENTAL HEALTH

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ABSTRACT

The teaching profession is regarding as the noblest profession.It is therefore important that those individuals who join the teaching profession should be dedicated and competent in their work.The present study was conducted to study the job satisfaction of school teachers of different stream in relation to mental healthin the COVID-19 situation.The sample of study comprised of 200 secondary school teachers (100 arts and 100 science) selected randomly from two districts of state Punjab, India giving fairly equal representation to gender and locale. Teacher's job satisfaction scale by Madan and Malik (2019) and Positive Mental Health Inventory by Agashe and Helode (2007) were used to collect data. The result of the study revealed positive correlation between Job satisfaction and mental health for both arts and science teachers.

***Keywords**:* Job Satisfaction, Mental health, School Teachers

1. Introduction

Education has long held a special role in the worldwide community. Many people have emphasized education's central role and unique relevance in national development. 'Education' is a broad term that encompasses a wide range of topics. It could be referring to formal education or the lifelong process of learning from experiences. It has been described as the acquisition of knowledge, attitudes, skills, culture transmission, bringing out and developing one's full potential, disciplining, personality moulding, and emancipation, among other things.

Education is the sum of all the processes through which a person interacts with the society in which he lives, as well as the social processes through which people are exposed to the influence of a carefully selected and controlled environment in order to achieve social competence and optimal individual development. Education has long been acknowledged as the most significant aspect in human growth, contributing to globalization-aware country progress. Education is viewed as a potent tool for bringing about desired changes in a country's socio-cultural life. The entire educational process is moulded and sculpted by the human personality known as the instructor. According to Kothari Commission (1964-66), "The destiny of India is now being shaped in her class-rooms. This we believe is no more rhetoric. In a world based on science and technology, it is education that determines the level of prosperity, welfare and security of the people."

2. Job Satisfaction

Job satisfaction refers to a person's sense of fulfilment or enjoyment at work. Our level of contentment is determined by the ratio of what we have to what we want. Age, gender, salary, length of service, tenure, working conditions, job security, and social status are all important considerations. Job satisfaction is described as the degree to which an individual's needs are met and how that fulfilment is perceived; thus, job satisfaction can be considered a generalised attribute in an individual. As a result, job satisfaction can be defined in terms of human needs and the environmental sources of these requirements.. Job contentment is an attitude that is the outcome of a balanced synthesis of many positive and negative work experiences. It expresses the degree to which an employee's employment expectations and the job's rewards are aligned.

Job satisfaction was mainly classified into two areas-(1) Intrinsic Factors (2) Extrinsic Factors. Intrinsic Factors contain (i) job concrete statements (ii) job abstract statements. Extrinsic Factors contain (i) psycho social aspect (ii) financial aspect like salary, bonus (iii) national growth.

According to Hirschfeld (2000) job satisfaction is the extent to which people like their jobs. According to Statt (2004) job satisfaction can be defined also as the extent to which a worker is content with the rewards he or she gets out of his or her job, particularly in terms of intrinsic motivation. According to Sharma (2019) job satisfaction can be described as the way employees feel about their job and different aspects of their jobs.

3. Mental health

Mental health is a broad phrase that refers to an individual's condition as a result of his mind's moral organization and functioning. The terms "mental health" are made up of two words: "mental" and "health." In general, health refers to a person's physical or mental well-being, as well as the absence of disease. As a result, mental health refers to a sound mental state, a pleasant state of mind, or the absence of mental sickness. Health encompasses more than just physical well-being; it also encompasses an individual's internal psychological equilibrium.Those who are mentally healthy continue to grow, develop, and mature throughout their lives by taking responsibility and finding fulfillment without putting too much of a personal or social price on it. Mental health is critical for maintaining a positive outlook on life and adjusting to new situations quickly. Children's mental health is critical for effective learning and overall personality development. Mental health is important not only in children's lives, but also in the lives of entire communities. Mental health has a significant impact on both personal and societal life.

Good physical health, psychological comfort, intellectually developed, and emotionally controlled, socially adaptable, socially approved goals, sense of satisfaction, flexibility in behavior, enthusiastic and reasonable, healthy habits, attitudes, and interests, healthy philosophy of life, self-understanding, and understanding of environment are all characteristics of a mentally healthy person.

According to the World Health Organization (2004) mental health is a state of well-being in which the individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community.According to Legg and Felman (2020) mental health refers to cognitive, behavioral, and emotional well-being. It is all about how people think, feel, and behave.

4. Review of Literature

No significant difference was found in job satisfaction of teachers on the basis of stream Bala (2015); Kavitha and Venkateswaran (2015); Kumar and Rajendran (2016); Sivakumar and Arun (2019 but Rinsangi (2019) found that there is significant difference in job satisfaction of college teachers of Science and Arts stream.

Significant positive relationship between job satisfaction and mental health was reported by Mistry (2010); Maheshbabu (2012);Baro and Panda (2014) and Singh (2015).whereas Nadinloyi, Sadeghi and Hajloo (2013) revealed significant negative relationship between depression and job satisfaction. Babu (2014) conducted a study and revealed that there is no significant correlation between job satisfaction and mental health.

5. Objectives

1. To investigate the significance of relationship between job satisfaction and mental health ofschool teachers.
2. To investigate the significance of relationship between job satisfaction and mental health of Science school teachers.
3. To investigate the significance of relationship between job satisfaction and mental health of Arts school teachers.

6. Hypotheses

1. There is no significant relationship between job satisfaction and mental health of school teachers.
2. There is no significant relationship between job satisfaction and mental health of Science school teachers.
3. There is no significant relationship between job satisfaction and mental health of Arts school teachers.

7. Sample

Three stage random sampling technique will be used to select sample from the defined population. In the 1ststage two districts will be selected randomly from Punjab state of India.In

the 2nd stage 20 schools from each district will beselected randomly from both rural and urban areas.In the 3rdstage 200 teachers having more than 5 year of regular teaching experience will be selected from selected schools giving fairly equal representation to gender and locale.

7.1 Tools

a) **Teacher's Job Satisfaction Scale (TJSS) by Madan and Malik (2019)** to be adapted by the investigator in the light of present situation. TJSS is a likert type 5 point scale to measure satisfaction with different aspects of the job. The scale has 35 items and response to each item is to be given on a 5 point scale viz -Always, Often, sometimes, rarely and never.There is no time limit for the completion of the test.

b) **Positive Mental Health Inventory (PMHI) by Dr. C.D. Agashe and Dr. R.D. Helode (2007).** PMHI contains 36 items. In this inventory, the subject read the statement carefully and decide on the basis of their first reaction, whether it is 'True' or 'false' for him.There is no time limit for the completion of the test.

8. Results

To investigate the significance of relationship between job satisfaction and mental health for arts, science and total school teachers. Pearson's coefficient of correlation was worked out and the values are given in tables 1, 2, and 3 below:

Table 1: Relationship between Job satisfaction and Mental Health of School Teachers (N=200)

Sr. No	Variables	r
1	Job Satisfaction	0.38*
2	Mental Health	

** Significant at 0.01 level of significance*

Table 1 show that the value of correlation between job satisfaction and mental health of school teachers is 0.38 which is significant ($p<0.01$). Hypothesis 1 which states that "There is no significant relationship between job satisfaction and mental health of school teachers" is thus rejected. This finding is well supported by the studies conducted by Mistry (2010); Maheshbabu (2012);Baro and Panda (2014) and Singh (2015).

Table 2: Relationship between Job satisfaction and Mental Health of Science School Teachers (N=100)

Sr. No	Variables	r
1	Job Satisfaction	0.31*
2	Mental Health	

** Significant at 0.01 level of significance*

Table 2 show that the value of correlation between job satisfaction and mental health of science school teachers is 0.31 which is significant ($p<0.01$). Hypothesis 2 which states that "There is no significant relationship between job satisfaction and mental health of Science school teachers." is thus rejected. This finding is in line with the studies conducted by Mistry (2010); Maheshbabu (2012);Baro and Panda (2014) and Singh (2015).

Table 3: Relationship between Job satisfaction and Mental Health of Arts School Teachers (N=100)

Sr. No	Variables	r
1	Job Satisfaction	0.45*
2	Mental Health	

** Significant at 0.01 level of significance*

Table 3 show that the value of correlation between job satisfaction and mental health of arts school teachers is 0.45 which is significant ($p<0.01$). Hypothesis 2 which states that "There is no significant relationship between job satisfaction and mental health of Science school teachers." is thus rejected. This finding is in line with the studies conducted by Mistry (2010); Mahesh babu (2012); Baro and Panda (2014) and Singh (2015).

9. Conclusion

As the results of present study reveal positive correlation between job satisfaction and mental health for both arts and science teachers as well total teachers.Teachers' mental health is critical for improving the learning environment and service quality. The mental health of the teacher can be improved if he can gain a greater understanding of himself, accept himself primarily as he is, and take an active role in moulding his life rather than simply reacting to demands. In the long run, more job satisfaction is likely to lead to better individual mental health and organizational performance. To improve job satisfaction of teachers, there is

a need to create good organizational climate for better mental health of school teachers in schools. Principals and authorities are advised to appreciate the efforts of teachers in the COVID-19 situation and provide them supportive environment in the schools.

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SOCIAL MEDIA ACTIVITIES: UNDERSTANDING WHAT GENERATION Z STUDENTS DO ON SOCIAL MEDIA - A PILOT SURVEY

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ABSTRACT

Social networking sites have become deeply ingrained in our lives as a result of their ease of use and technical advancement. Generation Z is becoming more interested in consuming, engaging in, contributing to, and sharing various sorts of online material. Earlier studies on Generation Y and Generation Z access to social media raise several questions that have yet to be answered. They focused primarily on the United States and the United Kingdom, ignoring other regions and countries (including India, which has a sizable youth population) with a substantial and rapidly growing share of Generation Y and Z populations, and where the determinants of social-media usability vary enormously. In the present study, an attempt has been made to determine which type of activities have been performed by generation Z students by using social media as well as which activities they favored. Four factors have been extracted by using Factor analysis and an independent T-test has been performed to examine the gender disparities in the use of various social media activities among Generation Z students.

Keywords: *Social Media Activities, Generation Z Students, Information-seeking, Academics, Entertainment, Socialization.*

Introduction

As a consequence of the pioneering nature of computer and Internet technologies, rapid change and advancement are perceived, and social media comes under one of these advancements. Social media can be described as a term that consists of various network-based technologies that facilitate users in creating content (information or experiences) via social media and sharing them individually or in various groups in the form of texts, audio-visuals, and images, etc. Based on different definitions and explanations, various functions of social media are determined, such as social media sites as web-based sites that facilitate communication, the creation of online communities, and the sharing of information within these communities, together with two-way communication. In the education field, it enables interaction between faculty and students, sharing academic content with mates and teachers, etc. (Boyd & Ellison, 2007; Dabbagh& Reo, 2011; Dan V. Dao, 2015). By examining these characteristics, it can be concluded that social media is proficient at meeting learning criteria because users typically do not accept and trust information blindly, but are aware enough to produce their own material based on the information they get. (Dabbagh & Kitsantas, 2012; Solomon & Schrum, 2007). So, social media offers a time and space-independent opportunity to users so that they can easily accomplish their learning activities by contacting their friends (Selwyn, 2009).

Generation Z & Social Media

Brosdahl & Carpenter (2011) divided the generations into three categories based on their birth years: Generation X, Generation Y, and Generation Z. People born between 1961 and 1980 were classified as Generation X, those born from 1981 to 1990 as Generation Y, and those born after 1991 as Generation Z. Because of the 1990s online revolution, Generation Z is the first generation to have easy access to Internet technology, and they have been exposed to an astonishing level of technology in their early years. People in Generation Z typically belong to two groups: school and college-going students or new entrants into organizations. They are often characterized as the most tech-savvy generation, as chatting via social media is an essential part of their routine. They have deep online bonds, which allows them to take a break from the emotional and psychological problems they face in real life. They prefer social sites to communicate and stay in touch with the people they know, and it is essential for them to get feedback or comments regarding their style and the products they use. They also value the opinions of others (Williamson, 2011). This generation

can be called voracious users of online content and has a great affinity for web-based communication as they have the technology at their fingertips (Prakash Yadav & Rai, 2017). There have already been studies on Gen Z's rising use of social media, but a more extensive study on their social media activities and behavioural influence is needed.

Background of the Problem

Hansen et al. (2011) stated that the tremendous improvement in the variety of social media facilitated the users' various new options for interaction. Access to social media through mobile phones makes it easy to use as it is interactive and user-friendly (Ada et al., 2013; Hanna et al., 2011). Many studies (Kabilan et al., 2010; McCool, 2011; Wright, 2010) have shown the use of social media in administrative processes, social processes, academic purposes, entertainment, and information seeking. However, in studies carried out to find out about social media usage habits, it was discovered that social media was mainly used for reading blogs, commenting, examining others' status, listening to music, making friends, and involvement in social and educational activities, etc. (Li, 2007; Vural & Bat, 2010; Lenhart et al., 2010; O'Keeffe et al., 2011; Kocadere & Aşkar, 2013; Ada et al., 2013). Kamiloğlu & Yurttaş (2014) carried out a study on Turkish culture and found Facebook as the most preferred social media platform, which helps with entertainment, acquiring information, and also works as a time-pass activity. Additionally, many studies observed an incessant increase in social media usage (Anderson, 2012) and concluded that youngsters' usage is quite more than adults' usage (O'Keeffe et al., 2011; Lenhart et al., 2010). Generation Z is unaware of a world where smart devices do not exist. In fact, they are spending almost 50 minutes longer than the average (3 hours and 38 minutes) on the Internet. Their problem-solving ways, networking, communication with others, learning, buying, and eventually how they will be highlighted in the workplace have been modernized through the device's having 24/7 access to global information (Jenkins, 2021).

Research Objectives

The objectives of the study are:

1. To identify the activities performed by Generation Z students on social media.
2. To identify the most preferred activities performed by Generation Z students on social media.
3. To find out the gender discrepancies among different social media activities performed by Generation Z students.

Review of Literature

Espinoza & Juvonen (2011) have highlighted the negative effects of excessive internet use and impulsively keeping on checking their profiles, such as depression, isolation, and social anxiety. They also affirmed that these online plugged-in activities surely impact negatively on young users' education and rest patterns, which results in a reduction of their contribution in the real world. Kim et al. (2014)investigated whether Wikipedia and SNS were preferred by the majority of respondents for acquiring information. About 70 percent of participants used other users' reviews and video-sharing sites because they facilitate detailed information, other people's viewpoints, and guidelines. Users check the reliability of the content across diverse sources to evaluate them. They also review feedback from others. Tezci & Icen (2018) used two scales in their study, which revealed that "YouTube" is usually used by the students and it is followed by "Facebook." Gender differences have an imperative impact on social media usage. Students give priority to education purposes, which is followed by entertainment purposes. Social media for social interaction got the least preference. Aillerie & McNicol (2018) explored that most teenagers preferred social networking sites for acquiring information related to social activities. It was also observed that they are not favouring social media sites for academic-related information, but still, some students are using them for such purposes, along with for everyday life information seeking. In the study conducted by Sunar et al. (2018), the majority of respondents agreed that social networking sites affect their habits and nature. 86% of those polled agreed that social networking sites can be an effective tool for e-learning, while the rest preferred

book learning for the best academic results.It was concluded that the consequences of spending more time on social media are a lack of attention and poor academic performance. In his study, Ali et al. (2021) revealed clear differences between social media usage among teenage boys and girls. Communication and interaction are the main purposes of using social media by boys, while girls prefer it for educational purposes. A strong positive correlation has been found between social media usage and the academic performance of students.

Research Methodology

A quantitative approach has been used for this exploratory research design. Participants have been selected from leading educational institutions in Haryana, India by using a self-compiled questionnaire. In addition to demographical data, the questionnaire entailed 5 point Likert Scale questions with response options from 1 to 5 (Strongly Disagree, Disagree, Undecided, Agree, and Strongly Agree). A null hypothesis has been developed with the goal of discovering gender disparities in various social media activities performed by Generation Z students.

H_0: There is no significant effect of gender on the usage of different social media activities.

Participants & Sampling:

Data from 200 participants using a convenient sampling method has been collected for the pilot survey. There are 93 male respondents (46.5%) and 107 female respondents (53.5%). The majority of students, i.e., 143 students (71.5%), belong to the social science faculty. Only 3 students (1.5%) belong to the science and technology as well as engineering streams.

Data Analysis

Objective-1:Identification of activities performed by Generation Z students in social media.

To achieve this objective, a total of 26 statements related to different social media activities have been used to conduct a survey on students as a pilot implementation, and Exploratory Factor Analysis has been performed for the determination of relevant factors.

Table 1: KMO and Bartlett's Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.928
Bartlett's Test of Sphericity	Approx. Chi-Square	4751.246
	df	276
	Sig.	.000

In Table 1, the KMO value for the statements was 0.928. The Bartlett's Test of Sphericity values were observed to be significant ($p<0.05$), which indicates that measures based on items can be factorable. The Varimax Rotation technique has been used to examine factor structures. Items having a 0.50 and above factor loading value were selected as these indicate a factor (Costello & Osborne, 2005). Two statements were excluded because one had a factor loading value of below 0.50 and the other had an overlapping value. Reliability analysis was also carried out, which revealed that overall Cronbach's alpha is 0.96, and reliability for each factor extracted was also found to check the trustworthiness of the scale.These factors explained 76.27% of the total variance.

After determining the number of extracted components, the next step is to analyze and label the factors. This is accomplished through the process of determining which factors are related to which of the original variables.

Factor Identification

According to the variables loaded on each factor, all of the factors have been given proper names. These are explained further below.

Factor 1: Academics-Related Activities

According to the rotated matrix, respondents perceived this component to be the most essential, with a maximum explained variance of 28.018 percent. This factor is heavily weighted in nine out of twenty-four social media activities. This factor is called Academics-Related Activities because it includes statements such as online group discussion, communicating for exam preparation, learning about curricular aspects, collaboration with other students, research for an assignment, reading a pdf of an academic article, sending/receiving an email, etc. As a result, it is observed that the usage of social

media in academics is the most important aspect that Gen Z students consider.

Factor 2: Information-Seeking Activities

It was found to be the second most important factor, accounting for 18.871% of the explained variance. Five features were loaded on to this factor. Sharing new ideas, getting information about the job, watching the news, and general knowledge are highly dependent on this factor, and thus researchers have named this factor "Information-Seeking Activities".

Factor 3: Activities for Socialization

This is the second most significant factor, accounting for 16.748 percent of the explained variance.This factor was loaded with six statements. Social identity, interpersonal relationships, current social events, message posting, sharing photos, videos, or music with others, and message loading are high on this factor, and thus researchers have named this "Activitiesfor Socialization".

Factor 4: Entertainment Activities

This factor, which accounts for 12.63 percent of the variation, is loaded with four types of traits. This element comprises statements such as viewing movies online, playing digital games, interacting in the virtual world, and video communication, hence the term "Entertainment Activities" has been allocated.

Objective-2: Identification of the most preferred activities performed by Generation Z students in social media

To identify the most preferred activity performed by generation Z students, the mean value of every item as well as the overall mean of the four factors extracted by using exploratory factor analysis are calculated.

Table 2: Mean Scores of various items and Factors Extracted

Factor Name	Statements	Mean	Overall mean	Standard Deviation
F1: Academics-Related Activities	Online group discussion.	3.67	3.74	0.94
	Communicating with friends for exam preparation.	3.94		
	Learning about the curricular aspects.	3.64		
	Help from teachers.	3.71		
	Collaboration with other students.	3.66		
	Research for an assignment.	3.83		
	Read a pdf of an academic article.	3.76		
	Sending/receiving an email.	3.85		
	File sharing sites.	3.65		
F2: Information Activities	Sharing new ideas.	3.76	3.81	1.00
	Information about the job.	3.81		
	Watching the news.	3.81		
	General knowledge.	3.93		
	Reading current affairs.	3.77		
F3: Activities for Socialization	Social identity.	3.48	3.57	0.96
	Interpersonal relationships.	3.35		
	Current social events.	3.73		
	Message posting on the website.	3.42		
	Sharing photos, videos, or music with other people.	3.72		
	Messaging	3.76		
F4: Entertainment Activities	Watching movies online.	3.86	3.56	0.92
	Playing digital games.	3.49		
	Engaging in the virtual world.	3.41		
	Video communication.	3.50		

In Table 2, results of the factors show that the highest mean (mean = 3.81, SD = 1.00) concerning the activities performed by students on social media was observed to be for seeking information. This is followed by the activities related to academics (mean =3.74, SD =.94).

Students have almost the same level of social media usage for socialization (mean of 3.57, SD of.96) and entertainment activities (mean of 3.56, SD of.92). With the help of the mean score of each item, it is revealed that students preferred social media for communication with their friends in preparation for the examination as it has the highest mean score (3.94 out of 5). Getting information for enhancing general knowledge is also preferred by students as its mean score is 3.93, and it is followed by watching movies online (3.86). Whereas, engaging in the virtual world (3.41) and maintaining interpersonal relationships (3.35) have the lowest mean values, which hereby indicates that these are the least preferred activities performed by generation Z students on social media.

Objective 3: Determine the gender disparities in various social media activities performed by Generation Z students

To achieve the third objective, an independent t-test analysis was conducted to determine gender disparities among social media activities performed by students.

Table-3: Gender-Based Analysis of Social Media Usage for various activities

Activities	Gender	N	Mean	SD	t	p	Remarks
Activities related to Academics	Male	93	-0.169	1.086	-2.225	**.027**	Significant (p< 0.05)
	Female	107	0.147	0.898			
Information-Seeking activities	Male	93	-0.178	0.983	-2.371	**.019**	Significant (p< 0.05)
	Female	107	0.155	0.993			
Socialization Activities for	Male	93	0.023	0.901	.298	.766	Not Significant (p>0.05)
	Female	107	-0.020	1.083			
Entertainment Activities	Male	93	0.089	0.892	1.169	.244	Not Significant (p>0.05)
	Female	107	-0.077	1.084			

Elucidation:

Null hypothesis, H_0 is partially rejected as the p values of two activities are greater than 0.05, and it demonstrates that there is a significant effect of gender on the usage of social media activities for two factors, i.e., academic-related activities and information-seeking activities. Table 3 shows that the use of social media for academic-related activities differs by gender ($t = -2.225$, $p<0.05$). The social media usage of female participants (mean = 0.147, SD = 0.898) lags behind that of male participants (mean = -0.169, SD = 1.086). Use of social media for acquiring information also varies according to gender ($t = -2.371$, $p<0.05$). Here also, female participants (mean = 0.155, SD = 0.993) lags behind the male participants (mean = -0.178, SD = 0.983). According to the descriptive analysis, it is clear that generation Z boys place a higher value on both activities than girls. Remaining two factors have also been favored by boys more than the girls of generation Z.

Discussion

The present study was conducted with the goal of determining the activities that Generation Z students have participated in as well as their activity preferences. Factor analysis suggests that there are four types of activities, namely: academic-related activities, information activities, activities for socialization, and entertainment activities. All these factors cumulatively explain 76.27% of the total variance, which is considered good in the social sciences.

The first activity is titled "academic-related activities" and was assigned a high loading value, which shows the use of social media for academic purposes is also preferred by students. Technology enhances learning and surpasses traditional techniques in far too many ways. Technologies are enhancing the learning process by providing many formats, a wide range of materials, and a number of delivery channels that are not limited by time, space, or location. It also provides a good platform for teaching and learning, which are very

beneficial for teachers and students. However, studies carried out by Kim et al. (2011) and Aillerie & McNicol (2018) revealed that social media is preferred for academic/course-related research as well as for acquiring information related to social activities. Tezci & Icen (2018) also concluded that social media is used for academic purposes on a priority basis. Moran et al. (2011) found social media usage for educational purposes at a low rate, but it was also affirmed that online videos are preferred by students for fulfilling educational purposes. The second activity, titled "information-seeking activities," has made it evident that social media has covered the entire world for accessing and disseminating information online. It consists of a wide range of communication channels, is considerably popular among students, and helps them with collaborative learning. Information seeking purposes have the highest mean values, which reflects that it is the most preferred social media activity performed by students. Various researchers' studies (Kim et al., (2011), Kim et al., (2014), Aillerie & McNicol (2018), Kamiloğlu & Yurttaş (2014)) have similar results. Pepitone (2010) also agreed that social media is an innovation that has really gained considerable use as an information source. The next important activity is socialization. In the present scenario, everyone is so busy posting their achievements and many other updates to stay in touch with their online friends as well as their relatives who are far away. This is considered a good way to maintain interpersonal relationships. Focusing on the results for socialisation purposes, it is revealed that they are not so much preferred by students. Tezci & Icen (2018), Dabbagh & Kitsantas (2012), Karpinski & Duberstein (2009), and Rithika & Salvaraj (2013) have also concluded the same results, that social interaction via social media is least preferred.

Last but not least, there is recreational activity. It has been observed that entertainment is vital since it brings everyone together and helps in making bonds with others. Social media brings joy and supports the relaxation of tension to a considerable extent. It diverts people's attention away from their stressful lives and entertains them in their spare moments.Using social media for entertainment has the lowest mean in the present study. There is not much difference in the mean values of socialization activities and entertainment activities. Nonetheless, it has the lowest mean of all, indicating that it is the least preferred by students. However, in a study conducted by Lin & Lu (2011), enjoyment was concluded as the most desirable purpose of using social media. The ultimate purpose was to uncover gender differences in social me dia activity use. On the basis of a review of literature, hypotheses were formulated that there is no effect of gender on the usage of different social media activities. The null hypothesis was partially rejected on this basis.

Conclusion

Despite being aware of the risks associated with embracing social media for various purposes, Generation Z students are mature enough to benefit from it. This research examined the activities that generation Z students are involved in using social media along with their activity preferences. Gender differences in social media use have also been stated. According to the findings, Generation Z students primarily use social media for four purposes: academics, information, socialization, and entertainment. As we are aware that numerous forms of information are available online, students are meeting their demand for gaining information on work, current affairs, general knowledge enhancement, news events, and new perspectives on something with the help of social media itself. Generation Z students are also adopting social media for their educational and academic needs, as social media tactics assist them in confronting the uncertainties surrounding education in the modern scenario. The findings confirmed the existence of gender inequalities in social media usage. All the concerned stakeholders, like educational institutions, parents, instructors, and media professionals, should administer social media usage so that everyone can benefit from technological improvements.

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PROBLEM OF STUBBLE BURNING: A CASE STUDY OF PUNJAB

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ABSTRACT

Agricultural pollution due to stubble burning is the main issue in North-western states like Punjab, Haryana and Uttar Pradesh. The stubble burning leads to the hike in greenhouse gases like CO_2, N_2O, NO_2, SO_2, Methane, etc., which threatens sustainable developmental goals. Since stubble burning happens between October to December the combination of smog and fog leads to severe air pollution. These harmful gaseous emissions lead to an increase in a high fatality in Human beings due to various diseases like asthma, chronic bronchitis, which decreases lung function. Stubble burning also leads to an increase in Global warming by the depletion of the Ozone. The stubble burning can be reduced only when the farmers are aware of its after-effects and alternative solutions like the use of rice stubble as fodder, in bio thermal plants, bio-oil paper production and biogas production etc. Paddy straw can also be incorporated into the soil thus increasing the fertility level. It can also be used in energy technologies and thermal combustion. An integrated crop residue management approach is the need of the hour to control this human-indexed catastrophe.

Keywords: *Stubble burning, pollution, Punjab*

Introduction

Stubble burning is one of the biggest agricultural-based pollutions resulting in a hike in greenhouse gases and thereby threatens sustainable development. This stubble burning is a recent phenomenon since the emergence of the green revolution. Green revolution becomes successful, in northwestern states like Punjab and, Haryana. The emergence of the green revolution led to the commercialization of agriculture. Traditionally the topography of Punjab is not suited for the cultivation of rice but the availability of water resources forced Punjab to cultivate rice along with wheat to meet the food requirements of the growing population and make our country an agriculturally self-sufficient country. Since Rice cultivation leads to an increase in rice stubble and traditionally Punjab did not use this rice stubble for fodder, no alternative available was economically beneficial to the poor farmers. Hence they used to burn the stubble which was very cheaper compared to other alternatives.

Burning paddy straw results in nutrient losses of 3.85 million tons of organic carbon.59000 tonnes of nitrogen,20000 tonnes of Prosperous and 34000 tonnes of potassium. (Reddy.et.al2019). As per the data provided by the government based on satellite aggregation,9434 cases of stubble burning were reported between sseptember21 and October 21 in the Punjab state. (Vikas Vasudeva, The Hindu,2020). Since the paddy harvesting gaining pace in Punjab, the key rice-producing is witnessing a large hike in the burning of Kharif crops this year. (Vikas Vasudeva, The Hindu2020).

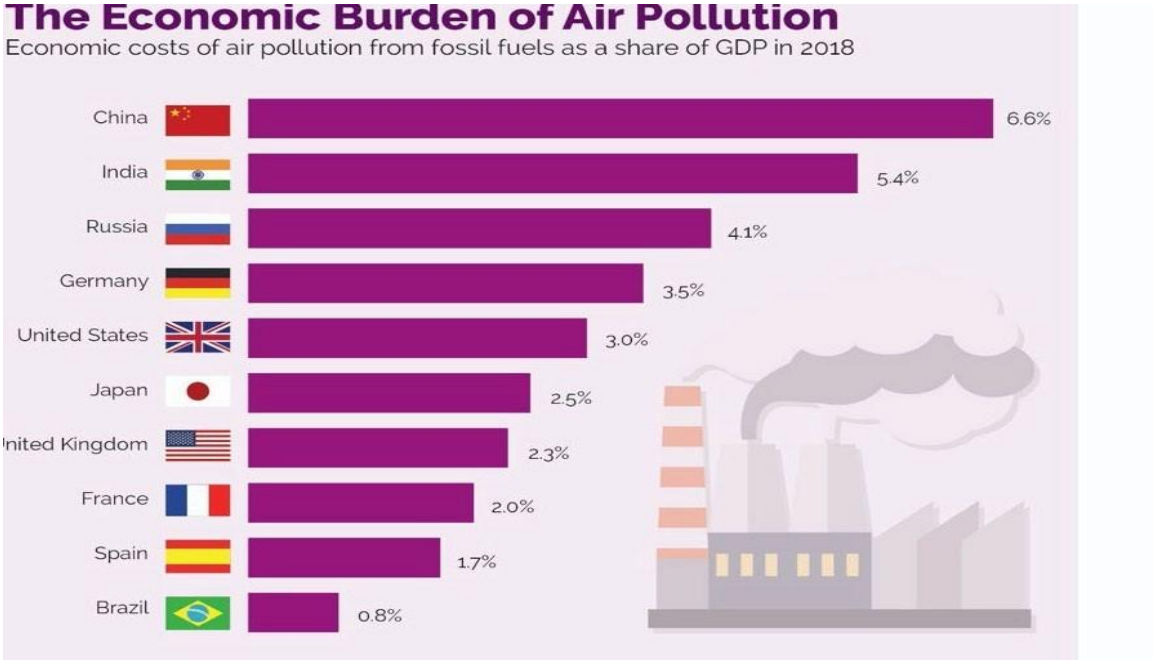
The rise of co2 in the atmosphere during stubble burning results in the death of the animal and human beings by polluted air, as the high levels of concentration of co2 in the blood, can convert normal haemoglobin into deadly haemoglobin and cause severe impacts on people vulnerable to respiratory deceases and cardiovascular decease, children and pregnant women are most vulnerableto the pollution. (P. Kumar et.al 2015). After the harvesting of grain, residual biomass is left in the form of stubble. Every year a huge amount of straw, stem etc. are produced

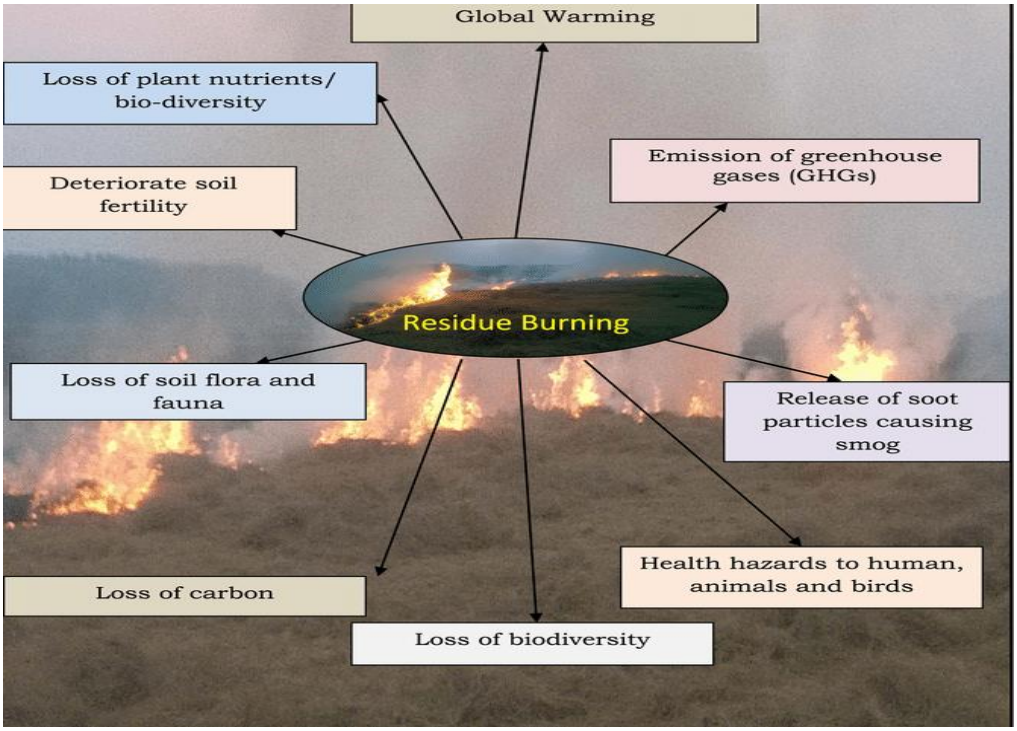
(Jain.et.al2014). The main cause of stubble burning since 2009 is due to the policy adopted by the Punjab government to save the groundwater exploitation i.e. delaying by harvesting of Kharif cropsso that seasonal rain could replenish the groundwater before diverting it into agricultural purposes. Rice straw in Punjab and Haryana contains a large amount of Silicon and thus it is non palpable to animals. In this case, if the stubble is used as fodder, it will impact the quality of milk. It has been verified that the quantity of calcium in the milk decreases by a minimum of 2 per cent if rice is used as fodder (Reddy et.al 2019). Farmers of Punjab are forced to burn stubble

due to the lack of labour during the harvesting period and due to the limited time to prepare the field for harvesting of Kharif crops. Since other alternative methods are costlier, they preferred to return the stubble. (Reddy et.al 2019

Living in an area with high air pollution from intense crop residue burning (CRB) is leading to a hike in risk by severe acute respiratory infection ARI especially among children less than five years in Northern India. This crop residue burning leads to a loss of over USD 30 BILLION annually. (IFI) partner institute.

Consequences of stubble burning





Air pollution results in the direct long-run effects of pollution on human capital accumulation and other socio-economic indicators. It has been found that severe air pollution not only increases the infant mortality rate but also cause retardation and delays in the

normal development of surviving children. Air pollution affects working adults also since severe respiratory problems will affect their job-related performance thereby sincerely jeopardizing their lifetime economic well-being (Kim et.al 2017). Pollution is a heterogeneous entity and produces highly variable effects on human biology and health. It affects mortality, morbidity reproduction and development. Severe air pollution effects tend to produce chronic and sub lethal effects, although they can affect the vulnerable section of society. (Children and old people) (M Schell and Dehnam 2003). The table represents the amount of crop stubble burned in India.

Rice	44	Thumaty et al. (2015)
Wheat	24	Thumaty et al. (2015)
All Crops	98.58	Jain et al. (2014)
All Crops	131.9	IPCC (2006)
All Crops	127	Mehta (2004)
All crops	133.14	Garg (2008)
All Crops	84	Pratika and Sandhu (2020)
All crops	70.8	Badarinath et al. (2006)
All crops	133.14	Garg (2008)
All crops	350	Mandal et al. (2004)
All crops	347	Gupta et al. (2004)
All crops	184.9	Agarwal et al. (2008)

It has been found that due to stubble burning, the cost of health problems is high among Punjab people. During the stubble burning season family of many farmers suffered from irritation in the eyes and congestion in the chest. They had to spend Rs 300 to 500 per householdon medicine. (Kumar et.al 2015). It has been found that the contribution of stubble burning in airpollution is very high. The air quality becomes austere mostly between October and November across north Indian states (Mishra 2019). The AQI of urban areas is most affected by stubble burning because of the emission of pollutants from vehicles and industries leading to severe air pollution (Mishra 2019). The number of death rates due to air pollution is increasing considerably, especially in South andCentral Asia. The number of deaths attributed due to air pollution increased considerably from1.5 million to 1.2 million between 1990 and 2015(Sharma et.al 2019). The residents of Indo Gangetic plain regions were reported to have lesser life expectancy compared to other Indian regions (Kapil 2019). This is the reason why south Asian countries are characterized by the highest no of premature deaths due to prolonged exposure to high concentrations of greenhousegases and particulate matter (Lieu et.al 2018). Due to stubble burning the soil temperature increases as a result 23.73% of the nitrogen in various forms is removed from thesoil, and the beneficial microbes also decline to the depth of 2.5 cm in the soil. (Kumar et.al 2015).

Month	**PM10 (µg/m^3)**					**NO2 (µg/m^3)**					**SO2(µg/m^3)**				
	2017	**2018**	**2019**	**2020**	**2021**	**2017**	**2018**	**2019**	**2020**	**2021**	**2017**	**2018**	**2019**	**2020**	**2021**
January	-	108	204	96	111	-	12	14	14	12	-	6	7	7	7
February	-	83	119	123	104	-	12	12	17	14	-	6	7	8	8
March	-	111	115	94	106	-	13	12	12	19	-	7	7	7	10
April	-	114	119	--	120	-	13	13	--	18	-	7	7	--	7
May	-	126	111	-	123	-	13	14	-	13	-	7	7	-	7
June	-	203	115	91	86	-	13	12	15	15	-	7	7	7	7
July	-	100	102	99		-	13	13	14		-	7	7	8	
August	64	166	82	49		10	13	12	14		5	7	7	7	
September	64	86	111	70		10	12	13	15		6	7	8	8	
October	111	84	114	80		12	12	15	15		7	7	8	8	
November	175	138	133	-		14	14	15	-		8	7	8	-	
December	91	148	87	103		14	16	12	14		5	7	7	7	
Annual Avg.	**101**	**122**	**118**	**89**		**12**	**13**	**13**	**14**		**6**	**7**	**7**	**7**	

Comparative Values of PM10, SO2 &NO2 µg/m^{3}for the year 2017-21

Rural Area Station Name**: - Satyam College, Vill. Kotla Doom, Ramtirath Road, Distt. – Amritsar**

Source; https://ppcb.punjab.gov.in

Month	PM10 (µg/m^3)					NO2 (µg/m^3)					SO2(µg/m^3)				
	2017	2018	2019	2020	2021	2017	2018	2019	2020	2021	2017	2018	2019	2020	2021
January	302	288	176	161	197	28	26	23	26	26	17	15	13	12	13
February	179	220	132	163	160	23	23	20	27	26	13	14	12	12	13
March	207	167	102	136	162	23	21	21	29	27	11	12	12	12	13
April	198	204	136	--	174	24	22	21	--	25	13	12	13	--	11
May	194	245	131	--	153	25	22	22	--	31	14	11	13	--	12
June	220	290	119	149	168	25	21	21	28	33	14	12	12	13	11
July	131	147	108	125		19	19	22	26		11	11	12	12	
August	120	153	122	112		19	18	25	25		11	11	12	12	
September	111	140	128	142		20	22	28	26		11	14	12	12	
October	246	173	159	188		26	24	29	28		12	11	13	13	
November	354	167	135	250		25	19	26	26		13	10	12	13	
December	293	245	159	188		26	24	28	28		15	12	12	13	
Annual Avg.	**213**	**203**	**134**	**161**		**24**	**22**	**24**	**27**		**13**	**12**	**12**	**12**	

Comparative Values of PM10, SO2&NO2 µg/m^{3}for the years 2017-2021
Station Name: - Punjab Pollution Control Board office building, near water Tank,Focal point, Jalandhar. https://ppcb.punjab.gov.in

Month	PM10 (µg/m^3)					NO2 (µg/m^3)					SO2(µg/m^3)				
	2017	2018	2019	2020	2021	2017	2018	2019	2020	2021	2017	2018	2019	2020	2021
January	131	162	188	187	192	23	48	29	26	32	10	10	14	9	11
February	120	158	140	189	219	22	47	18	32	36	9	7	9	10	11
March	102	180	135	179	190	21	53	20	29	40	7	9	12	9	12
April	127	241	189	--	184	23	45	26	--	42	9	7	18	--	12
May	122	188	136	131	147	23	34	26	22	27	9	8	15	7	11
June	131	252	153	144	168	24	32	19	22	27	11	10	18	7	10
July	131	126	144	117		23	16	15	22		9	6	9	6	
August	119	73	116	133		22	11	31	22		7	5	41	6	
September	158	96	135	143		23	17	32	24		11	9	12	9	
October	209	177	138	187		25	33	31	29		10	11	10	11	
November	326	209	174	300		48	25	30	36		13	13	8	16	
December	251	183	162	179		43	31	27	32		10	13	9	10	
Annual Avg.	**161**	**170**	**151**	**172**		**27**	**33**	**25**	**27**		**10**	**9**	**15**	**9**	

Station Name: -Nahar Industrial Enterprises Ltd, Industrial Area – A,Ludhiana(Earlier Rita Sewing Machine, Industrial Area-A, Ludhiana)**Source: https://ppcb.punjab.gov.in**

Month	PM10 (µg/m^3)					NO2 (µg/m^3)					SO2(µg/m^3)				
	2017	2018	2019	2020	2021	2017	2018	2019	2020	2021	2017	2018	2019	2020	2021
January	101	173	175	130	135	33	40	39	36	25	6	7	8	7	10
February	108	123	116	118	98	30	40	37	26	24	6	7	7	7	7
March	111	149	145	112	128	28	41	43	27	24	6	6	7	7	9
April	98	137	132	--	112	38	36	36	--	18	6	7	7	--	7
May	104	140	153	118	110	29	38	39	16	22	6	7	8	8	9
June	101	142	136	119	101	28	38	38	17	25	6	7	7	9	10
July	118	134	133	85		30	37	37	20		6	7	7	6	

August	114	131	126	70		36	37	37	17		7	8	7	6	
September	120	117	132	104		37	36	37	14		7	7	7	7	
October	201	117	102	129		45	37	35	27		8	7	5	9	
November	277	136	143	123		41	41	24	25		9	8	7	8	
December	174	138	131	130		40	40	29	26		13	8	7	9	
Annual Avg.	**136**	**136**	**135**	**113**		**35**	**38**	**36**	**23**		**7**	**7**	**7**	**8**	

Comparative values of PM10, SO2 and NO2(**µg/m^3**)
Station Name: - **United Iron & Re-rolling Mill, Amloh Road, Mandi Gobindgarh. Source: https://ppcb.punjab.gov.in**

Month	**PM10 (µg/m^3)**					**NO2 (µg/m^3)**					**SO2(µg/m^3)**				
	2017	**2018**	**2019**	**2020**	**2021**	**2017**	**2018**	**2019**	**2020**	**2021**	**2017**	**2018**	**2019**	**2020**	**2021**
January	123	161	181	129	130	33	41	39	34	26	6	7	7	7	9
February	110	110	157	121	105	32	42	39	31	22	6	7	8	7	7
March	103	119	138	113	117	29	38	39	29	24	6	7	7	7	8
April	104	183	169	--	110	32	35	37	--	17	6	7	7	--	8
May	102	135	160	105	107	28	39	38	17	23	6	7	8	9	8
June	103	143	139	112	102	28	37	37	16	26	6	7	7	6	9
July	122	147	162	86		31	39	38	15		6	7	7	6	
August	106	116	131	74		36	38	38	19		7	7	7	6	
September	112	111	141	113		39	38	38	13		7	7	7	8	
October	205	133	110	127		45	38	36	27		9	8	6	9	
November	277	156	144	132		42	38	21	26		9	8	6	8	
December	195	138	122	106		38	41	25	23		8	7	7	9	
Annual Avg.	**139**	**138**	**146**	**111**		**34**	**39**	**35**	**23**		**7**	**7**	**7**	**7**	

Comparative values of PM10, SO2 and NO2 **(µg/m^3)**
Station Name: - Modern Automotive Industry Ltd, Vill-Chatarpura, Near Focal Point, Mandi Gobindgarh (Earlier Modi Oil & General Mills, Arya School Road, Mandi Gobindgarh)
Source: https;//ppcb.punjab.gov.in

Month	**PM10 (µg/m^3)**					**NO2 (µg/m^3)**					**SO2(µg/m^3)**				
	2017	**2018**	**2019**	**2020**	**2021**	**2017**	**2018**	**2019**	**2020**	**2021**	**2017**	**2018**	**2019**	**2020**	**2021**
January	110	162	175	135	132	32	41	31	34	25	6	7	8	7	10
February	108	102	116	114	101	32	41	37	30	23	6	7	7	7	7
March	101	119	153	120	123	27	38	38	29	26	6	7	7	7	9
April	106	171	174	--	107	31	33	34	--	19	6	7	7	--	6
May	108	116	149	102	105	29	37	37	17	20	6	7	8	8	7
June	97	145	128	113	105	28	36	36	16	22	6	7	7	7	8
July	122	129	124	78		31	36	37	14		6	7	7	6	
August	109	123	123	72		35	38	38	18		7	7	8	6	
September	117	116	133	105		38	38	37	14		7	7	7	7	
October	194	123	105	142		43	37	34	28		8	7	7	10	
November	265	146	145	123		43	38	29	26		8	8	7	8	
December	186	139	136	110		42	37	31	23		8	8	7	10	
Annual Avg.	**135**	**133**	**138**	**110**		**34**	**38**	**35**	**23**		**7**	**7**	**7**	**8**	

Station Name: - Dhiman Steel Rolling Mills, Guru ki Nagari, Mandi Gobindgarh(Earlier M/s Raj Steels, Guru ki Nagari, Mandi Gobindgarh).**Source:https;//ppcb.punjab.gov.in**

Table 3. The central pollution control board, India's AQI and particulate standards Central Pollution Control Board, 2014)			
AQI Ranges	**PM10 (24-hr)**	**PM2.5 (24-hr)**	**Category**
0-50	0-50	0-30	Good
51-100	51-100	31-60	Satisfactory
101-200	101-250	61-90	Moderate
201-300	251-350	91-120	Poor
301-400	351-430	121-250	Very Poor
401-500	430+	250+	Severe

Objectives: To find out the contribution of stubble burning in hiking of air pollution in Punjab by increasing the concentration of PM10, SO2 in the air.

Hypothesis:
Null Hypothesis: There is no significant difference in the values of PM10, SO2 From Septemberto December in the Jalandhar district of Punjab in the year 2020.
Alternative Hypothesis: There is a significant difference in the values of PM10, SO2, from September to December in the Jalandhar district of Punjab in the year 2020.

Methodology: The methodology used here is a secondary method of data collection and data are collected from various secondary sources like the Punjab pollution control board, research article newspaper and magazine. For proving our hypothesis, we take the values of PM10, SO2, and NO2 From January to December in the Jalandhar district of Punjab in the year 2020.

I used paired t-test for analyzing my studies and the formula for the paired t-test is

$$t = \frac{\sum d}{\sqrt{\frac{n(\sum d^2)-(\sum d)^2}{n-1}}}$$

Where d= Difference paired value.n=Number of samples.

Month	PM10	NO2	Difference	D2
Jan	161	26	135	18225
Feb	163	27	136	18496
March	136	29	107	11449
April	136	21	115	13225
May	131	22	109	11881
June	149	28	121	14641
July	125	26	99	9801
August	112	25	87	7569
September	142	26	116	13456
October	188	28	160	25600
November.	250	26	224	50176
December	188	28	160	25600
			1569	220119

$$t = \frac{\sum d}{\sqrt{\frac{n(\sum d^2)-(\sum d)^2}{n-1}}}$$

t= 1569/√12(220119-(1569)*(1569)/11
=1.003
Decision on a hypothesis:

Based on the P-value
As the p-value =1.003is greater than the level of significance i.e 0.05 so the null hypothesis is rejected and the alternative hypothesis is accepted.

Table 3. The central pollution control board, India's AQI and particulate standards (Central Pollution Control Board, 2014)

AQI Ranges	**PM10 (24-hr)**	**PM2.5 (24-hr)**	**Category**
0-50	0-50	0-30	Good
51-100	51-100	31-60	Satisfactory
101-200	101-250	61-90	Moderate
223.01-300	251-350	91-120	Poor
301-400	351-430	121-250	Very Poor
401-500	430+	250+	Severe

Limitation of the study: This study is purely based on the secondary data which is collected from the Punjab pollution control board website, newspaper and other materials. More study is required based on primary data collection using the questionnaire method.

Management Of Stubble Burning

There are several methods adopted regarding the management of stubble burning. Incorporation of residues in the soil.

Establishment of the marketplace for crop residue burning.Creating public awareness.

Providing subsidies on the agricultural implement.

Encouraging crop diversification.

Introducing machines like a happy seeder and stubble burry scheme method. Straw decomposing bacteria and fungi.

Use of rice residues as fodder for animals.

Creating scope for skilled and Semi-skilled operations under MNREGA. Since stubble wastes can be directly collected by the farmers and by labourers employed under MNREGA they can employ many people.

Inefficiency in agriculture and lack of market access to farmers and lack of post-harvest storage facilities becomes a big hurdle for farmers regarding the proper use of their stubble.

Conclusion

Stubble burning is a recent phenomenon that emerged in the northwestern agro- economy due to the introduction of rice-wheat cropping patterns. Since stubble burning is a threat to sustainable development since it pollutes the air and creates health problems among all living beings, the practice should be completely avoided. For this, it is essential to understand thevarious social-economic issues among farmers that forces them to stubble burning. All essential steps that encourage farmers to use their stubble in an eco-friendly way rather than burning should be encouraged by Government and must adopt these steps and provide all the facilities to farmers at acheaper rate so that it is economically beneficial for them which will prohibit them from burning the stubble.

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FACTORS INFLUENCING ONLINE FOOD ORDERING AND DELIVERY SERVICES - AN EXPLORATORY STUDY

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ABSTRACT

Purpose *- The basic idea of this study is to evaluate the factors influencing the expectations of online food ordering and delivery service consumers. The aim of the study is to explore the behavioral aspects of consumers of the online food industry in an emerging economy, India.* ***Design/methodology/approach*** *- Study collected the data from 200 respondents and analyzed it using qualitative and exploratory approach. Collected data was statistically analyzed using factor analysis, to conclude the major influencing factors of the online food ordering and delivery services.* ***Findings*** *- Results found service design as the strongest factor, convenience as the next important factor, service attractions as the third factor and price as the weakest factor, affecting the choices of the customers of online food ordering and delivery services.* ***Practical implications*** *- This study offers practical implications to both, the developers of online food services and the restaurants and provides mapping of factors affecting consumer's intention to use online food ordering and delivery services.* ***Originality/value*** *- The industry of online food aggregators is growing and demands more research for better insight by practitioners and researchers. This paper expands limited existing research in the field of online food business and explores consumers adoption behaviours that are critical for the success of the providers of online food delivery services.*

Keywords*- Online food services, Service design, Convenience, Service attractions, Price*

Introduction

The growth of technology including internet has considerably impacted the e-commerce and online retailing advancement. Improvement of telecommunication infrastructure, easy affordability of smart devices, together with lack of time, more convenience and increasing purchasing power have forced the providers to integrate technology into business and cater to rising needs of the people (Machado and Pigatto, 2017).

In a report by India Brand Equity Foundation (IBEF), it was reported that e-commerce has transformed the way the business is done in India. The size of e-commerce market in India is expected to grow to US$ 111.40 billion by 2025 from US$ 46.2 billion as of 2020. This trend is facilitated by the growing number of smart phone users. According to a report publish by IAMAI and Kantar Research, in India internet users are expected to reach 900 million by 2025 from 622 million in 2020, increasing at a CAGR of 45% until 2025 (Report: September 2021). It indicates that more than 60% people of India will be having access to the cheap data for availing online services and thus, engaging in online shopping. The global scenario in this context is much ahead as digitalization globally had taken place much earlier as compared to the Indian landscape.

The idea of online food delivery is growing fast owing to increase in the number of working population, growing number of smart phone users, e-commerce and digital marketing in India (Das and Ghose, 2019). Customers of online food ordering and delivery services value convenience and ease as these services have eliminated the frustration of poor weather and traffic congestions (Ha, 2013).

Although many of the previous researches arecentered on online shopping behaviour of consumer but, not much has been explored in thefield of online food delivery business (Sethu and Saini, 2016).Therefore, there is poor understanding of consumer behaviour for the consumers, shopping online fromonline food industry in the growing market of India. This research contributes to the existing body of knowledge of online food delivery business through the identification of factors that are responsible for affecting the choices of the customers of online food ordering and delivery services in a developing country. With new players entering into the market, it becomes mandatory to understand the consumer behaviour and to determine the factors critical to the success of emerging business of online food delivery services, in the Indian market.

Review of Literature

Ramos (2021) researched to find the factors influencing customers usage intention of food delivery apps during COVID-19 quarantine. Results were based on the Unified Theory of Acceptance and Use of Technology 2 and showed that effort expectancy, food and beverage quality, performance expectancy and price saving orientation influenced the customers' continuous usage behaviour.

Prasetyo et. al. (2021)undertook research during new normal of Covid-19 to determine the factors affecting the customer loyalty and satisfaction in online food ordering and delivery services in Indonesia, based on extended theory of planned behaviour (TBH) approach. Results based on structural equation modelling (SEM) concluded that hedonic motivation had the highest effect on customer satisfaction and loyalty followed by information quality, price and promotion. It was also found that navigational design and perceived ease of use were insignificant in influencing customer satisfaction and loyalty for online food delivery services during new normal of Covid -19.

Ghosh (2020) explored the factors influencing satisfaction of customers in consumption of fast food through online medium. Study on the basis of principal component factor analysis found five factors that could assist service marketeer in formulation of strategies catering to online food consumers. The most important factor identified was quality followed by customer service, price, time and deliverythat significantly affected the satisfaction level of customers of online food.

Gunden et. al. (2020) in their study examined the consumers intention to use online food delivery services. The findings showed that performance expectancy was the strongest factor responsible for affecting consumers intention to use online food delivery services, followed by self-image. Less impactful factors include mindfulness and habit, while impulse buying propensity had a negative impact on the consumers intention to use online food delivery services.

Saad (2020) conducted research to evaluate the factors affecting the consumer choices while online food ordering and to study consumer behaviour in the online food delivery industry. Study found direct factors including delivery time, price, service quality and condition of food delivered and Indirect factors constituting menu, delivery tracking service, variety and number of restaurants and attitude of delivery person as the important factors affecting the success of online food delivery industry.

Kapoor and Vij (2018) made research to examine how mobile app attributes of online food aggregators affects the purchase decision of the consumer by empirically testing mobile appattribute-conversion model. The results showed that information design, visual design, navigational design and collaboration design of the online food aggregators affect the purchase decision of their consumers and result into conversion.

Pigatto et. al. (2017) made a study in Brazil to characterise the performance of online food companies and to evaluate the content of website of online food companies. The study showed that dimension 'content' was with the highest incidence of attendance followed by 'functionality' and 'usability'.

Objective of The Study

In the light of the above discussion, this study empirically examines the factors influencing the online food ordering and delivery services.

Scope of The Study

The Study includes responses from the consumers of online food ordering and delivery services and is limited to few states of north India. It focuses purely on the services, which brings food from the restaurants, direct to the customers doorstep as per their choices.

Methodology

Research is based on the primary data which was collected randomly from the customers of online food ordering and delivery services across the Indian cities, through a web-based survey. For data analysis descriptive analysis and factor analysis were employed.

Sample Size

Determining the minimum sample size for factor analysis is not straight forward and involves subjectivity (Pearson and Mundform, 2010). There is difference in opinions of researchers, regarding determination of sample size in factor analysis (Williams et al., 2010; Tabachnick, 2007; Hogarty, 2005; Hair et al.,

1995, Gorsuch, 1983). Some of the recommendations regarding minimum sample size (N) are:

- Minimums for sample size ranges from 100 to over 1,000. (Mundfrom et at., 2005)
- Any sample size over 300 is considered adequate. (Kindle., 2017)
- Sample size greater than 500 is considered good. (MacCallum et al., 1999)

Comrey and Lee (1992) offered a rough rating scale for adequate sample size in factor analysis: 100 = poor, 200 = fair, 300 = good, 500 = very good, 100 or more = excellent. They urged researchers to obtain samples of 500 or more observations whenever possible in factor analysis studies. To determine the sample size, many researchers also recommended minimum sample to variable ratio as 3:1, 6:1, 10:1, 15:1, 20:1.Number of variables in the study are 6, and considering 20:1 as minimum sample to variable ratio, the size of the sample should not be less than 120.On the basis of these recommendations, the sample size of this study was selected as 200 (see Table 1). The study surveyed 200 consumers of online food ordering and delivery services, to develop consumer profile and to determine factors influencing these services.

Sampling Technique

Non-probability judgemental sampling technique was used in selection of respondents and collection of data. From the target population, only those were allowed to participate in the survey,who were the users of online food ordering and delivery services. In the study target population was a mix of students, business persons, private and government employees.

Survey Instrument

With the help of structured questionnaire as a research tool, primary research has been undertaken. Questionnaire included closed-ended questions and ratings on 5-point Likert scale.

Analysis Tool

Data collected was analysed using MS-Excel and SPSS. The statistical software tool SPSS 26 was used for analysis in the study. Firstly, descriptive analysis was conducted for the consumers of online food ordering and delivery services. The statistical significance was determined with a p-value<0.05. Finally, factor analysis was undertaken using PCA as the data reduction technique for identifying non-overlapping factors.

Data Suitability for Exploratory Factor Analysis (EFA)

Online food ordering and delivery services is a new and a growing concept, and hence the exploratory factor analysis (EFA) technique was used in the study. EFA was performed to increase the reliability of the variables by identifying the overlapping variables, that can be removed (Watkins, 2018). To find if factor analysis is appropriate, with the selected sample size the Kaiser–Meyer–Olkin (KMO) test and Bartlett's Test of Sphericity (BTS) are carried out (Shkeer and Awang, 2019). If KMO is greater than 0.6 and the BTS significance $\alpha < 0.05$, then factor analysis can be done with the sample data (Hair et al., 2010). Adequacy of the sample was verified using Kaiser–Meyer–Olkin (KMO) test and Bartlett's Test of Sphericity (BTS) was applied to know if the dataset was suitable for factor analysis. Factor analysis began by obtaining eigen values for all the factors. The KMO value of this study is 0.932 the significance level for BTS is 0.000 confirming the suitability of the sample data for factor analysis (Table-1).

Table1-KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.932
Bartlett's Test of Sphericity	Approx. Chi-Square	2416.846
	df	325
	Sig.	.000

Source: Primary Data

Data Analysis and Discussions

Table2-Demographic profile of respondents (N=200)

Demographic variable	Group	N=200	Percentage%
Gender	Male	96	48
	Female	104	52
Age	Up to 24	109	54.5
	25-34	68	34
	35 & above	23	11.5
Education	Higher Secondary	35	17.5
	Graduate	78	39
	Post Graduate and Above	87	43.5
Occupation	Student	98	49
	Home-Maker	10	5
	Self-employed	31	15.5
	Salaried	47	23.5
	Professional	14	7
Monthly Income	Up to 50,000	83	41.5
	50,000-1,00,000	67	33.5
	Above 1,00,000	50	25

Table 2 shows that the primary data comprises 200 households selected from Indian cities. The demographic profile shows that from 200 respondents, 96 (48%) male and 104 (52%) female participated in the study. Of the respondents, 109 (54.5%) belongs to up to 24 age group, 68 (34%) belongs to 25 to 34 years age group and only 23 (11.5%) belongs to age group of 35 & above. Out of 200 respondents, 35 (17.5%) are educated up to the level of higher secondary, 78 (39%) are graduate and 87 (43.5%) are from the education level of post-graduation and above. Of the respondents, 98 (49%) are students, 10 (5%) are home-maker, 47 (23.5%) are salaried and 14 (7%) are professional. As far as monthly income is concerned, 83 (41.5%) respondents reported their income is up to 50,000 rupees, 67 (33.5%) reported between 50,000 to 1,00,0000 rupees and 50 (25%) reported their income more than 1,00,000 rupees.

Table-3 shows the results of exploratory factor analysis. It is a data reduction technique applied on 24 items to determine the important factors influencing online food ordering and delivery services. Principal component analysis has been used as the extraction method and the factors with the Eigen Value > 1 were considered while extracting the factors. Principal component analysis extracted four factors, which explained 55.358% of the variances. The statements with factor loadings > 0.40 were considered in the corresponding factor. Table shows that Factor1 is the linear combination of the variable number 14,16,20, 18,17,12,15,11,22. Factor2 is the linear combination of the variable number 8,5,7,6,21,9,10. Factor3 is the linear combination of the variable number 25,26,23,19. Factor4 is the linear combination of the variable number 2,1,3,4.

Table3-Description of Exploratory Factor Analysis

	Statements	Factor Loading	Eigen Value	Variance Explained	Cronbach Alpha
Factor1	Multiple restaurants	.736	4.313	17.972	.870
	Restaurant search locator	.664			
	Quick calculation of price and other charges	.663			
	Dynamic search feature	.650			
	Detailed digital menu	.532			
	Staff courtesy	.528			
	Restaurant contact details	.502			
	On-time delivery	.490			
	Multiple payment options	.478			

Factor2	Easy to purchase	.684	3.411	14.212	.850
	Convenient Easy availability	.669			
	Time saving	.624			
	Reduces travel efforts	.571			
	Easy navigation	.564			
	Easy to track	.503			
	Easily locates delivery address	.501			
Factor3	Appealing Packaging	.745	3.262	13.593	.752
	Good quality food	.652			
	Attractive cashback options	.625			
	Friendly shopping cart	.476			
Factor4	Tax charges	.803	2.595	10.811	.799
	Service charges	.780			
	Discounts	.716			
	Service standards maintenance charges	.488			

Extraction Method: Principal Component Analysis
Rotation Method: Varimax with Kaiser Normalization
a Rotation converged in 7 iterations

Naming of Factors

Appropriate names were given to all the extracted factors according to the variables that loaded on each factor. The four factors extracted are discussed below:

Factor1 (Service Design): Nine out of twenty-four statementsload to this factor. This factor with an Eigen Value of 4.313 explains 17.972% of the total variance in the dataset and group the items such asmultiple restaurants, restaurant search locator, quick calculation of price and other charges, dynamic search feature, detailed digital menu, staff courtesy, restaurant contact details,on-time delivery &multiple payment optionsand thus the name Service Design has been assigned.

Factor2 (Convenience): This is the second most influencing factor of online food ordering and delivery services with an Eigen value of 3.411 explains 14.212% of the total variance in the dataset, the name Convenience has been assigned to it.Sevenattributes load on to this factor and includes time saving, convenient, easy navigation, easy availability, easy to track, easily locates,reduces buying efforts&on-time delivery.

Factor 3 (Service Attractions): The third factor with an Eigen Value of 3.262 explains 13.593% of the total variance in the dataset grouping attributes such as appealing packaging, good quality food, attractive cashback options and friendly shopping cart. As this factor factors stresses on attractive features of online food services, thus the name Service Attractions has been assigned to

Factor 4 (Price): The last factor in the study with an Eigen Value of 2.595 explains 10.811% of the total variance, grouping attributes such as tax charges, services charges, discounts and service standards maintenance charges. Name assigned to this factor is Price as it focuses on amount paid for availing such services.

Conclusion

Current study emphasizes on identification of the factors that influences online food ordering and delivery services. The primary research at hand collected responses from 200 respondents across various cities in India, diverse age groups, educational backgrounds and occupational profiles. The data collected was subjected to Principal Component Factor Analysis in SPSS for identifying the underlying constructs explaining variances across the twenty-four items borrowed from literature, to find factors significant to online food industry. EFA was applied on twenty-four statements affecting the performance of online food delivery services. The analysis isolated four factors, the most important factor out of the ones isolated is “Service Design”. The factor group items across service pattern and procedures and explains the highest variance in the respondent dataset. “Convenience” is the next most important factor and signifies the importance of ease and comfortability, while ordering food online. The next factor isolated is “Service Attractions” which explains the importance of the promises claimed by the providers of online food services. The last

factor found significant in the study is "Price" and explain why it is important for online food providers to correctly price their service because of its intangible and heterogenous nature. Studying such factors provides insight into consumer's adoption behaviour, which are critical to the success of online food aggregators. The research at hand builds avenues for online food aggregators operating in digital space, to correctly place their service by emphasizing on the most important factors affecting their services, subsequently increase their customer satisfaction and loyalty in the highly fragmented industry and command more market share through increased revenues.

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ACADEMIC ANXIETY IN RELATION TO FAMILY CLIMATE OF ADOLESCENTS

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ABSTRACT

Adolescence is the crucial period of life during which many physical, cognitive and social changes takes place. These changes and continuous pressure from parents and teachers of achieving educational goals makes the adolescents academically anxious(Sharma and Shakir, 2019). As reported by Mattoo and Nabi(2002), Family Climate puts profound effect on Academic Anxiety of students.Thus objective of the present study was to investigate the relationship of Academic Anxiety with Family Climate of adolescents. The sample consisted of 600 adolescent students of IX class selected from Moga district of Punjab by adopting the stratified random sampling technique. Data was collected by administrating Academic Anxiety Scale by A.K.Singh and A.Sen Gupta (2013) and Family Environment Scale by Saini, S. and Kaur, P. (2017). In the data analysis process, Mean, S.D., 2x2 ANOVA and Pearson Correlation Coefficient were used. The findings of the study reported that there is no significant difference in Academic Anxiety based on Gender while significant difference found between Academic Anxiety scores based on Locale. The finding of the study also revealed significant difference between the Family Climate scores on the basis of Gender, while on the basis of Locale, no significant difference was found between mean Family Climate scores of adolescents. Moreover the findings of the study also revealed that a significant negative relationship exists between Academic Anxiety and Family Climate of adolescents. From the findings of the study, researcher recommended that Family Climate must be made constructive by providing learning facilities, support strategies like guidance and motivation related to their education and stress management techniques etc. to reduce the Academic Anxiety among adolescents.

Keywords: *Academic Anxiety, Family Climate, Adolescents*

Introduction

Adolescence is the most important and critical stage of life that involves many physical, cognitive, emotional and social changes between childhood and adulthood. Adolescence is such phase of life where they require their self-recognition, independence and high level of academic achievement. Thus desire to excel in their studies becomes the major source of anxiety among adolescents, to be described as Academic Anxiety. Academic Anxiety is the psychological condition that brings feeling of uneasiness, fear, worry and nervousness out of the academic pressure. Academic Anxiety is the fearful inner response of adolescents towards his/her academic activities practiced at school or home. Meetei (2012) described it as a kind of state anxiety that relates to impeding danger from academic environment, teachers and certain objects like mathematics, English etc. There are numerous cognitive, non-cognitive and environmental factors that plays significant role in Academic Anxiety of adolescents. Among all, Family Climate is one of the strongest environment factor in adolescent's life that influence their Academic Anxiety. Family context is the fundamental group of society where physical, emotional and educational needs and objectives of adolescents are to be fulfilled. Adolescent's behavior depends on how their family perceives them. Family Climate is such framework that involves the relationship of child with other family members. Nature of relationship i.e. cohesiveness or harmony determines the characteristics of family. It puts a profound and persistent effect on behavior pattern of child and helps the adolescents to face the challenges and problems of life. From the literature review, it was found that Academic Anxiety and Family Climate were significantly associated with each other. As parents expect that their children climb the ladder of highest academic performance, but adolescents can't rise up to that expectation, ultimately leads them towards anxiety. Sarma (2014) concluded that parental pressure is major cause of academic stress among students. Encouragement, respectful, supportive and healthy family environment helps the adolescents to grow in a positive manner which motivates them to attain their educational goals successfully that directly reduces their Academic Anxiety. On the other hand, unsupportive, inconsistent and poor family environment does not provide love, affection and motivation to adolescents, serves

as a source of Academic Anxiety among adolescents. Chen, Liu and Li (2000) revealed that unsupportive parents were unable to provide adequate resources become the cause of Academic Anxiety among adolescents.

Review of Related Literature

Kumari (2010) studied the effects of some psychological variables on Academic Anxiety of 300 intermediate class students. The results of the study concluded that Academic Anxiety of students belonging to nuclear family pattern and joint family pattern have equal level of Academic Anxiety and also socio-economic status of students do not affect their Academic Anxiety but self-concept of students have significant effect on Academic Anxiety of students.

Erozkan (2012) examined the relationship between anxiety sensitivity and parenting styles among 255 Female and 290 Male high school students and found significant relationship between anxiety sensitivity and parenting styles. It was also concluded that perceived parenting styles are important predictors of anxiety sensitivity for high school students.

Kumar (2013) studied the Academic Anxiety among adolescents in relation to their home environment and revealed that senior secondary school students have equal level of Academic Anxiety on the basis of Gender and Locale (urban & rural). Healthy & stable home environment eliminates the fear, anxiety and mental problems of adolescents.

Rani (2017) conducted a study on Academic Anxiety among senior secondary school students in relation to their home environment. The result of study demonstrated that senior secondary school girls are more academically anxious than boys but no significant difference was found in home environment of boys and girls of senior secondary schools. The results also showed a positive relation between Academic Anxiety and home environment of students.

Kaur and Chawla (2018) investigated the Academic Anxiety and school adjustment among adolescents residing in orphanages and ones with their families and results concluded that girls had higher anxiety as compared to adolescent boys. Results also showed that adolescents living in orphanages have lower level of Academic Anxiety than ones living with their families and adolescents.

Kumar (2018) conducted a study on academic stress, family environment and music at adolescent stage. The findings of the study demonstrated negative relationship between academic stress and family environment of adolescents. Adolescents having unhealthy family environment will have high academic stress and vice-versa. Furthermore adolescent girls have more academic stress than boys, while no difference was found in family environment of boys and girls.

Gosain (2019) studied the correlational study on Academic Anxiety and home environment of secondary school students and demonstrated that authoritative home environment causes Academic Anxiety whereas friendly and caring home environment reduces Academic Anxiety. The study also showed significant difference in the direction of correlation between Academic Anxiety and home environment with respect to Gender.

Statement of Problem: Academic Anxiety in Relation to Family Climate of Adolescents

Research Objectives

The present study has been administered on adolescents to attain the following objective:

- To study and compare the Academic Anxiety of adolescents on the basis of Gender andLocale.
- To study and compare the Family Climate of adolescents on the basis of Gender andLocale.
- To study the relationship between Academic Anxiety and Family Climate of Adolescents.

Hypotheses

The following hypotheses have been farmed to achieve the above mentioned objective:

- There exist no significant difference between Academic Anxiety of adolescents on the basis of Gender, Locale and their interaction.
- There exist no significant difference between Family Climate of adolescents on the basis of Gender, Locale and their interaction.

- There exist no significant relationship between Academic Anxiety and Family Climate of Adolescents.

Operational Definitions

Academic Anxiety: It refers to the sum total of the scores attained by the respondents in the Academic Anxiety Scale by A.K.Singh and A.Sen Gupta (2013). It determines Academic Anxiety on the basis of five components which are Worry, Emotionality, Task Generated Influence, Study Skill Deficits and Procrastination.

Family Climate: It refers to the sum total of the scores attained by the respondents in the Family Environment Scale by Saini S. and Kaur P. (2017). It determines Family Climate on the basis of nine constructs which are communication, encouragement of the individuals, commitment to family, religious orientation, social connectedness, ability to adopt, expressing appreciation, clear roles, time spent together.

Research Methodology

The research design used in this study was descriptive survey research design. Sample for this study consisted of 600 adolescents students of Moga district selected with the help ofstratified random sampling technique. Two standardized tools, Family Environment Scale by Saini, S. and Kaur, P. (2017) for Family Environment of Adolescents and Academic Anxiety scale by A.K.Singh and A.Sen Gupta (2013) for Academic Anxiety among Adolescents were used. To determine the differences on Academic Anxiety scores and Family Climate scores of adolescents in relation to Gender and Locale Mean, Standard Deviation and 2x2 ANOVA were used.To find out the correlation between Academic Anxiety and Family Climate Pearson coefficient of correlation was employed.

Results and Discussion

Hypotheses:1

There exist no significant difference between Academic Anxietyof adolescents on the basis of Gender, Locale and their interaction

Mean and SD of different subgroups of 2x2 Analysis of Variance of the score of Academic Anxiety of adolescents with respect to Gender and Locale

Variables	**Locale**		
Gender	Rural	Urban	**Total**
Male	M= 9.91 SD=3.37/ N=150	M= 11.57 SD=3.59/ N=150	M= 10.74 SD=3.57/ N=300
Female	M= 10.08 SD=3.16/ N=150	M=10.73 SD=3.06/ N=150	M= 10.40 SD=3.12/ N=300
Total	M= 9.99 SD=3.26/ N=300	M= 11.15 SD=3.35/ N=300	M= 10.57 SD=3.36/ N=600

To analyze the variance, the obtained Academic Anxiety scores have been subjected to ANOVA with respect to Gender and Locale of the adolescents. The findings are presented in ANOVA summary Table below:

Summary of 2X2 ANOVA on the Academic Anxiety Scores of adolescents in relation to Gender and Locale

Sources of Variance	**SS**	**Df**	**MSS**	**F-value**	**p-value**	**Result**
Gender(A)	17.01	1	17.01	1.55	.213	Not Sig at 0.5 level
Locale(B)	200.68	1	200.68	18.35	.000	Sig at 0.5 level
Interaction (AXB)	38.01	1	38.01	3.47	.063	Not Sig at 0.5 level
Within	6514.94	596	10.93			

Interpretation:

Academic Anxiety (A- Gender)

Above table showed that the difference between the mean Academic Anxiety scores on the basis of Gender is not significant. The mean Academic Anxiety score of adolescents does not differ significantly indicating that the Female adolescents and the Male adolescents have similar level of Academic Anxiety.

Academic Anxiety (B- Locale)

Above mentioned table concluded that the difference between the mean Academic Anxiety scores on the basis of Locale is significant. The mean Academic Anxiety score of Urban adolescents is significantly higher than the mean Academic Anxiety score of Rural adolescents which indicates that the Academic Anxiety of Urban adolescents is significantly more than that of the Rural adolescents.

Academic Anxiety (AXB – Gender X Locale)

From ANOVA Summary Table it can be concluded that the interaction effect of Gender and Locale on the Academic Anxiety of adolescents is not significant. The subgroups formed through the interaction of Gender and Locale does not differ significantly.Therefore the Hypothesis stating ***"There exists no significant difference in the Academic Anxiety of adolescents on the basis of Gender, Locale and their interaction"***stands accepted for Gender and interaction effect but stands rejected for Locale.

Hypothesis 2

There exist no significant difference between Family Climate of adolescents on the basis of Gender, Locale and their interaction.

Mean and SD of different subgroups of 2x2 Analysis of Variance of the score of Family Climate of adolescents with respect to Gender and Locale

Variables / **Gender**	**Locale**		**Total**
	Rural	Urban	
Male	M= 164.21 SD=30.11/ N=150	M= 168.85 SD=28.86/ N=150	M= 166.53 SD=29.53/ N=300
Female	M= 178.16 SD=23.11/ N=150	M=173.45 SD=31.78/ N=150	M= 175.80 SD=27.84/ N=300
Total	M= 171.18 SD=27.69/ N=300	M= 171.15 SD=30.39/ N=300	M= 171.17 SD=29.05/ N=600

To analyze the variance, the obtained Family Climate scores have been subjected to ANOVA with respect to Gender and Locale of the adolescents. The findings are presented in ANOVA summary Table below:

Summary of 2X2 ANOVA on the Family Climate Scores of adolescents in relation to Gender and Locale

Sources of Variance	SS	Df	MSS	F-value	p-value	Result
Gender(A)	12908.48	1	12908.48	15.72	.000	Sig at 0.5 level
Locale(B)	.202	1	.202	0.01	.988	Not Sig at 0.5 level
Interaction (AXB)	3280.68	1	3280.68	3.99	.046	Sig at 0.5 level
Within	489441.30	596	821.21			

Interpretation:

Family Climate (A- Gender)

From the table it can be concluded that the difference between the mean Family Climate scores on the basis of Gender is significant. The mean Family Climate score of Female is significantly higher than the mean Family Climate score of Males which indicates that the perception of Family Climate of Female adolescents is significantly better than that of the Male adolescents.

Family Climate (B- Locale)

It is concluded that the difference between the mean Family Climate scores on the basis of Locale is not significant. The mean Family Climate score of Urban adolescents and Rural adolescents does not differ significantly

indicating that the Rural adolescents and Urban adolescents have similar Family Climate.

Family Climate (AXB – Gender X Locale)

The ANOVA Summary Table above depicts that the interaction effect of Gender and Locale on the Family Climate of adolescents is significant. Rural Female adolescents have significantly highest scores for Family Climate and Rural Male adolescents have significantly lowest Family Climate scores in comparison to their counterparts.Therefore the Hypothesis stating ***"There exists no significant difference in the Family Climateof adolescents on the basis of Gender, Locale and their interaction"***stands accepted for Gender and interaction effect but stands rejected for Locale.

Hypothesis:3

There exist no significant relationship between Academic Anxiety and Family Climate of Adolescents.

Summary of correlation analysis of Family Environment with Academic Anxiety

Variable	N	Mean	SD	'r' Value	p- value	Result
Family Environment	600	171.17	29.05	-0.081	.046	Sig at 0.5 Level
Academic Anxiety		10.33	3.57			

Interpretation

The above table depicts that there exists a significant negative relationship between Family Climate and Academic Anxiety of adolescents. The higher level of Family Climate of adolescent's tends to decrease the Academic Anxiety of adolescents and vice versa. Therefore the Hypothesis stating ***"There exists no significant relationship of Family Climate with Academic Anxiety"*** stands rejected.

Conclusion

The results of the study explored that Female and male adolescents have same level of Academic Anxiety. This finding is supported by Mattoo and Nabi, 2012 who revealed no significant difference between male and Female respondents on the Academic Anxiety level. But in terms of Locale, urban adolescents have higher Academic Anxiety as compared to rural adolescents. This present study is aligned with Dey*et al.*(2014) that demonstrate that urban adolescents are more academic anxious than rural adolescents.As urban parents have high expectations from their children to achieve better in their academics. For this they pressurized adolescents to excel in their study that leads to Academic Anxiety among adolescents.The interaction effect of Gender and Locale on Academic Anxiety indicates that all the sub groups have similar level of Academic Anxiety. The results of the study also concluded that rural and urban adolescents have similar perception about Family Climate. In terms of GenderFemale adolescents have better Family Climate than male adolescents. This present study is supported by Aglawe(2020) that showed that girls of urban and rural areas possess more comfortable and healthy Family Climate than rural and urban boys.As girls have strong bonding and likelihood with their parents(Worthen,2011). The interaction effect of Gender and Locale on Family Climate of adolescents showed that Rural Female adolescents have the highest Family Climate scores and the Rural Male adolescents have the lowest Family Climate scores. The results of the study examined a negative significant correlation between Academic Anxiety and Family Climate of adolescents. Family environment is the most important agency that influences the behavior of child. The adolescent's emotional and behavior development depends on the environment of family in which he/she grows (Repetti*et al.*, 2002). Good, pleasing, supportive and congenial home environment that provides effective learning facilities, encouragement, sound interpersonal relationships within the family, healthy parenting style, feel satisfied and secure reduces the Academic Anxiety among adolescents whereas the adolescents having unsupportive parents, family conflicts, cohesiveness, lack of warmth, affection and communication, insecurities, fear and depression within the family directs them to be

anxious. As per Guleria (2017), adolescent grow in healthier family environment feels less anxiety as compared to their counterparts. Unstable and unhealthy family environment leads adolescents towards the Academic Anxiety. Therefore a stable and healthy family environment is necessary for adolescents to eliminate the mental health problem like frustration, fear and anxiety etc.

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HIGHER EDUCATION AMONG SCHEDULED TRIBE WOMEN: AN ANALYTICAL STUDY WITH SPECIAL REFERENCE TO RAU-MARI KOCHARI GAON OF DIBRUGARH DISTRICT

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ABSTRACT

Scheduled tribes (STs) are historically disadvantaged people recognised in the constitution of India. During the period of British rule in the Indian subcontinent, they were known as the "depressed classes." The scheduled tribes comprise about 8.6% of India's population (according to the 2011 census). Since independence, the scheduled castes and scheduled tribes have been given reservation status, guaranteeing political representation. The constitution lays down the general principles of affirmative action for SCs and STs. Higher education has a significant role in refining the concept and delivering key messages for sustainable development. Although the door of higher education is open to all, due to various reasons, higher education is not accessible for all. The backward casts, like ST's, SC's, and other minor communities, have not been able to equally receive it specially the women. Numerous reasons exist why women are not equally able to get access to higher educational facilities. The tribal women's community has to suffer a lot in life because of the disinterest for higher education as education is mainly connected with women's upliftment and empowerment. Hence, an attempt has been made in this paper to find out the problems of higher education among ST women.

***Keywords**: Higher education, Women, Empowerment, Rural areas, Scheduled Tribe*

Introduction

Indian society is a multicultural and multi-lingual society with the existence of different social groups. Scheduled tribes (STs) are one of the important segments of greater Indian society comprising about 8.6% of India's population (according to the 2011 census). This social group of Schedules Tribes have been widely considered as disadvantaged group and several affirmative actions such as reservation in jobs and admission into educational institutions along with age relaxation have been taken in post independence era.

Higher education has a significant role in refining the concept and delivering the norms of sustainable development in true sense. Although the door of higher education is open to all, due to various reasons, the norms of higher education is yet to be accessible for all. In a country like India, it has been often seen that numerous social groups which are widely considered as the disadvanced segments of the society such as the Scheduled Tribe's, Scheduled Castes, and the minor communities, have not been able to equally receive it to a great extent. Importantly, the scenario of higher education among the feminine sections of such group is yet to be a satisfactory one owing to numerous reasons. It has been seen that the tribal women's community has to suffer a lot in life because of the disinterest for higher education as education is mainly connected with women's upliftment and empowerment. Hence, an attempt has been made in this paper to find out the problems of higher education among ST women paying special attention to the Scheduled Tribe Women belonging to the Rau- Mari Kachari Gaon of Dibrugarh District, Assam.

Scheduled Tribe in India: A Brief Overview

Scheduled tribes (STs) are widely considered as a socially and economically deprived ethnic groups. They belong to different linguistic, ethnic, and religious groups enriched with their unique social, cultural and economic characteristics.

According to Gillin and Gillin, "A tribe is a group of local communities which lives in a common area, speaks a commom dialect and follows a common culture." Similarly, noted scholar, Dr. D.N. Mazumadar has defined a tribe as a collection of families or groups of a family bearing a common name, members of which occupy the same territory, speak the same language and observe certain taboos regarding marriage, profession or occupation and have developed a well assessed system of reciprocity and mutuality of obligations."

India has been the home of numerous ethic entities from the time immemorial and some of them are socially and economically deprived ethnic groups that are now recognized as Scheduled Tribes (STs) by the constitutional and other statutory provisions. Further, people belonging to ST category have been entitled with various affirmative actions taken by the State mechanism. Importantly, the scheduled tribes of north-east India can be divided into two groups i.e. Hill tribes (ST-P) and Plains tribes (ST-P). The hill tribes generally reside in Arunachal Pradesh, Meghalaya, Manipur, Mizoram, Tripura, Nagaland and the hills districts of Assam, while the plains tribes are found in the plain areas of Assam.

Table:1 Tribal Population of North-East India

Name of the State	Total Population	Tribal Population
Arunachal Pradesh	1097968	705158
Assam	26655528	3308570
Manipur	2166788	741141
Meghalaya	2318822	1992862
Mizoram	888573	839701
Nagaland	1990036	1773122
Sikkim	540851	111415
Tripura	3199203	993426

Source: Census report 2001, Govt. of India

It is widely perceived that bringing all round development of a given society requires full participation by all sections of that society, including women too. The socio-economic status of a society also largely depends on the role, education, and participation of women in the family. Tribal women occupy an important place in society in the same line of non-tribal women or even more because of their culture and traditions. As the entire tribal societies are lagging behind in developmental aspects, the tribal women are also not able to develop themselves with respect to others.

Education is the only instrument by which individuals and society can improve individual endowments, build a level of capacity, overcome obstacles, and expand opportunities for continuous improvement in their welfare. Importantly tribal society in general and the tribal women in particular is also not exceptional from this very fact. Hence, ensuring education including higher education is a central tool of bringing all round development of a society including the tribal ones as well. Further, women's empowerment can be strengthened via higher education. It assists women to empower themselves to become leaders of their society as well as to contribute to their family and national development also. It builds self-confidence, knowledge, and skills among women. The year 2001, was celebrated as the year of women's empowerment, which recognized women as agents of socio-economic change and development in the country. The Govt. of India inspires young girls to continue their higher education by launching schemes like the Indira Gandhi Scholarship for single girl children.

The greater educational scenario of Assam has been accelerated to a great extent during post independent era with the establishments of Medical colleges, Engineering Colleges, Indian Institution of Technology (IIT) and other higher educational institutions. This was a landmark for increasing the literacy rate as well as enlightening the people of Assam. The following table indicates the literacy trends of Schedule Tribes in India.

Table: 2 Literacy Trends for Scheduled Tribes in India from 1961 to 2011(In Percent)

Year	Male	Female
1961	13.83	3.16
1971	17.63	4.85
1981	24.52	8.05
1991	40.65	18.19
2001	59.17	34.76
2011	68.53	49.35

Source: National Commission for SCs & STs, Fifth Report & Census, 2011

The present study has been carried out on the Rau-mari Kochari Goan of Dibrugarh district of Assam, a state of North Eastern India. Basically, this village is inhabited by the people belonging to Sonowal Kochari tribe. The Sonowal Kacharis are the indigenous and ancient inhabitants of the northern and upper Assam area of the Brahmaputra valley and these people have been granted the status of Scheduled Tribe by the State mechanism.

Generally, agriculture has been the traditional source of income of livelihood of people belonging to Sonowal Kachari tribe. However, involvement in other sources of income such as jobs, business has also been being involved by

the Sonowal Kachari people over the period of time. Similarly, Sonowal Kachari women generally wear their traditional clothes on homemade handlooms as the Sonowal Kachari women possess expertise in weaving and can easily make dresses like *Chador Mekhla, Riha,* and other traditional attire.

Objective of the study

The objective of the present study is unfold the problems associated with higher education of Scheduled Tribe women paying attention to the women of the said village.

Methodology of the Study

The methodology of the present study includes the following-

- **Method:** In the present study descriptive survey method has been used. The data collected was based on current status of phenomena.
- **Population of the Study:** In the study, population covered all the tribal people of Rau-mari Kochari Goan of Dibrugarh district.
- **Sample of the Study:** In the present study incidental sampling is used to select sample. The number of sample is 40

Tools used in the present study

In the present study the investigator has used inquiry forms. Questionnaire and observation have also been used to collect the relevant data. Further, different sources like books, journals and articles have been consulted and various websites have been visited for gathering relevant information pertaining to the present research exercise.

Analysis and interpretation of data

It is matter of great displeasure that most of the Women are subject to deprivation in various cases within and outside of the prevue of the societies in which they live. They are bound to live within the four walls of their home, playing the role of a bread making machine along with bearing and rearing child. Importantly, both in tribal and non-tribal societies, women have to suffer miseries relating to their different aspects of life. With the passage of time and recent trends like modernization and globalization, the status of women is also being changed. But to some extent, the position of tribal women makes them incapable of running with the rest of the women. The major causes behind the backwardness are the lack of education among the tribal societies. Education means an all round drawing out of the best in a child. It is important for everyone, but especially significant for women. An educated woman can have a smaller and healthier family and can take care of the health and education of her family members. Tribal societies, because of numerous problems, fail to provide educational opportunities to girls. Right to education is now a fundamental right in India after the 86th amendment of the Indian constitution, in 2002. Parents are now bound to provide educational opportunities for their children from the age group of 6–14 years. However, in spite of taking such measures, the scenario of education in general and women education of tribal women in particular is yet to achieve satisfactory position. It has been widely seen that even after completing free and compulsory education up to 14 years of age, the question of further education become illegible as most of the parents have often been seen hesitating to provide higher education to their children. Given, the scenario, the existing research exercise has been conducted to shed some lights on various dynamics of the women education among the tribal women

After conducting the present study, the following information associated with the problems of scheduled Tribe women in higher education have been found by the researcher.

- The present area of the study is approximately 20 kilometres away from the district head quarter of Dibrugarh town. But large portions of parents are found to hesitate to send their girls to nearby colleges or University to get higher education. The following table shows the educational status of the present study:

Table: 3 Educational Statuses of Male and Female

Educational Level	Male	Female
Higher	5	2
Secondary	22	12
Primary	38	30

The data on educational status of male and female tribal of the concerned study revealed that 95% males and 75% females get primary education, 55% males and 30% female completed their secondary education whereas only 12.5% and 5% females are higher educated. The status of higher education is very poor among the tribes but when we talk about women's participation in higher education the ratio shows very pathetic.

- The attitude of parents is not positive towards higher education. The majority of parents are illiterate or school dropouts. In such circumstances, where parents are illiterate, how can they think of the higher education of their daughters? 64% of respondents viewed higher education as a boring process, while 76% replied that it's a luxurious process and not meant for them.
- Ignorance about the schemes and programmes for the development of scheduled tribes is another issue for continuing the higher education of women. The government of India has launched different schemes and programmes for the welfare of tribal populations.

It is well known that the ministry of tribal affairs has been set up in 1999 with the objective of providing a more focused approach to the integrated socio-economic development of the scheduled tribes. The ministry adopted the following schemes and programmes in this regards.

i. Special central assistance and grants under Article 275(I) of the constitution.
ii. Scheme of development of PTDS.
iii. Tribal Research institutes
iv. Ashram schools in tribal sub area
v. Vocational training centre in Tribal areas.

The present study shows that 65% of the respondents are not aware of the schemes and programmes for their upliftment, and the remaining 35% are aware of just a little bit about them.

- Another significant issue in the higher education of women from schedule tribes is the poor economic situation of their respective families. Poor parents often fail to provide the required educational facilities to their daughters. Even 85% of parents replied that they fail to provide the daily communication to their daughters. In short, it has been found that when a family is not financially constant, the rest of the issues of women education and women empowerment become insignificant.
- The stereotypical attitudes of parents as well as society towards the higher education of women obstruct their ability to persist the journey of knowledge. Though we are living in the 21st century, where globalization and modernization have changed each and every aspects of our lives and the world has eventually turned into a global village, on the other hand, because of the dearth of education, people are still believing in some superstitious beliefs and prejudices and engaging in some inhuman practices like witch haunting, sacrificial rites of children, etc. Such societies always overlook the education of women. In the present study, though the investigator did not find such kinds of evil practices prevailing among the respondents, they have been found interested in performing their religious practices. They replied that they would never leave their traditional beliefs as they are the descendants of their unique and rich culture.
- Lack of social consciousness and sensitization among women regarding higher education is an another cause of low ratio of higher education among scheduled tribe women. Ignorance and unwillingness on the part both parents and guardians stand up as an obstacle for higher education of scheduled tribal women. Some social taboos, myths, superstitious believe prevailing associated with tribal societies also acts barriers for women's higher education.
- Early marriage is the most prevalent custom in tribal societies. Girls are either forced by their families to marry as soon as possible, or they choose their life partners on their own. The cause may be different for their early marriage, but it's a constraint for continuing higher education of tribal women.
- In a country like India, where multicultural and linguistic groups are available, the language scenario and the problems

associated with it are complex and controversial. The mother tongue, Assamese, is used as a medium of instruction at the under-graduate level, but English is used as a medium of instruction at the post-graduate level, except for vernacular literature subjects. For English, a foreign language, there is still hesitation among students and people are not comfortable with it. In the present study, the investigator found that 88% of the respondents had English phobia, and because of that, they could not complete their college education either.

- In the present study, it's revealed that married women students fail to complete their educational careers after marriages. Women students were discouraged from continuing their education because of their husband's low income and family pressures. They are pressurized and encouraged to be ideal wives and mothers and are trained in domestic tasks to handle the family affairs

The above discussion shows how the scheduled tribe women still have to travel miles for achieving satisfactory advancement, and education is the main way that can ensure development. For that, not only women but also parents, the educational community, and society have to be informative, conscious, and active. The following suggestions can help with the higher education of scheduled tribe women:

- The problem of parents' poor economic condition can be solved by providing governmental incentives to poor families with girls to continue their higher education.
- Awareness is needed for both families and girls regarding the need and importance of higher education for life. Changing social norms is always a very slow process, and it needs intervention from different directions. It is equally important to campaign at the grass-roots level as it is to educate the state, community, and religious leaders.
- Language is the barrier for tribal women to entering higher education. At school level, English should be taught correctly by school teachers, as well as, if possible, higher education should be taught in the mother tongue.
- Public policies should be framed to focus on the higher education of tribal girls. Families should priorities sending their daughters to school and obtaining higher education.
- Evidence of a correlation between the number of female teachers and girls' enrolment, provides a strong argument towards the importance of female teachers. Teachers' work should positively impact girls' views of themselves and gender relations within their community. Curriculums should also reflect gender equality within educational resources such as textbooks, presenting both boys and girls equally.

Conclusion

As always, we must focus on dismantling patriarchal values that oppress women and girls and prevent them from reaching their highest potential. Boys and girls should be valued equally and have the same opportunities as each other. Education is the most important instrument by which both individuals and society can improve. For the higher education of tribal women, the attitudes of tribal families should be positive and the government should be revised to get a balance between both men and women. The tribal girls should be encouraged to continue their higher education. They should be taught about the importance of higher education and how higher education acts as an important instrument for human resource development that leads to individual development, social development, and national development.

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A STUDY OF EMPLOYEE RETENTION IN IT INDUSTRY IN PUNE CITY

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ABSTRACT

In today's competitive era recruiting potential and knowledgeable people for job is very important and needed for an employer. Because both recruiting and retaining the employees are one of the major issues facing the IT Sector today. In previous days salary was only important parameter but now it's just one among the differrent parameters.. Due to high level of attrition and competition now a days it is important to know whether the employees are satisfied with their job and organization, if not the reason of not retaining the job.

Keywords-*Employees, employer, retention, employer branding*

1.1 Introduction

In the era of globalization the today's world is becoming more modest and unbalanced than ever before, The IT based industries are seeking to gain competitive advantage at all cost and are revolving to more innovative sources through HRM practices. HRM practices have been defined in numerous characteristics. Likewise, Minbaeva (2005) viewed HRM practices a set of practices used by organization to manage human resources through smoothing the development of competencies that are firm specific, produce complex social relation and generate organization knowledge to sustain competitive advantage. Against this backdrop, overall HRM practices relate to specific practices, formal policies, and philosophies that are designed to attract, develop, motivate, and retain employees who ensure the effective functioning and survival of the organization.[17]

In the present era concept of HRD is considered extremely by most of the medium and large scale industrial organizations, so as to keep the organizations competent and forward-looking. HRD intentions at the promotion of the well- being of individuals, families and societies. It deals with creating conditions that enable human resource to get the greatest out of themselves and their lives. As human resources develop themselves, new problems and issues arise and the growth-development- problem loop continues.

The study also includes various trends of practice followed by the organizations and its effect on the problem of attrition. Retention is a top business priority for more than one third of the organizations. More than one third of HR professionals in IT Sector views retention as one of their pressing issues. It is not very often that the management would be aware of the true reason as to why an employee would be leaving their organization. To be successful in knowing the reason, an effective exit interview procedure is very essential. This would help the organization to an extent to get a clear picture of what is going wrong.

1.2 Objectives of the study

1.To Study the concept of employee retention and employer branding.
2.To study the parameters of employee retention in IT industry

1.3 Research Methodology of the study

The type of research is empirical and analytical research where investigation into a problem or situation which provides insights to the researcher.

1.3.1Area selected for the study

As Pune is considered as a hub of IT industry so Pune is selected as an area for research.

1.3.2 Sample units selected for the study

For the present study sample size is of total 150. The samples are selected in equal proportion from every IT companies i.e 50 samples from Top level, 50 samples from Middle level and 50 samples from Lower level companies. In every IT companies the population size is more than 300 hundred

employees working in different shifts and in different departments.

1.3.3 Sampling procedure

In the current study the diverse sampling technique are applied for the effective selection of 150 sample respondents. In the first stage, IT hubs (Centers) are chosen, by purposive sampling method. Were the researcher is able to cover the selected area. In the second stage, the different companies are selected by applying convenience sampling method. In the third stage, samples are selected from every category (Top level, Middle level and Lower level) from the IT companies by implementing stratified random sampling method. employees followed to other levels. In the fourth stage, sample respondents are selected by convenience sampling method.

1.3.4 Data Base of the Study

1.3.4.1 Primary Data

The primary data are in original sources from which the investigator straight collected data which is not been formerly collected. The researcher for the present study is followed the following methods to organize correct facts and statistics from primary sources:

1. Direct Personal Interview and Discussion:
2. Telephonic Interaction:
3. Mail Survey:
4. Structured Questionnaire:

1.3.4.2 Secondary Data

The following secondary sources were used.

- Annual Reports of IT companies
- Company websites
- Dissertations &Thesis
- Journals
- Magazines

1.4 Scope and limitations of the study

Present research is undertaken in Pune city, Maharashtra, India. Employees working in IT sector are taken as sample respondents.It covers the different aspects or parameters of employee retention which is very important for employer branding also.The research is only limited to IT industry and not the other industry sectors.

1.5 Techniques of data investigation and explanation

The collected data is exposed to different statistical techniques like Likert's summated and Semantic differential scale to measure attitude of individual or group to particular situation, Percentage, Mean, Standard Deviations, Tabulation, Classification, Graphical presentation.

The mean score of each statement is achieved and transformed into percentile value, in order to find clear and easy comprehensible picture of the level of agreement for each statement, from every categories of sample respondents.

For analyzing and interpreting the mean score and percentile value collectively the following ranking scale is established. According to the values obtained from the mean score/percentile values the following rankings were given. For each variable whatever the mean score/percentile values are obtained rankings are given and explanation is completed consequently.

Table No 1.1 Dimensions Ranking

Sr.No	Mean Score	Percentile Value	Rankings
1	5.00 – 4.75	100.00 – 95.00	Perfect Relationship
2	4.74 – 4.25	94.80 – 85.00	Excellent Relationship
3	4.24 – 3.75	84.80 – 75.00	Good Relationship
4	3.74 – 3.25	74.80 – 65.00	Satisfactory Relationship
5	3.24 – 2.75	64.80 – 55.00	Average Relationship

Source: *Self-Generated*

1.6 Employee Retention Parameters

A) Functional Retention

Table No. 1.2 Receive Eye-catching Salary				
Sr.No.	**Employee Category**	**Mean Score**	**Percentile Value**	**Ranking**
1	Top Level	4.18	83.67	Good
2	Middle Level	4.03	80.67	Good
3	Lower Level	3.70	74.00	Satisfactory
Average		**3.97**	**79.45**	**Good**

Source: *Questionnaire*

With reference to Table No.1.2 highlights views of employees regarding receive eye-catching salary in IT companies. Overall it is observed that average mean score is 3.97 and percentile value is 79.45 which indicate ranking good. In IT companies employees are getting the salary as per qualification and experience.

Table No. 1.3 Incentives and Rewards				
Sr.No.	**Employee Category**	**Mean Score**	**Percentile Value**	**Ranking**
1	Top Level	4.10	82.00	Good
2	Middle Level	3.97	79.33	Good
3	Lower Level	3.62	72.33	Satisfactory
Average		**3.90**	**77.89**	**Good**

Source: *Questionnaire*

With indication to Table No.1.3 emphasizes opinions of employees regarding incentives and rewards in IT companies. Overall it is observed that average mean score is 3.90 and percentile value is 77.89 which indicate ranking good. In IT companies employees are getting the incentives as per the work shifts and rewards are given on the occasion of special achievement made by the employees in process allotted to them. Incentives and rewards are given to employees to some extent to retain the employees.

Table No. 1.4 Appreciations in Work				
Sr.No.	**Employee Category**	**Mean Score**	**Percentile Value**	**Ranking**
1	Top Level	4.25	85.00	Excellent
2	Middle Level	4.03	80.67	Good
3	Lower Level	3.88	77.67	Good
Average		**4.05**	**81.11**	**Good**

Source: *Questionnaire*

With reference to Table No.1.4 shows the employees approach regarding appreciations of work in IT companies. Overall it is observed that average mean score is 4.05 and percentile value is 81.11 which indicate ranking good. In IT companies when employees are achieving beyond the target given to them with excellent output then employees are appreciated. The appreciation is done by felicitation, rise in incentives and offering special tours.

B) Operational Retention

Table No. 1.5 Freedom & Authority to Employees				
Sr.No.	**Employee Category**	**Mean Score**	**Percentile Value**	**Ranking**
1	Top Level	4.08	81.67	Good
2	Middle Level	3.68	73.67	Satisfactory
3	Lower Level	3.47	69.00	Satisfactory
Average		**3.74**	**74.78**	**Satisfactory**

Source: *Questionnaire*

With reference to Table No.1.5 signifies employees views on freedom and authority in IT companies. Overall it is observed that average mean score is 3.74 and percentile value is 74.78 which indicate ranking satisfactory. In IT companies there is freedom for employees while performing task, but task should be performed within time span. The authority is also given to some extent to employees after consultation with process heads. Freedom for employees is the factor of employee retention in IT companies.

Table No. 1.6 Transparent Work Culture

Sr.No.	Employee Category	Mean Score	Percentile Value	Ranking
1	Top Level	4.28	85.67	Excellent
2	Middle Level	4.07	81.33	Good
3	Lower Level	3.90	78.00	Good
Average		**4.08**	**81.67**	**Good**

Source: *Questionnaire*

With indication to Table No.1.6 indicates opinions of employees regarding transparent work culture in IT companies score is 3.90 and percentiles value is 78.00 which indicates ranking good respectively. Overall it is observed that average mean score is 4.08 and percentile value is 81.67 which indicate ranking good. In IT companies there is transparent in work culture. The work is equally distributed among the employees as per authority and proper reporting is done about the completion of tasks. There is no discrimination in allotment of work and responsibilities in IT companies

.

C) Organizational Values

Table No. 1.7 Solves Employees Problem

Sr.No.	Employee Category	Mean Score	Percentile Value	Ranking
1	Top Level	4.73	94.67	Excellent
2	Middle Level	4.55	91.00	Excellent
3	Lower Level	3.98	79.67	Good
Average		**4.42**	**88.45**	**Excellent**

Source: *Questionnaire*

With indication to Table No.1.7 denotes employees opinions regarding IT companies solve the employees problems. Overall it is observed that average mean score is 4.42 and percentile value is 88.45 which indicate ranking excellent. In IT companies any problems related to work arise among employees are solved by the higher authorities.

Table No. 1.8 Never Disappoint Employees

Sr.No.	Employee Category	Mean Score	Percentile Value	Ranking
1	Top Level	4.77	95.33	Perfect
2	Middle Level	4.52	90.33	Excellent
3	Lower Level	4.43	88.67	Excellent
Average		**4.57**	**91.44**	**Excellent**

Source:*Questionnaire*

With reference to Table No 1.8represents approach of employees regarding IT companies never disappoint employees. Overall it is observed that average mean score is 4.57 and percentile value is 91.44 which indicate ranking excellent. In IT companies employees are the central point, since IT companies are service based industries. In IT companies employees are never disappointed to maintain the reputation of Companies and retain the employees

.

D) Organizational Appreciations

Table No. 1.9 Organisation has Good Reputation				
Sr.No.	**Employee Category**	**Mean Score**	**Percentile Value**	**Ranking**
1	Top Level	4.78	95.67	Perfect
2	Middle Level	4.33	86.67	Excellent
3	Lower Level	4.20	84.00	Good
Average		**4.44**	**88.78**	**Excellent**

Source: *Questionnaire*

With reference to Table No.1.9 shows opinions of employees regarding IT organizations has good reputation. Overall it is observed that average mean score is 4.44 and percentile value is 88.78 which indicate ranking excellent. IT companies are having good reputation in the market. From last two decades IT companies are expanding in Pune only due to good reputation and availability of skilled human resource. The flow of foreign currency is also increased due to IT companies.

Table No. 1.10 Employees Consider Prestigious in Organisation				
Sr.No.	**Employee Category**	**Mean Score**	**Percentile Value**	**Ranking**
1	Top Level	4.62	92.33	Excellent
2	Middle Level	4.27	85.33	Excellent
3	Lower Level	4.08	81.67	Good
Average		**4.32**	**86.44**	**Excellent**

Source: *Questionnaire*

With indication to Table No.1.10 demonstrates employees consider prestigious in IT organisation. Overall it is observed that average mean score is 4.32 and percentile value is 86.44 which indicate ranking excellent. In IT companies employees feel prestigious to work. The status and standard of living improves in the society. So employees are retained in IT companies by offering good salary packages.

E) Services Aspects

Table No. 1.11 Employees Participation in Management				
Sr.No.	**Employee Category**	**Mean Score**	**Percentile Value**	**Ranking**
1	Top Level	3.75	75.00	Good
2	Middle Level	3.58	71.67	Satisfactory
3	Lower Level	3.35	67.00	Satisfactory
Average		**3.56**	**71.22**	**Satisfactory**

Source: *Questionnaire*

With reference to Table No.1.11 reveals approach of employees regarding employees participation in management. Overall it is observed that average mean score is 3.56 and percentile value is 71.22 which indicate ranking Satisfactory. In IT companies employees are not taken into consideration while taking the management decisions. The autonomy is given only to work related decisions for employees in IT companies.

Table No. 1.12 Work from Home				
Sr.No.	**Employee Category**	**Mean Score**	**Percentile Value**	**Ranking**
1	Top Level	3.78	75.67	Good
2	Middle Level	3.40	68.00	Satisfactory
3	Lower Level	3.24	64.80	Average
Average		**3.47**	**69.49**	**Satisfactory**

Source: *Questionnaire*

With reference to Table No.1.12 views of employees regarding work from home in IT companies.Overall it is observed that average mean score is 3.47 and percentile value is 69.49 which indicate ranking satisfactory. In IT companies employees are dealing process related to information technology. In IT companies there is high confidentiality if emergency arise, to some extent there is provision for employees to work from home in IT companies.

F) Organizational Image

Table No. 1.13 Empower Employees

Sr.No.	Employee Category	Mean Score	Percentile Value	Ranking
1	Top Level	4.33	86.67	Excellent
2	Middle Level	4.13	82.67	Good
3	Lower Level	4.00	80.00	Good
Average		**4.15**	**83.11**	**Good**

Source: *Questionnaire*

With indication to Table No.1.13 shows employees views regarding empower employees in IT companies. Overall it is observed that average mean score is 4.15 and percentile value is 83.11 which indicate ranking good. In IT companies employees are continuously motivated to perform efficiently. Employees are empowered to work with full prospective in IT companies.

Table No. 1.14 Honest & Sincere in Addressing Concerns

Sr.No.	Employee Category	Mean Score	Percentile Value	Ranking
1	Top Level	4.15	83.00	Good
2	Middle Level	3.93	78.67	Good
3	Lower Level	3.72	74.33	Satisfactory
Average		**3.93**	**78.67**	**Good**

Source: *Questionnaire*

With reference to Table No.1.14 illustrates approach of employees regarding honest and sincere in addressing concerns in IT companies. Overall it is observed that average mean score is 3.93 and percentile value is 78.67 which indicate ranking good. In IT companies employees are honest and sincere in addressing concerns to some extent. If there is personal attachment in the IT companies then employees are concerned about the co-employees. Without employees engagement personal attachment will not established.

Table No. 1.15 Maintain Effective Public Relations

Sr.No.	Employee Category	Mean Score	Percentile Value	Ranking
1	Top Level	4.22	84.33	Good
2	Middle Level	3.88	77.67	Good
3	Lower Level	3.63	72.67	Satisfactory
Average		**3.91**	**78.22**	**Good**

Source: *Questionnaire*

With indication to Table No.1.15 indicates opinions of employees regarding employees maintain effective public relations in IT companies. Overall it is observed that average mean score is 3.91 and percentile value is 78.22 which indicate ranking good. In IT companies employees are maintaining effective public relations. In IT companies there is need of communication competencies, since different types of clients are required to be tackled by employees. Customer engagement is also important in IT companies.

G)Planned Vision

Table No. 1.16 Employees Considered as Core of Organisation				
Sr.No.	**Employee Category**	**Mean Score**	**Percentile Value**	**Ranking**
1	Top Level	4.35	87.00	Excellent
2	Middle Level	4.17	83.33	Good
3	Lower Level	3.78	75.67	Good
Average		**4.10**	**82.00**	**Good**

Source: *Questionnaire*

With reference to Table No.1.16 specifies employees considered as core of organisation. Overall it is observed that average mean score is 4.10 and percentile value is 82.00 which indicate ranking good. In IT companies employees are considered as core segment of the organisation, since IT industry is service based industry. So employees retention is challenge for IT companies. To maintain employees content from all the aspect is essential in IT companies.

H)Metaphorical Benefits

Table No. 1.17 Knowledge and Progressive Opportunities				
Sr.No.	**Employee Category**	**Mean Score**	**Percentile Value**	**Ranking**
1	Top Level	4.48	89.67	Excellent
2	Middle Level	4.33	86.67	Excellent
3	Lower Level	4.15	83.00	Good
Average		**4.32**	**86.45**	**Excellent**

Source: *Questionnaire*

With indication to Table No.1.17 denotes employees knowledge and progressive opportunities in IT companies. Overall it is observed that average mean score is 4.32 and percentile value is 86.45 which indicate ranking excellent. In IT companies employees are having the progressive opportunities. Employees are also provided opportunities to update their knowledge related to work by organizing orientation programmes in IT companies.

Table No. 1.18 Equivalent Treatments in all Sphere				
Sr.No.	**Employee Category**	**Mean Score**	**Percentile Value**	**Ranking**
1	Top Level	4.18	83.67	Good
2	Middle Level	3.95	79.00	Good
3	Lower Level	3.73	74.67	Satisfactory
Average		**3.95**	**79.11**	**Good**

Source: *Questionnaire*

With reference to Table No.1.18 represents employees views regarding equivalent treatment in all sphere. Overall it is observed that average mean score is 3.95 and percentile value is 79.11 which indicate ranking good. In IT companies employees are having good relationship as organisation but regarding treatment, all are not equal treated. Since every employees duties and responsibilities are defined accordingly employees are handled to retain in IT companies.

I) Nature of Work

Table No. 1.19 As A Mentor& Friendliness				
Sr.No.	**Employee Category**	**Mean Score**	**Percentile Value**	**Ranking**
1	Top Level	4.24	84.80	Good
2	Middle Level	4.28	85.67	Excellent
3	Lower Level	4.10	82.00	Good
Average		**4.21**	**84.16**	**Good**

Source: *Questionnaire*

With reference to Table No.1.19 implies views of employees regarding heads act as mentor and friendliness.Overall it is observed that average mean score is 4.21 and percentile value is 84.16 which indicate ranking good. In IT companies there is friendliness to some extent and also heads act as mentor for employees for personal matters. Work related matters there is absence of friendliness in IT companies.

Table No. 1.20 Open Communication				
Sr.No.	**Employee Category**	**Mean Score**	**Percentile Value**	**Ranking**
1	Top Level	4.22	84.33	Good
2	Middle Level	4.18	83.67	Good
3	Lower Level	3.74	74.80	Satisfactory
Average		**4.05**	**80.93**	**Good**

Source: *Questionnaire*

With reference to Table No.1.20 states employees approach regarding open communication in IT companies. Overall it is observed that average mean score is 4.05 and percentile value is 80.93 which indicate ranking good. In IT companies there is open communication is to some extent among employees. Work related matters are communicated by proper hierarchy. Some confidentiality is also maintained by employees related to work and performance.

J) Work Ethos

Table No. 1.21 Team Building Atmosphere				
Sr.No.	**Employee Category**	**Mean Score**	**Percentile Value**	**Ranking**
1	Top Level	4.37	87.33	Excellent
2	Middle Level	4.48	89.67	Excellent
3	Lower Level	4.18	83.67	Good
Average		**4.34**	**86.89**	**Excellent**

Source: *Questionnaire*

With reference to Table No.1.21 indicates approach of employees regarding team building atmosphere in IT companies. Overall it is observed that average mean score is 4.34 and percentile value is 86.89 which indicate ranking excellent. In IT companies there is team building atmosphere. Every task is completed collectively so there is excellent team building atmosphere of process heads in IT companies, which help to retain employees for long period in Companies.

Table No. 1.22 Friendly Work Environment				
Sr.No.	**Employee Category**	**Mean Score**	**Percentile Value**	**Ranking**
1	Top Level	4.25	85.00	Excellent
2	Middle Level	4.02	80.33	Good
3	Lower Level	4.08	81.67	Good
Average		**4.12**	**82.33**	**Good**

Source: *Questionnaire*

With indication to Table No.1.22 shows views of employees regarding friendly work environment in IT companies.Overall it is observed that average mean score is 4.12 and percentile value is 82.33 which indicate ranking good. In IT companies there is friendly work environment. The duties and responsibilities are performed by employees without any burden with collective work environment. Employees are mostly retained with IT companies due to work culture and supportive environment.

The findings of the research is as follows

1. It is clear that average mean score is 3.97 and percentile value is 79.45 which indicate ranking good . In IT companies employees are getting the salary as per qualification and experience.
2. It is clear that average mean score is 4.05 and percentile value is 81.11 which indicate ranking good . In IT companies when employees are achieving beyond the target given to them with excellent output then employees are appreciated. The appreciation is done by felicitation, rise in incentives and offering special tours.
3. It is found that average mean score is 4.08 and percentile value is 81.55 which
indicate ranking good . In IT companies there is supportive nature among employees. The management of tasks and operations is exposed and approachable style in IT companies.
4. It is noticed that average mean score is 3.74 and percentile value is 74.78 which
indicate ranking satisfactory . In IT companies there is freedom for employees while performing task, but task should be performed within time span. The authority is also given to some extent to employees after consultation with process heads. Freedom for employees is the factor of employee retention in IT companies.
5. It is found that average mean score is 4.76 and percentile value is 87.11 which indicate ranking excellent . In IT companies employees are the core segment so high importance is given to employee satisfaction and retention.
6. It is seen that average mean score is 4.42 and percentile value is 88.45 which
indicate ranking excellent . In IT companies any problems related to work arise among employees are solved by the higher authorities.
7. It is noticed that average mean score is 4.44 and percentile value is 88.78 which
indicate ranking excellent . IT companies are having good reputation in the market. From last two decades IT companies are expanding in Pune only due to good reputation and availability of skilled human resource. The flow of foreign currency is also increased due to IT companies.
8. It is found that average mean score is 4.32 and percentile value is 86.44 which
indicate ranking excellent . In IT companies employees feel prestigious to work. The status and standard of living improves in the society. So employees are retained in IT companies by offering good salary packages.
9. It is found that average mean score is 3.56 and percentile value is 71.22 which
indicate ranking Satisfactory. In IT companies employees are not taken into consideration while taking the management decisions.
The autonomy is given only to work related decisions for employees in IT companies.
10. It is found that average mean score is 4.14 and percentile value is 82.89 which
indicate ranking good . In IT companies employees are motivated by providing financial incentives after special achievement related to process. There are no provisions of contests in IT companies for motivation.
11. It is found that average mean score is 4.15 and percentile value is 83.11 which
indicate ranking good . In IT companies employees are continuously motivated to perform efficiently. Employees are empowered to work with full prospective in IT companies.
12. It is found that average mean score is 3.93 and percentile value is 78.67 which
indicate ranking good. In IT companies employees are honest and sincere in addressing concerns to some extent. If there is personal attachment in the IT companies then employees are concerned about the co-employees. Without employees engagement personal attachment will not established.
13. It is seen that average mean score is 4.25 and percentile value is 84.89 which indicate ranking excellent. In IT companies employees

are communicated goals and missions of processes, accordingly operations are conducted in IT companies.

14. It is found that average mean score is 3.72 and percentile value is 74.44 which indicate ranking satisfactory. In IT companies employees succession planning is made to some extent. The concentration is made only on completion of responsibilities allotted to employees. There is low concentration on employee's succession planning in IT companies.

15. It is found that average mean score is 4.32 and percentile value is 86.45 which indicate ranking excellent . In IT companies employees are having the progressive opportunities. Employees are also provided opportunities to update their knowledge related to work by organizing orientation programmes in IT companies.

16. It is found that average mean score is 3.95 and percentile value is 79.11 which indicate ranking good. In IT companies employees are having good relationship as organisation but regarding treatment, all are not equal treated. Since every employees duties and responsibilities are defined accordingly employees are handled to retain in IT companies.

17. It is found that average mean score is 4.21 and percentile value is 84.16 which indicate ranking good . In IT companies there is friendliness to some extent and also heads act as mentor for employees for personal matters. Work related matters there is absence of friendliness in IT companies.

18. It is pretty clear that average mean score is 4.34 and percentile value is 86.84 which indicate ranking excellent. Professionalism is maintained in IT companies. As per the expertise task is allotted to employees. Employees are fulfilled their professional need in IT companies, which is important for employee retention.

19. It is clear that average mean score is 4.34 and percentile value is 86.89 which indicate ranking excellent. In IT companies there is team building atmosphere. Every task is completed collectively so there is excellent team building atmosphere of process heads in IT companies, which help to retain employees for long period in Companies.

20. It is seen that average mean score is 4.12 and percentile value is 82.33 which indicate ranking good. In IT companies there is friendly work environment. The duties and responsibilities are performed by employees without any burden with collective work environment. Employees are mostly retained with IT companies due to work culture and supportive environment.

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ANALYTICAL DESIGN OF CIRCULAR MICROSTRIP ANTENNA ARRAY WITH DGS FOR 5G COMMUNICATION APPLICATION

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ABSTRACT

5th generation mobile connectivity provides advanced and advanced service applications. Research is underway on 5G network communication applications. Expected from a 5G antenna to meet high speed, low latency and high bandwidth. An antenna is a set of multiple connected horns that work together as a single antenna, transmitting or receiving radio signals. The Circular Microstrip Patch Antenna (CMPA) is a design program and is the most innovative research site for the 5th generation communication application. This paper proposed the novel design of a microstrip antenna list with two blank frames and feature features for 5G C-band applications. CST microwave studio software is used to design and measure the antenna. The resonant frequency of this antenna is 24.2 GHz and 35.82 GHz. The total bandwidth achieved by the proposed antenna is 2.37GHz. Larger bandwidth works for next generation or 5G mobile applications.

Keywords: *Microstrip, Circular, Array, Antenna, CST, FR4, VSWR, Return Loss, Bandwidth.*

I. Introduction

In addition to the industry research efforts for the most efficient wireless technology distribution network, the wireless industry is constantly addressing the growing demand for wireless technology technology, driven by continuous improvements in computer acquisition and communication, and the emergence of new customer handsets and applications (such as the need for internet access). This trend will occur in the coming years of 4G LTE, which means that sometime around 2020, wireless networks will face congestion, as well as the need to implement new technologies and facilities in order to effectively meet the continuing needs of carriers and customers. The life cycle of every new generation of mobile technology is usually ten years or less (as shown earlier), due to the evolution of computer technology and communication. Our work envisages a wireless future in which mobile data rates increase to multi gigabit-per-second, made possible by the use of control rods and a mm-wave spectrum that can simultaneously support cellular communication and reconfiguration, with possible cellular integration and Wi-Fi services.

Recent research suggests that mm-wave waves could be used to amplify radio spectrum bands from 700 MHz to 2.6 GHz for wireless communication [2]. The performance of mm-wave wireless [5], in addition, mm-wave network company frequencies allow for large bandwidth allocation, which translates directly to higher data transfer rates. The Mm-wave spectrum will allow service providers to significantly expand the channel bandwidth limits far beyond the 20 MHz channels used by 4G customers [1]. By increasing the RF channel bandwidth of mobile radio channels, the data volume increases significantly, while digital traffic delays are significantly lower, thus supporting better internet-based access and applications that require less delays. Mm-wave waves, due to their very small wavelength, can use polarization and new spatial processing techniques, such as large MIMO and beamforming flexibility [4]. Given this important bandwidth jump and the new

power provided by mm-waves, channel-to-device links, and back-to-back links between basic channels, they will be able to handle much larger capacity than today's 4G networks in densely populated areas.

Also, as operators continue to reduce cell-covering environments to exploit space reuse, and to use new interoperable structures such as MIMO algorithms, relays, and to reduce interference between primary channels, the cost of each channel will decrease as they become more and more widely distributed. In urban areas, making wireless backhaul is essential for flexibility, fast delivery, and reduced continuous operating costs. Finally, in contrast to the different spectrum used by most cellular operators today, where the coverage ranges of cell networks vary widely in three octave frequencies between 700 MHz and 2.6 GHz, the mm-wave spectrum will have a much closer spectral distribution, making the distribution features of the mm-wave bands very similar and "similar". 28 GHz and 38 GHz bands are currently available with spectrum assignments greater than 1 GHz of bandwidth. Originally intended for use by the Local Multipoint Distribution Service (LMDS) in the late 1990s, these licenses could be used for mobile phones and retrospectively [5].

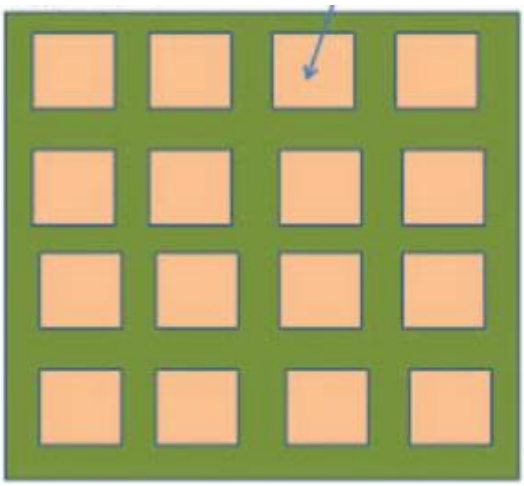


Figure 1: Array Antenna

The Microstrip array cable is well known for the fact that the data transmission line of the thinner line of the receiving cable is higher compared to the miniaturized scale fix fix. Microphone receivers will be the focal point of the project. The range of small scale strips is the use of a radio of the same custom components in the dielectric chunk, which can be easily created with existing PCB techniques. In contrast to conventional scale scales, which use one side of the unit as a ground plane, the thin scale line actually uses the dielectric part as a handle. This receiving cable is selected because it is straightforward but has the potential to improve in the future. A wide, double-protected secure reception cord with enhanced external bandwidth is introduced in this operation.

II. Background

J. Colacoet al.,[1]There is a need for uninterrupted online live streaming education, especially in developing countries such as India, which requires high data rates and high bandwidth. Therefore, in this research paper, the authors have developed a microstrip patch for high-quality internet education and other 5G applications using 5G millimeter wavelengths with an audible frequency of 26 GHz. In the proposed design, the authors used a rectangular patch with a 2.2 dielectric constant and a dielectric loss tangent of 0.0010. The design is modeled and analyzed using FEKO software. Thus, after the simulation writers experienced a good recovery loss of -33.4 dB, a good bandwidth of 3.56 GHz, VSWR <; 2, a maximum gain of 10 dB and an antenna radiation efficiency of 99.5%. This proposed design is advantageous during ongoing lockdown closures worldwide.

M. Patriotis et al., [2]the antenna can be used simultaneously in acquisition mode (Rx) and transmission mode (Tx) by selecting reconfigured and replanted channels. The resetable PIN diode (BPF) channel is used in the Tx port to select the activity band. The

antenna range brings a gain of 12 - 15 dB over its operating frequencies and a significant portion of less than 0.56 dB over its operating bands. This adjustable antenna list can be used for K / Ka-band CubeSat books.

A. M. Yusuf, et al., [3 In this experiment, a double band antenna antenna 1 × 8 in the C-band (5.8 GHz) and the X-band (9.65 GHz) were designed and performed on the FR-4 substrate. The E-shaped clip is made real in this antenna to achieve a double response frequency.

N. Yan, et al., [4]the antenna is intended to work naturally and is assembled using five substrate layers with ventilated holes. It is used to connect an antenna-driven clip to a feed line, and to produce audio frequency at 5.2 GHz. The U-shaped openings are scratched on the antenna-driven unit to combine impedance. To further expand the impedance bandwidth, a compact episode with retrospective space is introduced and subsequently another audio frequency is created at 6.2 GHz. As shown by the deliberate results, the antenna section achieves a partial bandwidth of 17.5% from 5.2 to 6.2 GHz and a gain of 9.7 dBi. Considering the antenna component, an eight-component antenna system with a reinforcing system is introduced.

M. Long, et al., [5]Replaced square rings, with sharp edges embedded in the empty crosses and eight ruffles welded on each side, are obtained to shape the upper layer of metasurface. Outside of the episode off-band. The next layer includes four Angular polygonal metallic leaflets and four therapies. Everything that contradicts ties the two neighboring Angular leaflets together.

R. Tiwariet al., [6]The Microstrip Patch Antenna (MPA) is an array design and is the most emerging research space for a 5th generation communication application. This paper proposed a novel design of a dumbbell shape microstrip antenna list with a global structure with the feature of wi-fi communication applications under the 5G network.

A. Mukhopadhyay et al., [7]a world leader in communications, Bose was instrumental in the development of modern radio and sonic technology. In 1896 his work was remembered by the IEEE as an ancient "historic achievement" of Asia. In 1997 the Institute of Electrical and Electronic Engineers of America called Bose "Father of Radio Science." The Royal Society of England was impressed by Bose's research paper on electromagnetic waves.

R. Tiwariet al., [8]Research on Antenna design and imitation is an emerging area among researchers. An antenna is a basic feature of wireless communication. There are different shapes and types of sticks, which are used in different applications. Now a Microstrip antenna for the day is very useful in front of electrical equipment applications.

III. Proposed Methodology

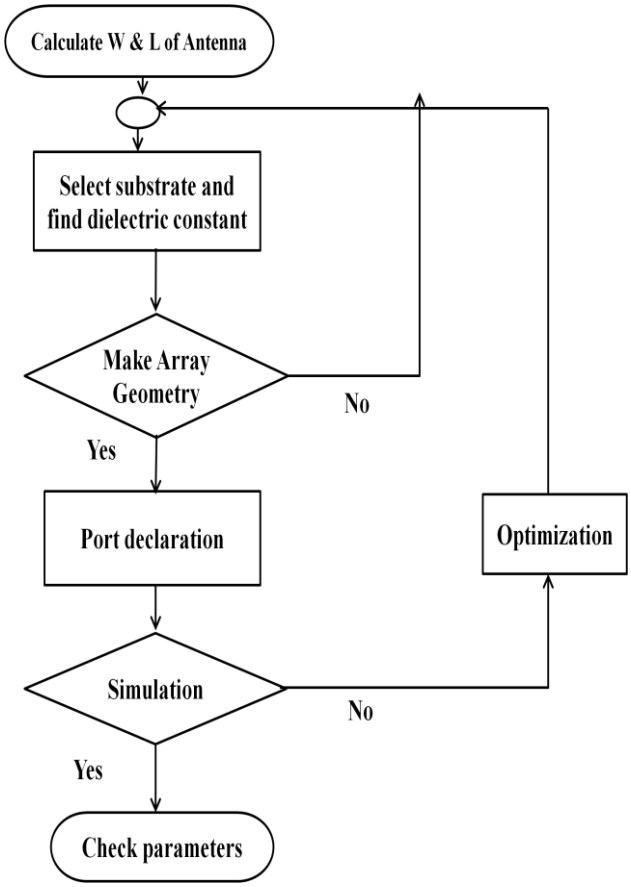


Figure 2: Flow Chart

The flow chart work as following steps-

1. First find application and define requirement.
2. Next steps is finding out major specification of antenna
   a. Resonating Frequency of antenna (according to application define in initial step of CST).
3. Choose a suitable substrate , it may depend upon various factor like availability of material, integration of antenna with other circuit components on board. Dielectric constant and height of substrate are important for microstrip antenna parameter calculation.
4. Calculate Microstrip antenna dimension. Most of the time antenna used in wireless communication is not simple antenna, these are customized structure.
5. Calculate antenna width and length using standard formula.
6. Antenna height (Its define in substrate material already for microstrip antenna its usually 1.5mm-1.6 mm). It can be selected using CST
7. Draw antenna geometry and define materials.
8. Define feed-point and radiation boundary
9. Run simulation and check performance parameters values.

First, it is identified early or the upcoming plan, such as the antenna design for the 5G communication system, is identified by previous readings. Then get technical specifications. Now find the right model or design for the program you want and the results. The next step is to set the intended purpose of the research work. Finally focus on the various challenges that occur during research and designing a design strategy.

After the selection antenna band and application of design, the next step is to calculate the radiating patch width and length.

Step 1: Calculation of Width (W)

For an efficient radiator, practical width that leads to good radiation efficiencies is:

$$W = \frac{1}{2f_r\sqrt{\mu_0\varepsilon_0}}\sqrt{\frac{2}{\varepsilon_r+1}}$$ Where, μ_0 is the free permeability, ε_0 is the free space permittivity and ε_r is relative permittivity.

Step 2: Calculation of Effective Dielectric Coefficient (ε_{reff}) the effective dielectric constant is $\varepsilon_{reff} = \frac{\varepsilon_r+1}{2} + \frac{\varepsilon_r-1}{2}\left[1+12\frac{h}{W}\right]^{1/2}$

Step 3: Calculation of Effective Length (L_{eff})

The effective length is $L_{eff} = \frac{C}{2f_0\sqrt{\varepsilon_{reff}}}$

Step 4: Calculation of Length Extension (ΔL)

$$\frac{\Delta L}{h} = 0.412\frac{(\varepsilon_{reff}+0.3)(\frac{W}{h}+0.264)}{(\varepsilon_{rff}-0.258)(\frac{W}{h}+0.8)}$$

Step 5: Calculation of actual Length of Patch (L)

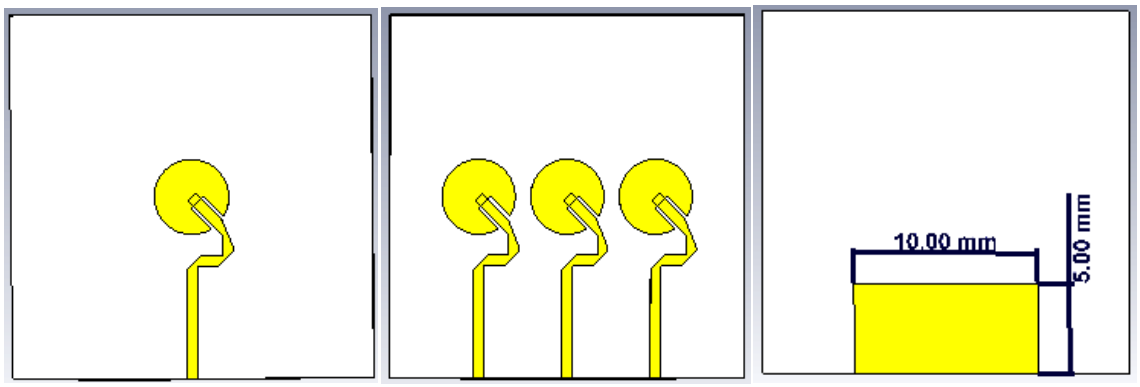
The actual length of radiating patch is obtained by

$L = L_{eff} - 2\Delta L$

Step 6: Calculation of Ground Dimensions (Lg, Wg)

Now the use of CST microwave studio software, make the design using calculated dimensions.

Figure 3, showing a high view on the receiver line of the proposed microstrip, one side of the dielectric substrate travels as an outlet system and the opposite side of the substrate travels as a ground plane. As shown in Figure 3, the views of the rectangular radio system with a microstrip server are programmed and the lower plane together makes boundary fields and the field responds by emitting radiation from the receiving line. Microstrip array receivers are recommended for smaller size and better reference. The resonant frequency of the proposed reception devices is estimated at 5.4GHz and 6.4GHz which means it operates under C-band. The proposed radio cable should be useful for the entire C-band system.



(a)(b)

Figure 3: (a) Top view single element (b) Top view array (c) Defected Ground Structure

Figure 3displays the antenna for the proposed microstrip system. The upper and lower layers are made of missing copper material and the substrate is made of FR4 material with a value of 4.4 dielectric steady.

IV. Simulations Results

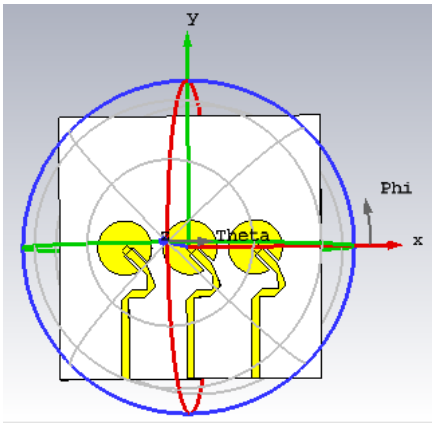


Figure 4: Simulation and fields of proposed antenna

CST microwave studio used to reassemble the proposed system. Figure 4 shows the replicated and attractive electric field in a circular planning frame.

Table 1: Design parameters for proposed Antenna

Sr No.	Parameter	Value
1	Frequency(f_r)	20-28 GHz
2	Dielectric constant(ε_r)	3 / Rogers 3003
3	Metal Height	0.035mm
4	Substrate Height(h)	1.57 mm
5	Line Impedance	50 Ω
6	Antenna Length	20 mm
7	Antenna Width	20 mm
8	Tangent Loss	0.06
9	Feed patch length	6.21 mm
10	Feed patch width	0.98 mm

Band-I:
Return loss

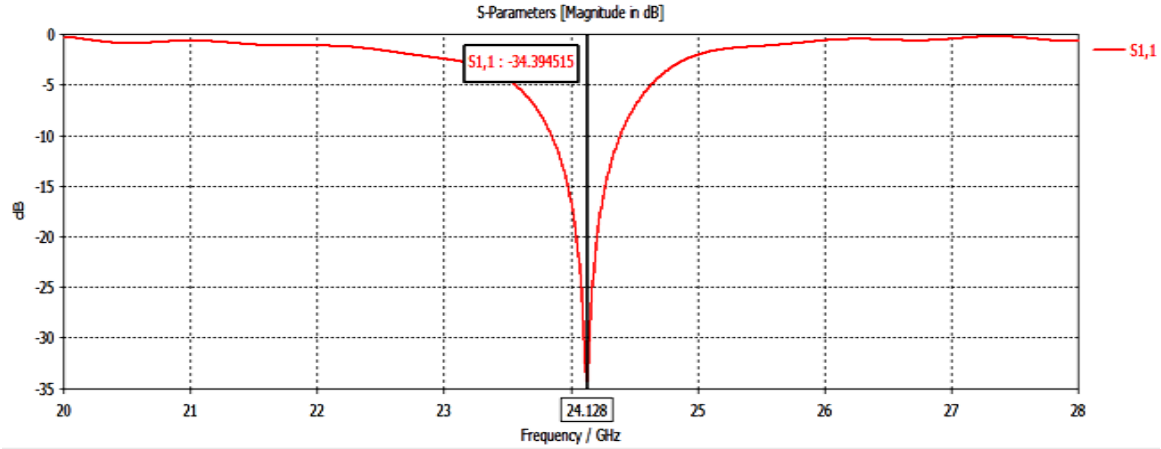


Figure 5: Return loss

Figure 5The obtained value of S11 or return loss is -34.39 dB for 24.128 GHz resonant frequency, where antenna efficiency is higher..

Bandwidth

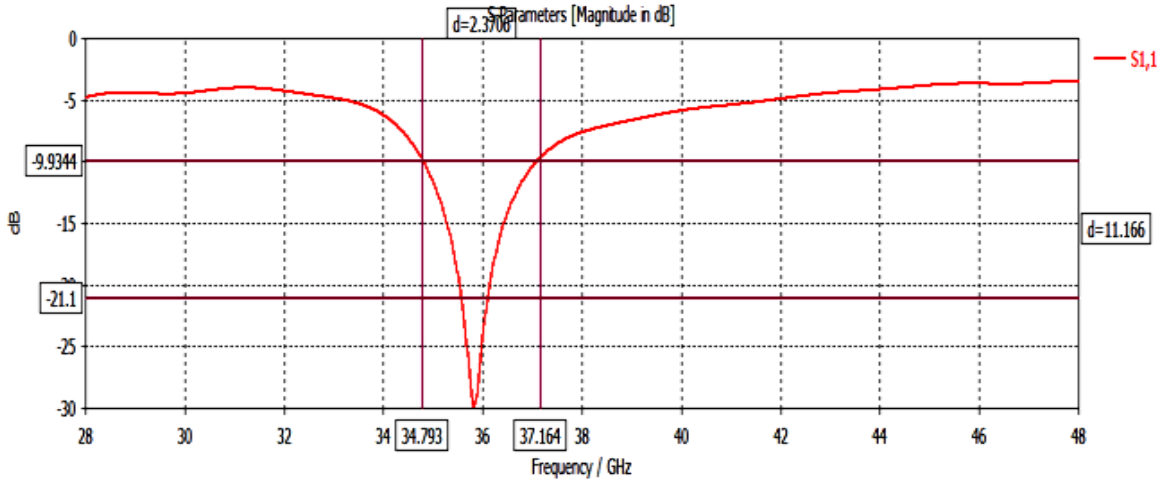


Figure 6: Bandwidth

For broadband antennas, the bandwidth is expressed as a percentage of the frequency difference (upper minus lower) over the center frequency of the bandwidth. The bandwidth of proposed antenna is 2371 MHz, (37.164 GHz – 34.793GHz), for optimized band.

Voltage Standing Wave Ratio (VSWR)

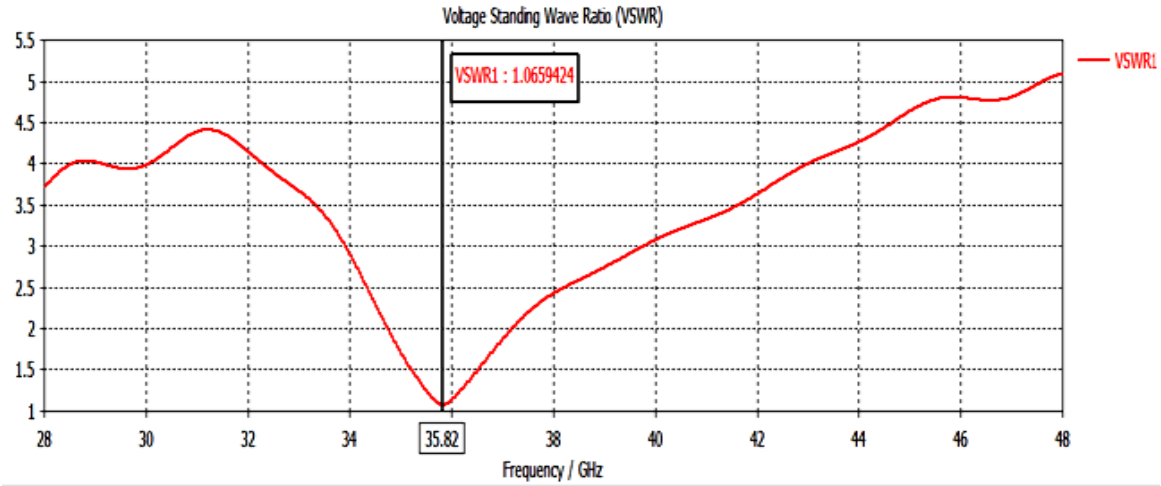


Figure 7: VSWR

Figure 7 shows VSWR must lie in the range of 1-2, which has been achieved for the frequencies 35.82GHz. The value for VSWR is 1.065.

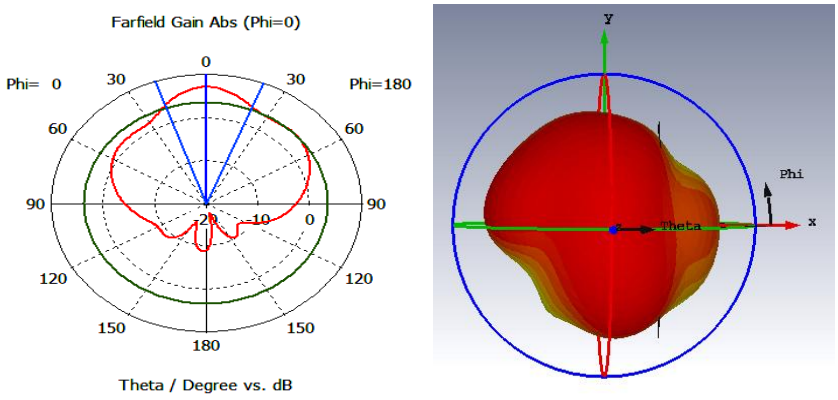


Figure 8: Radiation pattern

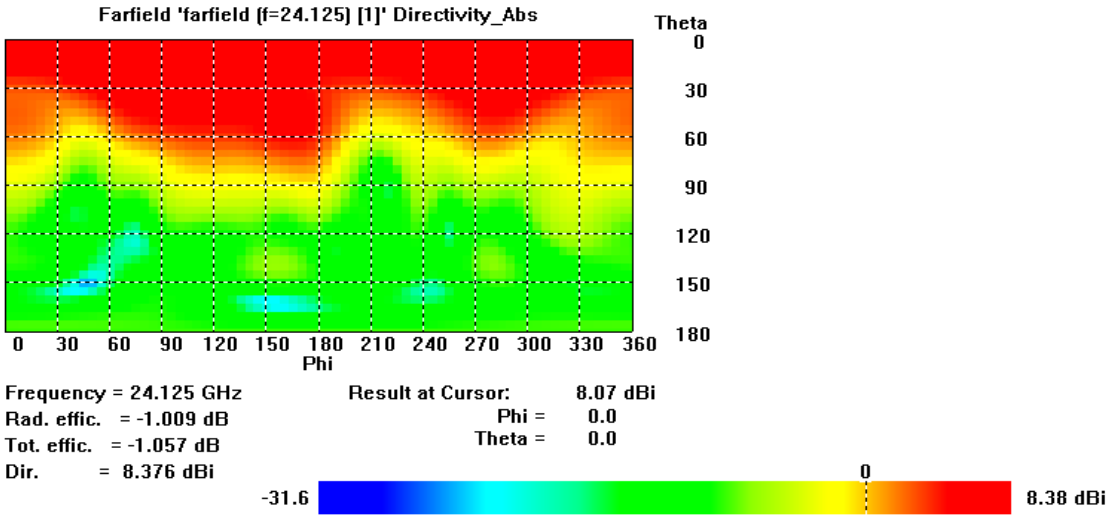


Figure 9: Directivity

Figure 9 is showing directivity of far field radiation pattern. The value of directivity of proposed antenna is 8.376 dBi.

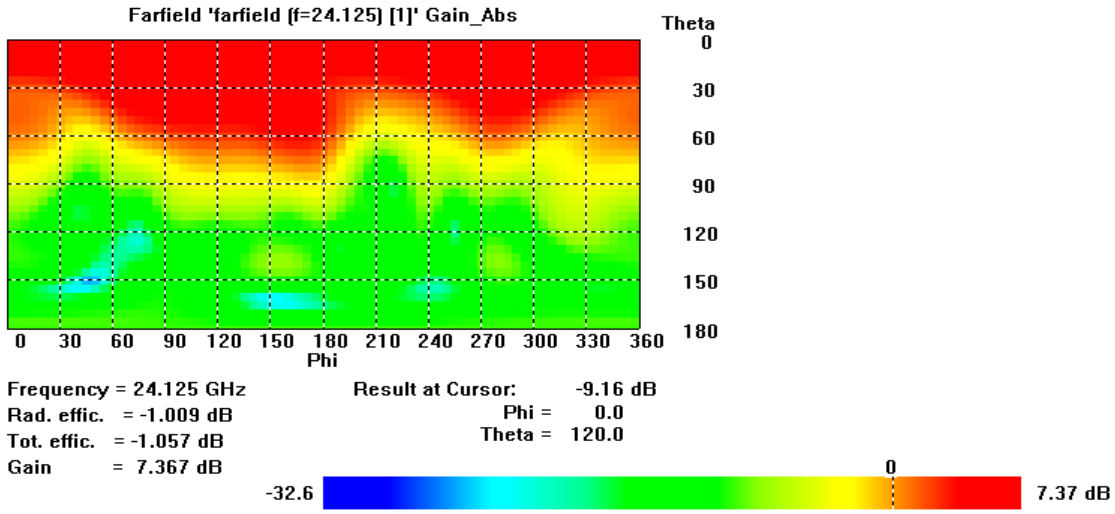


Figure 10: Gain

Figure 10 is showing directivity of far field radiation pattern. The value of gain of proposed antenna is 7.367 dB. Therefore array pattern achieve greater value of directivity and gain.

Table 2: Comparison of proposed design result with previous design result

Sr No.	**Parameter**	**Previous work**	**Proposed work**
1	S11 or Return Loss	-32.86 dB	-34.39 dB
2	VSWR	1.0372	1.0388
3	Resonant Frequency	28.5 GHz	24.2 GHz 35.82 GHz
4	Bandwidth	1.63 GHz (1636 MHz)	2.3 GHz (2371 MHz)
5	Directivity	NA	8.376 dBi
6	Gain	10 dBi	7.367 dB or 10 dBi
7	Pattern	Single	Single and Array

Table 2shows the comparison between the previous design and the proposed design. It is clear from this table and leads to the proposed antenna list with DGS design having a much better and better result than previous results.

V. Conclusion

A circular microstrip antenna is configured and redesigned using a CST microwave studio. Production results are presented and tested. The design of the proposed antenna is basic and reduced to a size of 20 x20x1.6 mm3. The comparable results show that the antenna bandwidth includes a 5G mm wavelength connection. Next the return loss is 34.39 dB at 24.2 GHz, -29.91GHz for 35.82 GHz audio frequency. The transmission capacity invested is 2371MHz. The total number of bands is 1 and the total gain is 10dB. So it will only mean that the proposed antenna configuration makes little sense in the future 5G communication systems

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LITERATURE REVIEW OF LOAD BALANCING TECHNIQUES IN CLOUD COMPUTING

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ABSTRACT

Cloud computing enables on-demand supply of IT resources and offers several advantages. Because most businesses have moved their operations to the cloud, datacenters are frequently inundated with irregular loads. It is critical to balance the load among servers when dealing with heavy network traffic in the cloud. Load balancing can help with this. The basic aim of load balancing is to evenly distribute the demand among all available servers such that no server is under or overloaded. Load balancing is the technique of distributing load via multiple nodes in order to make optimal use of resources when work is overburdened. Load balancing is required when a node is overburdened to support the load. When a node is overburdened, the load is distributed to the other optimum nodes. The purpose of this article is to shed light on the idea of load balancing on cloud platforms and how it may help improve the performance of cloud systems. The study also describes many static load balancing methods and dynamic load balancing strategies.

Keywords: *Cloud Computing, Load balancing, Round Robin, FCFS, Active Monitoring, Throttled.*

1. Introduction

Cloud computing [1] is an on-demand infrastructure that delivers pooled services and other devices in line with the customer's needs. Cloud computing is an internet term that is widely used. The whole universe of the Internet can be seen as a cloud. With cloud storage you can reduce the capital and maintenance costs.

Load balancing [2] is one of the main problems in cloud infrastructure, and they are closely linked to improved use and customer retention. Cloud computing [3] has to be done with proper techniques. If the complex local workload is uniformly spread across the entire Cloud, load balancing means that no nodes are crossed over and several other nodes are left idle.

Cloud [4] is a network focused on the Internet. Cloud is a service series. Cloud offers services on request. The core cloud providers are: infrastructure, software services, network services. Cloud computing is a new field that focuses on utility computing, architecture for service, internet and consumers.

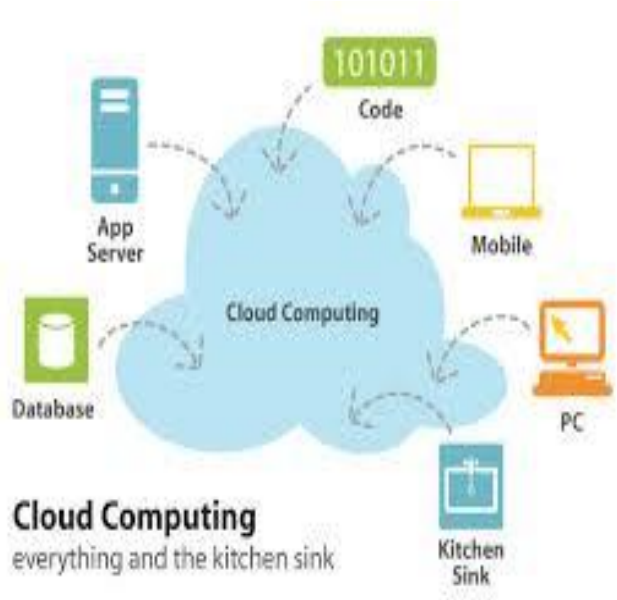

Figure 1: Cloud computing Environment [5]

For many researchers now, cloud computing [6] is a favorite subject. In the coming years, the internet will become more popular with the regular rise. Load balance is now truly a challenge in cloud computing systems. There is a distributed solution. Since maintaining only one or more unusual facilities in order to meet the necessary demands is not always practicable or cost effective. Per job should be individually configured for effective load

balancing on suitable servers and customers as the cloud is a very dynamic system and its components operate in a large scale.

The load balance [7] is the mechanism by which the load is divided between many resources in every machine. The load then has to be spread across the cloud-based resources such that any resource does at every time roughly the same work. The simple requirement is to provide many strategies for juggling requests to solve the application more efficiently. Both cloud providers are enabled by automated load balancing services to allow customers to scale up the number of CPUs and/or memories to satisfy growing demand. These are discretionary and based on the business needs of our customers. [8]

2. Literature Review

Sotomayor et al. [9] proposed a calculation, to be specific, cooperative calculation to adjust the heap in static climate. The calculation followed first-cum-first-serve to satisfy the assignment. The asset which contains the hub with the most un-number of associations is designated to the errand. Nonetheless, the significant downside of this calculation was that the high level burden adjusting requirements, for example, the handling time and the reaction time for every individual help demand, are not supported by this kind of portion errands.

Radojevic and Zagar [10] proposed an elective variant of Round-Robin calculation called Central Load Balancing Decision Model (CLBDM). The proposed calculation utilized the root guideline of cooperative effort, then it additionally estimated the network length among worker and customer by figuring generally execution season of errand on giving Cloud asset. The discoveries demonstrate that the new calculation coordinates data from end client experience and virtualized PC conditions and proactively impacts load adjusting choices or responsively change choice in dealing with basic circumstances. In any case, the proposed calculation presented new components that can bargain strength of the entire PC framework despite the fact that the proposed model tackles numerous issues that can occur with today‟s accessible models. The, presentation of CLBDM as a focal administration module impacts both the heap adjusting choices, and virtual worker assets which can thusly prompt the conceivable single mark of disappointment. Besides, without appropriate plan and designing in the components, like unwavering quality, strength and heartiness, CLBDM can prompt extreme execution issues or even the inaccessibility of the entire framework. Another issue that caused CLBDM to become temperamental is that it generally will in general go into the unanticipated circles and begin to fold its choice between hubs, bringing about terrible showing and end-client experience.

Pasha, Agarwal and Rastogi [11] proposed a Round-Robin VM load adjusting calculation and embraced Java language for executing the proposed VM booking calculation in CloudSim tool stash. The investigation expected the whole application is sent in one server farms with virtual machine having 2048 MB of memory and running on actual processor equipped for making a speed of 1000 MIPS. The exploratory discoveries demonstrated that Round Robin VM Load Balancing technique improves the heap adjusting execution by devouring less an ideal opportunity for booking virtual machine. The disadvantages, for example, powerlessness to gauge the yield measurements like reaction time and handling time, restricts its use.

Shah and Farik [12] proposed a half and half static calculation by conjoining the weighted cooperative calculation and the maximum min load adjusting calculation. This examination determined the limit of the server‟s assets by utilizing the weight task highlight of the weighted cooperative calculation, before load task is finished. Further, this is joined with highlights of the maximum min calculation where the base and greatest execution times are determined. Subsequently determined greatest time esteem is utilized to plan errands to the relating machines. This strategy can utilize the most extreme time for task fruition and planning the heavier undertakings since it is known prior to booking of errands is finished. Moreover, the procedure additionally beats the starvation as all errands will be flowed in a cooperative design. Be that as it may, a significant downside of this calculation was its non-similarity with complex

foundations and changing client prerequisites.

Nayak and Patel [13] directed a scientific investigation with respect to the current choked calculations and their presentation in the Cloud organizing so as a mean for adjusting the heap. The investigation proposed an altered choked calculation for adjusting the heap. The discoveries uncovered that the proposed adjusted choke calculation functioned admirably in spite of the distinction in the hidden limit of each VM. This improved proposed calculation utilized more boundaries, for example, expected reaction time and stacking condition while taking the choice of VM determination. The examination determined expected reaction time utilizing CPU use of VM. The examination uncovered that the use of improved choked burden offsetting calculation with less overhead, yielded an expanded number of client demand taking care of and better VM allotment, which thus will diminish the disavowal in the quantity of solicitations showed up at the server farm of the Cloud.

Raj [14] proposed the new static burden adjusting which is altered form of old one. Patel and Shah [15] discoveries uncovered that the execution of the proposed choke calculation decreases reaction time, datacenter demand overhauling time just as cost. Nonetheless, the relative and scientific investigation of existing and proposed choke calculation uncovered that to check the accessibility of VM for exact choice more burden adjusting boundaries ought to be incorporated. Besides, the usage of the proposed calculation in an alternate equipment design additionally should be checked.

Aswathi, Nisha and Mahesh [16] proposed another calculation which utilizes throughput of the host machine to improve the choked calculation. The throughput of each host machine as for its virtual machine was being determined and the outcome was put away in the hash table alongside the subtleties kept up in the heap balancer. From that point onward, in view of this throughput, the calculation plays out a sliding sort on the hash table. In view of this arranged hash table the undertaking will be distributed to the accessible virtual machine. The discoveries uncovered that the proposed calculation beat the current ones. As indicated by the discoveries, the proposed calculation limited the general reaction by communicating the heap to more proficient virtual machine. Nonetheless, absence of similarity with the yield measurements, like versatility, throughput, dependability, and so on, capacities as the significant disadvantage of this calculation. Moreover, its utilization was restricted to basic homogenous frameworks as it were.

The contrast between the static calculations and the unique burden adjusting plan is that the responsibility appropriation is executed at runtime among the processors. The new data gathered from the premise of task of new cycles to the slaves by the expert. In contrast to static calculations, under-stacked processors are progressively allotted by the unique calculations. Or maybe, they are powerfully dispensed by the distant hosts‟ demands and are cushioned on the primary host‟s line. Traditional disseminated systems‟ writing has pondered the issue of burden adjusting for over twenty years. A few approaches, methodologies and calculations have been recommended, executed and arranged [17].

An efficient planning approach also distributes work load among available virtual machines in a data center while reducing overall response time and processing time for the data center [18]. The Throttled (TVLB) and ESCE (AVLB) algorithms are combined using this approach. VM states benefit from the TVLB technique. In one of two states, a virtual machine may be: AVAILABLE or BUSY. Active VM Load Balancing algorithms examine and allocate to an idle set of VMs continually the working queue for new cloudlets. It also monitors the clouds on every virtual machine. This allocated cloudlet list helps to determine if a VM is overloaded or underloaded simultaneously. The VM load Balancer moves some load, based on this data, from congested VMs to VMs using the least clouds to maintain a high degree of equilibrium on virtual machines.

This Algorithm combines two algorithms, notably the Ant colony optimization algorithm and the Bee colony algorithm. It employs a mathematical equation based on a natural

heuristics method to locate the most frequent most suited nodes for transferring loads.

Load Balancing Mutation means a cloud schedule based on particle swarm optimization that considers dependability, runtime, time transmission, turntime, transmission costs, and a load balance between jobs and virtual machines. load balancing mutation By taking into consideration the resources available and resettling activities that fail to assign LBMPSO may contribute to the reliability of the cloud computing environment [19]. This procedure is compared with the standard PSO, random algorithms and Fastest Processor Cloudlet (LCFP), which show that LBMPSO increases Makespan outcomes, runtime and round trip time.

The expected execution time for each task on each machine must be determined and represented by an Expected Time calculation before beginning the cloud job allocation. Finally, using Ant Colony Optimization (ACO), it determines the optimal completion and makespan time for the work scheduling procedure [20]. The simulated execution times for a cloud environment are used to assess this approach. The nature of cloud computing is dynamic. As a result, prediction-based analysis is not possible, and performance monitoring of any application in cloud computing is critical. In this work, a scheduling method for appropriate resource use and congestion reduction in a cloud environment was explored.

3. Conclusion

Load balancing is a technique for dispersing loads across many persons, such as CPUs, disk drives, servers, or other devices. Load balancing is a critical and difficult operation in a cloud platform. Without load balancing, virtual servers on the cloud would receive traffic in an ad hoc way, with some machines overloaded while others underutilized. As a result, adequate load balancing on the cloud platform is required. We have covered the fundamentals of load balancing in this article, including what it is, different types of load balancing, the necessity for load balancing, and several recommended techniques for it. The study also discusses the advantages and disadvantages of the various suggested algorithms.

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LITERATURE SURVEY OF DECISION TREE BASED TECHNIQUES FOR HEART DISEASE CLASSIFICATION AND PREDICTION

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ABSTRACT

Several researchers have utilized data mining techniques to detect illnesses. Some systems are designed to forecast a specific illness, while others are designed to anticipate a wide range of diseases. The accuracy of illness prediction can also be improved. In this post, we have presented an overview of available data categorization techniques. These algorithms are, for the most part, represented by themselves. Data classification is a frequent and computationally demanding operation. We've also laid the groundwork for data categorization. We'd compare the most appropriate algorithms from a large set of existing algorithms. This study provides a review of the research on decision tree-based methods for heart disease categorization and prediction.

***Keywords**: Data Mining, Disease Prediction, Decision Tree, KDD*

1. Introduction

Heart disease [1] [2] is a dangerous condition with a high prevalence; it affects roughly 5% of people under the age of 35 in industrialized nations and more than 20% of those over the age of 75. Heart collapse episodes account for around 3–5% of hospital admissions. Heart failure is the most commonly seen reason for admission by clinicians in their clinical practice. The expenditures are quite substantial, accounting for up to 20% of overall health expenditure in affluent nations.

There are several types of cardiac illness, each of which affects different internal organs of the heart. As a result, any type of heart ailment may be classified as a cardiovascular sickness [3], and some of the heart-related ailments are discussed below. Coronary heart disease (CHD) is the most prevalent kind of heart disease globally. It is also known as coronary artery disease (CAD). It is a disease characterized by fat buildup in the blood veins and capillaries. It also prevents blood from flowing into the heart's veins and capillaries, resulting in an inadequate supply of oxygen and blood to the heart's internal organs.

To establish an effective illness management plan, a vast quantity of data must be examined. The most typical occurrences are early illness identification based on artificial intelligence, evaluation of severity, and early prediction. This will slow the course of the disease, enhance patients' quality of life, and lower related medical expenditures. Machine learning approaches have been used in this direction.

Data mining [4] [5] (also known as data or knowledge discovery) is the act of examining data from many viewpoints and synthesizing it into meaningful information that may be utilized to generate revenue, decrease costs, or both. Data mining software is one of the analytical techniques used to analyze data. It all offers users the ability to examine data from a variety of dimensions or viewpoints, categorize it, and describe the correlations discovered. Data mining is the process of discovering correlations or patterns among hundreds of variables in huge relational databases.

Machine learning's common approaches [4][5][6]. There are three primary components of a decision tree:

1. A decision node that sets an attribute for checking.
2. An edge or branch that fits one of the potential attribute values that include one of the test attribute outcomes.
3. The class to which the entity belongs contains a leaf sometimes called an answer node.

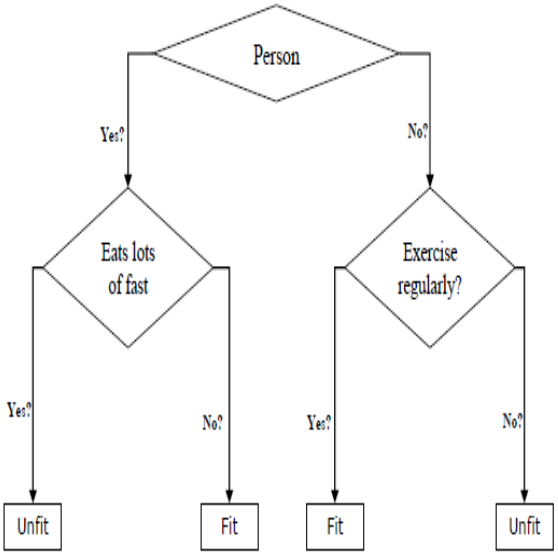

Figure 1: Decision Tree [6]

Two main steps in decision trees should be ensured:

1. Tree building: A decision tree is created on the basis of a specified series of training sessions. The test attribute for every decision node should be chosen and the class labeling for each leaf should be specified.
2. Classification: we begin by classifying a new instance by the root of the decision tree and then determine the attribute. The effect of this test causes the tree branch to decrease relative to its value. Repeat until a leaf has been found. The instance is then listed as the class characterizing the reached leaf.

Decision trees have also been used for intrusion detection [7][8][9]. The decision trees select the best features for each decision node during the construction of the tree based on some well-defined criteria. One such criterion is to use the information gain ration.

2. Literature Survey

A correspondence survey of a few characterization calculations is completed with the assistance of the open source mining apparatuses. The trials were directed utilizing WEKA, KNIME, Tanagra, Rapid Miner and Orange, additionally the exactnesses were estimated. The arrangements like KNN, DT, Naïve Bayes and the choice Stump have been thought about utilizing every one of the five devices. It is noticed that the DT and KNN calculations results better than different calculations [10].

Choice tree characterization is an all around utilized strategy and best fit in clinical conclusion. C4.5 Decision Tree is perhaps the most famous and adequately utilized classifier for pregnancy information order. The C4.5 grouping calculation is utilized to anticipate the danger of pregnancy for ladies. Complexity during pregnancy has ended up to be a significant issue for ladies of today‟s time prompting passing of both mother and hatchling. The exhibition of C4.5 Classifier is assessed for precision. Some other order strategies can likewise be utilized for breaking down pregnancy information, however C4.5 classifier is utilized because of its force, fame and productivity and the delicacy of the pregnancy issue. C4.5 classifier offers better execution and gives pregnant lady an exact degree of danger to give them a protected and solid pregnancy period [11].

Characterization is utilized to order everything in the arrangement of information into one of the predefined set of classes utilized in more extensive applications, which groups different sorts of information. Irvine datasets from the University of California were contrasted and unique characterization strategies. All procedure has been assessed by thinking about the accuracy and execution time and execution. Assessment has been completed with J48, Regression Testing, Bayes Net and Naïve Bayes Updatable calculations. The execution of the datasets of numerous Classification procedures with assessment standards as precision and execution time has been analyzed. It is seen that presentation of grouping strategies changes with various dataset. Elements that influence the classifier’s execution are (I) dataset (ii) number of occurrences (iii) qualities and (iv) sorts of traits. J48 and Naïve Bayes Updatable have given better outcomes with other informational indexes utilized in correlation. [12].

Cardiovascular coronary illness turns into the significant explanations behind the passings and in-time analysis is vital. Angiography can analyze precisely, however it is very exorbitant and prompts many results. A few existing

approachs have been gathered information from patients and executed with many mining methods to get great exactness with a more modest sum cost and disadvantages. An information base with 303 patient records and 54 highlights has been utilized. The highlights considered in this information base are plausible indications of CAD according to the accessible therapeutic data. The datasets are cleaned utilizing a strategy called include creation. The boundaries acquire, certainty is estimated to gauge the productivity of forecast. This technique yields the exactness rate of 84.8 percent and it is better when contrasting existing methodologies. The future degree is to anticipate the status of individual courses. It is vital and critical to analyze the illness influenced patients than robust and generous people groups. To arrive at more improved and energizing results greater dataset, new constructions and more extensive mining styles may be applied [13].

Ischemic coronary illness is the best key reasons of death, so upgrades what's more, the thinking of symptomatic measures would be helpful. ML strategies can be used to examine and decipher the acquired consequences of an interesting patient dataset and this can be strong to improve the exactness of determination bit by bit. Numerous tests were directed and demonstrated that the outcomes got are comparable as like the consequences of clinical specialists. The calculations are delayed to dissect Receiver Operating Attributes (ROC) bend to adjust the tradeoffs of affectability and explicitness. The anticipating strength of ML techniques has been contrasted and analyzes utilized regularly and shows that it very well may be seriously improved [14].

The issues pertinent to coronary illness were explored for the individuals of both the sex utilizing mining rules to discover the explanation. The University of California, Irvine (UCI) Cleveland dataset was explored different avenues regarding the wiped out and solid dataset by taking certainty as a pointer. Guys have more possibility of getting heart hazards than females. The significant quality addressing solid and wiped out circumstances were perceived. It is noticed that the torment and exercise actuated angina determine the event of coronary illness for male and female. Resting ECG a significant factor and slant of level gives the confusion just for females. The outcomes showed that men are exceptionally powerless against Computer aided design than females. Prior to start of menopause, women are not having odds of getting coronary failure connected to the manly of comparative age [15].

Information Mining Tools need standardized information, clear cut information and some need numerous information scales. In view of the technique utilized various outcomes will be created. It is important to locate the appropriate information design for every characterization strategy to acquire solid outcomes. All out factors are valuable for settling on choices and finish up information for clinical information. Absolute information is useful for the greater part of the information mining methods and is generally simple to use for separating clinical information [16].

Viable information mining and inductive learning can be accomplished utilizing Decision trees which are utilized for characterization and prescient demonstrating. The Efficient C4.5 Calculation has been applied for the investigation of deals. C4.5 is broadly utilized characterization in prescient mining; its exactness debases for complex issues and calculations. To improve the exactness and execution of this calculation L Hospital rule is proposed by the creator. This standard abbreviates the computational advances and expands the exactness in settling on prescient choices alongside progress in data acquire. It is reasoned that the calculation acts effectively and fits the information ideal for the applications with gigantic volumes of informational collections. It is essentially better for applying genuine world applications. Developing of the DT can accelerate and better-organized choice tree can be acquired which prompts better guidelines. It is tried different things with the business examination of tobacco and discovered to be quick and proficient. The downsides of high memory use furthermore, helpless productivity because of greater information base are dispensed with [17].

The exhibition of C4.5 is improved by the utilization of L-Hospital Rule, which abbreviates the figuring and builds the productivity of dynamic calculations. By utilizing the comparable rule the pace of data acquire is improved a lot. It is reasoned that the improved calculation is proficient and fit precisely for the utilizations of enormous volumes of information, and its proficiency has been essentially better in accordance with the true application. Developing of the choice tree can accelerate and better-organized choice tree can be gotten which prompts better guidelines. This calculation was confirmed by the examination of tobacco deals. Quicker and more powerful outcomes were acquired without the difference in a ultimate choice. The impediments of low effectiveness and memory utilization while managing enormous measure of information were killed. On the off chance that the measure of information isn't huge, the first C4.5 is suggested as a result of its higher exactness [17].

Incapacity and demise of grown-ups are because of coronary illness in well created nations. Indeed, even examination was done in the determination and treatment of coronary coronary illness, still it is important to investigate further. The framework centers around the assessment and decrease of coronary illness. Examination of information was finished by C4.5 order strategy by thinking about five parting standards. Around 528 records were accumulated for investigation. It is assessed that DT‟s uphold in distinguishing the danger and it may be a conclusive factor. Besides, the mined models and rules help with diminishing the Computer aided design horribleness and perhaps mortality. However, extra investigation by more noteworthy datasets for additional mining strategies and conditions are bit required [18].

3. Conclusion

Data mining approaches based on decision trees can be used to forecast a variety of illnesses. The findings of this study will have a significant impact in the medical field. It may be extremely beneficial to both patients and doctors. To improve the classifier's accuracy, further work should be done utilizing various data mining classification methods such as rule-based inference, maximization of expectations, and so on. This article undertook a critical examination of the existing decision-making tree-based method. In a nutshell, their job is weighed in terms of advantages and drawbacks.

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A LITERATURE REVIEW OF VARIOUS VERSIONS OF RSA ALGORITHM TO PERFORM ENCRYPTION AND DECRYPTION OF DATA

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ABSTRACT

The RSA cryptosystem is the most frequently used shared key cryptosystem. It is the first cryptosystem to employ a public key. The bigger the size of the key, the better the power of this cryptosystem. There are several RSA algorithms and variants. However, it is snatching the hot topic of science. Because the drive to store secret data isn't going away. Data is continually moving over the network in the current day. This network might be either local or global in scope. It will be sent through e-mail or another method. It is also critical to protect a personal or private material from prying eyes. There is also a requirement to develop a zero-tolerant security method. In this paper, we suggested an examination of several RSA algorithm variants.

Keywords: *Cryptography, RSA, Encryption, Decryption, Cryptanalysis*

1. Introduction

The need to encrypt crucial information shared over an unprotected network has given rise to the idea of cryptography. As cryptography is performed, sender encrypts or encodes information with a hidden key in such a manner that only the receiver can recognize it. Cryptanalysis, on the other hand, means undesired access to knowledge without a hidden key. Cryptography and cryptoanalysis converge to create the word 'Cryptology.'

Information management is a very serious topic today Governments, companies and people are now requesting secure information in electronic records, which is favored to conventional documents (paper and microfilm, for example). Documents in electronic form need less physical space, their transition is almost seamless, and can be accessed via simpler databases. The opportunity to allow more effective use of information has resulted in a rapid growth in the valuation of information.

However, information in electronic form is potentially more harmful to security risks. In comparison to documents written on paper, information in electronic form can practically be stolen from a distant area. It is much easier to change and intercept electronic messages than its counterparts on paper. Information protection is defined as a collection of steps taken to deter the unauthorized use of electronic data, whether the unauthorized use takes the form of exposure, modification, replacement or destruction of the data.

Several initiatives have been considered to provide these facilities, but no one initiative will provide full protection. Of the different proposed steps, the use of cryptographic mechanisms provides the highest degree of security and complete stability. The cryptographic scheme translates electronic data into a changed form. The owners of the information in changed form are now assured of its security features. Depending on the protection services required, the guarantee might be that the data cannot be changed without detection or that the data is incomprehensible to anyone but approved parties.

DES (Data Encryption Standard)[1], the first commercial encryption standard, was written in 1975. Due to less protection (small 56-bit key size), it lost popularity and AES (Advanced Encryption Standard, commonly known as Rijndael)[2] developed. In 1976, Whitfield Diffie and Martin Hellman developed the idea of public key[3]. The first public cryptographic key algorithm, RSA[4], was designed in 1977. In the late 1990s, the idea of a hybrid solution was used due to the popularity of electronic transactions.

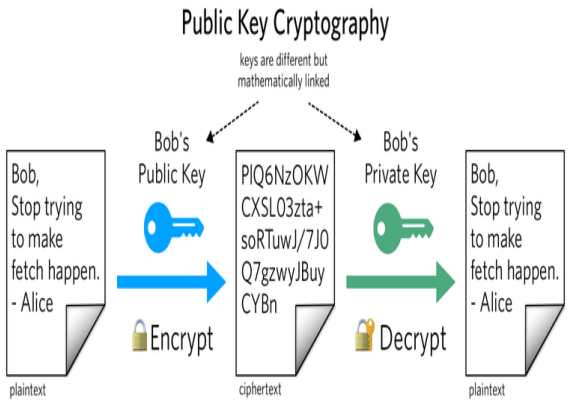

Figure 1: Public Key Cryptography

In the hybrid method, the message as a whole is encrypted by a symmetric key algorithm, but the hidden key used in the algorithm is transmitted by a public key algorithm. There is a tendency for various encryption algorithms to protect a message in transit. This algorithms are designed to fulfill the established security objectives.

2. Literature Review

Encryption in the Electronic Codebook (ECB) mode isn't gotten semantically [1]. Versifier et al. [2] have shown that IV determinism can moreover make encryption mode figure block securing (CBC) temperamental. The inadequacy, in any case, remained theoretical until late 2011. By using the inadequacy Doung and Rizzo[3] showed a live assault (known as BEAST) on Paypal.

Sporadic number generators have commonly been an enormous wellspring of shortcoming [4],[5],[6]. This is in light of the fact that an impressive part of the cryptographic plans depend upon a cryptographically shielded subjective number generator for key and cryptographic nonce age, if an unpredictable number generator can be made obvious (e.g., use of obvious seeds, roundabout access PRNG, it might be used as an optional entry by an interloper to break the protection.

The security network has portrayed the NIST standard for the period of pseudo-discretionary numbers called "Twofold EC PRNG" as uneven and auxiliary entry able [7]. In [8] makers exhibited that the essential explanation behind the 2015 Juniper scene was this aberrant access limit of Dual EC PRNG. In [8], makers also showed how the course of various shortcomings set off by programming botches achieves seed spillage in Juniper Network.

The creators in [9] proposed another figuring dependent on RSA. The proposed assessment was having new limits to amass the eccentricity of encryption strategy and unraveling measure. The proposed strategy is secure alternately with past frameworks. In any case, it is computationally over the top exorbitant. Utilization of different limits in encryption and unscrambling measure, makes it uncommonly time wasteful.

Work done in [10] introduced another modulus rather than modulus n. in past techniques, n was outcome of 2 indivisible numbers. Rather than n , another variable in shipped off beneficiary. It is continuously secure yet appraisal of new factor is taking an immense heap of time for the most part.

Another resuscitated understanding of RSA was proposed by creators in [11], it utilizes the chance of four indivisible numbers instead of two. Four indivisible numbers were replicated to discover development modulus. They besides proposed a period ground-breaking key age measure. Time of open key and private key are subject to new factor. They were not reliant on augmentation modulus n.

In [12], another kind of RSA was proposed. This translation makes utilization of four indivisible numbers. It has besides given another encryption key age method. Disregarding the way that this key age procedure is whimsical and taking an immense heap of time. As opposed to n they have utilized a solitary indivisible number w in encryption and unscrambling. This makes duplication modulus flimsier. Unscrambling time is in like way more.

The makers in [13] proposed another computation subject to RSA. The proposed estimation was having new limits to construct the multifaceted nature of encryption cycle and interpreting measure. The proposed methodology is secure conversely with past strategies. Regardless, it is computationally lavish. Usage of various limits in encryption and disentangling measure, makes it very time inefficient.

Work done in [14] presented another modulus instead of modulus n. in past procedures, n was consequence of 2 indivisible numbers. Instead

of n , another variable in shipped off beneficiary. It is more secure yet figuring of new factor is taking a lot of time almost.

Another invigorated variation of RSA was proposed by makers in [15], it uses the possibility of four indivisible numbers instead of two. Four indivisible numbers were expanded to find duplication modulus. They in like manner proposed a period capable key age measure. Time of public key and private key are dependent on new factor. They were not dependent on expansion modulus n.

MultiPrime RSA [16] was designed to enhance the decryption speed of RSA cryptosystem by taking more than two primes for the modulus. It consists of k primes $p_1, p_2 ... p_k$ instead of using only two as in standard RSA. This variant is more suitable for use in resource constrained devices as it is more efficient in terms of computational speed as compared to RSA CRT.

In the savvy computerized condition the information security assumes the noticeable job in information transmission through correspondence channel. To make the information secure, the data ought not be accessible or revealed to unapproved people ("classification"), ought to be shielded from unapproved change ("honesty") and accessible to approved people according to necessity ("accessibility"). So "classification", "honesty" and "accessibility" are considered as the key goals with respect to information security [17].

Another Enhanced RSA which defeats the confinements of above calculations was created by [18] dependent on four prime numbers. It decreases the immediate assaults as the calculation of "open key" just as "private key" isn't reliant straightforwardly on "people in general key" part n, where n is the result of two prime numbers. It relies upon the estimation of N, where N speaks to the duplication of four prime numbers. Also, it upgraded the "key age time" when contrasted with the customary RSA. In any case, the issue related with this work is that the speed of encryption and decoding process is less concerning the customary RSA calculation. Another RSA variation was recommended by Y.

Different scientists have additionally investigated the presentation of RSA calculation by changing key length bits in virtual banking applications [19]. RSA is likewise applied to e-wellbeing security frameworks [20], e-learning applications [21], and one time passwords on subsidize moves.

This paper [22] presents another Hybrid security calculation for RSA cryptosystem named as Hybrid RSA (HRSA). Here calculation of "open key" (P) just as "private key" (Q) relies upon the estimation of M, where M is the result of four prime numbers. So multifaceted nature associated with factorizing the variable M increments.

3. Conclusion

With the introduction of new network development approaches, network security is becoming more important. This has become much more significant with the increased usage of the World Wide Web, since users may access tools and update information. Cryptography is a Greek word that refers to the provision of concealed information. This entails the conversion of knowledge (plain text) into another format (Cipher text). The primary function of cryptography is to solve difficulties related to authentication, honesty, and privacy. In addition, we offered an investigation into several cryptography methods. This is mostly a review of relevant scientific publications.

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METAVERSE: A GAME-CHANGING INNOVATION FOR ENTREPRENEURS

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ABSTRACT

Metaverse started with the gaming industry but this invention will spread and game-change numerous others. Lately, much has been said about metaverse, including the counter-accusations of Facebook, Inc. renaming itself Meta Platforms, Inc. Some went as far as saying metaverse will be the new face of the Internet. However, this paper will discuss what exactly is metaverse and how will it be an implicit game-changing invention for businesses. Presently the recent Covid-19 pandemic has given rise to an alternate world where people could escape and this virtual world is more seductive than ever. The evolution of the Metaverse will affect not only businesses-- small, medium, or big-- but also possibly everyone as it has been seen in the recent times of the Covid crises which have earlier changed how people communicate, work, and play. Technologies alike as NFTs, AR and virtual reality, and online gaming all present unique openings for the brands to reach new customers in new ways. Corporations are rushing to roll out metaverse platforms, which, of course, include virtual reality gests like Meta's that teleporta user to an entirely new dimension. But despite big tech's trendy sweats, lower players will have a massive part to play within the metaverse. This is because the metaverse will be delicate to confine off-- thanks in large part to the blockchain. This will mean ample openings for startups and entrepreneurs will arise within this wild new digital world. Experts believe that the metaverse will signify the coming step in our digital evolution, bringing new pitfalls and openings along. However, doing business in the metaverse will not be simple – questions of how to regulate it are already arising at the moment.

Introduction to Virtual Worlds and the Metaverse

Virtual worlds are online computer-generated atmospheres where several users in distant physical positions can network in real-time for the purposes of work or play. Virtual worlds constitute a subsection of virtual reality applications, a more general term that refers to computer-generated simulations of three-dimensional substances or environments with seemingly real, through, or physical user communication. The word Metaverse is a combination of the prefix “meta” (meaning “beyond”) and the suffix “verse” (for “universe”). Thus, it literally means a universe beyond the real world. More precisely this “universe beyond” refers to a simulated world, distinguishing it from metaphysical or divine conceptions of provinces beyond the physical realm. In addition, the Metaverse refers to a fully immersive three-dimensional digital ecosystem in distinction to the more comprehensive concept of cyberspace that reflects the totality of shared online space across all dimensions of representation. Although the Metaverse always references an immersive three-dimensional digital space, conceptions about its specific nature and organization have changed over time. The general progression has been from viewing the Metaverse as an amplified version of an individual virtual world to conceiving it as a large network of interconnected virtual worlds. Neal Stephenson, who coined the term in his 1992 novel Snow Crash, vividly conveyed the Metaverse as a Virtual World perspective. In Stephenson’s conception of the Metaverse, humans-as-avatars interact with intelligent agents and each other in an immersive world that appears as a nighttime metropolis developed along a neon-lit, hundred-meter-wide grand boulevard called the Street, evoking images of an exaggerated Las Vegas strip. Since Stephenson’s novel appeared, technological advances have enabled real-life implementation of virtual worlds and more complex and expansive conceptions of the Metaverse have developed. In 2007, the Metaverse Roadmap Project [Smart et al. 2007] offered a multifaceted conception of the Metaverse that involved both “simulation technologies that create physically persistent virtual spaces such as virtual and mirror worlds” and “technologies that virtually-enhance physical reality such as augmented reality” (i.e., technologies that connect networked information and computational intelligence to physical objects and spaces). In contrast to the Metaverse Roadmap, a 2008

white paper on Solipsis, an open-source architecture for creating large systems of virtual environments using a peer-to-peer topology, provided the first published account of the contemporary Metaverse as a Network of Virtual Worlds perspective. The Solipsis white paper defined the concept as "a massive infrastructure of inter-linked virtual worlds accessible via a common user interface (browser) and incorporating both 2D and 3D in an Immersive Internet" [Frey et al. 2008]. Frey et al. and the IEEE Virtual World Standard Group (http://www.metaversestandards.org) also offered a clear developmental progression from an individual virtual world to the Metaverse using concepts and terminology aligned with the organization of the physical universe [Burns 2010; IEEE VW Standard Working Group 2011b]. The term first appeared in Neal Stephenson's science fiction novel Snow Crash in 1992; moreover, academics have been writing about ideas such as "extended reality" and "virtual worlds"for decades (Dionisio et al., 2013;Kelly, 2021; Lee et al., 2021; Payne, 2021). The predecessor of the metaverse, Second Life, which was established in 2003, reached 57 million registered accounts in its own virtual world by its 15th anniversary (Voyager, 2018). On Second Life, users interact in various ways, such as sending instant messages, co-visiting destinations, attending multi-player games, or creating, selling and buying virtual artifacts. Despite its large userbase, the platform lacked to grow (Schultz, 2018; Voyager, 2018), and the factors that have led to diminished user growth in the case of Second Life remain unclear. One barrier might be the limited transferability of a user's existing network onto the platform, causing increased costs for users who wish to make the transition. Building on the hypotheses of virtual 3D interaction, validated by Second Life, this, in turn, could be a promising opportunity and advantage for Meta to transfer its existing userbase into metaverse, ultimately paving the way to new and transaction-based revenue streams.

Features of the Metaverse: Current Status and Future Possibilities

On October 28, 2021, Mark Zuckerberg, the CEO of the "social network of the world" (Read, 2013, p. 193), Facebook announced a name change to "Meta" while elaborating on a new vision that entailed building up the "metaverse," a three-dimensional space representation based on virtual and augmented reality (Choi and Kim, 2017). At first glance, the new name and a far-reaching vision appear to be an innovation, suggesting a significant impact on the company's overall business model (BM). BMs have developed as a critical tool for commercializing innovations by providing a framework that a company can use to create and capture value from technological developments or innovative ideas (Chesbrough, 2010; Osterwalder et al., 2005; Teece, 2010). Following their recognition as critical drivers of innovation, BMs in themselves have become a differentiation factor in the competitive landscape. Nevertheless, even a well-established and currently profitable BM cannot be seen as a permanent fixture, considering the dynamic, constantly changing environment that companies face (Chesbrough, 2010). In practical terms, researchers are increasingly identifying a company's ability to change its BM before being forced to do so by external pressure, especially in volatile contexts, to be a critical source of competitive advantage (Hamel and Valikangas, 2004). The understanding of the need for a constantly changing BM has increased the scholars' focus on business model innovation (BMI) and has led to a burgeoning in the number of academic publications devoted to the subject (Foss and Saebi, 2017). Furthermore, some authors have referred to BMI as a viable way for organizations to adjust to changing sources of value generation in times of high environmental instability (Pohle and Chapman, 2006; Schneider and Spieth, 2013). the company's unforeseen announcement presented a new company focus, aiming "to bring the metaverse to life and help people connect, find communities and grow businesses" (Meta, 2021a). According to the company, now named Meta, the metaverse will resemble a mix of today's online social experiences in a three-dimensional space or projected into the real world (Meta, 2021a). As a technology, this new vehicle may significantly influence connections between the users and the platform by addressing the visual,

auditory, somatosensory and gustatory senses while allowing for movement- and touch-based interactions (Studen and Tiberius, 2020). Accordingly, the company has defined its new IJEBR vision as going beyond a further development of the products or services, to the point of "ushering in a new chapter" (Meta, 2021a) for Meta.

The Coming of age of The Metaverse Creates Huge Opportunities For Businesses

This is what the CEO of Epic Games has to say about it:"This Metaverse is going to be far more pervasive and powerful than anything else. If one central company gains control of this, they will become more powerful than any government and be a god on Earth-Tim Sweeney, CEO, Epic Games". Already there are signs of a massive opportunity unfolding. Look at the artist called "Beeple" (Mike Winkelmann for friends) who started selling unique digital art pieces online. All you buy is an image with a proof of ownership blockchain token (non fungible token). During 3 days in December, Beeple sold US$ 3.5 million worth of digital art work. Recently, the buying frenzy topped when the owner of his own art work metaverse bought Beeple's ultimate US$ 69 million art work.

Beeple was in no way the first to dip into the nexus of art, digital and blockchain of course. Already in 2017 a company called Axiom Zen released digital trading cards portraying cute little cats. hese CryptoKitties breed with each other so you can combine two of them to create new kitties. Cute but useless you say? Perhaps, but $30 million market transactions tell you they did something right.

Many big businesses are getting involved in the Metaverse space. Microsoft already bought Minecraft developer Mojang in 2014 for US$ 2.5 billion. Gaming universe builder Roblox is now worth US$ 30 billion. Trillions more dollars arebeing created as we speak and businesses can no longer afford to not be in the know or even part of it.

The Metaverse: A User Opportunity of a Lifetime?

The metaverse is not only a business opportunity. It also creates major opportunities to increase user engagement tremendously.This is not just interesting for businesses that want to create deeper customer relations and increase revenue. It is of major importance for these customers themselves. Just like in gamelike situations, the metaverse can offer users a completely democratized experience. Especially when these experiences are hosted on the blockchain, further enhancing user agency. Users can take full control of their identities in their own crafted journeys, while at the same time collaborating with other users and interacting with brands.

The Octalysis Group is currently working with a company that is giving its users control of their marketing power for example. What they do is to create identities of users on the blockchain which gives them power to sell their attention to brands that want to advertise to them directly. In return they command a direct . The brand does not see their name and only knows the cohort that this user belongs to. In a metaverse built in the digital space on the blockchain, users become increasingly powerful. Stay tuned for updates from us.

The advent of the metaverse as one of the dominant environments where businesses will interact with their customers supercharges the need for true user engagement.

How can you ensure that you catch the engagement of users that are highly empowered through the new metaverse setup? Just creating a digital functionality for users to interact with does not mean that they will interact with or buy your product. It does not mean that these users do the actions that you want them to do.Virtual reality often feels shallow as there is no user journey built in the virtual reality headset experience. Websites without engagement design are nothing more than a collection of functionalities, just like the universe without life is like a black hole. The trick is to create user engagement design that intersects with the fully immersed digital experiences that users have in the metaverse.

In fact the metaverse is all about having a user Journey. Look at the movie Ready Player One for example. The people in this fictional metaverse are not just mindlessly gaming their time away. The design of the metaverse Oasis in the movie is set in such a way that it appeals to all aspects of human

motivation according to the 8 Octalysis Core Drives.

layers in the Oasis constantly feel that they are progressing in their Journey by collecting experience points or currency. The game also provides them a means of livelihood which empowers feelings of ownership and possession. And because certain events are only taking place at certain times there is a lot of Scarcity Designed for people to come back to experiences again and again and again.

Because they have built up such a high level of ownership and possession they also fear to lose what they have built up in the experience. This creates some obsession to come back to the experience on a daily basis. The Oasis also gives users virtually unlimited creativity as it allows them to play whatever role they want to play or whatever area they want to visit.

And obviously the game is extremely social which combines very well with the feelings of curiosity that people face during social exchanges as well as exploration in the game itself. On top of that, the inventor of the game has designed for users to enter an epic hero's journey to free the metaverse of evil forces.

Who cares how the game in Ready Player One has been designed? Well, the Oasis is the ultimate form of the metaverse. It's the exact direction that least some of the newly emerging metaverses are taking. It may be an environment that you as a business may want to interact with. In that case you need to make sure that your design optimizes fully for human motivation. The time has gone that companies can just rely on your value proposition of their products to win people over and to get them to buy products and services.

The already short attention span of users in the digital space is shortened even more by the amount of distraction that goes on in the metaverse (or metaverses). The design of your product or service needs to be so good that there is almost no reason the user would not want to interact with your product in the first place. On top of that you need to ensure that users feel truly empowered and engaged when they first start to interact with your product or service. And not long after that your design needs to optimize for long term and deep user engagement.

And even when you manage to get users back again and again, you are not yet done.

You then need to think of a design that empowers veteran users to become your internal and external brand ambassadors. These leaders will show everybody in the experience how to behave and will tell everybody outside the metaverse to join the metaverse (and by proxy your brand influence circle).

Now, crafting such an engaging user journey around your business offering is not easy. It requires a thorough understanding of human motivation; knowledge of Behavioral Science and human biases and heuristics. It necessitates having the ability and empathy to crawl in the skin of the users. Only then will you be able to create the right human touch just like successful games have done.

XR Will Create The Metaverse – But Can't Sustain It

This is the incentive for so many companies to build the virtual environments that the metaverse will depend on. They are likely to be based in "extended reality" (XR) – the combination of augmented, virtual and mixed reality technologies. Universal access is essential if the metaverse is to bridge our physical and virtual lives to the same, or greater, extent that smartphones and the mobile web do today.

Unlike the web, however, which nobody owns and is paid for by everyone who uses it, the basic infrastructure for accessing the metaverse is largely being developed by private enterprise. As recently as 2019, more than 80% of the VR headset market was controlled by four companies, each of which used proprietary software.

Even if – as some argue – the route to the metaverse is via AR, it is unlikely to be financed by the free and open-source model that gave us the internet. Either way, without reasons to accelerate adoption, sceptics say the metaverse will never be anything more than a subset of gaming.

This may be why alternative framings, that imply that the metaverse is a point in time, are being popularized. Specifically, the metaverse represents the moment at which our digital lives – our online identities, social and professional relationships, and assets – become

more important than their physical counterparts.

Experiences, Not Technology, Will Be The Bedrock Of The Metaverse

If the metaverse is less of a product and more of a framework for human interaction, it is practical to look at metaverse monetization through the lens of experiences, rather than technology. This widens the range of business models that support individuals and companies in creating, marketing and selling new products, goods and services.

Some are already experimenting with the most obvious of these – advertising. Reports of brands using video games, AR features and digital replicas provide early use cases of how they could build recognition and engagement among consumers on metaverse-like platforms. Patents filed by Meta indicate that advertising and sponsored content will form a significant part of its metaverse strategy.

Although advertising is anathema to many technologists, it funds the internet as we know it. It produces high margins and allows content creators to drive discovery and engagement with their work, making it attractive – and, importantly, feasible – to anyone exploring the metaverse as a business opportunity.

But advertising today is dominated by the private sector and tied to products that predominantly hold real-world value. This doesn't really support the argument that the metaverse will create a new digital economy, different from the one we know today.

This is why non-fungible tokens (NFTs) are being watched with interest. Fashion houses, auctioneers and sports properties are among the businesses selling NFTs, which enable individuals to own digital assets. People have long built communities based on things they own, and the technology behind NFTs – blockchain – theoretically can create incentives for these communities to form and strengthen.

For example, a feature where the creator of an NFT is paid a percentage each time their NFT is traded could be used to support artists financially. The important role that the creative industries play in shaping culture and identities could normalise NFTs among a wider audience.

NFTs could also boost the development of the metaverse by encouraging the development of digital marketplaces. Creators of metaverses could charge commission fees on transactions, like how app stores function today. This model provides developers with a global audience and consumers with a common experience.

However, it is subject to intense debate across the technology ecosystem. App store "transaction taxes" are a contrast to the future envisaged by "web3" advocates, who see the metaverse as one of several counterweights against the power held by large technology companies, and an opportunity to decentralize the experience, control, and monetization of the internet in favor of users, content creators and asset owners.

Perhaps paradoxically, the push toward decentralization may end up producing more gatekeepers. Critics argue that if the metaverse is to have real products with real users, it must favor uniform, centralized experiences. These can never be truly open, and there's a certain irony in seeing large companies declare their intentions for defining and building the metaverse in this way, considering the history of how platforms, experiences and products have developed in the technology industry in recent decades. The power dynamics that aggregators exert on the internet today may be hard to avoid replicating.

Regulating The Metaverse

Regulation will also play a role in the development of the metaverse. Many web3 start-ups are still flying under the regulatory radar, and the list of hacks, scams and simple errors they are subject to is growing.

Questions of how to prevent fraud, eliminate copyright infringement and guarantee the integrity of digital environments are yet to be answered in detail, just as there will be debates over how to make the metaverse a safe place that accounts for the human rights that have been developed and enforced, to varying extents, in the real world. The Metaverse clearly was the inspiration for what is now known as Second Life (SL), an online game offered by Linden Lab.2 Snow Crash also contributes to Second Life on another level. The burbclaves described in the novel may turn

out to be the governance model to which Second Life is moving. Second Life is therefore turning Stephenson's thought experiments3 into reality in more than one sense.

Second Life has evolved into one of the popular online Multi User Virtual Environments (MUVEs) with at present some 14 million Residents.4 Unlike the related Massively Multiplayer Online Role Playing Games (MMORPGs), Second Life lacks a content-driven plot; the users define what SL is used for.

Perhaps because SL lacks a plot and instead provides a powerful platform for social interaction, the idea has been coined that SL can be regarded as a social microcosmos which would potentially make it a unique research platform for the social sciences and clinical therapy (Yee et al., 2007).

One of the interesting phenomena to study is that of privacy. Privacy is a basic human and social need (e.g., Westin, 1967). It is a multidimensional concept, with physical (e.g., bodily integrity), spatial (e.g., home as a private sphere), relational (e.g., private conversations), and informational dimensions. Since the rise of ICTs, informational privacy has gained importance. Informational privacy is often associated with the notion of informational control: 'being in a position to determine for [oneself], when, how, and to what extent information about [oneself] is communicated to others' (Westin, 1967 p. 7). Informational control allows individuals to define social contexts in which they present different aspects of themselves. For instance, your boss (generally) does not enter your bedroom, and your grocer does not (need to) know where you work. Audience segregation is considered to be an essential aspect of identity (cf, Goffman, 1959) and necessary to create and maintain social relationships (Rachels, 1975).

Privacy is a value worth protecting in itself, but is also instrumental to other values, such as personal autonomy, emotional release, and self-evaluation. It also plays an important role in society at large. Free speech, which is essential for public debate, is served by anonymous speech, for instance. Privacy therefore is not only an individual value, but also a social one. Privacy is, or should be, built into systems and organizational practices and procedures.

Conclusion

In the past three decades, substantialdevelopment has been made in moving from text- based multiuser virtual environments to the technical implementation of advanced virtual worlds that previously existed only in the fictional imagination. Contemporary virtual worlds are now complex immersive environments with increasingly realistic 3D graphics, integrated spatial voice, content creation tools, and advanced economies. These progressive capabilities has enhanced immense opportunities for the business to flourish and thus paving a way for the new age entrepreneurs which enable them to serve as elaborate contexts for work, socialization, creativity, and play and to increasingly operate more like digital cultures than as games. The current work has defined success in this effort as achieving substantial progress with regard to elements of a fully-realized Metaverse. In addition to conceptual and computational challenges, the development of the Metaverse may be constrained by significant economic, political and legal barriers. At present, virtual worlds are dominated by proprietary platforms. These platforms have played an important role in the history of virtual worlds by providing advance capital and enhancing public awareness of the technology. However, these proprietary and state-based virtual world platforms have sparked initial growth but now risk constraining innovation and advancement. There is a dire need to impose certain regulations to keep the platform within the bounds of legal jurisdiction. As we have seen with the growth of the Internet, advancement has been best served by the combined participation and innovation of proprietary and open-source initiatives. Similarly, the advancement of a fully-realized Metaverse by an entrepreneur would likely be maximized by harnessing the same process of collective effort and mass innovation that was instrumental in the creation and expansion of the Web.

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PSYCHOLOGICAL WELL-BEING IN RELATION TO PEER PRESSURE AMONG ADOLESCENTS

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ABSTRACT

The present study investigated the effect of peer pressure on psychological well-being of adolescents. A sample of 1008 adolescents studying in 11th and 12th class of rural and urban schools of 5 districts was selected from Punjab by using simple random sampling technique. Psychological well-being scale by Sisodia and Choudary and Peer pressure scale by Singh and Saini were used for data collection. The data was analyzed using mean, standard deviation, and't' test. The study revealed moderate level of psychological well-being and moderate level of peer pressure in the sample. There is no significant difference for psychological well-being w.r.t. gender. There is no significant difference between psychological well-being w.r.t. locale. There is no significant difference between psychological well-being of adolescent's w.r.t. type of institution. There is no significant difference in peer pressure of adolescents' w.r.t. gender. There is significant difference of peer pressure of adolescent's w.r.t. locale and type of institution. Further, there is significant relationship between psychological well-being and peer pressure among adolescents.

Keywords: *Adolescents, psychological well-being, Peer pressure.*

Introduction

Adolescence is the stage of life in which an adolescent has to face many challenges like physical, emotional, psychological as well as social. During adolescence, several biological, cognitive, physiological, emotional, and social changes emerge, and certain risky behaviors arise and are linked to adolescent's health (Abbas and AlBuhairan, 2017). Although it is believed that adolescence is a healthy time in an individual's life, around 15% of the global burden of disease accounted for by disability adjusted life years (DALYs) is in the 10-24 years old age group (Abbas and AlBuhairan.2017). Adolescents need good mental health to build normal emotional and mental development, to develop their potential, to have fulfilling relationships with peers and family, and to deal with the challenges of future life (Raheel, 2015). Adolescence is the phase where adolescents require the strong mental health to tackle the life in effective way (Sharma and Tanka, 2014). So, it is needed that psychological well-being of adolescents must be positive.

Well-being is a way of life. Especially in terms of life ideally inclined to health and wellness; unifying body, mind, and soul; individually full of purposeful attitude and aim to live more fully; and a functional life in all social, personal, and environmental aspects (Myers et al., 2003). Well-being requires harmony between mind and body. It implies a sense of balance and ease with the pressures in a person's life. Well-being is concern with how and why people experience their lives in positive ways, including both cognitive judgments and effective reactions (Golder, 2018). According to Bhimwal (2007) well-being is a multidimensional construct comprising of physical, mental, and social components. Well-being is more than the absence of mental illness and can be measured by several psychological and social indicators like life satisfaction, depression, anxiety, self-esteem, etc.

In present era, psychological well-being achieved much importance. The term psychological well-being is used nowadays in the literature to refer to a wide range of issues including mental, emotional, social, physical, economic, cultural, and spiritual health and consequently, it has been defined in various ways (Sharma and Tanka, 2014). Psychological well-being is one of the most frequently studies areas in psychology literature (Schmutte and Ryff, 1997). Psychological well-being has many dimensions like social, physiological, and social. Ryff has given six dimensions of psychological well-being that are autonomy, personal growth, environmental mastery, personal relations, self-acceptance, and purpose in life. Psychological well-being is the dynamic and active process that gives a sense of knowledge to the people about how their lives

are enduring the interaction between their circumstance's activities and psychological resources or 'mental capital' (Devaramane and Yenagi, 2019). Psychological well-being is the combination of feeling good and functioning effectively. Sustainable well-being does not require individuals to feel good all the time; the experience of painful emotions (e.g. disappointment, failure, grief) is a normal part of life, and being able to manage these negative or painful emotions is essential for long-term well-being. Psychological well-being is, however, comprised when negative emotions are extreme or very long lasting and interfere with a person's ability to function in his or her daily life (Judge and Arora, 2017). Psychological well-being can describe as a state of mind with an absence of a mental disorder from the perspective of positive psychology it may include an individual's ability to enjoy life and create a balance life activities and efforts to achieve psychological resilience (Waghmare, 2016). According to psychological well-being theory, individual's psychological health depends on his positive functioning in certain aspects in life. Individuals should have in positive relationship with others; should be dominant over the environment; should accept himself and his past; should has a goal and meaning in his life; should have personal development and the ability to make his own decisions (Ozen, 2005). Psychological well-being is a term that is influenced by many factors such as autonomy, personal growth, positive relations with others and purpose in life etc. Peers, family and school environment are also important factors that can affect the psychological well-being of adolescence.

Peer groups play a dominant role during adolescence. Every adolescent gets influenced by peer's groups. At the stage of adolescence, adolescents spend most of their time with peers. They enjoy their company and they mostly like those things which the dominant groups like whether it is wrong or right. Peer's groups have both positive and negative aspects. These groups can make or destroy the life of individual. An adolescent with negative family environment has more chances to fall in bad company. From school level adolescents starts to experience peer pressure (Moldes, Biton, Gonzaga and Moneva, 2019). As children reaches at adolescence stage, they become more dependent for their choices and morality with their peers (Uslu, 2013). Academic performance of teenagers also gets affected from peer groups. Kusumakar (2000) explained peer pressure as the bidding and cheering of same age group adolescents to impel the individual to act something. Mc Gregor (2001) defined peer pressure as the effect employ by a prominent peer group in inspire a individual to change his personality in order to certify the group standard.

Literature Review

Hussey, Kanjilal and Okunade (2013) investigated the effects of an enlarged adolescent social environment comprising of peers, schools, parents, and neighborhoods on adolescent psychological well-being. 20,745 adolescents were interviewed for data collection. It was found that an adolescent's perceived support from schools and parents are important predictors of their mental well-being. Further, peers' mental well-being and peer support are not significant predictors of psychological well-being.

Isarabhakdi & Pewnil (2016)explored the correlation of the engagement in family and peer activities, internet use, and mental well-being among high school students aged 15-19 years in Kanchanaburi province, Thailand. A self-administered questionnaire was applied on 1074 high school students in three schools during 2012 academic year. The study showed that family and communication factors significantly affect high school students' mental well-being. Further, engagement in family activities is more important than other factors in explaining the variations in student's mental well-being.

Minasochah & Minasochah(2019) determined the relations between peer and parental attachment with psychological well-being in male and female adolescents from diaspora families in Bawean Island. The study was conducted on 135 teenagers. The measuring instrument used was Inventory of parent and peer attachment and Ryff Scale of Psychological Well-Being. The study showed that peer attachment with psychological well-being has a significant relationship with peers.

Further on contrary, parent attachment with psychological well-being has significant relationships.

Khanna & Singh(2015) in their study investigated how Indian adolescents and teachers perceive issuesrelevant to adolescent well-being. Data was collected from 900 students and 17 teachers were individually interviewed using a semi-structured interview schedule. Study found peers as prominent factor in enhancing as well as distributing participant's well-being.

Lucktong, Salisbury and Chamratrithirong(2018) examined the importance of attachment and self-esteem on the psychological well-being among 1360 adolescents. Participants completed a self-administered questionnaire during school hours. It was found that secure parental and peer attachment is significant to adolescent psychological well-being. Secure peer and school attachment are significantly associated with greater prosocial behaviors while parental and school attachments are positively associated with life satisfaction.

Kibret & Tareke(2017) examined the contribution of instructor, peer and university support for promoting psychological well-being among students in the Andhra regional universities. Data were collected from a sample of 384 students. Results revealed that peer support and teacher support were found to be significant predictors of psychological well-being compared to university support that proved to be less useful.

Chan and Chan (2011) investigated how adolescent's susceptibility to peer pressure is related to their relationships with mothers and emotional autonomy from parents. A sample of 550 adolescents was selected from Hong Kong. It was found that mother's behavioral and psychological control predicted adolescent's susceptibility to peer pressure in both positive and negative directions.

Kosir, Socan and Pecjak (2007) conducted a study on 1159 students of age range from childhood through early to middle adolescence. The study examines the role of interpersonal relationships with peers and with teachers in students' academic achievement. Results found that well-being in School and academic engagement does not describe the relation between social relations and academic achievement. Further, peer relations are connected to students' academic achievement in younger students.

Katyal(2015) investigated the difference in peer attachment and well-being of orphan and non-orphan children. The sample consisted of 50 orphan and non-orphan children. Inventory of parent and peer attachment and Stirling Children's Well-being scales were used for data collection. The study revealed that non-orphan children have more positive outlook dimensions of well-being as compared to orphan children.

Objectives of the study

1. To study psychological well-being and peer pressure among adolescents.
2. To find out the significant differences in psychological well-being of adolescents with respect to gender.
3. To find out the significant differences in psychological well-being of adolescents with respect to type of institution.
4. To find out significant differences in psychological well-being of adolescents with respect to locale.
5. To find out significant differences in peer pressure of adolescents with respect to gender.
6. To find out significant differences in peer pressure of adolescents with respect to type of institution.
7. To find out significant differences in peer pressure of adolescents with respect to locale.
8. To find out significant relationship between psychological well-being and peer pressure of adolescents.

Hypothesis

1. There is no significant difference for psychological well-being with respect to gender.
2. There is no significant difference for psychological well-being with respect to type of institution.
3. There is no significant difference for psychological well-being with respect to locale.

4. There is no significant difference in peer pressure of adolescents with respect to gender.
5. There is no significant difference in peer pressure among adolescents with respect to type of institution.
6. There is no significant difference of peer pressure among adolescents with respect to locale.
7. There is significant relationship between psychological well-being and peer pressure among adolescents.

Methodology

Descriptive survey method was used.

Sample

A sample of 1008 adolescents studying in 11th and 12th rural and urban schools of 5 districts was selected from Punjab. Simple random sampling technique was used.

Tools Used

Psychological Well-being Scale

Psychological Well-being Scale by Sisodia and Choudhary (2005) consists of 50 statements. It includes five areas with 10 items in each area i.e. satisfaction, efficiency, sociability, mental health and interpersonal relations. The test-retest reliability was 0.87 and the consistency value for the scale is 0.90. The scale was validated against the external criteria and coefficient was 0.94.

Peer pressure scale: Peer pressure Scale by Singh and Saini (2010) consists of 25 items. It is a uni-dimensional scale and is a self-report 5-point Likert scale measured Strongly disagree (5), Disagree (4), Can't say (3), Agree (2), Strongly Agree (1). It also contains reverse items. Positive items are scored from 1 to 5 and negative items or reverse items are scored from 5 to 1.

Results and Discussion

In order to psychological well-being and peer pressure among adolescents the data were analyzed, and computed values of sample are given in tables.

Table 1: Showing psychological well-being and peer pressure among adolescents.

Variables	N	Mean	S.D
Psychological well-being	1008	202.41	25.367
Peer pressure	1008	59.91	17.880

Table 1 shows that the mean for the measure of psychological well-being and peer pressure has been found to be 2.241 and 59.19 respectively in total sample of 1008 adolescents and their S.D is 25.367 and 17.880 respectively. The values show moderate level of psychological well-being and moderate peer pressure in the sample.

Table 2: showing significant differences in psychological well-being of adolescents with respect to gender.

	N	Mean	t-value	p-value
Male	518	202.06	0.454	0.650
Female	490	202.79		

Table 2 reveals that the mean score psychological well-being of male and female adolescents is 202.06 and 202.79 respectively and the t-value is 0.454 which is not significant at 0.05 levels. It shows that psychological well-being of female is higher than male adolescents. Hence, the hypothesis H01 that there is no significant difference for psychological well-being w.r.t gender is accepted.

Table 3: Showing significant differences in psychological well-being of adolescents with respect to type of institution.

	N	Mean	t-value	p-value
Government	498	201.86	0.691	0.484
Private	510	202.96		

Table 3 indicates that the mean score of psychological well-being of government and private school adolescentsis 201.86 and 202.96 and the t-value is 0.691 which is not significant at 0.05 level. It shows that the psychological well-being of private schools is higher than government schools. Hence, the hypothesis H02 that there is no significant difference for psychological well-being w.r.t type of institution is accepted.

Table 4: Showing significant differences in psychological well-being of adolescents with respect to locale.

	N	Mean	t-value	p-value
Rural	462	202.56	-165	-869
Urban	546	202.29		

Table 4 shows that the mean score of psychological well-being of rural and urban studentsis 202.56 and 202.29 respectively and t-value is .165 which is not significant at 0.05 level. It indicates that the psychological well-being of rural adolescents is higher than urban adolescents. Hence, hypothesisH0 3 that there is no significant difference between psychological well-being w.r.t locale is accepted.

Table 5: Showing significant differences in peer pressure of adolescents with respect to gender.

	N	Mean	t-value	p-value
Male	518	58.99	0.360	0.719
Female	490	59.39		

Table 5 shows that the mean score of peer pressure of male and female adolescents is 58.99 and 59.39 respectively and the t-value is 0.360 which is not significant at 0.05 level. It reveals that peer pressure among female adolescents is higher than male adolescents, but difference is not significant. Hence, the hypothesis H04 that there is no significant difference in peer pressure of adolescents' w.r.t gender is accepted.

Table 6: Showing significant differences in peer pressure of adolescents with respect to type of institution.

	N	Mean	t-value	p-value
Government	498	67.73	2.552	0.011
Private	510	60.60		

Table 6 shows that the mean scores of peer pressure of government and private school adolescents is 67.73 and 60.60 respectively and t-value is 2.552 which is significant at 0.05 level. It shows that peer pressure of government school adolescents is higher than the private school adolescents. Hence, the hypothesis H05 that there is no significant difference in peer pressure among adolescents with respect to institution is rejected.

Table 7: Showing significant differences in peer pressure of adolescents with respect to locale.

	N	Mean	t-value	p-value
Rural	462	57.33	3.048	0.002
Urban	546	60.76		

Table 7 reveals that the mean score of peer pressure among rural and urban school students is 57.33 and 60.76 and the t-value is 3.048 which is significant at 0.01 level. It shows that the peer pressure of urban school students is higher than rural school students and difference is significant. Hence, the hypothesis H06 that there is no significant difference of peer pressure among adolescents w.r.t locale is rejected.

Table 8: Showing relationship between psychological well-being and peer pressure of adolescents.

Variable	R	p-value
Psychological well-being	-0.032	-308
Peer pressure		

Table 8 indicates the relationship of psychological well-being and peer pressure among adolescents. The coefficient of correlation is -.032 which shows negative correlation between psychological well-being and peer pressure among adolescents. If the peer pressure among adolescents is high psychological well-being is likely to be low. Level of significance of relationship between psychological well-being and peer pressure is low. Hence hypothesis H07 that there is significant relationship between psychological well-being and peer pressure among adolescents is accepted.

Discussion

The study found that psychological well-being of private schools is higher than government schools as private schools provide better facilities, better infrastructure, and more qualified teachers than government schools. Psychological well-being of rural adolescents is higher than urban adolescents. Urban adolescents' experiences lack of

communication with their parents because in urban area mostly parents are working so they feel isolated from their families. Further, single child system adopted by urban families also is a reason for lower level of psychological well-being among urban adolescents. Peer pressure among female adolescents is higher than male adolescents because girls go through more with emotional and hormonal changes than boys so there are more chances that girls get more affected by peer pressure. Peer pressure of government school adolescents is higher than the private school adolescents. Government schools have lack of counselors that can help adolescents to overcome challenges of peer pressure and that can teach them the negative effects of peer influence. Further, lack of parent's responsibility also a reason for more peer pressure in government schools. Peer pressure of urban school adolescents is higher than rural school adolescents because urban area adolescents are more exposed to sedentary behaviors. They choose passive leisure and have lower levels of physical activity.

Conclusion

The study found that psychological well-being of private schools is higher than government schools. Psychological well-being of rural adolescents is higher than urban adolescents. Peer pressure among female adolescents is higher than male adolescents. Peer pressure of government school students is higher than the private school students. Further, peer pressure of urban school students is higher than rural school students. Also, there exists negative correlation between psychological well-being and peer pressure among adolescents.

Educational Implications

The study found that psychological well-being of government school students is lower so the school environment should provide students better facilities and teachers for proper growth of adolescents. Psychological well-being of urban adolescents is also found low. Urban adolescents should be given healthy family environment so that adolescents could share their feelings and doubt with their parents. Adolescent girls should be guided properly about their physical and emotional changes in their body so that effect of peers can be minimized. Higher peer pressure is found among government school adolescents. So, proper counselors should be assigned in government schools who can guide them from negative peer pressure. Further, urban school adolescents should engage them in more physical activities rather that internet usage so that they feel free from negative thoughts.

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A STUDY ON CAREER MATURITY OF SECONDARY STUDENTS OFGOVERNMENT AND PRIVATE SCHOOLS IN PUNJAB

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ABSTRACT

The reason for the exploration is to decide the career maturity of secondary students. The ongoing review was directed utilizing the regularizing overview technique, with 200 secondary school students from the Bathinda locale of Punjab. A straightforward irregular examining procedure was utilized to choose the example. The fundamental discoveries show that secondary school students have an elevated degree of career maturity, and there is no significant contrast in the mean career maturity scores of students concentrating in Punjabi rather than English medium or rural rather than urban students. There is a significant contrast in the mean career maturity scores of students from government and private schools.

Keywords: *Career Maturity, Secondary School Students*

Introduction

Donald Super, who presented the idea of "professional maturity" over quite a while back, instituted the expression "career maturity". Considering formative speculations at that point, Super viewed careers as happening in a progression of formative stages, with each stage recognized by unambiguous exercises. "Indicating a decision" was the formative job of connecting mindfulness to word related information. Individuals are adult in their calling or prepared to go with satisfactory decisions when they are occupied with anticipated investigation and have adequate information on business, self-information, and navigation, as per Super's unique situation. Thought about how outcome in these undertakings could be surveyed to compare people well with those at a similar formative stage, possibly playing out similar errands while indicating the arrangements of assignments. Practically all instrument creation and a significant part of the exploration connected with the career maturity construct have examined the last option kind of examination. Various career maturity pointers were produced for use with young people and grown-ups, a large portion of which were firmly connected with Super's speculations.

A few examinations have been directed to decide if the quantity of seasonal positions held in secondary school can anticipate career maturity. A few investigations observed no connection between's kin who have done a significant measure of temporary work and career maturity levels, while others observed that students with work experience had higher mean career maturity scores than students without. It has been recommended that youngsters can profit from temporary positions provided that the workspace is viable with their career objectives. While research on the significance of career maturity in strict gatherings in the United States has been led, very little work has been done beyond the United States to examine its importance across societies.

While studies have been led across societies in numerous nations, not many correlation studies have been directed. In any case, a significant assemblage of examination in South Africa has reliably shown that students are less developed in their callings than their White companions. As per the analysts, career maturity intercessions ought to be modified to Western White qualities and ought to zero in additional extensively on the weightiness of life circumstance.

Career Maturity

Career scholars have been propelled by constructivists to help individuals in working purposely to lay out their own headway. Picking a career includes considerably more than the psychological course of attempting to adjust individual and word related information. This activity happens inside a bigger setting

that incorporates the singular's private socio-social setting. A person's "career story" is an assortment of photos portraying how the individual sees oneself on the planet. While the grasping parts of oneself (e.g., interests, capacities) and the universe of work involve the substance of the story, the designs of the individual and their situating inside the story-the singular's account about himself-furnish every person with its uniqueness. What's more, the individual's attention to their hand in the advancement of the story building is message points for the customary career maturity assemble.

As found in this review, the career maturity develop has gotten significant hypothetical, applied, and research consideration, including ideas for ways it very well may be changed to make it suitable in the midst of changing position examples and more advantageous for a more extensive scope of social and financial classes. The benefit of thinking about setting explicit factors was essential for Super's underlying origination of the build, similar to the idea of progress as a component of mature activities. In his later works, Super proposed changing the expression "career maturity" to "career flexibility" to all the more likely well-spoken the scope of career- related ways of behaving, experience, and abilities at various levels and strategies used to distinguish career development.

The importance of career maturity in our insight into career conduct is reflected in the degree of examination that requirements to keep on being distributed on it, almost 50 years after the system was first recommended. The develop has advanced to where it can change its name or shape toall the more likely address the alterable working world in the twenty-first hundred years. Nonetheless, conceivable Super's goals will stay fundamental for any new definition.

Students Throughout School and Career Maturity

Career maturity was found to be a solid indicator of secondary students' professional maturity as the direction toward the occupational objective. They didn't, be that as it may, recognize hopeful and down to earth occupational assumptions. The helpful career aspiration is the work objective that the objective wannabe is sure to accomplish. The optimistic occupational longing, then again, has additionally been characterized as an occupational objective that an individual is allowed to seek after however is uncertain of accomplishing. There was no such ongoing concentrate in the important examination writing.

In gatherings, sex assumes an interesting part as an indicator of career maturity. Additionally clear sex as a characterizing component of career maturity would then work distinctively in India than in Western nations. No such deliberate review has been attempted under Indian circumstances to date. Since various elements associated with career maturity were displayed to perform undertakings diversely in various race, culture, and orientation gatherings, and on the grounds that there is an absence of such examination strategies under Indian social foundation, it is fundamental to exactly look at whether personality is occupational aspiration.

Need of The Study

As per research on student career maturity, there are additionally a few factors that add to career maturity in a youngster's development. For over 30 years, career or professional maturity has been investigated, evaluated, and tended to. Super (1957) authored the term in his career improvement hypothesis, and it tends to be described as how much the individual has culminated the age-proper occupational obligations appropriate to their formative stage (Betz, 1988). Young people are viewed as career-mature assuming that they will settle on temporary career decisions and have aggregated information on instructive and occupational other options. Subsequently, the examiner consented to take on this report.

Review of Related Literature

Liu, Yan, et al. (2014) investigated the connection between's career maturity and work accomplishment, as well as the underlying circumstances that enhance this relationship. Throughout two timeframes, information was gathered from 1,202 youthful Singaporeans in China. The discoveries uncovered that career maturity was emphatically connected with

work achievement, and that this positive relationship was enhanced by both profound social knowledge and professional interest.

Jaseena M.P.M. et al. (2013) found the degree and contrast in the mean scores of maturity and debate goal of Kerala Higher Secondary School students. A poll review was utilized for the examination. The example is included 685 public secondary schools that are sufficiently addressed by different boundaries. As per the discoveries, students have moderate degrees of career maturity as well as struggle ability.

Quinter Migunde et al. (2015) researched the situation with secondary school students in Kisumu Municipality as far as career maturity and career independent direction, as well as the relationship among career maturity and career hesitation in Kisumu Municipality, Kenya. Tests of 370 secondary school student's year from one to year four were surveyed on career maturity and career hesitation. As per the discoveries of the ongoing review, government funded schools are more developed in their career field and have less occupational pressure than their tuition based school peers, getting career advising significantly works on one's degree of career maturity, and ladies figured out how to score extensively higher on career hesitation.

Sudhindra Roy (2015) examined secondary school students' career maturity. The enlightening study strategy was utilized in the examination. The examination was circulated to 120 secondary school students. To lead the review, schools (both private and public) in West Bengal's Birbhum area were picked aimlessly. The instrument utilized for the investigation was the Career MaturityInventory (CMI) by John Crites, Indian Adaptation by Nirmala Gupta, 1989.

Rajeev Oberoi (2016) researched the effect of parental endorsement dismissal on secondary school students' career maturity comparable to school arranging (both public and private) and the Board of Affiliation (CBSE and M.P. State Board). 400 Jabalpur District secondary school students were picked in light of the Mohsin Parent-Child Inventory. The students picked for the last review were given Crites' Indian Career Maturity Inventory variation (Nirmala Gupta). That's what the discoveries show, in contrast with different classes, parentally endorsed young men going to CBSE-partnered tuition based schools have the most noteworthy individual maturity, while parentally dismissed young men going to CBSE-associated government schools have the least. There is no impact on the career maturity of young men learning in MP Board subsidiary schools on parental acknowledgment dismissal, school the executives' attitude, or leading body of affiliation demeanor.

Rika Eliana et al. (2016) found out about the career maturity of secondary school students. Career maturity ought to be explored since numerous instructors are not enthused about endeavora career way subsequent to moving on from secondary school. This review attracted 206 studentsfrom different schools Medan City. The Career Maturity Inventory type C was utilized by Crites and Savickas, who adjusted it to the Indonesian language. CMI Type C gives a complete score to career decision status and contains 4 aspects, which are as per the following: genuine concern, association, conviction, and conversation.

Objectives of The Study

1. To find out whether there is any significant difference between the mean Career Maturity scores of students studying in Punjabi and English Medium.
2. To find out whether there is any significant difference between the mean Career Maturityscores of Rural and Urban students.
3. To find out whether there is any significant difference between the mean Career Maturity scores of Government and Private school students.

Hypotheses of The Study

1. There is no significant difference between the mean Career Maturity scores of students studying in Punjabi and English Medium.
2. There is no significant difference between the mean Career Maturity scores of Rural andUrban students.
3. There is no significant difference between the mean Career Maturity scores of Government and Private school students.

Method Of Study

The present investigation was undertaken by using normative survey method. The survey

method gathers data from a large number of cases at a particular time.

Sample for the Study

The sample was chosen using a simple random sampling technique.
A sample of 200 secondary students was drawn from the Bathinda district (Punjab).

Tool Used

1. Career Maturity Scale constructed and standardized by John O. Crites & Mark L. Savickas (2011).

Null Hypothesis

There is no significant difference between the mean Career Maturity scores of students studying in Punjabi and English Medium

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Table 1: Significance of Difference between the Mean Career Maturity Scores of Students Studying in Punjabi and English Medium

Sample	N	Mean	SD	t-Value	Significance level at 0.05
English	139	18	2	0.16	Not Significant
Punjabi	61	18	1.7		

Since the 't' value in the preceding table is not significant at the 0.05 level, the above Null hypothesis is accepted, and it is stated that there is no significant difference in the mean Career Maturity scores of students studying in Punjabi and English Medium.

Null Hypothesis

There is no significant difference between the mean Career Maturity scores of Rural and Urbanstudents.
In order to test the above Null hypothesis 't' value is calculated.

Table 2: Significance of Difference between the Mean Career Maturity Scores of Students Studying in Rural and Urban

Sample	N	Mean	SD	t-Value	Significance level at 0.05
Urban	89	18	2.0	0.32	Not Significant
Rural	111	18	1.9		

Since the 't' value in the preceding table is not significant at the 0.05 level, the above Null hypothesis is accepted, and it is stated that there is no significant difference in the mean Career Maturity scores of students studying in Rural and Urban.

Null Hypothesis

There is no significant difference between the mean Career Maturity scores of Government andPrivate school students.
In order to test the above Null hypothesis 't' value is calculated.

Table 3: Significance of Difference between the Mean Career Maturity Scores of Students Studying in Government and Private school students.

School	N	Mean	SD	t-Value	Significance level at 0.05
Government	89	18.5	2.1	2.8	Significant
Private	89	17	1.8		

Since the 't' value in the preceding table is not significant at the 0.05 level, the above Null hypothesis is Rejected, and it is stated that there is significant difference in the mean Career Maturity scores of students studying in Government and Private school.

Summary of Results

1. There is no statistically significant difference in mean Career Maturity scores ofPunjabi and English Medium students.
2. There is no statistically significant difference between rural and urban students' meanCareer Maturity scores.
3. There is a significant difference in mean Career Maturity scores of students from government and private schools.

Conclusions

The ongoing concentrate on the Career Maturity of secondary school students uncovered that this is at an undeniable level. Therefore, exercises will be remembered for the secondary educational system to support this. Just when students arrive at the apex of Career Maturity will their achievements become significant. Accordingly, educators should remember that while arranging study hall guidance.

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A CULTURAL STUDY OF AMULYA MALLADI'S A BREATH OF FRESH AIR

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ABSTRACT

A Breath of Fresh Air brings a rich cultural psychology according to the modern society. The author brings the central theme of the protagonist Anjali to explore the modern life. Through the protagonist she brilliantly portrayed people's life in the society. Malladi tells the simple story of love, marriage, guilt, ego, forgiveness and jealousy in one novel. She perfectly distinguished the human emotion and complexities in various situations. The role of women in Indian society gives great happening that may encounter in Indian literature. Bhopal tragedy and Indira Gandhi`s assassination brings few moments of past. The novel takes place entirely in India. Man as a social animal, forms society and becomes a cultured human being by obeying certain rules developed by it.

***Keywords**: portrayed, emotion, situation, moments and human.*

The title of the novel explores the horror when a catastrophic gas leak poisons the city air. And also it indicates the Bhopal gas leak of 1984, which killed more than 3,800 people. This incident took place in Madhya Pradesh, India. The title then explains in the beginning of the novel. The novel as a character Anjali as to escape from the past life and move her present life peacefully with a fresh breath. Here, Amulya malladi indicates the real incidents in the history of India in the beginning of the novel. The story mostly revolves around the three characters Anjali, Prakash and Sandeep. Anjali expects arrival of her husband and waits for him in the Railway station. At that time the Bhopal gas tragedy occurs, Anjali did not know what is going to be happening in the station. Anjali couldn't escape from inhaling the gas would be great disorders in her life. The toxic chemical named methyi isocyanate leaked out of the pesticide plant union carbide India limited in Bhopal. Anjali had felt that the incident would be a great tragedy of her life. I had seen people die around me that night.

I had seen the city of Bhopal turn in to a cemetery for months to come after the incident. Mass burials had taken place and I couldn't shrug the thought that I could have been one of those bodies piled up against. One another, buried anonymously, or burned to a cinder without any last rites… I knew that every breath I took was leading me to death, untimely or otherwise. (173)

Anjali felt that if Prakash could take care off to the right time from the railway station. Anjalidid not face these consequences in her life. Later Anjali divorces Prakash. Prakash marries Indira. Sandeep-Anjali couple has a son named Amar, who carries the reflections of Bhopal gas tragedy as fatal heart and lung diseases. Amar born in the womb of Anjali, whose internal organs with exuding the poisonous gas on the day brings auspicious moment to remember. Through Amar, the novel explores the tragic state and life of people, whose children were physically and mentally challenged.

How Bhopal gas tragedy is pictured as disastrous through the portrayal of the character, Anjali needs to be examining here. Anjali had to live with the disease almost until their death and transferred the bodily difficulties to their offspring too. *A Breath of Fresh Air* is by nature a right all living being in the universe. After some years Anjali and Prakash occur to live in the same place in Ooty with their families. Prakash makes in his fact in the life of Anjali again. Their path met again when Prakash was stationed in the same town as Anjali. The guilty feeling that haunted Prakash forced him to visit Anjali's house and found about his life and his son. Anjali is a divorced woman that her culture looks down upon. After that Amar's physical condition is bad and he is admitted more serious medical treatment. He is hospitalized and shifted to military hospital becomes the place of final scene in which Amar expresses his request to go out and have a breath of fresh air. Anjali his mother takes him out of his room to the open space of balcony. There Amar takes his last fresh breath. At the time of Amar's birth itself

he was put in an incubator and disbelief remained whether there was a problem with his lungs. The treatment did not better his condition. Major Mukesh Mohan the pulmonologist, who treats Amar, says:

"I have had a few cases from the Bhopal gas tragedy, but they were relatively minor. This is very advanced," he said. "Madam, I am very sorry that you got trapped there that night. I have heard some scary stories from colleagues who were posted in Bhopal then. We still don't know how damaging that gas really was. New lung disease caused by the gas seems to keep cropping up, and your son also had a heart valve problem, right?" he flipped through Amar's file… (195-196)

The inhalation of the gas gave Anjali chronic bronchial asthma. Babies born even today with the evident to the senses of 1984 tragedy through biological deformities. Methyl isocyanate has disturbed the genetic make-up of the guilt victims who inhaled the gas and these deviations get unfurled through their later generations which are presently in Bhopal. Here is a part of the narration of the day of tragedy by Anjali in the novel.

"The homeless had started gathering their meager belongings, while others were standing up, moving, looking around, asking questions, trying to find out what could be done. Soon it became unbearable and the exodus began. People started to clamor to get out of the station. But if he had come and picked me up when my train arrived two hours ago, we would have been safe. I would have been safe, my mind cried out. I opened the taxi door and pushed into the people who swarmed around the car. There was no relief for anyone… the voices of others, screaming and yelling and demanding the gods for an answer. (3-7)

In the novel above scene is portrayed in the prologue of the novel which is narrated by Anjali. After being taken to the military hospital from the street, the next day Anjali failed in her try to bring to exactly on anything. Thus, the Bhopal gas tragedy find its way for the entry in the novel, here Amulya ends the prologue. In this regards Mishra opines that:

When the production moves to India, it becomes an easy target for the fundamentalists, who see in it one more example of cultural travesty, of foreign denigration of dharma and Hinduism. (Mishra 292)

Amar the only son of Anjali serves more than one purpose in the novel. Like Anjali he too is affected by gas tragedy before his birth. Amar was affected by respiratory diseases which is one of the horrific consequences of the leakage of the toxic gas. Anjali came to know that Amar had difficulty in inhaling oxygen immediately after his birth. Sandeep consulted many a specialist and found that their child's inborn deformity or disease was exit of isocyanate gas in the internal organs of the mother.

A Breath of Fresh Air has thus taken special care to portray those mothers whose wombs were constantly made impure after the tragedy. Through Amar, the novel explores the tragic state and the life of the children who were suffers physically and mentally because of the toxic problem. Anjali writes about the breathing problem of Amar,

…the doctor told us when he came back to our hospital room. "We have put him in an incubator. Maybe there is a problem with his lungs. Thus began a nightmare that never really ended. We went from specialist to specialist and were finally told that Amar's breathing problems were related to the methyl isocyanate gas I had inhaled in the Bhopal Railway Station. But that was years ago and I couldn't understand how something that happened so long ago could affect my baby. Then I found out more about the deadly gas and how I shouldn't have more children, that any child we had would probably have the same set of problems. Some of the specialists said that they were surprised that I had even gotten pregnant. One of the symptoms of inhaling methyl isocyanate gas was infertility. And just like that, my past took over my future."(204-205)

The novel explains that a social disaster brings a whole family into a misery. It refers to the kilter of the sacrifice at the time of the leakage of the gas and also after that. Like Amar, the disaster does not palate the anxiety effect of a breath of fresh air. Sandeep sophisticated the manifestations of the internal harm done by the gas on Anjali:

Her breath was laboured and each time she inhaled she made a hissing sound. She was studying on my dining/study table in the living

room. I was trying to cook a decent meal for us in the adjoining kitchen. When she could breathe again, she told me she had asthma and how she had gotten it. I listened intently, in rapture that she had survived one the worst chemical catastrophes of the century. I had read about the Bhopal gas tragedy, and they still talked about it on the news two years after the fact. Analysts had been there that night, breathing the poisonous gas. And she was here now with me, struggling to breathe. (76-77)

The eminent structure is that the novel focuses on the social disaster caused by great tragedy. All the incidents took part in very beginning of the novel. The novel is more fictional than rational. The greater part of the novel focuses the emotional violence and brings relationship between the eminent characters and practical incidents in the novel. Amulya Malladi's novel *A Breath of Fresh Air* focuses on this aspect that upsetting the culture of the people through the disaster, not among in one generation but also it conveyed to several generations. However, even then among the characters, Anjali and Amar are the rational status. When she was a student of literature, she adored her family and experienced the effect of favourable fortune.

It was almost four months after the "set-up" dinner at Gopi's that Anjali and I met again. She was talking to a friend outside the auditorium where the students of the Department of Literature were performing a play. As a member of the faculty I had a free ticket, and since I had nothing better to do on a Saturday night I went to see *A Midsummer Night's Dream.* Our eyes met as we waited to go inside the theatre and before I could turn away and pretend I didn't see her she waved lightly. I waved back uncomfortably. I felt uneasy. After all, Gopi and Sarita had tried to set me up with her. I wondered if she was hopeful because of that. I noticed that she stood out in a crowd because of her shoulder-length straight hair, her height, and her beautiful face. I on the other hand was thirty-one years old and looked like the average man on the street. (73-74)

The novel depicts the state proposal assistance and protection of natural rights for both social and cultural victims. Thus the novel concludes the social disaster as a social change in the human life. It has now come to a final stage that the most popular term for the study of literature and culture form an outlook by environmental politics. The study of fictions or social and cultural incidents in literature are brought great implementation in the past generations.

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STUDENT GRADE PREDICTION IN EDUCATION SECTOR- A SYSTEMATIC LITERATURE REVIEW

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ABSTRACT

Grade Prediction systems have become an important part of Education Sector now a days in most of the developed foreign countries. They play a vital role in retention of student stress for examination performance, act as an early warning device for educators, especially for the educators in MOOC's (Massive Open Online Courses) where an educator cannot keep track of the massive students in order to identify the students who are likely to receive poor grades. After reviewing a wealth of literature on student grade prediction, it has been observed that all the Grade Prediction Systems have been developed for the gaint foreign universities (having datasets specific to those university curriculum and courses). In this paper, a detailed review of 56 papers on Grade Prediction research available on popular sources like ACM, IEEE and ScienceDirect has been done to identify the techniques/algorithms used by them, the datasets, student attributes they have considered for making predictions and the evaluation parameters used for evaluating such systems. Finally,a student grade prediction model for Indian Engineering Education sector have been proposed followed by the proposed research methodology.

Introduction

Colleges and Universities are prestigious places to access higher education. The intake of students in higher educational institutes, especially in India is extremely diverse in terms of their family backgrounds, educational interests and passions. Example, The students in a batch of a particular college course have some fraction of school topper students (definitely good in academics),ranging from the Some students need a lot of attention from instructors because if special attention will not be given to those students who are not getting good grades, it could be detrimental to their emotional state and their career in the long run.

By using machine learning algorithms, the prediction of how well the students are going to perform so that it can help the students whose grades are predicted low. Most of the Grade prediction systems are based on Machine Learning and Deep Learning Techniques. Others are based on statistical theories. The rest of the paper is organized in the sections namely background, containing the basic information about Machine Learning and Deep Learning Technologies, Problem Formulation- which explains in detail the proposed problem statement, its need and applications. The section Literature review presents the detail of all the papers studied for the understanding of the topic and for depicting the contribution of researchers in this field. The proposed research methodology shows the plan in which the proposed work will be implemented followed by the conclusion.

Background

A machine learning system gets its input from historical data, builds prediction models, and the moment it receives fresh/ new data, it predicts an output for that new data. The precision or accuracy of the output predicted relies upon the amount in which the data is received. The more the amount of data received, the better the model, the more accurate the predicted output (Iqbal et al., 2019; Madapana & Wachs, 2017).

Consider a complex problem, in which we have to perform some predictions. We can input data to generic algorithms rather than writing a code for the same. These algorithms help the machine build logics based on the data using which it predicts the output. Machine learning has brought a huge change in our perspective of the problem itself.

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Problem Formulation

Universities are a place to acquire greater knowledge and access higher education. The students entering the universities have different IQ levels. Some need more attention and clarity and their facts whereas others are sharp enough to grab the most they can from a little information. If not given the required care and support, the weaker ones may suffer both emotionally and career-wise. Whereas giving more time and efforts by the teachers to the students with higher IQ levels may drain the teachers their energy and time and restrict them from attending to the ones who require it more.
So, to save the time and energy of the teachers as well as the students, the Student Grade Prediction model is introduced.
With the help of this very model, the teachers won't have to wait even for the first semester exams or the SATs to judge the performance of the new batch of students, which otherwise helps the teachers to know the performance and IQs of all the students. Because this way a lot of time is wasted. Had the teachers known which students can perform good or bad in a particular subject or field, they would work on the weaker ones more than the brighter ones. And if things work this way, the weaker students would get the required support from their teachers and they can excel even in their weak fields.
Apart from serving an early warning device for educators, Student Grade Prediction tools also helps in relaxation/retention in student's stress towards studies when they can self evaluate before the final examinations.
It has been observed that till now, almost all popular student grade prediction models have been made on foreign university's datasets. This work proposes a student grade prediction model which uses Machine Learning and Deep Learning Technologies for predicting Indian Student's Marks. Now India is a large country and it is impossible to sample students from the entire county, so the scope of the problem is narrowed down to the Computer Science Engineering students of popular colleges in Punjab (Ludhiana) area like GNDEC, PCTE, LCET and CT University. A dataset will be formed by manual collection of information from the students via internet such as Google Forms and then will be processed for its data analysis, preceded by various machine and deep learning algorithms.

Literature Review

For understanding in depth, the contribution of various researchers in this field, a total of 131 papers from the most reputed sources like IEEE, ACM, ScienceDirect and Springer were downloaded. The preliminary screening is done by reading the titles and the abstracts of the papers. After initial screening 61 papers were selected for the thorough study (from which 5 papers were discarded because they did not contribute in the existing study).

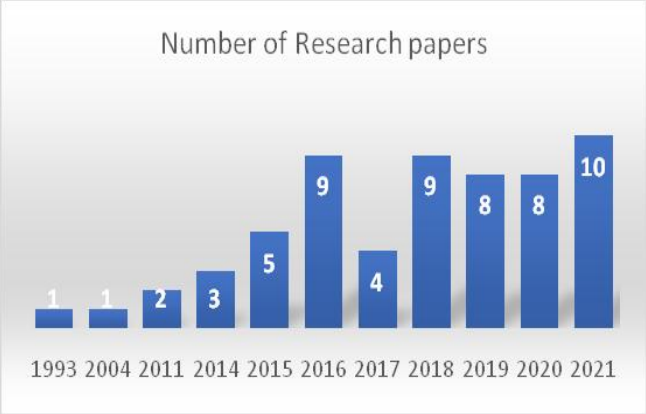

Figure 1: Detail of research papers against years

Hence a total of 56 papers from year 2004-2022 were studied systematically and are presented in the tabular forms below.Figure one shows the count of papers studied for the review yearwise, depicting that just student grade prediction systems have been gaining popularity from 2016 and are still popularly researched about till 2021 which shows the novelty of the topic.
The literature has been divided into 3 sections, research papers using sole machine learning techniques, the research papers using combination of machine learning and deep learning techniques, the papers which use other computational techniques such as statistical analysis, rule based and other AI techniques.

For each and every paper the algorithms used in it, the datasets used, size of the datasets, evaluation parameters used and the description of the work they have done is in listed systematically.

Table 1: Review of Literature related to Machine Learning Techniques

S. No.	Paper	Authors	Year	Algorithms used (Names)	Datasets used (Names)	size of the dataset	Description of work
1	Decision Tree Based Students' Grades Analysis [16]	AdmirMujkic, Ivan Boban, Ivan Dugandzic, Nina Bijedic	2014	Decision Tree algorithm based on the student's marks on the subjects	Mannual Data Collection (from 22nd March 2003 to 24th April 2013 of the students participating in the exams)	361 students	Tools used for the study are - Microsoft Excel 2013 and RapidMiner (Java)
2	Personalized Grade Prediction: A Data Mining Approach [8]	Yannick Meier, Jie Xu, OnurAtan, Mihaela Van Der Schaar	2015	Regression and classification algorithms	Mannual Data Collection	700 students	The Authors have developed a model for early prediction of student grades specially in massive open online courses in which there are a lot of students enrolled in each course such that the faculty cannot focus on each and everyone to track their assessments.
3	Grade prediction with models specific to students and courses [17]	AgoritsaPolyzou, George Karypis	2016	Sparse linear and low rank matrix factrorization techniques	Mannual data collection	2949 students	This paper presents a student grade prediction tool for the students of computer science and electronics and engineering off university of Minnitosa. This tool was made to ensure did the student complete their degrees timely . If a student is likely to finish his degree more than the duration of the course , it will be alarmed beforehand.
4	The Predictive Relationship among the Community of Inquiry Framework, Perceived Learning and Online, and Graduate Students ' Course Grades in Online Courses [18]	Amanda J. Rockinson-Szapkiw, Jillian Wendt, Mervyn Wighting, Deanna Nisbet	2016	hierarchical multiple regression (HMR), Preliminary Analysis, correlation analysis.	Mannual Data Collection	131 students from Spring 2012 to Spring 2013 at a private institution in central Virginia.	A predictive correlational design and hierarchical multiple regression (HMR) was used to examine whether students' sense of community of inquiry and perceived learning predicted their course points, while controlling for demographic variables and online course format. the entire predictive model explained 55.6% of the variance in course points. Students with higher levels of perceived social presence, cognitive presence, and teaching presence had higher course scores. Likewise, perceived learning was also positively associated with students' course points.
5	Domain-Aware Grade Prediction and Top-n course recommendation [19]	AsmaaElbadrawy, George Karypis	2016	Neighbourhood based user collaborative filtering, Matrix factroization, popularity based ranking approaches	mannual data collection	60,000 students in 10,000 courses from 10 colleges, 570 course subjects.	This paper represents work which is combination of grade prediction and recommender system. The students performance is predicted using the prediction techniques and then a particular student is recommended online courses using the collaborative filtering technique was making recommendations .

6	Models for Early Prediction of At-Risk Students in a Course Using Standards-Based Grading [2]	FarshidMarbouti Heidi A. Diefes-Dux, Krishna Madhavan	2016	Logistic Regression, Support Vector Machine(SVM), Decision,MLP, Naive Bayes Classifier, K-Nearest Neighbour	student grades after 5weeks of first semester	not specified	The grades at the end of 5th week of the at-risk students were used as subset in this article. Seven various models were used to differentiate between the at-risk students and intelligent students. Models were created on the basis of standard-based grading. The Feature selection method proved out to be the most efficient one.
7	Enhancing the capabilities of Student Result Prediction System [20]	Pamela Chaudhury, Sushruta Mishra, Hrudaya Kumar Tripathy, Brojo Kishore	2016	naïve bayes, C4.5, logistic regression, SVM	UCI reporistory	678 entities	This is the paper which serves as the base paper of the study . The authors of this paper have thoroughly studied the 33 attributes which are known to impact the students grades at the end of the semester . The same attributes are taken for carrying out our study with a little modification according to Indian culture and education system . The authors have also put forward the problem of class imbalance and technique to deal with it .
8	Survival Analysis based Framework for Early Prediction of Student Dropouts [21]	Sattar Ameri, Mahtab J. Fard, Ratna B. Chinnam, Chandan K. Reddy	2016	Ridge and Lasso	mannual data collection	1350 students	Multiple studies have attempted to improve metacognitive awareness, understanding of one's own thought processes, here awareness/ understanding of how much grades they can score) accuracy with mixed results. However, these studies have not stated the types of information university students use to make performance predictions.
9	Test Bias: Prediction of Grades of Negro and White Students in Integrated Colleges [22]	T. Anne Cleary	2016	Multiple Linear Regression and Corelation techniques	college grades for negro and white students in integrated colleges are compared.	not specified	The authors of this paper tried to find if there exists some bias in the evaluation or grade prediction of nigro and white students . At the end it was made clear that , the items in the Preliminary ScholisticAptitude Test are not biased, and that, if the test is discriminatory, the dicrimination is not largely attributable to particular set of items.
10	Metacognition in the Classroom : The Association Between Students' Exam Predictions and Their Desired Grades [23]	Gabriel D. Saenz, Lisa Geraci, Tyler M. Miller, Robert Tirso	2017	Multiple Regression	Students actual and predicted grades	S1:73 S2:184 S3:119 S4: 70	**Study 1**:Students were asked to predict their exam grades and to identify what factors they used for their predictions, along with reporting their Ideal and Minimum Grades. **Study 2**:Replicated and generalized the findings from Study 1 in another, larger, sample of students from a different course at a different university. **Study 3**:Replicated the findings from Studies 1 and 2, with one modification(capture role a single item ie. preparation using a 5-point scale (1: Not at all; 5: More than ever) in prediction **Study4**:Students were asked to make a grade prediction and specify to what extent they used each of five

							potential factors to inform their predictions.All items were entered in a multiple regression to determine their ability to predict grade predictions. Results showed that all items(r,Attendance, Study Habits/Preparation, and/or Prior Performance, Minimum Grade, and IdealGrade) together established a significant model in a multiple regression
11	Classification and Prediction based Data Mining Algorithms to Predict Students' Introductory programming Performance [24]	M. Sivasakthi	2017	Classification techniques like K means	Data collected from 280 students in a particular course	280	The authors have used machine learning techniques to classify the student performance in two two classes namely pass and fail in order to timely aram the students about their results.
12	Enriching Course-Specific Regression Models with Content Features for Grade Prediction[17]	Qian Hu, AgoritsaPolyzou, George Karypis, HuzefaRangwala	2017	Multiple regression techniques	proposed work	proposed work	Authors have explained in detail how regression models can be applied onto the content off students data in order to predict their grades .
13	Recursive Clustering Technique for Students' Performance Evaluation in Programming Courses [12]	Anand V. K., Abdul Rahiman S.K., E. Ben George, A.S. Huda	2018	Recursive clustering technique, pattern clustering	mannual data collection	198 students	The authors of this paper have made a prediction model using recursive clustering techniques pattern clustering and machine learning techniques for predicting the marks of students in particular programming courses .
14	Technique for Students' Performance Evaluation in Programming Courses [25]	Shantanu K, Kumar S.	2018	K-Means clustering algorithm and K means++	data of 200 students	200	Students present in the lower groups will be taken into consideration since they are highly prone to fail. Each of these groups will be provided with the set of programs and notes automatically based on their group. After a time period another assessment will be carried out and again the students will be clustered based on their new performance. This process will be repeated for three times The results are compared to the number of students in each group before applying the recursive clustering technique and after. Thus enabling the student to be on track.

15	Student Performance Prediction Model for Early-Identification of At-risk Students in Traditional Classroom Settings [26]	HutchataiChanlekha, JittiNiramitranon	2018	Multiple logistic regression	mannual data collection	380 students	In this work, we set the grade category *A* as the cutoff for binary grade prediction due to the grade distribution that enrollments with grades in the *A* category take up around 56.12% of the overall enrollments in our data. Students who cannot receive an *A* can be deemed as scoring behind half of the students on average.
16	Grade Prediction of Student Academic Performance with Multiple Classification Models [27]	Xu Zhang, RuojuanXue, Bin Liu, Wenpeng Lu, Yiqun Zhang	2018	Classification algorithms	mannual data collection	Not specified	With the ensembling of machine and deep learning with Rasch models, a strong ability to predict a students grade is shown. Additionally, in some cases more data wouldn't necessarily improve performance. Thus providing the understanding that our ability to predict a grade, for a specific problem, may or may not improve with more data
17	Early Prediction of the Grade Point Average of University Students Diploma: Neural Network Approach [28]	Ekaterina E. Vasileva, Daniil S. Kurushin, Sergey S. Vlasov	2019	Random Forest	mannual data collection	750 students	Students predicted Ideal grade and minimum grade for their midterm and final exams(consisting of a multiple choice test as part of the course).
18	Early Performance Prediction for CS1 Course Students Using a Combination of Machine Learning and An Evolutionary Algorithm [29]	Filipe D. Pereira, Elaine Oliveira, David Fernandes, Alexandra Cristea	2019	evolutionary algorithm and hyperparameter-tuning with random search.	data from only the first two weeks to predict the student final grades.	not specified	set of features in ML pipelines which were optimised, featuring a combination of an automated approach with an evolutionary algorithm and hyperparameter-tuning with random search. As a result, an accuracy of 75.55% is achieved.
19	Visual Analytics of Student Performance Data From an Introductory Chemistry Course [8]	Haozhang Deng, Xuemeng Wang Wang, Zhiyi Guo, Ashley Decker, Xiaojing Duan, Chaoli Wang, G.Alex Ambrose, Kevin Abbott	2019	Pearson Correlation, linear regresion	students' course grades, scores on each assignment, exam, lab and tutorial, and points on each assignment and exam question,student characteristics data, learning behaviour data	949 students who enrolled in the chemistry course in the Fall 2018 semester.	Case study 1: Examining detailed pathway from overall grade distribution.This case study covers design requirements R1, R2, R3, and R4. Case study 2: Comparing course performance of student groups. This case study covers the design requirement R4. Case study 3: Validating exam questions. Design requirement R5 is covered here. Case study 4:Analyzing relationship between student performance and coursework design. This case study covers design requirements R1, R2, and R5.

20	Methods for Double-Blind Peer Review and Grade Prediction of Student Software Projects [30]	Irfan Prazina, VensadaOkanovis	2019	SVM, matrix factorization	mannual dataset taken	800 students	to explain the prediction results, which is useful foradvisors to provide personalized feedback to students.
21	Improving Learning Experience of Students by Early Prediction of Student Performance using Machine Learning [31]	Hina Gull, Madeeha Saqib, Sardar Zafar Iqbal, Saqib Saeed	2020	SVM Ridge and lasso	Manual data collection of students in a university	1800 students	This paper presents usage of different machine learning techniques to predict student grades .
22	Grade Prediction Method for University Course Selection Based on Decision Tree [32]	Hussein Rajabu Mkwazu, Cairong Yan	2020	Decision Tree and Classification Algorithms	Mannually acquired from the Student Information System of the Sokoine University of Agricultural (SUASIS),	86012 records and 11 attributes. having course results for students from 2014 to 2019	the performance of the students of the Sokoine University of Agriculture from 2015 to 2020 using different perspectives, including the scores of each course obtained by the students was used. Specifically, classification techniques to predict and analyze the collected data were used, hoping to assist students in choosing courses to reduce dropouts and failures. The main contributions of this work are on Gain Feature Selection (IGFS), Correlation-based Feature Selection (CBFS), Chi-Squared Feature Selection (CFS), and Gain Ratio Feature Selection (GRFS).
23	Early Prediction of Undergraduate Student's Academic Performance in Completely Online Learning: A Five-Year Study[5]	Javier Bravo-Agapito, Sonia J. Romero, Sonia Pamplona	2020	Regression algorithms	Manual data collection from five universities	Around 2000 entries	The authors make use of simple and multiple linear regression techniques in order to predict the performance of a student in undergraduate course depending upon the previously collected data set off students with a detail of five years performance .
24	Using Machine Learning Techniques and Matric Grades to Predict the Success of First Year University Students[33]	Nastassja Philippou, RiteshAjoodha, Ashwini Jadhav	2020	Multiple linear regression and decision trees	Manual data collection	1500 student records	Depending upon the previous school records of the students their performance in first Year of college is predicted .

25	Under Pressure : How Faculty Gender and Contract Uncertainty Impact Students' Grades[34]	Amanda L. Griffith, Veronica Sovero	2021	Logistic regression	Manual data collection	Data set off 2000 students and 150 faculty members	In this study the authors have correlated the gender and contract uncertainty of faculty with the students grades in order to find out that if there is a bias existing due to these factors .It was found that contract uncertainty pressurises the faculty to perform better and hence result in improved student grades.
26	Features Exploration for Grades Prediction using Machine Learning [35]	Kevin Bouchard, Lucas Gonzales, Julien Maitre, Sébastien Gaboury	2021	K-means, C-means, Hierarchical K-means	grades of students of Qubec's primary school and high school.	9000 student records	data preparation of a large database of students from one School Board of the province of Quebec and experiment on a classification task to predict the ending grade of students. Several features were extracted and tested. It was observed that competency evaluation would contribute to such predictions. The absences of students also slightly helped in that regard.
27	Dataset of Student Level Prediction in UAE [9]	ShathaGhareeb, Abir Hussain, Wasiq Khan, Dhiya Al-Jumeily, Thar Baker, Rawaa Al-Jumeily	2021	Machine learning-Pattern Analysis methods, Levelling	Information of students in the form of excel sheets	1550 students.	The basic idea behind this was to figure out automated student levelling i.e. at which level the student must be moved to a different school having different international curriculum. 1. The exam marks of students for 3 terms-Maths,Science and English were collected for the two consecutive years. 2. Data on various other factors like the students' interests, their family background, concentration leveletc. where also rcorded for further clarity. 3. The information was collected from the gatekeeper of the nominated school to have a record of what information was being given. 4. Technical validation of data is done so as to check the meaningfullness, correctness and security of data that was to be used.
28	Multiclass Prediction Model for Student Grade Prediction Using Machine Learning [36]	Siti Dianah Abdul Bujang, Ali Selamat, Roliana Ibrahim, OndrejKrejcar, Enrique Herrera-Viedma, Hamido Fujita, Nor Azura Md Ghani	2021	SVM, logistic regression	mannual data collection	1700 students	All factors affecting the overall personality of the student were taken into consideration.

29	Predict the Selection of Mathematics Subject for 11th Grade Students Using Data Mining Technique [37]	Saeed Sulieman Al-Nadabi, C. Jayakumari	2021	J48, sample logistic regression and Naïve Bayes.	Mannually data extracted from one of the educational sector of Oman.	2000 students	education has developed in Oman, especially in the last's stages of education, as the student in the tenth grade must choose the mathematics subject that suits his/her abilities to move to the eleventh grade. The main objective of this project is to predicate the selection of mathematics subject for 11th grade students using Data Mining technique. Different education data mining (EDM) were applied, using classification methods.The results of this project show that many students must choose applied mathematics because of their level in mathematics subject.

S. No.	**Title of the paper**	**Authors**	**year**	**Algorithms used (Names)**	**Domain on which work is being done**	**size of the dataset**	**Description of work**
1	Explaining student grades predicted by a neural network[38]	T. D. Gedeon, H. S. Turner	1993	Back propagation Feed Forward neural Network	Students of Computer Science in University of New South Wales	153 Student	Depending upon the in component and in semester evaluation marks (lab assignments, in time quiz, mid term marks), the final exam component (Comprising 60% of the grade) is predicted. The work is done for only one subject COMP1111 of computer science students.
2	Prediction of Student Academic Progression : A Case Study on Vignan University [30]	K V Krishna Kishore, S Venkatramaphanikumar, Sura Alekhya	2014	Multilayer Perceptron (MLP), CART, J48, Naïve Bayes, RBF Networks.	Student Marks	datset with 134 students, having 1203 tuples	The authors in this work have use the data of 134 students in the university of vignan to predict the student's data that who are at risk, and some proactive measures like extra classes & supporting material are offered to improve the academic progress of those students. After applying various machine learning and deep learning algorithms namely J 48, Naive Bayes , CART, RBF and MLP, it has been found that the best performance is given by rbf and MLP models with an accuracy of 95% add 97% respectively.
3	Correlation of Topic Model and Student Grades Using Comment Data Mining [39]	Shaymaa E. Sorour, Kazumasa Goda, Tsunenori Mine	2015	LSA PLSA SVM ANN	Student's comments on online course academy (GODA courses)	not specified	This study shows the usage of a data set containing comments on a particular online course website . The comments of students are processed for their morphology , lexical , syntactic and semantic structure. In the next step they are processed using 2 most popular probabilistic techniques called plsa and lsa to understand the theme of the comments . Later on they are trained using artificial neural networks and support vector machines add the results are tested for their prediction accuracies.
4	Exploring Students' Learning Attributes in Consecutive Lessons to Improve	Shaymaa E. Sorour, Tsunenori Mine	2016	ANN's	Student's performance	20,000 students	Student grade prediction frame text comments . Use of probabilistic techniques in great prediction

	Prediction Performance[40]						
5	Data Mining Analysis on Student's Academic Performance through Exploration of Student's Background and Social Activities[7]	Ching ChiehKiu	2018	topic mining and theme generation algorithms, LSTM, LSA,PLSA	Students performance in school and background activities	2000 students	The authors use semantic analysis (LSA) and probabilistic latent semantic analysis (PLSA), and generate prediction models using support vector machine (SVM) and artificial neural network (ANN) "
6	Evaluation of Grade Prediction using Model-Based Collaborative Filtering methods[41]	LjupchoRechkoski, Vangel V. Ajanovski, MarijaMihova	2018	collaborative filtering methods-matrix factorization	Students previous grades	Not specified	The authors nvestigate how the student and course academic features influence the enrollment patterns and we use these features to define student and course groups at various levels of granularity. We show how these groups can be used to design grade prediction and top-n course ranking models for neighborhood-based user collaborative filtering, matrix factorization and popularity-based ranking approaches.
7	Temporal Models for Personalized Grade Prediction in Massive Open Online Courses[42]	Qi Qi, Yuexia Liu, Fan Wu, Xiangguo Yan, Ning Wu	2018	ANN's	Students grades in online courses	5000 grades	we proposed an attribute-based method to build a prediction model by classifying comment data into 6 attributes (attitudes, finding, cooperation, review the lesson, understanding, and next plan activity). The results indicated that the attribute-based method had better prediction results than the topic based method,
8	Reliable Deep Grade Prediction with Uncertainty Estimation[43]	Qian Hu,Huzefa Rangwala	2019	i)Multilayer Perceptron (MLP) and ii) Recurrent Neural Network (RNN).	Students Grades	10,000 marks	the proposed models achieve better performance than prior state-of-the-art approaches. Besides more accurate results, Bayesian deep learning models estimate uncertainty associated with the predictions. We explore how uncertainty estimation can be applied towards developing a reliable educational early warning system.
9	Research and Application of Grade Prediction Model Based on Decision Tree Algorithm[44]	Yaling Zhang, Bei Wu	2019	ID3 Algorithm, C4.5 Algorithm, CART Algorithm	Student Grades	13670	The grade prediction of different decision tree classification algorithms is studied in the real data set of C language programming course, and evaluates three models constructed by ID3, C4.5 and CART algorithm through experiments. The experimental results show that the grade prediction model constructed by ID3 algorithm has better performance than that constructed by the other two algorithms
10	The Automated Grading of Student Open Responses in Mathematics [45]	John A. Erickson, Anthony F. Botelho, Steven McAteer, AshviniVaratharaj, Neil T. Heffernan	2020	XGBoost, LSTM, Rasch Model performance.	Student's response to automatic grading in Maths	27,199unique students with 150,447 total student responses to 2,076 uniqueproblems,	With the ensembling of machine and deep learning with Rasch models, a strong ability to predict a students grade is shown. Additionally, in some cases more data wouldn't necessarily improve performance. Thus providing the understanding that our ability to predict a grade, for a specific problem, may or may not improve with more data

						and graded by 970 unique teachers.	
11	Students' Online Behaviour Patterns Impact on Final Grades Prediction in Blended Courses [5]	Yangyang LuoNan Chen,Xibin Han	2020	Combination of LSTM's and RNS	Grades in blended courses	10700 Subject dates by 2100 students	Students online behavior is being recorded using various probabilistic techniques and then using deep learning their grades are being predicted in the blended courses .
12	Deep Analytic Model for Student Dropout Prediction in Massive Open Online Courses [46]	Ahmed A. Mubarak,Han Cao,Ibrahim M. Hezam	2021	The CONV-LSTM, CNN Layers, The LSTM model	students' performance Massive Open Online Courses (MOOCs)	10000 students	The proposed model deals directly with the raw clickstream data and automatic extraction of important feature, which saves much time and efforts, unlike machine learning-based dropout prediction methods which need manual feature engineering. Our model takes into consideration class imbalance problem and employs the custom loss function
13	Prediction of Middle School Students' Programming Talent Using Artificial Neural Networks [11]	Ali Çetinkaya, ÖmerKaan Baykan Konya	2021	Levenberg–Marquardt, Bayesian regularization, and scaled conjugate gradient algorithms	Students marks in coding subjects	sample of 200 sudents is used	1.The prediction models of middle school students' programming talent were investigated for future career trajectories. 2. the programming tendency of middle school students was predictable by the parameters used in the participant questionnaire. 3.ANN was an appropriate machine learning method to forecast participants' skills, such as analytical thinking, problem solving, and programming aptitude.
14	Hidden Space Deep Sequential Risk Prediction on Student Trajectories [47]	BardhPrenkaj,Damiano Distante,Stefano Faralli,Paola Velardi	2021	Deep Learning trajectory prediction, Autoencoders	student educational records	1900	1.GRU-AE, a novel strategy for student dropout prediction in e-courses, is proposed. 2.Both hidden space data and time-related data from student trajectories are leveraged. 3.Three datasets – one on e-degrees – are used to benchmark GRU-AE against 14 methods. 4.E-tivity data and embedded information sieve dropouts from persisters in e-degrees.
15	Massive LMS Log Data Analysis for the Early Prediction of Course-Agnostic Student Performance [48]	Moises Riestra-Gonzalez, Maria del Puerto Paule-Ruíz, Francisco Ortin	2021	CNN's (LSTM, autoencoders)	student performance logs	30,000	The system has picked learning management system records of students in order to make their predictions off performance in future .
16	Towards Equity and Algorithmic Fairness in Student Grade Prediction [49]	Weijie Jiang, Zachary A Pardos	2021	Long Short-Term Memory (LSTM), Adversarial Networks	students marks data	per-semester course enrollment information for 82,309undergraduates	The authors in this work has used generative adversarial networks and other deep learning techniques to find out the great level balancing strategy results first students off UC Berkeley enrolled in undergraduate courses.

Table 2: Literature review of papers using "other Techniques"

S. No.	Title of the paper	Authors	year	Algorithms used (Names)	Domain on which work is being done	size of the dataset	Description of work
1	Why Study Time Does Not Predict Grade Point Average Across College Students: Implications of Deliberate Practice for Academic Performance [50]	E. Ashby Plant, K. Anders Ericsson, Len Hill, Kia Asberg	2004	Rule Based Techniques are formed based on the basic trends found in student's previous scores	(Theoretical work)	(Theoretical Work)	The authors have studied the factors effecting the student's grade point average and have concluded that, students with higher SAT scores, most likely reflecting a higher level of previously attained relevant study skills and domain-specific knowledge, can attain the same or better grades with less study time. Independent of that effect, those who study alone in a quiet environment may study more effectively and, therefore, may attain a comparable performance with less overall study time than those who study in a more disruptive environment.
2	ESTABLISHING AN EARLY WARNING SYSTEM : Predicting Low Grades in College Students from Survey of Academic Orientations Scores [51]	Hall P. Beck, William D. Davidson	2011	simple statistical techniques of regression add correlation to find out the performance of alarming kids on the verge of failing the course.	Scholastic Assessment Test (SAT) scores and high school percentage rank of students	not specified	The authors have used simple statistical techniques of regression add correlation to find out the performance of alarming kids on the verge of failing the course. This is done so that such students can be given extra importance on the academics so as to save them from failing the course.
3	The Prediction of Student First Response Using Prerequisite Skills [52]	Anthony Botelho, Hao Wan, Neil Heffernan	2015	KT Model and ASSISTment use rule based computational methods to find the similarity (correlation) between the skills	Student Performance (marks) and first dependency (dependent subjects)	1170 students	In this study the authors make use of the fact that the initial performance of students in some of the subjects clearly show there study interests in the future higher level studies . Example a student consistently performs excellent in some of the subjects as compared to the others which show his interest in those subjects more than the others . Such a tool can be devised which predicts the subjects are courses a student should pick for the next higher level education.
4	Next-Term Student Grade Prediction [53]	Mack Sweeney, Jaime Lester, HuzefaRangwala	2015	Matrix factorization (Singular Value Decomposition), Factorizing Machine	Student's past semester grades	33000 students	Prediction of student grades in the next semester depending upon the record of previous semester grades using machine learning techniques like matrix factorization, SVD and factorization machine.
5	Correlation of Grade Prediction Performance with Characteristics of Lesson Subject [39]	Shaymaa E. Sorour, Jingyi Luo, Kazumasa Goda, Tsunenori Mine	2015	PLSA-Probabilistic Latent Semantic Analysis and LDA- Latent Dirichlet Allocation and SVM	Student's comments on a lesson (positive, neutral and negative)	not specified	The authors in this work have made use of a students comments on a particular lesson in order to understand his opinion on a particular lesson . A student may find a particular lesson interesting neutral or boring. Such feedback is collected via students comments and then probabilistic theme generation techniques are applied onto it in order to guess students marks to be obtained in these subjects in future.

6	Unskilled and unaware in the classroom:College students' desired grades predict their biased grade predictions[54]	Michael J. Serra, Kenneth G. DeMarree	2016	Statistical Techniques	Student Grades	(Theoretical Work)	The authors in this work have pointed out various statistical techniques that can be used for making predictions of students grades so that the lowest performing ones can be warned timely to earn high grades in the exams and similarly the overconfident students can be also made aware for their performance .
7	Discovering Hidden Course Requirements and Student Competences from Grade Data[55]	Mara Houbraken, Chang Sun, Evgueni Smirnov, Kurt Driessens	2017	Cool based techniques to discover the characteristics	theoretical work	theoretical work	The authors present Various rules based on which a student's performance can be related to some of the attributes that can be fetched from his regular attendance in the college .
8	Predicting International Students' Clinical and Academic Grades Using Two Language Tests (IELTS and C-test): A Correlational Research Study[56]	Amanda Müllera, Michael Dallerb	2018	Statistical Techniques	Academic English Test Marks of students	49 undergraduate and nursing students	It was found that both the IELTS test and the C-test were significantly correlated to both types of topic, albeit with different patterns. The two English tests were also tested for similarities in the constructs they measured, with a significant overlap found. The implications are to rethink the way English tests are applied to entry in university degrees involving a clinical component and, by extension, to direct universities to rethink how nursing students are supported during their degree.
9	Model development of students' scholarship status at first Asia institute of technology and humanities (Faith)[57]	Jonalyn Joy B. Labayne, Lester L. Mercado, Jheanel Espiritu Estrada	2018	Rule Based Techniques are formed based on the basic trends	Marks of students	1172	approach in building a practical model by identifying a number of attributes in comment data that reflect students' learning attitudes, tendencies and activities involved with the lesson
10	Teachers' Predictions of Students' Mathematical Thinking Related to Problem Posing[6]	Binyan Xu, Jinfa Cai, Qimeng Liu, Stephen Hwang	2019	computational techniques	students from two elementary schools and three middle schools in Shanghai.	4946(134 teacher predicted problems and 4812 student predicted problems)	Study was to investigate the mathematical problem posing of students across grades as well as their teachers' predictions about their students' mathematical problem posing. The second purpose was to understand potential relationships between students' problem posing and teachers' predictions about their problem posing at different grades
11	The Prediction of Academic Performance Using Engineering Student's Profiles[58]	Andres Gonzalez-Nucamendi, Julieta Noguez, Luis Neri, Víctor Robledo-Rella, Rosa María Guadalupe	2021	Discussion and exploration of features of dataset and student attributes	student profiles	(Theoretical Work)	Student profiles were determined from the constructs of multiple intelligences, self-regulated learning, and affective strategies. It was identified that students with higher development of logical/mathematical intelligence, greater self-regulation, and lower anxiety levels showed better academic performance.The determination of student profiles based on the constructs of multiple intelligences and on learning and affective strategies to identify the most important characteristics to ensure the academic success of engineering

		García-Castelán, David Escobar-Castillejos					students.The research includes several steps: (i) Instrument adaptation; (ii) Definition of student profile questionnaires and data collection; (iii) Reliability analysis of the students' profile questionnaires; (iv) Definition and execution of data processing and algorithms; (v) Design of measures

Proposed Methodology

The figure 2 given below describes the proposed methodology for implementing the research problem in future. The first step would be collecting the data set from various colleges of Punjab by using Internet resources example Google forms. After the data collection the collected data would be analyzed and the students behavior would be analyzed by using univariate and bivariate analysis. Each needed their data will be cleaned and missing values will be imputed using necessary techniques. The trend observed in the data would be visualized using various visualization tools available in the programming languages. Most common models observed in the literature review I to be figured and implemented on the data obtained. After that the data set would be splitted into two parts called testing and training such that the generated models can be trained by using training data and then tested using the test data in order to do necessary evaluations. The best suited model for predicting the student grades for our data set will be selected and finally will be hyper tuned.

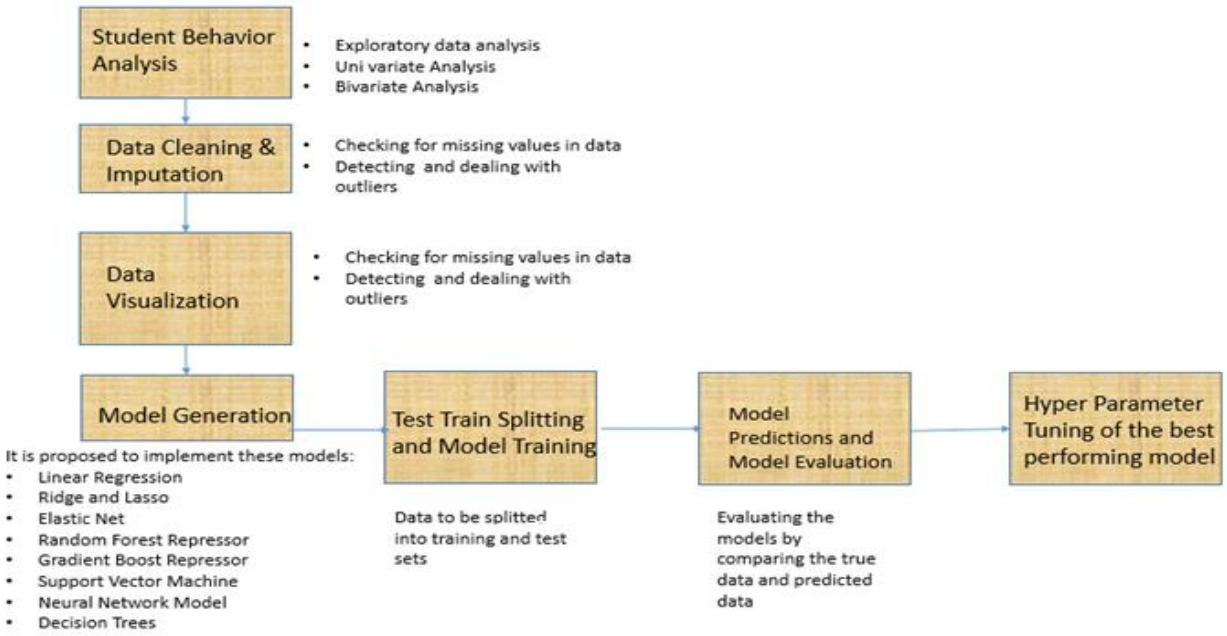

Figure 2: Proposed Research Methodology

Conclusion

Student Grade Prediction is a much needed tool in today's education system as it can really help students in their pre-self evaluation and educators in pre student assessment, rather than waiting for the final examinations to happen. One such system is proposed in this paper in which data is to be gathered for a particular set of students, then using data analytics processes, it would be observed for any interesting patterns present in it. Using various machine learning and deep learning techniques,models can be trained and predictions can be made.

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BONE AGE ASSESSMENT MODEL USING IMPROVED CONVOLUTIONAL NEURAL NETWORK

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ABSTRACT

In the field of endocrinology, determining a child's skeletal bone age is a routine process that is frequently used for illness identification as well as growth prediction for children. The calculation of bone age using conventional manual evaluation techniques mostly relies on the observer's own personal expertise in examining X-ray scans of the left hand and wrist. These approaches have a number of inherent drawbacks, ranging from poor efficiency to uncertain reliability. Some automated solutions based on machine learning or image processing have been offered as a potential solution to these challenges. In this paper, we have designed an improved convolutional neural network-based bone age assessment model. The proposed model has two phases. In the first phase, region of interest is found by hybrid the two swarm optimization algorithms, namely, whale optimization algorithm and cat swarm optimization algorithm with Kmean clustering algorithm. The hybridization is done to overcome the whale optimization algorithm challenges such as fall into local optima, low accuracy, and low convergence speed. In the second phase, the ROI images are trained and prediction is done using convolutional neural network. The simulation evaluation is performed on standard dataset and various performance metrics are found for it. The results show that the proposed model is superior over existing models in terms of MAE, RMSE, and RMSPE.

Keywords: *Bone Age Assessment, Cat Swarm Optimization Algorithm, Convolutional Neural Network, K-Mean Clustering, Whale Optimization Algorithm.*

1. Introduction

When compared to chronological age, skeletal bone age is much more accurate in reflecting the maturity level of the human body [1]. This degree of maturity is among the most crucial markers connected to health and growth. Chronological age is determined by counting the number of days from birth. Assessment of a child's skeletal age is a routine process in the field of endocrinology, and it is used often for both the diagnosis of illness and the forecasting of growth in children. In most cases, X-ray radiography of the left hand and twist is used to accomplish this goal. This technique produces a grayscale X-ray scan of the bone (shown in Fig. 1).

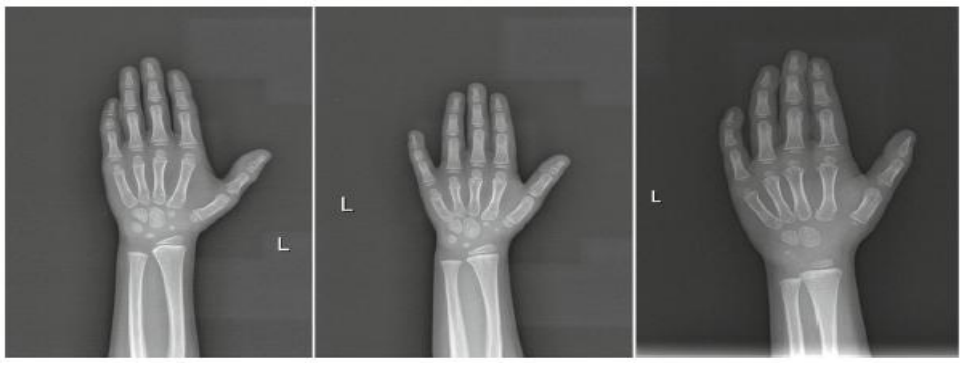

Figure 1 Sample of X-ray images of Hands[1]

The Greulich and Pyle (G&P) technique, for example, relies on personal experience and standardized skeletal bone age images to draw any conclusions in conventional manual evaluation procedures. TW (Tanner-Whitehouse) technique and its modifications [2-3] are the most often used methodology in practise because of their more rigorous processes for distinguishing the kinds of bones, assigning them with various values, and calculating a total signifying maturity. Manual evaluation techniques, on the other hand, have a number of inherent drawbacks, including poor efficiency, high expense, and inconsistent accuracy. To overcome limitation of these methods, advanced image processing-based method have been proposed. In the image processing methods, pre-processing,

segmentation, clustering, and prediction is performed. In the pre-processing step, various filters and enhancement methods are deployed. In the segmentation and clustering, various swarm-based intelligence algorithms and machine learning algorithms are deployed. In the last, for the prediction purposes, advanced machine learning algorithms such as deep learning [4-9], convolutional neural network [10], Residual attention based network [11]and ridge networks are deployed [12].

This paper's main contribution is to develop an improved convolutional neural network-based bone age assessment model. A two-step process is proposed in the model. Whale optimization and cat swarm optimization algorithms are used with the Kmean clustering approach to find the initial image region of interest. Using the segmented pediatric hand radiographs to train a convolutional neural network architecture, we were able to predict the bone age in the second phase. The standard dataset pictures given by the Radiological Society of North America are used in the simulation evaluation (RSNA). In addition, a variety of performance metrics are calculated. MAE, RMSE, and RMSPE are lower in the suggested method than in existing models.

The remaining paper is as follows. Section 2 shows the related work in which algorithms are explained that deployed for the proposed model. Section 3 explains the proposed model. Section 4 shows the simulation evaluation of the proposed model. Conclusion and future scope are shown in Section 5.

2. Related Work

In this section, we have explained the algorithms are deployed for the proposed model.

2.1 Median Filtering

The median filter, like the mean filter, is often used to minimize image noise. In many cases, it performs a better job than the mean filter in preserving the image's valuable details [13].

In median filter, each pixel in an image is examined one by one to determine whether or not it is typical of its surroundings. Instead of just substituting the mean of the nearby pixel values, the median of those values is substituted. By first ranking all the nearby pixel values numerically, the median is computed by substituting the middle pixel value for the one being evaluated. The average of the two middle image pixels is utilized if the neighbourhood has an even number of pixels. An example of a computationis shown in Figure 2.

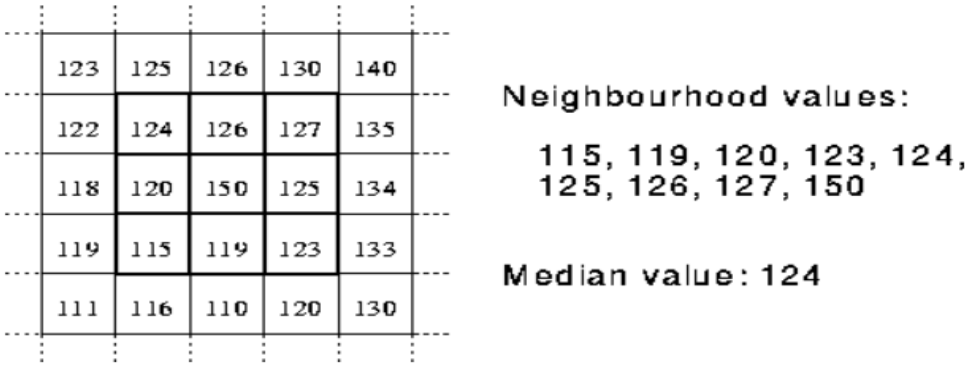

Figure 2 Median Filtering

Unlike the mean filter, the median filter calculates the median value of a neighbourhood. This has two major advantages:

- Because the median is a much more reliable than the mean, one particularly misrepresentative pixel in the neighbourhood will not have a substantial impact on the median value.
- The median filter doesn't really generate additional implausible pixel values when it crosses an edge because the median value must be the value from one of the pixels in the neighbourhood. Because of this, the median filter is much superior as compared to the mean filter when it comes to retaining sharp edges.

2.2 K-Mean Clustering Algorithm

In this section K-mean clustering algorithm is explained [14].

- Unlabeled data is divided into k groups via an iterative process that ensures that all datasets belong to a single group with comparable attributes.
- Using this method, we are able to group the data into distinct categories without having to do any training, making it easier to identify the divisions of groups in an unlabeled dataset on its own.
- The technique is based on centroid coordinates, and each cluster has a corresponding centroid. Algorithms like this one are designed to make it as easy as possible for a user to find the most relevant clusters from their data.

2.3 Whale Optimization Algorithm (WOA)

2.3.1 Inspiration

Whales are surprising mammals. There is no doubt that they are the largest land creatures on Earth. A mature whale may grow a length of 30 metres and a weight of 180 tonnes. In addition to killer, Sei, Minke, Humpback, finback, blue, and Right whales are the other seven primary species of this enormous animal. They are often believed to be predatory. As they have to inhale from the ocean's surface, they don't get any decent sleep. In reality, only half of the brain is awake at any one time. Whales are fascinating because they are thought to be extremely intelligent and emotional creatures [15]. As per Hof and Van Der Gucht [16], whales contain spindle cells in specific parts of their brains that are comparable to those seen in humans. Human judgement, emotions, and social interaction are all controlled by these specific cells in the brain. We are unique among animals because of the spindle cells in our bodies. For this reason, whales are more intelligent than adults since they have two times as many brain cells as an adult person. Whales have been shown to think, learn, assess, communicate, and even feel emotional like humans, although at a considerably lower degree of intellectual ability. According to research, whales (most notably killer whales) may evolve their own language. Whales' social behaviour is another fascinating aspect of their biology. They may be seen living alone or in a group of others. They are, though, almost only seen in groups. Killer whales, for example, are able to maintain a family for the rest of their existence. Humpback whales are one of the largest baleen whale species (Megaptera novaeangliae). When fully grown, a humpback whale is about the same size as a school bus. These predators have a preference for krill and smaller fish herds. These creatures may be seen in Fig 3.

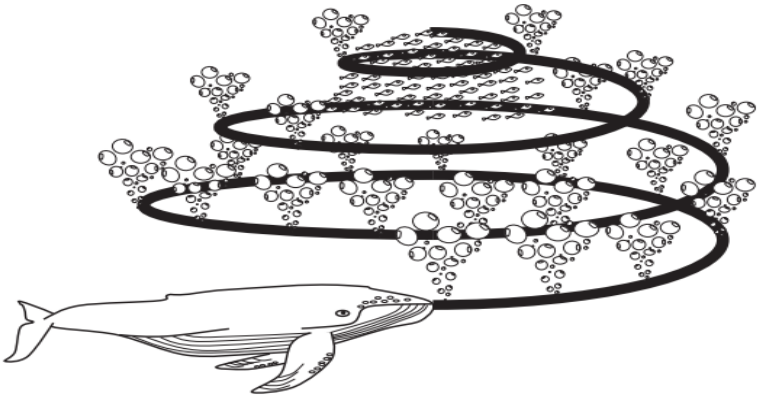

Figure 3 Bubble-net feeding behavior of humpback whales

Humpback whales have a unique way of hunting that is fascinating to learn about. The bubble-net feeding strategy [17] is the name given to this kind of foraging behaviour. There are several species of tiny fish and krill that Humpback whales select for prey. Foraging is accomplished by forming different bubbles along a circular or "9"-shaped route, as seen in Fig. 3. Prior to 2011, this behaviour could only be studied by looking at it from the ground. In contrast, Goldbogen et al. [18] used tag sensors to look into this behaviour. They were able to gather data on 300 feeding sessions from tagged whales using a bubble net. These two

techniques, known as "upward-spirals" and "doubleloops," have been identified as having a connection to the bubble. The humpback whales dive about 12 metres below the surface and then begin to produce bubbles around their prey in a spiral configuration before swimming back to the top. Coral loop, lobtail and capture loop are the three steps of the later manoeuvre. Ref. [18] has in-depth information on these conducts. It's worth noting that humpback whales are the only ones known to engage in bubble-net feeding. Optimization is performed on the spiral bubble-net feeding technique with the use of mathematical modelling.

2.3.2. Mathematical model and optimization algorithm

Predator-prey encounters, bubble-net-feeding technique, and prey-hunting are all discussed in this section. Then, the WOA method is shown.

2.3.2.1 Encircling prey

Humpback whales are able to locate and surround prey in the water. For a WOA algorithm to work, it has to presume that current best candidate solutions are either the target prey or are very near to that target prey. Other search agents will then aim to go up in rankings in order to compete with the top search agent. It can be shown mathematically that this is how it behaves:

$$\vec{D} = |\vec{C}.\vec{X^*}(t) - \vec{X}(t)| \quad (1)$$

$$\vec{X}(t+1) = \vec{X^*}(t) - \vec{A} \cdot \vec{D} \quad (2)$$

where t denotes the current iteration, A and C are coefficient vectors, X∗ is the position vector of the best solution achieved so far, X is the position vector, | | is the absolute value, and · is an element-by-element multiplication. It is worth highlighting here that X∗ should be adjusted in each iteration if there is a better alternative. The vectors A and C are calculated as follows:

$$\vec{A} = 2\vec{a} \cdot \vec{r} - \vec{a} \quad (3)$$

$$\vec{C} = 2 \cdot \vec{r} \quad (4)$$

Over the duration of iterations (in both the exploitation and exploration phases), an is reduced from 2 to 0 and r is a random vector ranging in [0,1].

In the case of a two-dimensional issue, the reasoning behind Eq. (2) is shown in Fig. 4(a). As per the location (X,Y) of the current best record (X,Y), a search agent may be updated (X,Y). It's possible to get different locations around the optimal agent based on the current position by modifying the A and C vectors' values. Fig. 4 (b) depicts a search agent's likely 3D updating location. Accordingly, it is important to highlight that by establishing the random vector (r), it is feasible to find any location in search space between the critical points shown in Figure 4. Therefore, Eq. (2) enables any search agent to modify its location in the region of the best current solution and replicates surrounding the prey.

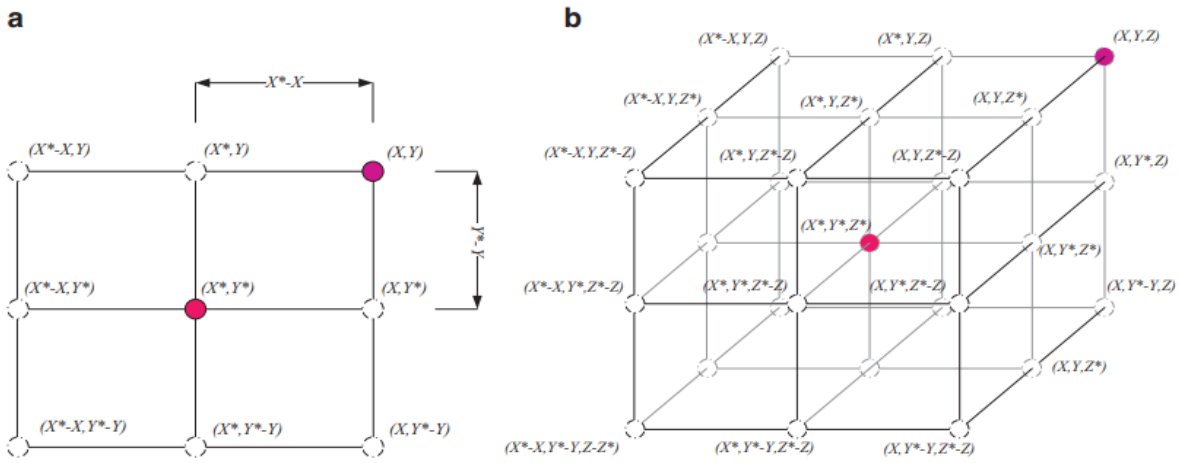

Figure 4 2D and 3D position vectors and their possible next locations (X∗ is the best solution obtained so far)

It is possible to apply the same idea to a search space with n dimensions, in which case the search agents will roam in hyper-cubes around the most optimal solution found so far. The humpback whales use a bubble-net approach to catch their prey, as described before. The following is the mathematical formulation of this approach:

2.3.2.2 Bubble-Net Attacking Method (Exploitation Phase)

In order to quantitatively describe humpback whale bubble-net behaviour, two techniques are devised as follows.

- **Shrinking Encircling Mechanism:** The value of an in the equation may be made smaller to accomplish this effect by using the equation (3). Take note of the fact that the fluctuation range of A is reduced as a result of a. In other words, the value A is chosen at random from the range [a,a], where an is dropped from 2 to 0 as the iterations go. By assigning random values to A in the range [-1,1], the new location of a search agent may be determined anywhere in the range between the agent's starting position and the position of the agent that is currently considered to be the best. In a 2D space, the potential locations that may be acquired by $0 \leq A \leq 1$ are shown in Fig. 5a. These positions can be reached by moving from the (X,Y) position towards the (X∗,Y∗) position.

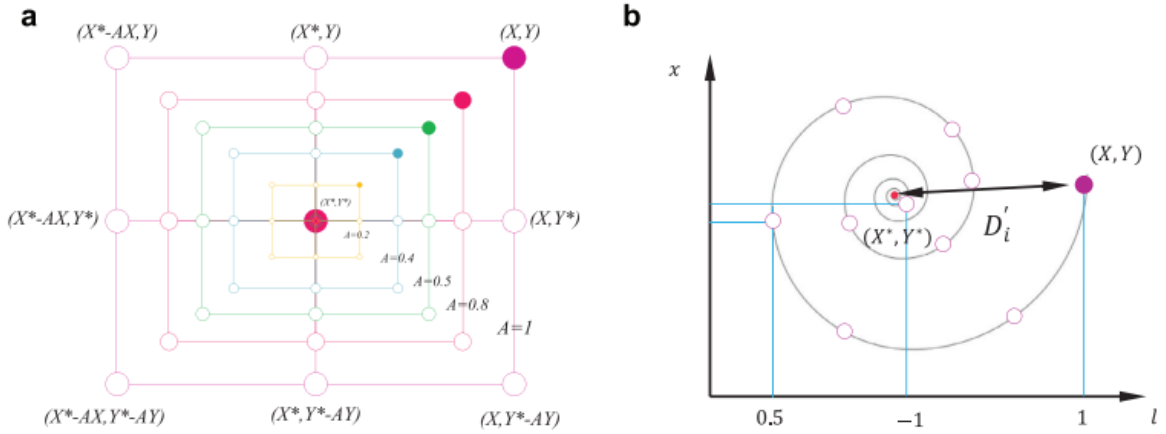

Figure 5 Bubble-net search mechanism implemented in WOA (X∗ is the best solution obtained so far): (a) shrinking encircling mechanism and (b) spiral updating position

- **Spiral Updating Position:** This method begins by determining the distance that separates the whale, which is positioned at (X,Y), and the prey, which is situated at (X,Y), as shown in Figure 5(b). An equation in the form of a spiral is then developed between the location of the whale and the prey in order to simulate the helix-shaped motion of humpback whales.

$$\vec{X}(t+1) = \vec{D'} \cdot e^{bl} \cdot \cos(2\pi l) + \vec{X^*}(t) \quad (5)$$

where $\vec{D} = |\vec{X^*}(t) - X(t)|$ and indicates the distance of the ith whale to the prey (best solution obtained so far), b is a constant for defining the shape of the logarithmic spiral, l is a random number in [−1,1], and. is an element-by-element multiplication. Take note that as the humpback whales are circling their prey, they are doing it in a spiral-shaped pattern at the same time. During optimization, whales' positions are updated in two ways: either via the shrinking encircling mechanism or through the spiral model, which we believe has a 50% chance of occurring. The following is the mathematical model:

$$\vec{X}(t+1) = \begin{cases} \vec{X^*}(t) - \vec{A} \cdot \vec{D} & if \ p < 0.5 \\ \vec{D'} \cdot e^{bl} \cdot \cos(2\pi l) + \vec{X^*}(t) & if \ p \geq 0.5 \end{cases} \quad (6)$$

Random number p in the range [0,1] is used. To supplement their random foraging, humpback whales use bubble-nets. The mathematical model of the search is shown in the following manner.

2.3.2.3 Search for Prey (Exploration Phase)

The similar method of searching for prey based on the change of the A vector may be used (exploration). Actually, humpback whales hunt in a random fashion, determined by their relative positions to one another. In order to

push the search agent to move further away from a referenced whale, we employ A with random values higher than 1 or less than 1 This is different from the exploitation phase, which updates the location of a search agent based on the best search agent that has been located so far. Allowing the WOA algorithm to execute a global search is made possible by this method and |A| > 1. As an example, consider the following mathematical model:

$$\vec{D} = |\vec{C} \cdot \overrightarrow{X_{rand}} - \vec{X}| \quad (7)$$

$$\vec{X}(t+1) = \overrightarrow{X_{rand}} - \vec{A}.\vec{D} \quad (8)$$

where ⟶Xrand is a random position vector (a random whale) chosen from the current population. Some of the possible positions around a particular solution with
A > 1 are depicted in Fig. 6.

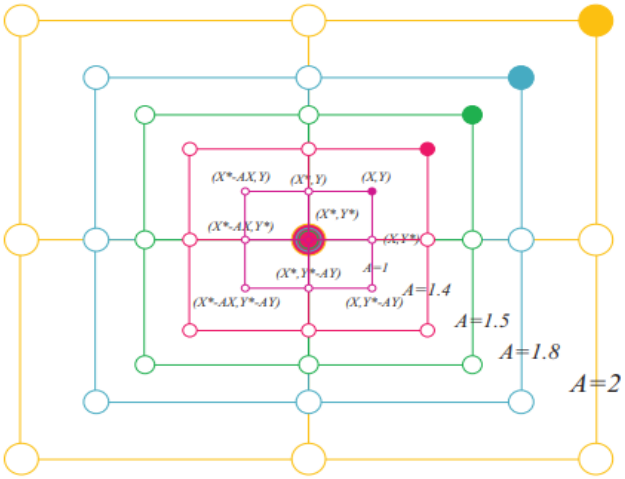

Figure 6 Exploration mechanism implemented in WOA (X∗ is a randomly chosen search agent).

Initially, the WOA algorithm generates a random collection of solutions. A random search agent or the best solution found so far are used as benchmarks for each iteration of search agents. Exploration and exploitation are provided by lowering the A value from 2 to 0. Whenever |A| is more than 1, a random search agent is chosen, whereas the optimal solution is chosen when |A| is less than 1. WOA has the ability to flip between a spiral and a circular movement depending on the value of p. The WOA algorithm is finally halted when a termination requirement is met. Figure 7 shows the WOA algorithm's pseudo code.

```
Initialize the whales population Xi (i = 1, 2, ..., n)
Calculate the fitness of each search agent
X*=the best search agent
while (t < maximum number of iterations)
    for each search agent
    Update a, A, C, l, and p
        if1 (p<0.5)
            if2 (|A| < 1)
                Update the position of the current search agent by the Eq. (2.1)
            else if2 (|A| ≥ 1)
                Select a random search agent (Xrand)
                Update the position of the current search agent by the Eq. (2.8)
            end if2
        else if1 (p≥0.5)
                Update the position of the current search by the Eq. (2.5)
        end if1
    end for
    Check if any search agent goes beyond the search space and amend it
    Calculate the fitness of each search agent
    Update X* if there is a better solution
    t=t+1
end while
return X*
```

Figure 7 Pseudocode of the WOA

2.4 Cat Swarm Optimization Algorithm (CSOA)

The first implementation of the cat swarm optimization was a continuous and single-objective algorithm [19]. Cats' resting and tracking behaviours were the inspiration for this design. Cats appear to be inactive and spend much of their time sleeping. But when they sleep, their awareness is quite high and that they are aware of what is going on all around them. These creatures keep an alert eye on their immediate surroundings, rushing fast toward any targets they see. Since these two key characteristics of cats are combined, CSO works on the same principle. Tracing and searching modes make up the CSO algorithm's two modes of operation, respectively. Solution sets are represented by cats. Each solution set consists of one or more cats. For each dimension in the search space, the velocity and the fitness value are calculated. Finally, a flag is used to categorize the cats into either searching or tracing modes. It is necessary to define how many cats will participate in iteration and then go through the algorithm with that number of cats. The best cat from each iteration is kept in memory, and the one at the last iteration will indicate the correct solution.

2.4.1 General Structure of Cat Swarm Optimization Algorithm

Using these stages, the algorithm is able to search for the best solution:

1) Solution sets must have upper and lower limits specified.
2) Generate N cats (or solution sets) at random and disperse them in the M-dimensional space with random velocity values without exceeding a preset maximum value of velocity.
3) According to the MR, categorize each cat into one of two groups: one that seeks, and the other which follows. The [0, 1] range is used to choose the MR mixture ratio. So, for instance, if the number of cats N is 10 and the MR is set to 0.2, 8 cats will be selected randomly to go through searching mode and the other 2 cats would be selected randomly to get into tracing phase.
4) Using the fitness function that is specific to the domain, determine the overall level of health and vitality of all of the cats. As a further step, the best cat is selected and stored in a database.
5) After this, the cats switch to hunting or tracing mode.
6) For each subsequent cycle, randomly shift the cats into searching or tracing modes depending on their MR.
7) Steps 4 through 6 should be repeated if the termination condition is not met.

2.4.2 Seeking Mode

This mode mimics the behaviour of cats while they are at rest. Within this mode, the following core parameters play significant roles: counts of dimension to change (CDC), seeking memory pool (SMP), seeking range of the chosen dimension (SRD), and self-position considering (SPC). The user sets these parameters via a trial-and-error process. If you want to know how many candidate spots are available for a cat to choose from, SMP is a good place to start. if SMP is set to 5, then for every cat, 5 random places will be produced and one of them would be picked as the next location of that cat. The other two factors, CDC and SRD, will dictate how the new positions are randomized. An interval [0, 1] specifies the number of dimensions that must be altered. With a search area of five dimensions with CDC set at 0.2%, 4 different dimensions out of the 5 have to be changed for each cat, while one of the five remains unchanged. According to CDC's selection criteria, SRD is an indicator of the level of mutation and alteration in the dimensions that were chosen. Last but not least, SPC is a boolean value indicating whether or not the cat's present location will be considered a contender for the following iteration. This means that, for example, if the SPC bit is set to true, we need to create (SMP-1) options rather than SMP number for each cat. The following are the procedures for entering search mode:

(1) Create as many copies of Cat_k's present position.

(2) Choose mutations at random across as many CDC dimensions as there are copies of each clone. In addition to this, add or remove SRD values at random from the present values, which take the place of the previous places according to the equation that follows:

$$Xjd_{new} = (1 + \text{rand} * \text{SRD}) * Xjd_{old}, \quad (1)$$

where Xjd_{new} specifies the next position; Xjd_{old} specifies the current position; j specifies the number of a cat and d specifies the dimensions; and rand demonstrates a random number in range [0, 1].

(3) Conduct a fitness assessment (FS) on all of the candidates for the available vacancies.

(4) Cat's next location should be decided based on likelihood, and candidate spots with higher FS have a greater chance of being chosen as indicated in equation (2). For those cases when each candidate's fitness values are identical, a probability of one is the best choice.

$$\text{Pi} = \frac{|FS_i - FS_b|}{FS_{max} - FS_{min}}, \quad \text{where } 0 < i < j. \quad (2)$$

In case, the objective is minimization, then $FS_b=FS_{max}$;
otherwise, $FS_b=FS_{min}$

2.4.3 Tracing Mode

Using this mode, we may simulate a cat's tracing habits. All dimensions of a cat's location are assigned random velocity values for the initial iteration. In the future, velocity values will need to be changed. In this mode, the following cats will move:

(1) First, update the velocities ($V_{k,d}$) for all the dimensions as per the equation (3).

(2) If a velocity value exceeds the maximum, then it is equivalent to the maximum velocity.

$$V_{k,d} = V_{k,d} + r_1 c_1 \left(X_{best,d} - X_{k,d}\right). \quad (3)$$

(3) Now, update the position of Cat_k as per the following equation:

$$X_{k,d} = X_{k,d} + V_{k,d}. \quad (4)$$

The flowchart of whale optimization algorithm is shown in Figure 8.

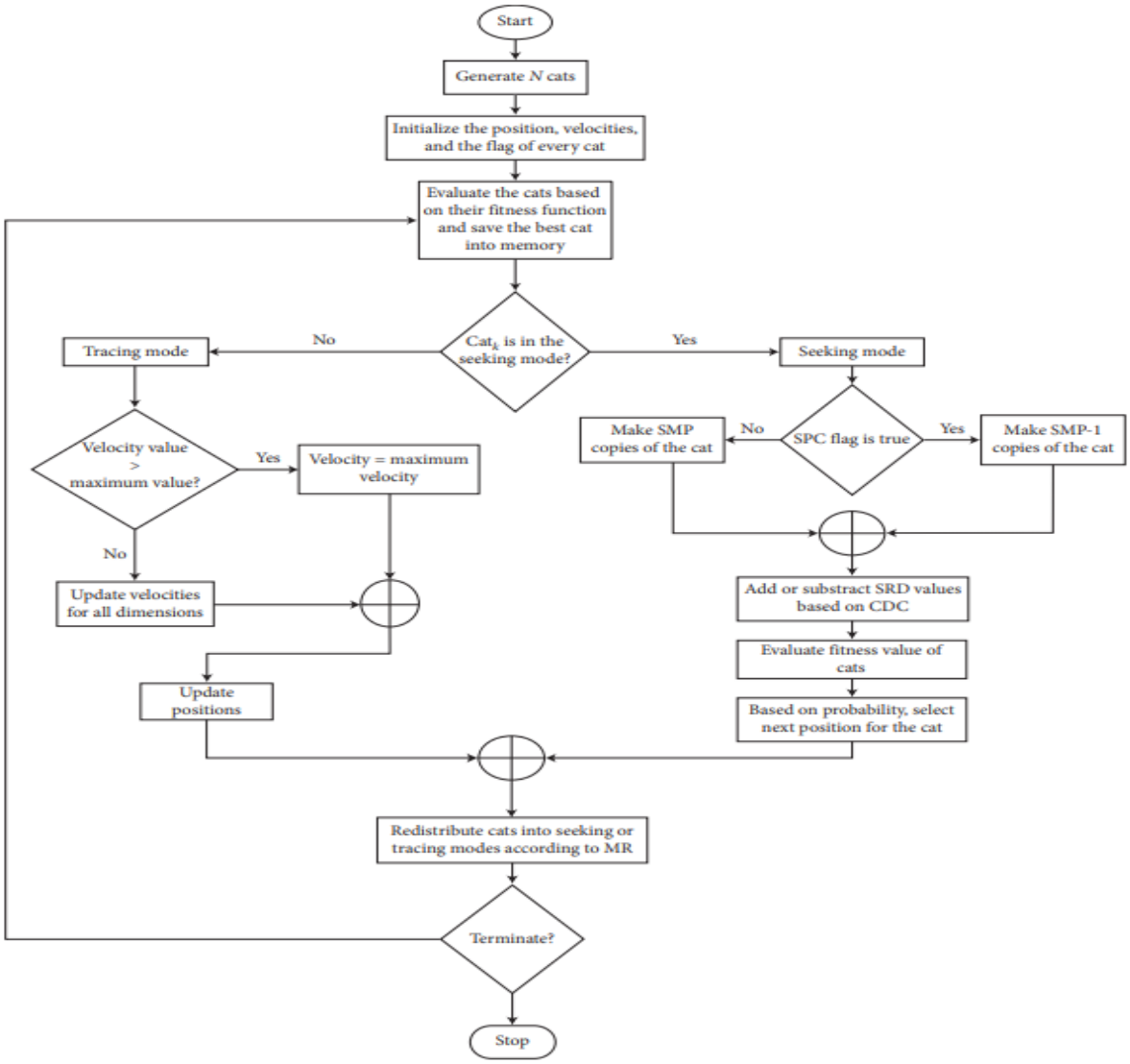

Figure 8 Cat Swarm Optimization Algorithm

2.5 Need of Hybridization of Whale and Cat Swarm Optimization Algorithm

Whale optimization algorithm is superior in terms of low internal parameters and easy implementation over other optimization algorithms. However, it faces numerous challenges such as falling easily into local optima, low accuracy, and slow convergence speed [20]. To overcome these challenges, WOA algorithm is hybrid with CSOA algorithm.

2.6 Convolutional Neural Network

A convolutional neural network may contain tens or even hundreds of layers that individually learn to detect distinct image features. Different resolutions of filters are applied to each training image, and the result of each convolved image is utilized as the input to the next layer. The filters can begin with simple characteristics, such as brightness and edges, and progress to characteristics that uniquely describe the item [21]. CNNs, like other neural networks, consist of an input layer, an output layer, and numerous hidden layers in between. These layers perform operations that modify the data in order to discover data-specific characteristics. Convolution, activation or ReLU, and pooling are three of the most typical layers.

- **Convolution:** The input images are passed through a series of convolutional filters, each of which activates specific visual attributes.
- **Rectified linear unit (ReLU)**: By mapping negative values to zero and keeping positive values, the rectified linear unit enables faster and more efficient training by maintaining positive values. This is sometimes referred to as activation, as only the activated features are carried on to the following layer.
- **Pooling:** Pooling reduces the amount of parameters that the network must learn by conducting nonlinear downsampling on the output.

These procedures are performed hundreds or thousands of times, with each layer learning to recognize distinct features.

3. Proposed Model

The flowchart of the proposed model is shown in Figure 9.

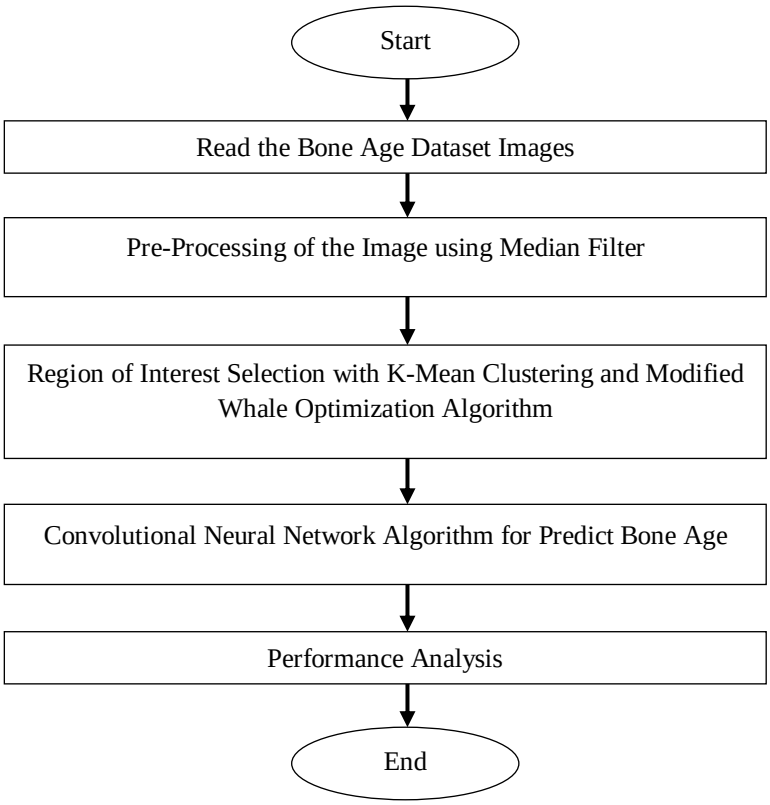

Figure 9 Flowchart of the Proposed Model

The steps of the proposed model are given below.

- In the first step, we have read the excel file which contains three information ID, bone age, and male/female. After that, according to ID number, we have read the RSNA hand X-ray images.
- In the second step, pre-processing of the image is done using median filtering.
- In the third step, extract the region of interest (ROI) from the image. For the selection of ROI part, we have used a combination of two optimization algorithms such as whale optimisation and cat swarm optimisation algorithm. Besides that, it is hybrid with the Kmean clustering algorithm.
- In the fourth step, after the ROI selection, we initialise the CNN algorithm for the training purposes. After that, CNN algorithm layers are defined. Next, in the testing phase, evaluation of the CNN algorithm is done to predict the bone age.
- In the fifth step, performance analysis of the proposed model is done.

4. Simulation Evaluation

In this section, simulation evaluation is conducted for the proposed model to evaluate its performance for bone age assessment. The proposed model effectiveness has been demonstrated thorough evaluation of its performance in contrast to a variety of existing models.

4.1 Detailed Description of Dataset

One way that the Radiological Society of North America (RSNA) measures the success of RidgeNet is via the use of its bone age information. RSNA is made up of 14,236 images of patients' hands, both female and male. For the training dataset, Stanford Children's Hospital obtained 12,611 pictures, for the validation set 1,425 pictures, and for the test set, 200 pictures. These pictures came from a variety of places and at various times. Fig. 5 shows a selection of hand radiographs from the RSNA collection. Observe that the photographs were taken at various times and under various situations with a variety of backdrop and hand-related variables such as size, contrast, and brightness. Male and female patients represent an even split in the training set's total number of radiographs. The bone ages of male and female patients are presented in Fig. 6, and they are not evenly distributed.

4.2 Simulation Setup Configuration

The proposed model was simulated in MATLAB and the system configuration was i7 processor, 16GB RAM, 64-bit operating system. The simulation setup configuration of CNN algorithm is given in Table 1.

Table 1 Simulation Setup Configuration of CNN Algorithm

CNN Parameter	**Value**
Max Epochs	20
Initial Learn Rate	0.001
Learn Rate Drop Factor	0.1
Learn Rate Drop Period	20
No of Layer	18
Min. Batch Size	64
Input Layer	64 x 64
Conv. Filter Window size	3 x 3
No of stride	2 x 2
No of Pool Size	2 x 2
Dropout Layer Probability	0.2

4.3 Performance Metrics

In this section, the performance metrics are explained that calculated for the proposed method to shows its effectiveness over the existing methods.

Table 2 Performance Metrics [12]

Parameter	Equation
Mean Absolute Error (MAE)	$MAE = \frac{1}{N}\sum_{m=1}^{N} \lvert X_m - X'_m \rvert$
Root Mean Square Error (RMSE)	$RMSE = \sqrt{\frac{1}{N}\sum_{m=1}^{N} (X_m - X'_m)^2}$
Root Mean Squared Percentage Error (RMSPE)	$RMSPE = \sqrt{\frac{1}{N}\sum_{m=1}^{N} \left(\frac{X_m - X'_m}{X_m}\right)^2}$

Where Ndenotes the total number of samples in the test set. X_m, X'_m denotes the actual and model's predicted values. A smaller value of these parameters suggests a better performance of the model.

4.4 Simulation Results

Figure 10shows the qualitative analysis of the proposed method in which bone age prediction is shown.

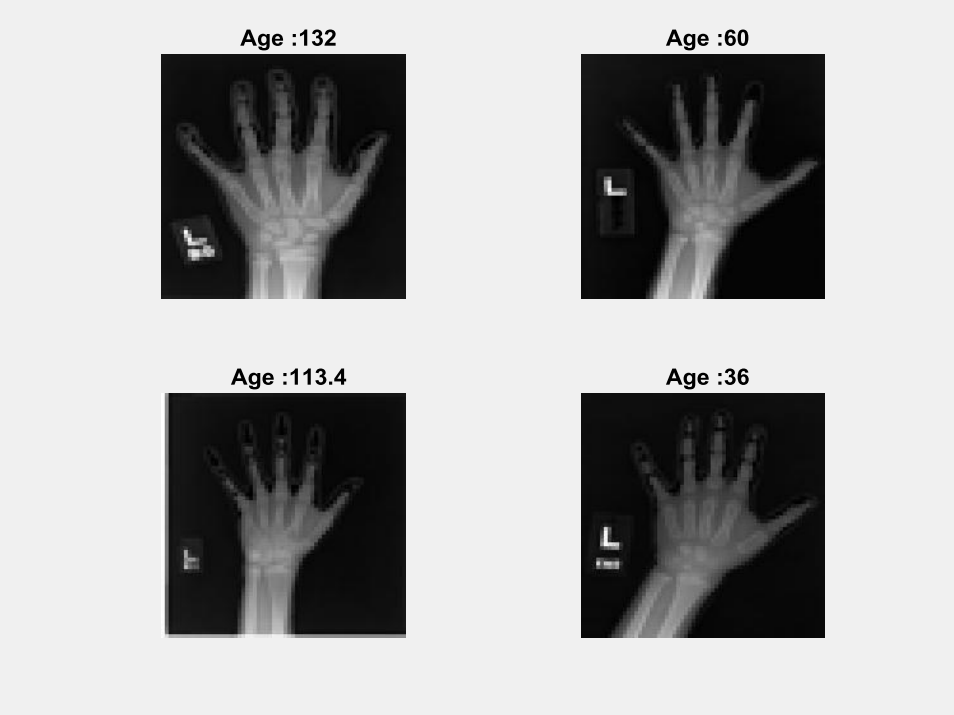

Figure 10 Bone Age Prediction using Proposed Method

Table 3 shows the performance metrics for the proposed method in which different options are taken under consideration such as both, male, and female.

Table 3 Performance Metrics for the Proposed Method

Option	MAE	RMSE	RMSPE
Both	2.9491	6.0617	0.9400
Male	4.0414	7.1328	1.0975
Female	1.7954	4.6297	0.7321

4.4.1 Comparative Analysis

In this section, comparative analysis is performed for the proposed method with the existing baseline methods based on the MAE, RMSE, and RMSPE parameters.

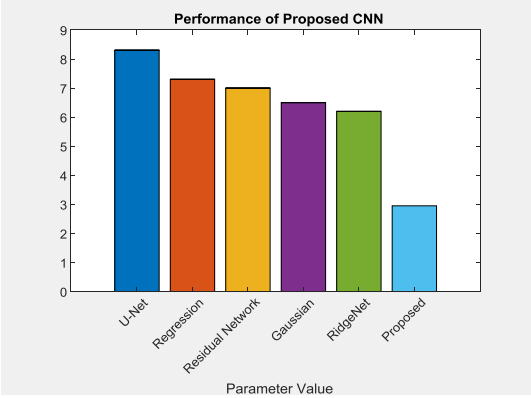

Figure 11 Comparative Analysis based on the MAE Parameter (for Both Gender)

Figure 11 provides a comparison between proposed and baseline techniques for calculating MAE for both genders. The suggested method has the lowest MAE of 2.9491, as shown in the bar graphs.

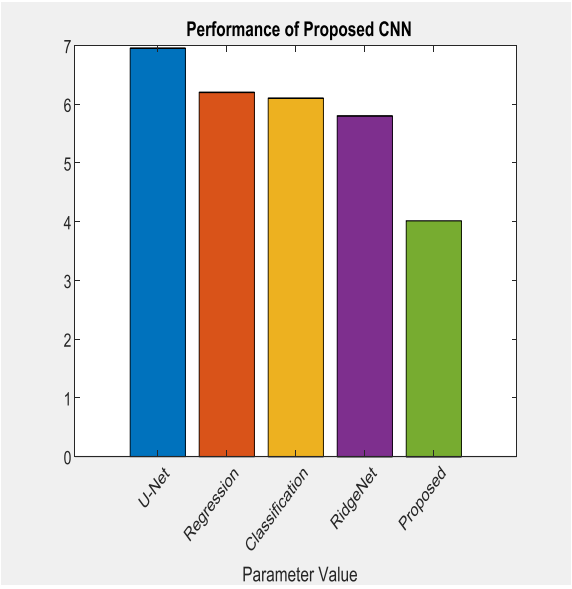

Figure 12 Comparative Analysis based on MAE Parameter (for Male)

As seen in the above figure, the proposed method performs the best, resulting in the lowest MAE of 4.014 for male genders when compared to the baseline methods.

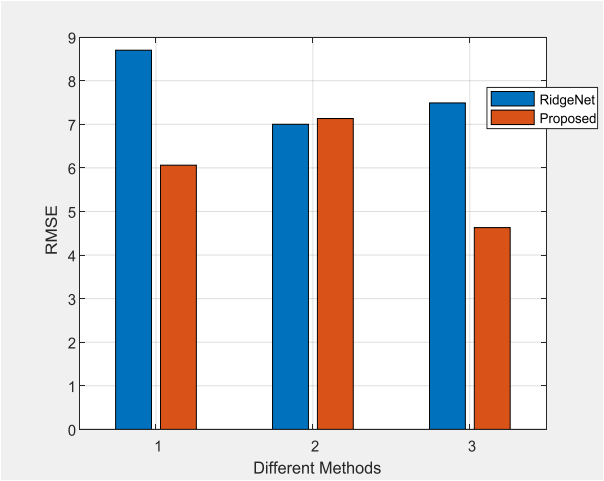

Figure 13 Comparative Analysis based on RMSE Parameter (Options: 1-Both, 2-Male, 3-Female)

Here are the RMSE bar graphs for both, men, and women using the suggested method and RidgeNet, which demonstrate that the proposed method is the most accurate, with the lowest overall RMSE value, as shown in Figure 13.

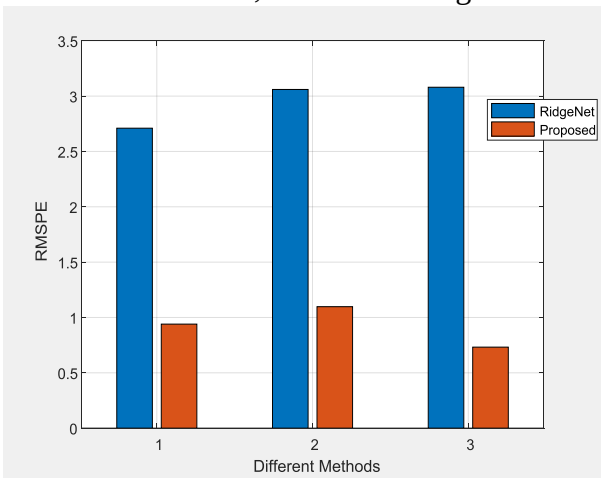

Figure 14 Comparative Analysis based on RMSPE Parameter (Options: 1-Both, 2-Male, 3-Female)

As shown in the figure, the RMSPE values produced by the proposed method and the RidgeNet approaches for both male and female genders show that the suggested methodology works well, yielding lower RMSPE.

6. Conclusion and Future Scope

Using the skeletal bone age, endocrinologists are able to detect and forecast children's disease and growth. Hand-and-wrist X-rays are traditionally used to estimate bone age in conventional manual assessments, however this method has a number of inherent disadvantages, ranging from low efficiency to unstable accuracy. Image processing and machine learning technologies have been proposed to solve these issues. In this paper, we provide a new bone age estimation model based on convolutional neural networks. A two-step process is proposed in the model. In the first step, a hybrid of the whale optimization method and the cat swarm optimization technique is used to find region of interest in the images. It is necessary to use a hybrid approach in order to avoid the problems associated with the whale optimization technique, such as local optimums, limited accuracy and a slow convergence rate. A convolutional neural network is used to train and predict segmented images in the second phase. Different performance indicators have been found for the standard dataset used in the simulation evaluation. MAE, RMSE, and RMSPE reveal that the suggested model is superior than existing models.

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ESTIMATING SOIL QUALITY ON SPECIFIC SOIL PARAMETERS USING MACHINE LEARNING TECHNIQUE

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ABSTRACT

Punjab's rich plains provide around two-thirds of all food grains produced in India each year. This is primarily due to Punjab's excellent soil.Green revolution technologies have both beneficial and harmful consequences in Punjab. So, there is a need to maintain the soil fertility of Punjab in such a way that it can give long-term high-level production to feed the growing population. It is important to thoroughly determine the borders of current nutritional shortfalls and to monitor changes in soil fertility to foresee their shortage for proper soil fertility management. A model is provided in this work for forecasting the soil fertility index for individual soil samples. The model was trained using a well-constructed dataset and the k-NN machine learning approach. The suggested model's accuracy in soil categorization was impressive.

Keywords: *Soil analysis, Machine learning, kNN, Punjab*

1. Introduction

Soil is the end product of the parent material as a result of the long-term influence of climate, terrain, and natural vegetation on the parent material. Geography, vegetation, and parent rock have only a minor impact on soil properties in Punjab. Because of regional climate variances, the variation in soil profile characteristics is significantly more pronounced [1].

The fertile plains of Punjab supply around two-thirds of all food grains produced in India each year. Punjab's good soil is the main reason for this. Climate variations provide a wide variability in soil, which results in the production of a wide range of crops and plants in Punjab. Calcareous soil, which comprises desert soil and sierozem soil, dominates south-western Punjab.The pH varies from 7.8 to 8.5 in this zone, which includes grey and red desert soil, calsisol soil regosol soil, and alluvial soil.The soil in central Punjab varies in texture from sandy loam to clayey. The alluvial soil found in this zone is known as arid and brown soil or tropical arid brown soil.The soil is loamy to clayey in Eastern Punjab. [2].

2. Literature Survey

In terms of production and productivity of two major food grain crops, wheat and rice, the Indian Punjab is a strategically significant region of the country.An unprecedented increase in wheat and rice yield and productivity in Punjabsince the "green revolution" has benefited India in addressing the periodic food crises of the 1960s [3].

In Punjab, green revolution technologies have both positive and negative repercussions. Farmers in Punjab, for example, initially achieved extremely high productivity levels by using high-yielding cultivars, irrigation systems, chemical inputs, and credit, but somehow chemical-based factors of production as well as machine-oriented farming techniques led to overexploitation of environmental assets, especially water and soil, to another stage where the most farming enterprises became environmentally unsustainable [4].

There is a need to maintain Indian soil fertility in such a way that it provides long-term high-level output to feed the rising population. For appropriate soil fertility management, it is necessary to carefully identify the boundaries of present nutritional deficits and to monitor changes in soil fertility to forecast their scarcity.To keep food production at a reasonable level while ensuring high productivity, soil fertility indices must be continually maintained at their starting levels by using sound and best techniques for soil management in terms of nutrients, water, plants, and energy. To sustain fertility, increase productivity, and protect the environment, adequate soil cultivation is required. Soil testing is useful in forecasting the correct soil cultivation technique to be followed [5] [6].

Machine learning's introduction in the agriculture industry has resulted in massive

remunerations in the research field employing analytical approaches. Machine learning analysis approaches are useful in determining basic variations in any branch of study by identifying remarkable relationships between objects and concepts [7].

3. Methodology

3.1 Data collection

The planned research would examine the soil fertility index of Punjab's dry and semi-arid regions. Soil data were obtained from several areas in Punjab for this study. These districts are located in Punjab's dry and semi-arid regions. There are four characteristics in this dataset, as well as 96 soil sample instances. Attribute descriptions are shown in Table 1.

Table 1: Attributes and description

Attribute	Description
N	Nitrogen (Kg/ha)
P	Phosphorus (Kg/ha)
K	Potassium (Kg/ha)
OC	Organic Carbon (%)

3.2 Proposed System

The technique attempts to assist Punjabi farmers incorrectly studying the soil to produce higher yields. The study analyses the nutrients present in the soil to be exact and accurate in predicting soil health. Machine learning techniques such as k-NN can be used to do this. The primary concept behind this suggested methodology is to determine the soil fertility index using N, P, and K content.Data collection is the first step, followed by pre-processing the dataset to remove missing attribute values, noisy data, and missed matches. The soil analysis model will be trained using the filtered dataset. The performance of the trained model will be assessed afterward. The model will be built using the k-NN approach, which is a well-known supervised machine learning technique.Figure 1 depicts an elevated overview of thisstudy.

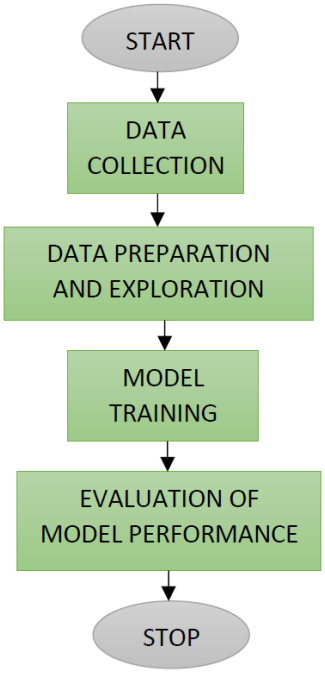

Fig. 1. Overview of the work

3.3 Machine Learning Algorithm (k-NN)

The k-NN algorithm is a supervised learning method in which the objective is known but the path to it is unknown. Understanding your immediate neighbors is the pinnacle of machine learning. This method, like Regression, is simple to understand and implement. The technique of the k nearest neighbors is a simple algorithm that keeps all current instances as well as categoriesof new cases based on a majority vote of its k neighbors. Using this method, unlabelled points are split into well-defined groups[8].

Setting the value of k is critical in determining the model's success. As a result, the value of k influences how well the data may be utilized to generalize the findings of the k-NN method. A large k number provides advantages, such as minimizing variation owing to noisy data; yet, it has the disadvantage of generating a bias, in which the learner tends to dismiss smaller patterns that may contain important insights [9].

4. Results and Discussion

4.1 Database analysis and attribute selection
This study constitutes soil samples from eight areas in Punjab. Mansa, Sangrur, Bathinda, Firozpur, Ludhiana, Moga, Faridkot, and Fatehgarh Sahib were the districts involved.

The impact of main nutrient levels was initially investigated. This study used three levels to create three separate soil characterization categories: low (L), medium (M), and high (H)(see Table 2). For example, if the soil has 76 kg of nitrogen per hectare, 34 kg of phosphorus per hectare, and 98.6 kg of potassium per hectare, the soil class is "Low".

Table 2: Soil characterization

Category	Available Nitrogen(N)	Available Phosphorus(P)	Available potassium(K)
Low (L)	Below 280Kg/ha	Above 25 Kg/ha	Below 110Kg/ha
Medium (M)	Below 280Kg/ha	Above 25 Kg/ha	110-280Kg/ha
High (H)	280-560 Kg/ha	Above 25 Kg/ha	Above280Kg/ha

4.2 Result analysis

The above-mentioned datasets serve as the foundation for the suggested model technique. On the training data set, the k-NN method was used, and the results were confirmed on the test data set. For the training and test data sets, the data set was partitioned into two halves with an 80:20 ratio. The above-mentioned soil characterization was used to train the model. The model's test findings divided the input soil samples into low (L), medium (M), and high (H) fertility indices(Figure 2).

```
> Category
 [1] L M L L M L L L L L M M L M M M L M L M
Levels: L M
> data.frame(testing_dataset[1],Category)
   Sample.no. Category
1          77        L
2          78        M
3          79        L
4          80        L
5          81        M
6          82        L
7          83        L
8          84        L
9          85        L
10         86        L
11         87        M
12         88        M
13         89        L
14         90        M
15         91        M
16         92        M
17         93        L
18         94        M
19         95        L
20         96        M
```

Fig 2. Test result

The crosstable () function was used to assess the model's performance. We've developed the model, but we still need to verify that the projected values are accurate and match the actual values. The outcomes of the above-mentioned technique's evaluation are displayed in Fig. 3.

```
> CrossTable(x=Actual, y=Predicted, prop.chisq = FALSE)


   Cell Contents
|-------------------------|
|                       N |
|           N / Row Total |
|           N / Col Total |
|         N / Table Total |
|-------------------------|


Total Observations in Table:  20


             | Predicted
      Actual |         0 |         1 | Row Total |
-------------|-----------|-----------|-----------|
           0 |         9 |         1 |        10 |
             |     0.900 |     0.100 |     0.500 |
             |     1.000 |     0.091 |           |
             |     0.450 |     0.050 |           |
-------------|-----------|-----------|-----------|
           1 |         0 |        10 |        10 |
             |     0.000 |     1.000 |     0.500 |
             |     0.000 |     0.909 |           |
             |     0.000 |     0.500 |           |
-------------|-----------|-----------|-----------|
Column Total |         9 |        11 |        20 |
             |     0.450 |     0.550 |           |
-------------|-----------|-----------|-----------|
```

Fig. 3. Evaluation results

There were 20 observations in the test data. The values were encoded as 0 and 1, with 0 denoting low(L) and 1 denoting medium(M). Nine samples were correctly predicted as 0 (TN->True Negatives), accounting for 50% of the total. Furthermore, a total of 10 of the 20 forecasts were TP or True Positive. There were no False Negatives (FN), which is no samples were observed that were truly medium (1) but were forecasted as low (0).The presence of FNs, if any, constitutes a potential hazard for the same reason, therefore reducing FNs is the primary emphasis for improving the model's accuracy. False Positives (FP) occurred once, indicating that one sample was truly low (0) in nature but was projected to be medium (1). 19 of the 20 observations were correctly predicted by the model. The evaluation findings show that k-NN functioned admirably. The model's overall accuracy is 95 percent ((TN+TP)/20), indicating that it performed well. However, the model was also evaluated using the statistic parameters like correlation, r-squared and mean absolute error. The evaluation results are shown in table 3.

Table 3: Evaluation results

Model Name	Correlation	R-squared	Mean Absolute Error (MAE)
k-NN	0.7	0.49	0.15

As shown in the table 3, the correlation coefficient for this model was 0.7, a positive one, which means the actual and predicted values moved in tandem. The R-squared describes how well the regression model fits the observed data, and the decision tree model had an r-squared of 0.49. The average magnitude of errors without considering their direction is calculated using mean absolute error and, for this model it was 0.15.

4.3 Comparative analysis

The proposed model for soil classification using a machine learning algorithm namely k-NN was compared with existing models. The comparison is shown in table 4.

Table 1: Comparing the proposed model with existing models based on soil classification

Models	Accuracy (%)
Soil Classification Model (k-NN) (proposed model)	95
Soil Classification Model (SVM) (Abhang et al., 2018)	91
Soil Classification Model (Regression) (Abhang et al., 2018)	94
Soil Fertility Index Model (Suchithra and Pai, 2019)	80
Soil Analysis Model (Meradevi et al., 2019)	94.6
Soil Electrical Conductivity Model (cubist) Orton et al., 2020)	89
Soil Moisture and OC Content (cubist) (Nawar et al., 2020)	93
Soil Classification model (k-NN) (Taher et al., 2021)	84
Soil expansion prediction (SVM) (Eyo et al., 2022)	93

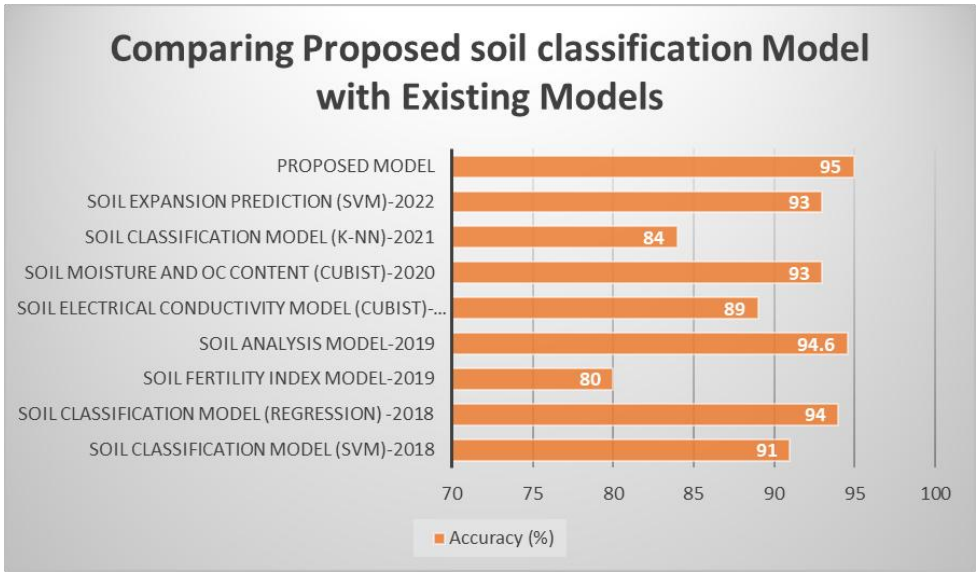

Fig. 4: Comparison of proposed soil classification model with existing models

As shown in table 4 and figure 4, the proposed model showed the highest accuracy among all the models. The model's overall accuracy is 95 percent, indicating that it performed well in comparison to other models.

5. Conclusion

In this paper, a model for forecasting the soil fertility index for individual soil samples is provided. Soil samples were collected from eight districts of Punjabnamely; Mansa, Sangrur, Bathinda, Firozpur, Ludhiana, Moga, Faridkot, and Fatehgarh Sahib. k-NN was used to train the model. A well-constructed dataset and machine learning technique support the suggested model. The precision of the soil categorization is superior to that of several other approaches. In the future, we will focus on offering fertilizer recommendations, as well as adding data from other districts to make this model more dependable and accurate.

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CRIME SCENE INVESTIGATION AND IMPORTANCE OF FORWARDING OF EXHIBITS TO COURT OR FORENSIC SCIENCE LABORATORY IN CRIMINAL INVESTIGATION.

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ABSTRACT

Presently Science and Scientific technology is expanding at an ever increasing rate and the application of scientific technology in crime investigation also increases with the changes occurring in the world. The forensic science consists of various disciplines of science and also touches every boundary of medical science. A crime scene is an important place where a criminal act has been taken place. The success or failure of investigation depends on careful handling of crime scene and processing of evidence. It is the skill of an investigating officer to collect, preserve and forwards the exhibits to the court or Forensic Science Laboratory without disturbing the material evidence. Any laxity in this regard will affect adversely to the prosecution.

***Keywords**: Forensic Science, Scientific Technology, Investigating Officer, Crime Scene*

Introduction

The law is dynamic in nature, not static. It changes accordance with the change of the society. The law is the basic of the society; it should be interpreted for the benefit of the society. The judiciary has the role to interpret the law for greater good. The development of Science and Technology and its application for administration of justice and for the detection of crime is not new to India. The use of new technology like DNA analysis, blood spatter analysis, hair and fiber analysis,3-D computer imaging, high performance liquid chromatography, mass spectrographs and modern technology are being used by the forensic scientists to reconstruct the offence and so as to identify the exact criminals. The forensic science is connected to science and criminal investigation and therefore, it applies scientific technology to detect the offence.

The complexity of the crime and detection of actual offender emphasizes the importance of scientific investigation i.e., forensic investigation. To solve a crime, a standardized scientific approach is used, it is said to be forensic investigation. The basic process of forensic investigation involves the analysis of crime scene and collection of physical evidences such as fingerprint, blood, semen, hair, residue and other forms of evidences which is the conclusive proof against the culprits and to ensure the evidence collected is credible and relevant. The principle of forensic is related to the famous Locard's principle. According to this principle, "the perpetrator always carries or leaves behind some traces of evidence at the crime scene."[i] A crime scene is a place where a particular crime has been committed. This is a place where there are possibilities of finding physical evidences of a crime which may be brought to the notice of the Police. In many cases, there may be multipoint crime scenes. This is the beginning point for an investigating officer which provides the information about the victim and the suspect and helps the investigator to reconstruct the crime scene[ii]. The collection, packing and forwarding of the collected evidence is very important in crime scene investigation. If the collected sample is packed without the presence of witnesses or not as per the guidelines, the court or the Forensic Science Laboratory may reject the evidence. Hence, extra care should be taken while collecting, packing and forwarding of the exhibits to the court as well as to the Forensic Science Laboratory.

Importance of Study

Crime scene investigation is to be done very carefully otherwise the material evidence from the scene of occurrence may have lost. There are many cases in which the investigating officers or forensic examiners do not take much importance in collecting and forwarding of samples to the FSL as well as to court. If the exhibits are forwarded not as per guidelines

laid down by the investigating agencies, the court or the FSL may reject the exhibits. This invites the criticism from various parts of the society, the court might have exonerate the real culprits as the benefit of doubt results the acquittal of actual offenders. The study will be helpful to assess the issues and to take adequate steps to prevent the laxity on the part of investigating officers and forensic examiners while conducting crime scene investigation and forwarding physical materials to the court or FSL.

Objective Of The Study

1. To study the role of Forensic Science in Criminal Investigation.
2. To study the loopholes in the absolute investigation
3. To find out the reasons in the defective investigation
4. To examine the kind of hurdles the key role players in the field of investigation are experiencing.
5. Actions taken at the outset of an investigation at a crime scene lead to assure proper resolution of a case.

Research Methodology

This paper is based on doctrinal research method. The primary data is collected from text books, international journal and articles, secondary data used is guidelines issued by various investigating agencies, judgements and reports from various commissions.

Crime Scene Investigation

The crime scene is the place where the criminal act or crime was committed. From this point, an investigating officer begins the investigation of a crime and determines the identities of the criminal. This is also a place from which the physical evidence is obtained. The criminal investigation depends upon the physical evidence and therefore, extra care should be given while handling the physical evidence. It is a very important place to an investigating officer where the success or failure of the entire investigation of crime decides. He should be able to recognize, collect and preserve the physical evidence available at the scene of occurrence. The first step of crime scene investigation is to establish a systematic plan for processing the efforts. Generally, the structure of crime scene processing is the

- Assessment of the crime scene,
- Search and recognition of the physical evidence
- Collection, handling and packing of physical evidence and
- Reconstruction of crime scene[iii].

The examination of crime scene gives the following information;

- Whether the crime scene alleged is genuine or not?
- Details of entry and exit of criminal at the scene of occurrence?
- No. of criminals/victim involved in the crime?
- Modus operandi used by the criminal?
- The exchange of evidence between the criminals and victim.
- Behaviors of the criminal at the scene of occurrence so as to establish his profile
- The language used by the accused enable to identify the location/region to which the criminal belongs to
- the activity of the criminal after the committing offence.[iv]

Criminal Investigator And Crime Scene:

The word investigation is coined by the term 'investigate' which means "to trace out or search into."[v] The duty of a Criminal Investigator is to bring out real unvarnished truth of a crime.[vi] According to Richard H. Ward "The primary function of the criminal investigator is to gather information, determine the validity of the information, identify and locate the perpetrator of the crime and provide evidence of his guilt before a Court of Law.[vii] Investigation of a criminal case is an intelligent duty but laborious and pains taking processes.

An investigating officer must have some basic and inherent talent to trace out the culprits. If he is not having such quality he should have achieved it by training and practices. Of all the qualities are necessary to an investigating officer, honesty and character are important.
When information about a crime is received, the investigating officer should visit the scene of crime immediately after registering FIR. A

crime scene is the most important place for an investigating officer. He can get useful information regarding crime and can collect evidences about the crime from the scene of crime. As the crime scene is the best source of evidence, it should be protected safely till the examination and collection of evidence by the Forensic Experts is completed. The collected evidences are to be subjected to analysis so as to trace the real accused of the case.

Documentation Of Crime Scene

It is very important to a criminal investigator that documentation of the scene of crime. It begins at the moment that an officer gets information of a crime and continues till the case is closed. Even though the evaluation of crime scene is a time consuming and requires patience to get proper result. It enables to keep a detailed record of everything an investigating officer saw or did. Basically, there are four methods of documentation in criminal investigation. They are

1) Report and Note making
2) Photography
3)Videography
4)Crime Scene sketching and mapping[viii].

The investigating officer should keep the documentation as a permanent record. While conducting preliminary survey of crime scene, an investigating officer can assess what type of documentation is needed i.e. photography, sketch, notes, measurements or video etc. A general description of the crime scene, just as the investigating officer observes it,should be narrated when he does the preliminary survey. The notes and reports should contain only facts, never include opinions, analysis or conclusions. They should be done in a chronological order.

Protection of the Crime Scene

Every crime investigators must know that the criminal always leaves some kinds of traces; the traces are very important which can be used in the reconstruction of the crime. It may also provide a link between the suspect with the victim and the scene of crime. If it is not properly protected, it may lead to loss, contamination or destruction of various forms of evidence. It may also be noted that if the evidence is once neglected, it cannot be retrieved at a later stage. The first officer arriving at the crime scene should take measures to protect the scene from the family members and curious onlookers. He should mark the area as," CRIME SCENE, DO NOT CROSS". Once the scene is touched or altered or changed, it will make the task hurdle for the investigating officers and it will also be a great task to reconstruction of crime scene and collect the physical evidence[ix].

Collection, Preservation, Packaging And Forwarding Of Evidence:

The collection of evidence can be started after completion of thorough documentation of the crime scene. While collecting the physical evidence, the extra care should be given to the most fragile or if there is a possibility of lost evidence to be collected first. The physical evidence should be collected in paper containers like packets, bags and envelopes. The physical clues of a crime be obtained from

- Scene of crime
- The victim
- The suspect and his environment.

A detailed search is to be conducted at these three sources and materials in sufficient quantities are to be collected and to send them to the scientific expert for examination. The materials even microscopic fragments or debris may contribute to solve a crime. It is very important as well as essential to an investigator for handling, labeling and packing of materials from the scene of crime. If these processes done in a correct method, it would strengthen the weak link in a chain of evidence, sometimes supply one or more link. If the handling of material evidences done by an investigating officer in careless manner, the valid materials collected may become useless. If an object bearing fingerprint,dust or hair or any other rare materials may be displaced or disturbed due to careless handling. Similarly, forwarding of exhibits delayed and errors occurred in packing and labelling which may affect adversely to the prosecution case.

In ***Hema Vs Transport Inspector of Police***, Madras in Crl.appeal No.31 of 2003 stated that the weapon used by the accused seized and produced before the court on a later stage was a serious lapse on the part of prosecution.

In ***State of Rajasthan vs Daulat Ram***, the Supdt.of Police did not accepted the seized opium after a period of one month for onward transmission Public Analytical Laboratory. The Hon'ble Supreme Court in case of ***Valsala v State of Kerala***[x] stated that the seized articles should be forwarded to the FSL for examination and the delay in sending the article will cause suspicious about the seizure of article. In ***Narain Singh v State***[xi], ***Daya Nand v State***[xii] and ***Ramesh v State***[xiii] the court contended that the delay in sending samples and errors occurred while forwarding the exhibits to the court or FSL will be fatal to the prosecution.

Therefore, the following guidelines should be followed while lifting the materials from the scene of occurrence.

- ✓ Do not touch anything with bare hand, use rubber gloves.
- ✓ Make a preliminary examination before picking or touching an article and note the exact position of the material
- ✓ While lifting, hold the article carefully on such parts, there is a possibility for a fingerprint touched by the previous users.
- ✓ While lifting a knife or a fire arm, it should be handled very carefully without affecting the fingerprints of previous users.
- ✓ Use forceps for picking small articles
- ✓ Handling should be done as minimum as possible and leave the article in its original position as much as possible

Packing:

- The collected materials/samples should be packed properly. This packing is to be done so as to avoid breakage, loss or contamination while transmitting from one place to other.
- The envelopes containing materials should be forwarded to Forensic Science Laboratory or court in a sealed condition and also be labeled properly
- All envelopes should be labeled, sealed and initials of investigating officers or witnesses are to be made without fail.

Labelling:

Evidence collected from the scene of crime should be properly labeled for positive identification. Date and time of collection, from whom and by whom the samples collected should be recorded properly. The collected sample should be preserved properly with same condition and for this proper containers are to be used. While transferring evidence from one place to another place signed receipt should be used. The errors occurred while packing and labeling of material evidence, the evidences will be inadmissible in the court of law.

Sealing:

If the seals are not affixed properly on the parcel, it may create the genuinity of the exhibits. Similarly if sample seal is not legible or if the sample is not attested by the investigating officer or if the details mentioned on the cover get destroyed due to leakage of fluids inside the container these will lead to the rejection of sample evidences by the FSL or by the court.

Forwarding Of Exhibits:

While forwarding the exhibits to the court, the investigating officer should verify that the articles are enclosed in the parcel; otherwise the exhibits will not be accepted by the court or by the FSL. In the following circumstances, there is a possibility for rejection of exhibits from the court or from the Forensic Science Laboratory.

- If the road certificate is not forwarded along with the exhibits. It is highly necessary for the court to prove the chain of custody.
- If the details of parcel forwarded and mentioned in the road certificate do not match.
- If the exhibits are not forwarded to the FSL immediately after recovery from the scene of occurrence, there is a possibility for putrefaction of biological samples and therefore it may become unfit for examination.
- If the nature of examination required is not furnished in the forwarding note.
- If the authorization certificate from a gazetted officer is not forwarded along with the exhibits.

It may also be taken care while handling the evidence from the scene of crime.

Biological Evidences:

- Identify and secure evidence in container from the scene of crime
- Do not touch the biological evidence with bare hands due to health and safety concerns. Use gloves for collection of samples.
- Excessive handling of evidence after collection is to be avoided.
- Paper bags or paper sheets can be used for packing.
- Do not use printed paper for packing as the ink on paper may contaminate the exhibits.
- Articles collected from the crime scene should be packed separately and labeled. Do not pack more than one item. The labeling shouldbe done on the cover not on the exhibits.
- Each article should be labeled with Crime No and date, name of Police Station, section of offence, name of investigating officer, district, state and signature of the investigating officer after sealing the exhibits.
- The labeled exhibits should be numbered consecutively and the forwarding officer should be signed.
- All the packed exhibits belonging to one case should be kept in one box or an outer covering.
- The dried blood sample can be collected by scrapping on a paper or can use fingerprint tape or cello tape to lift the stains of the blood. It can also be collected using filter paper or FTA card moistened with distilled water. Wet stains can also be collected in similar way, use cotton swab and kept in a paper bag after drying the same.
- If the biological samples not preserved on FTA cards, it creates problems in DNA analysis because the samples get putrefied.
- Use dropper or syringes to lift the sample of blood in EDTA (Ethylenediamine tetra acetic acid) from a pool of blood.
- Wet or moist items should not be kept in plastic or paper containers more than two hours. These articles should be air dried before packing.[xiv]

Hair:

- Minimum 10hair samples from the suspect are to be collected
- the pulled hair with roots are required for examination.
- black hair should be packed in white envelopes, white hairs in coloured paper and mixed hair in brown paper[xv]

Bones:

- If the bones are not get cleaned properly from the doctors, there is a possibility for growing fungus on uncleaned bones.
- The bones like femur, tibia and humors are to be preserved for examination.
- The burnt bones are to be packed properly i. e after wrapping in a cotton wool in a hand box[xvi]

Plant Remnants – Stem, Seeds, Leaves Etc.:

- It is to be confirmed that the samples collected is sufficient for examination
- Samples are to be packed separately for different items
- If samples are not protected from moisture, it may cause fungal growth.[xvii]

Blood Stained Weapons:

Blood stained weapons like dagger, hacksaw, sword, gun etc., should be protected after wrapping with white paper with the help of thread. Otherwise, there is a possibility for destruction of blood stain due to rubbing.

Viscera:

During postmortem of the deceased, the visceral organs should be taken in airtight containers and they shall be preserved in

- Saturated solution of sodium chloride for detection of common poison
- Rectified spirit for suspected poisoning
- 1% sodium hydroxide for suspected cyanide poisoning
- For preservation of blood add 1 gm of sodium fluoride per 20 ml of blood
- Blood with liquid paraffin or any vegetable oil for carbonmonoxide poisoning[xviii]
- If the IOs do not sent viscera immediately, it will putrefies and therefore it will become unfit for examination
- Take sufficient quantity of viscera for examination[xix]

Phenolpthalein Samples:

In bribery cases, the accused caught red handed, if the hand wash or pocket wash is taken in chlorinated tap water, the colour of the phenolphthalein may be decolorized. To avoid these, distilled water must be used.

Ndps Substances:[xx]

- While taking samples, it should be taken sufficient quantity.
- The correct weight of NDPS substances should be mentioned in the docket.
- Homogeneous representative sample to be sent for examination.
- Seizure of substances should be done as per provisions of NDPS act.
- The exhibits are to be sent for examination within 24 hours of seizure
- NCB forms in triplicate should be sent to FSL along with the documents
- Sample seal is to be affixed on the NCB forms

Physics Evidences:

- In cases of stolen vehicle, there is a possibility for changes in chassis number,engine number etc., Hence, whenever the vehicle seized, send the stolen vehicles immediately to the forensic science laboratory and get restore the chassis and engine number, otherwise the vehicle become wreckage.
- Similarly foot prints, tyre marks and plaster casts should be properly packed, otherwise, the exhibits may break down due to faulty packing.
- Send homogeneous samples of cement, mortar, concrete and other building material for examination

Fire Arms:

- Bullets, pallets, empty cartridges etc., recovered from the scene of crime should be sent to Forensic Science Laboratory for safe custody before recovery of the fire arm to avoid doubt of padding.
- Fire arms should be packed in a cotton bag otherwise, it may be tampered with.
- Blood stained bullets and pallets should be sending to the FSL without getting them washed.
- Recovery memo should be got signed by two independent witnesses while taking the items in custody, if not, the court will treat the evidence as no value.

Explosives:

- Live explosive or IED should be brought to FSL only after diffusing.
- Explosive should be packed as per SOP for sending to the laboratory
- Investigating officer take swabs of the gun shot residues from the suspected persons or from the deceased for examination. This will create link the arm with the firing person.

Paper Documents:

- Sample signature or writing should be at least five sheets are needed for comparison
- Admitted signatures or writings should be sent for comparison
- Sample writings or signature should be taken before authorized witnesses and authorized officer.
- Same type of paper and same type of pen or writing instrument as in the questioned documents should be used as samples for comparison.
- Questioned documents and sample writings should be separately marked to avoid confusion at the time of examination.

Electronics

- While taking custody of computer, hard disc, CDs, DVDs, pen drive, DPU etc., from the scene of crime, never operate them, otherwise, the 'hash value' of the document would have changed. These may become suspected in the eyes of the court.
  - Do not let it fall from a height which may cause loss of the data.
  - Do not place electronic document near a source of height or near a magnet which can cause destruction of data.

Conclusion And Suggestions

The failure in investigation of criminal cases may cause serious and far-reaching consequences for the individuals as well as communities. Unsolved crimes results to erode

the public faith in criminal justice system. Scientific methods of investigation helps the police to identify the real offenders and therefore extra care should be given while seizing/collecting the materials and forwarding to the court or FSL. Investigating officer must try to minimize the risk of error by assessing the evidence accurately and to avoid pre-mature shifts suspect based investigation.

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ROLE OF FAMILY SUPPORT IN BALANCING PERSONAL AND WORK LIFE OF WOMEN POLICE IN PUDUCHERRY UT

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ABSTRACT

The Economy and Financial needs of the Family made the women come out of the home and work live hood. They try to perform various jobs and sometimes may opt for difficult jobs to satisfy the above need. The present study was on women police personnel which was conducted in the Puducherry UT police Department. The study aimed to find the impact of family support on work-life balance. Various Statistical tools were used to meet the above-mentioned objectives. The results revealed that women with the responsibility for family members' health need to be given a helping hand to balance their personal and professional work.

Keywords: Women, Work-Life Balance, Family Support.

Introduction

Women play an active role in the economic development of their country. At the earliest, their role is only limited to household activities. The present educational and infrastructural facilities have encouraged women to occupy prominent positions in the corporate world. The current global competitive conditions have made the corporate companies formulate various welfare policies suitable for women to grab the untapped potential of the women workforce. Many women are opting for jobs to build a good career and give financial support to their families. To lead a comfortable living and self-satisfaction, women are working hard to get a balance between their personal and work life. The support from their spouse, parents, children, supervisors, friends, and peer groups will them in gaining a balance between paid and unpaid responsibilities. The Work-Life Balance (WLB) practices raise their job satisfaction and job performance and reduce absenteeism and stress.

Work-Life Balance(WLB)

The term Work-Life Balance (WLB) is attractive to all including individuals and Corporate all over the world. Though many have proposed various definitions, there is no accepted definition for this term. Work-Life Balance (WLB) is defined as a satisfactory level of involvement between the multiple roles of a person's life. It is a person's control over the responsibilities between their workplace, family, friends, and self. It is a comfortable state of equilibrium achieved between an employee's primary priorities at their workplace and in their private life. There are various people like family members, friends, supervisors, peer groups, and others involved in every person's life. The support gained from them will play a key role in leading a comfortable life journey.

Literature Review

Various research studies were conducted on Work-Life Balance, particularly on Women who were working in different sectors in India as well as in the other parts of the world.

Noharika and Supriya(2010) have highlighted work-life balance across genders and found that both men and women are experiencing work-life imbalance. Although after Liberalization, many Indian organizations have been introducing various work-life balance practices like flexible times, part-time work, and provision for child care facilities which are facilitated in various developed countries it is found that imbalance still exists among men and women in every organization.

Samuel and Vivienne's (1996) studies revealed that women balance their work and family identity by trading off one role for the other. In contrast, men can simultaneously identify with work and family roles.

Elizabeth et.al (2005) investigated the influence of gender and tenure status in balancing parenthood and career and the results revealed that women reported greater career

and family stress and perceptions of less institutional support for the balance of work and family ascompared to men.

Astrid (2008) has studied the attitude of men towards pregnancy, childbirth, and child-caring and found that they are different from that of women. According to him, fathers viewed the mother as the main parent, partly because of their alternating between work and home and because the mothers breast-feed the infants. Hence they feel their role is insignificant in child care.

Santhi and Sunder (2012) have conducted their study on Work-Life Balance in IT Industry to find their level of satisfaction as perceived by the women respondents and the major factors that are influencing their work-life balance. Their study found that a supportive environment in the organization and provision of welfare measures play a primary role and alternative working time, child care and recreation play a secondary role in balancing work and personal life.

The objective of the Study

In the light of the above review of the literature and the issues being raised, the objective of the present study is to examine,

- The impact of family members' support on Work-Life Balance among women Police Personnel of Puducherry UT Police Department, India.

Work is important for people to lead a happy and comfortable life. But the primary group of any person is his/her family members. If she gets the required support from her hubby and parents, it becomes easy for anyone to maintain a balance in their life. Low balance may result in employee attrition, and high absenteeism and sometimes may lead to health problems. And the job of women Police is an everyday challenge. The changing paradigm in the job of women police was that the public was placing more confidence in women officers, and women police were able to fulfill the roles of wife, mother, and officer on duty.

Research Methodology

Sample The respondents were selected using the census survey method of Puducherry Union Territory in India. The total respondents were 290 women Police. The questionnaire was developed by the authors for the present study. The respondents were asked to rate different items using a Five Point Likert Scale where 5 indicated Strongly Agree while represented Strongly Disagree.

ANOVA Results

Table 1: Analysis of Variance table for Work and Family Support by Number of Family Members

Sources of Variation	Sum of Squares	df	F	Significance at 0. 05 level	η_p^2
number of family members	4273.02	2	22.23	< .001	0.13
Residuals	27584.28	287			

An analysis of variance (ANOVA) was conducted to determine whether there were significant differences in work and family support by the number of family members.The ANOVA was examined based on an alpha value of 0.05. The results of the ANOVA were significant, $F(2, 287) = 22.23$, $p < .001$, indicating there were significant differences in work and family support among the levels of the number of family members (Table 4.95). The eta squared was 0.13 indicating the number of family members explains approximately 13% of the variance in work and family support. The means and standard deviations are presented in Table 2.

Table 2 : Mean, Standard Deviation, and Sample Size for Work and Family Support by Number of Family Members

Number of Family Members	Overall Score of Work and Family Support by Number of Family Members		
	No. of Respondents	Mean	S.D
Up to 3 members	173	66.38	9.38
4 to 5 Members	60	62.42	10.92
Above 5 members	57	74.19	9.83

Source: Primary Data

Post-hoc

Paired *t*-tests were calculated between each pair of measurements to further examine the differences among the variables based on an alpha of 0.05. The Tukey HSD p-value adjustment was used to correct for the effect of multiple comparisons on the family-wise error rate. For the main effect of the number of family members, the mean of work and family support for Up to 3 members (M = 66.38, SD = 9.38) was significantly larger than for 4 to 5 Members (M = 62.42, SD = 10.92), p = .020. For the main effect of the number of family members, the mean of work and family support for Up to 3 members (M = 66.38, SD = 9.38) was significantly smaller than for Above 5 members (M = 74.19, SD = 9.83), p< .001. For the main effect of the number of family members, the mean of work and family support for 4 to 5 Members (M = 62.42, SD = 10.92) was significantly smaller than for Above 5 members (M = 74.19, SD = 9.83), p< .001.

***t*-Test result**

Table 3 : Two-Tailed Independent Samples t-Test for Work and Family Support by Satisfaction levels with Salary

	Satisfied		Dissatisfied				
Variable	*M*	*SD*	*M*	*SD*	*t*	*p*	*d*
work and family support	71.70	11.57	65.55	9.66	4.47	< .001	0.58

Note. N = 290. Degrees of Freedom for the *t*-statistic = 288. *d* represents Cohen's *d*.

A two-tailed independent samples *t*-test was conducted to examine whether the mean of work and family support was significantly different between the Satisfied and Dissatisfied categories of Satisfaction levels with Salary. Assumptions of normality and homogeneity of variance were examined before the test.

Normality. Shapiro-Wilk tests were conducted to determine whether work and family support could have been produced by a normal distribution for each category of Satisfaction levels with Salary (Razali & Wah, 2011). The result of the Shapiro-Wilk test for work and family support in the Satisfied category was significantly based on an alpha value of 0.05, W = 0.91, p< .001. This result suggests that work and family support in the Satisfied category is unlikely to have been produced by a normal distribution. The result of the Shapiro-Wilk test for work and family support in the Dissatisfied category was significantly based on an alpha value of 0.05, W = 0.95, p< .001. This result suggests that work and family support in the Dissatisfied category is unlikely to have been produced by a normal distribution. The Shapiro-Wilk test was significant for both the Satisfied and Dissatisfied categories of Satisfaction levels with Salary, indicating the normality assumption is violated.

Homogeneity of Variance. Levene's test was conducted to assess whether the variance of work and family support was equal between the categories of Satisfaction levels with Salary. The result of Levene's test for work and family support was not significant based on an alpha value of 0.05, F(1, 288) = 2.04, p = .154. This result suggests the variance of work and family support may be equal for each category of Satisfaction levels with Salary, indicating the assumption of homogeneity of variance was met.

Results

The result of the two-tailed independent samples *t*-test was significantly based on an alpha value of 0.05, $t(288) = 4.47$, $p < .001$, indicating the null hypothesis can be rejected. This finding suggests the mean of work and family support was significantly different between the Satisfied and Dissatisfied categories of Satisfaction levels with Salary. The results are presented in Table 3

Suggestions and Conclusion

Family members‟ support affects the work-life balance of women employees. Lower balance may lead to higher absenteeism, and lower job satisfaction, and sometimes may turn to higher employee attrition. Organizations with cooperative work culture may help them to bring a suitable balance in their professional and personal lifeconducive environment in the family, as well as workplace, need to be created for women police through the extension of work and family support. Peers at the workplace and family members can play an important role in providing the necessary support to the women police.

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RELATIVE EFFECT OF PHYSICAL ACTIVITIES AND LIFESTYLE MODIFICATION ON BINGE EATING DISORDER AMONG OBESE INDIVIDUALS

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ABSTRACT

The aim of the study was to see the relative effect of physical activities and lifestyle modification on binge eating disorder among obese individuals. Eighty obese individuals from residential school of Kakching District, Manipur were chosen at random as subjects, and their ages ranging from 15 to 18 years. The subjects (N=80) were divided into four groups, each with 20 obese individuals: experimental group I, experimental group II, experimental group III, and control group IV. Physical activities training was given to the experimental group I (PAG), lifestyle modification training was given to the experimental group II (LMG), and combined physical activities with lifestyle modification training was given to the experimental group III (PALMG) for an hour in the morning for each session. The control group (CG) did not took part in any type of training. The training lasted twelve weeks and followed a set programme (six and seven session in the morning for three experimental group). Before and after the training period, data on selected dependent variables were collected. The collected data were statistically analysed by using paired 't' test and Analysis of Covariance (ANCOVA) statistics. To find out the paired mean difference, the Scheffe's post hoc test was used. The level of confidence was fixed at 0.05. According to the findings, it is concluded that physical activities, lifestyle modification and combined physical activities with lifestyle modification training had significantly reducedbinge eating disorder among obese individuals. It is also concluded that combinedphysical activities with lifestyle modification and isolated lifestyle modification group had better changes than isolated physical activities group among obese individuals on binge eating disorder.

Keywords: *Physical Activities, Lifestyle modification, Obesity, Binge Eating Disorder.*

Introduction

In modern scientific age in every field of human endeavour, as the utilization of technology is increasing day by day, human being are facing lots of health related problems. All are busy in their work and not getting time to engage in physical workout. Without any workout or physical exercises life become worthless, so it is important to perform well planned physical exercises or workout of average strength or power like doing walk or strolling, bicycling or peddling, or sports activities is very helpful in the development of healthy body. Doing physical exercises in well planned manner results in the improvement of healthy body and also helps in improving overall bodily problems. Workout and physical exercises now has become the important aspect of life which plays crucial role in improving behavioral aspects of health and body and also fitness helps in reducing risk factors such as mortality and morbidity from diseases(Sundland et al., 2008).

Obesity is basically intake of excess fat, the stored fat becomes a reason for obesity. Obesity is a state of abnormal or excessive fat accumulation (mainly in the form of triglycerides) in subcutaneous and/or visceral adipose tissue, usually resulting from a sustained positive energy balance (energy intake > energy expenditure) due to biological, behavioral, socioeconomic, psychological and environmental factors to the extent that health and quality of life may be impaired (WHO, 2000). When our body mass index (BMI) is 30 or greater, we are considered obese. To calculate our BMI, multiply our weight in pounds by our height in inches squared, then multiply by 703. Alternatively, multiply our weight in kilogrammes by our squared height in metres.

Lifestyle modification is changing long-term behaviours, such as eating or exercising, and sticking to the new routine for months or years. Obesity is one of the diseases that can be treated with lifestyle changes. The terms lifestyle modification, behavioral treatment, and behavioral weight control are often used interchangeably. An accumulating body of evidence shows that modest weight loss through dietary changes and exercise is an

effective means for preventing and managing obesity-associated disorders.

Binge eating disorder (BED) is a serious, life-threatening, and treatable eating disorder marked by recurrent episodes of binge eating large amounts of food (often quickly and to the point of discomfort); a sense of loss of control during the binge; feelings of shame, distress, or guilt afterward; and a lack of regular use of unhealthy compensatory measures (e.g., purging) to counter the binge eating.

Methodology

Subjects and variables

Based on the above mentioned concept, the purpose of this study was to analyse the isolated and combined effect of physical activities and lifestyle modification on binge eating disorder. To achieve the above statement, eighty obese individuals from residential school of Kakching District, Manipur, India were randomly selected as a subjects.The selected obese individuals age ranged from 15 to 18 years. Physical activities group (Group I), lifestyle modification group (Group II), combined physical activities with lifestyle modification group (Group III), and control group (Group IV) were all separated into four equal groups of twenty subjects each. The consent form for the proposed research study was collected from all the participants. The subjects were selected by calculating BMI. After that they were assigned to undergo specific training program which was helpful in the improvements of their health.

Physical activities and lifestyle modification were selected as independent variables in the study. As dependent variable, binge eating disorder was selected. The training programme lasted for a total of twelve weeks. A standard questionnaire namely binge eating scale by Gormally et al., (1982) was used to collect data on binge eating disorder. The pre-test were collected before the commencement of training programme and post-test were collected right after the twelve weeks training programme from three experimental groups and a control group.

Training Program

Physical activities

Experimental group-I performed physical activities six days per week for twelve weeks. The physical activities consists of brisk walking and three set of four exercises (jumping jack, high knee, half burpee, sit-up) starting with slow followed by fast repetitions. To determine the training load for the experimental group-I, the subjects were assessed for their exercise heart rate in response to various work bouts, proposed repetitions and sets. The subject's training zone was calculated using the Karvonen formula and set to 50 to 80 percent of HRmax. The work-to-rest ratio was set at 1:1 between exercises and 1:3 between sets.

Lifestyle modification

Experimental group-II underwent meditation and diet plan for seven days a week for twelve weeks. The meditation took place in the morning, starting at 5:30 a.m. Every three weeks, the time of the meditation was increased from 2 to 5 minutes. Between meditation sessions, there is a 1:1 work-to-rest ratio. And constructed diet plan was implemented as their daily diet plan.

Combined physical activities with lifestyle modification

Experimental group-III has performed the combination of physical activities and lifestyle modification six days and seven days respectively in a week for twelve weeks. The subjects in the combined physical activities with lifestyle modification group (PALMG) trained at the same volume, intensity, and frequency as the subjects in the physical activity group (PAG) and lifestyle modification group (LMG).

Experimental design and statistical technique

Pre and post-test random group design was used as experimental design. A paired "T" test was used to determine differences within groups from pre-test to post-test. The collected data from the four groups prior to and after the experiment on selected dependent variable was statistically analysed to determine the paired mean difference, if any by using the Analysis of Covariance (ANCOVA). Since there are four groups, the Scheffe's test was used as a post hoc test to determine paired mean differences, if any, whenever the obtained 'F' ratio value was found to be significant for adjusted post-test means. In all cases, the level of confidence was fixed at 0.05 for significance.

Result

The descriptive analysis shows means, percentage of improvement and 't' ratio of the collected data on binge eating disorder among experimental and control groups are presented in Table I.

Table I: Descriptive Analysis of the data on Binge Eating Disorder of experimental and control group

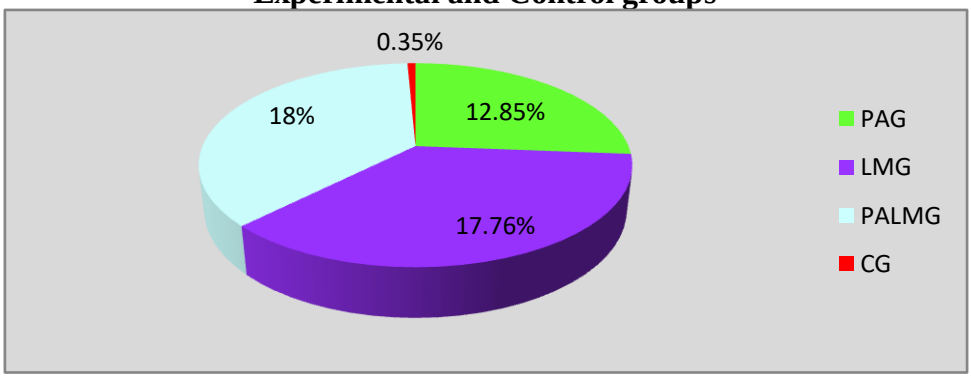
Training	Pre-test		Post-test		M.D	% of changes	't' ratio
	Mean	S.D	Mean	S.D			
PAG	26.45	3.23	23.05	2.52	3.4	12.85%	10.92*
LMG	27.30	3.13	22.45	2.56	4.85	17.76%	16.57*
PALMG	27.50	2.30	22.55	2.11	4.95	18%	20.14*
CG	27.80	3.47	27.90	3.21	0.1	0.35%	0.33

*****Significant at 0.05 levelof confidencefor the df of 1 & 19 is 2.093*

The obtained t-ratio of 10.92, 16.57, and 20.14 are greater than the required table value of 2.093 at 0.05 level of significance for df 1 and 19.It is clear that there was a significant difference between pre-test and post-test on binge eating disorderof physical activities group, lifestyle modification group, and combined physical activities with lifestyle modification group. However, the 't' ratio of the control group was 0.33, which was less than the required table value of 2.093 for df 1 and 19 at the 0.05 level of significance. As a result, it's clear that it was found insignificant.

From the findings, it shows that physical activities caused 12.85 % changes in binge eating disorder, 17.76 % changes in lifestyle modification, 18 % changes in combinedphysical activities with lifestyle modification, and 0.35 % changes in the control group.The percentage of changes on binge eating disorder of physical activities, lifestyle modification, combined physical activities with lifestyle modification group and control group are given in figure I.

Figure I: Pie Diagram showing the Percentage of Changes on Binge Eating Disorder of Experimental and Control groups



The data collected from four groups on binge eating disorder was statistically analyzed by ANCOVA and the results are presented in Table II.

Table II: Analysis of Covariance on Binge Eating Disorder of Experimental and Control groups

	PAG	LMG	PALMG	CG	SOV	SOS	df	M.S	f-ratio
Adjusted Post-test Means	23.68	22.42	22.36	27.48	BG	346.12	3	115.37	94.60*
					WG	91.46	75	1.22	

*****Significant at 0.05 level of confidence for the df 3 and 75 is 2.73.*

The adjusted post-test mean values on binge eating disorder of physical activities group, lifestyle modification group, combined physical activities with lifestyle modification group, and control group are 23.68, 22.42, 22.36 and 27.48 respectively. The obtained 'F' ratio of 94.60 for adjusted post-test score was greater than the required table value of 2.73 for df 3 and 75 for significance at 0.05 level of confidence on binge eating disorder. It was concluded that, the differences exist among the adjusted post-test means of physical activities group, lifestyle modification group, combined physical activities with lifestyle modification group, and control group on binge eating disorder.

Since, the 'F' value in the adjusted post-test means was found significant, Scheffe's test was applied to assess the paired mean of binge eating disorder difference and the results are presented in Table III.

Table III: Scheffe's test for the Differences between Adjusted Post-test paired Means on Binge Eating Disorder

PAG	LMG	PALMG	CG	M.D	C.I
23.68	22.42	-	-	1.26*	0.90
23.68	-	22.36	-	1.32*	
23.68	-	-	27.48	3.80*	
-	22.42	22.36	-	0.06	
-	22.42	-	27.48	5.06*	
-	-	22.36	27.48	5.12*	

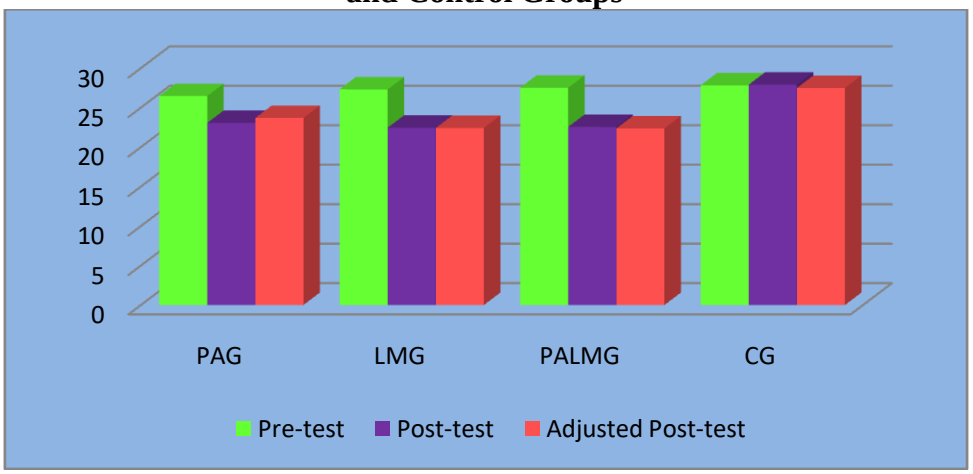
**Significant*

As shown in table III, the Scheffe's test post hoc analysis proved that significance mean differences existed between physical activities and lifestyle modification group, physical activities andcombined physical activities with lifestyle modification groups; physical activities and control groups; lifestyle modification and control groups; combined physical activities with lifestyle modification and control groups on binge eating disorder. Since, the mean differences 1.26, 1.32, 3.80, 5.06 and 5.12 are higher than the confident interval value 0.90. However, the mean differences between lifestyle modification and combined physical activities with lifestyle modification groups 0.06 is lesser than the confident interval value.

Hence, it is concluded that due to the effect of physical activities, lifestyle modification and combined physical activities with lifestyle modification training the binge eating disorder was significantly reduced among obese individuals. It was also concluded that combined physical activities with lifestyle modification and isolated lifestyle modification group were better than isolated physical activities groups in reducing binge eating disorder among obese individuals, whereas insignificant differences were found between isolatedlifestyle modification group and combined physical activities with lifestyle modification group.

The pre-test, post-test and adjusted post-test mean values of experimental and control groups on binge eating disorder are graphically represented in the figure II.

Figure II: Bar Graph Showing the Mean Values on Binge Eating Disorder of Experimental and Control Groups



Discussion:

Statistical findings of the study showed that 12 weeks of physical activities, lifestyle modification and physical activities with lifestyle modification trainings caused a significance improvement in binge eating disorder when performing brisk walking, jumping jack, high knee, half burpee, sit-up, diet plan and meditation.. The nature of the physical activities involves exercise that stimulates heart and lungs activity to produce changes in the body. The nature of lifestyle modification involves diet plan, mediation and food habits, behaviour to produced changes in the lifestyle, which help the subjects in reducing binge eating disorder.

These findings similar to Vocks et al.,(2010), Blanchet et al.,(2018), Levine et al.,(1996),Wadden et al.,(2001), Stice, Trost& Chase (2003) also found changes in binge eating disorder due to physical activities and lifestyle modification training.

Mousa et al.,(2010) documented thateating disturbances were prevalent among the present population sample. Participants have been more preoccupied with their body weight due to socio-cultural norms that are reinforced by media messages. Further research is needed to develop intervention programs to control eating disorders occurrence in Jordan.

Bratland-Sanda et al.,(2009) also stated that excessive PA was considered a harmful symptom in ED, and most units reported guidelines to manage excessive PA. Thirty-two units included PA in their treatment programmes. Clinicians found PA most relevant in the treatment of obesity and, except for binge eating, less for ED. PA was more commonly integrated in treatment compared to previous studies.

The reason for significant differences on binge eating disorder may be due to the effect of physical exercises, meditation and diet plan.

Conclusion

From the results of the study and discussion, the following conclusion are drawn.

1. Due to effect of physical activities, lifestyle modification and combined physical activities with lifestyle modification training, the binge eating disorder of the obese individuals was significantly reduced.
2. Combined physical activities with lifestyle modification and isolated lifestyle modification group were better than isolated physical activities groups in reducing binge eating disorder among obese individuals, whereas insignificant differences were found between lifestyle modification group and combined physical activities with lifestyle modification group.

We can conclude that combined physical activities with lifestyle modification can be implemented among obese individuals in order to improve their binge eating disorder.

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