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Concept Mapping: An Innovative Attempt to Enhance Meaningful Learning in EVS Classrooms

(Sub – Theme: A changing Education Landscape)

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Abstract:

The paper explores concept mapping as an innovative approach to enhance meaningful learning that helps the teacher and students. This approach can lead to a significant improvement in teaching – learning environment. According to Campelo&Piconez (2016), "Concept Mapping is a meta-learning strategy based on Ausubel's theory of meaningful learning."Concept maps represent organized knowledge visually. By developing and implementing the concept maps on selected topics of the VIII standard of EVS subject, the investigators found thatthe teaching and learning shows a shift from rote learning to meaningful learning when the students assimilate concepts. Students could understand the relationship between concepts through concept maps, which were helpful to have a more profound knowledge of these particular concepts and retain it. In this paper, the investigators will probe into the idea of concept maps; in brief, the theory is underlining concept maps. The investigators have analyzed the results both qualitatively and quantitatively. Applying the concept mapping approach in class VIII of CBSEBoard school of Meerut district of state Uttar Pradesh, India. The paper also envisages concept mapping as effective teaching in the present dynamic education system.

Keywords: *Concept mapping, meaningful learning, teaching-learning environment, teaching strategies.*

Introduction

In the present education system, we should encourage those teaching strategies that enhance learners' deep understanding of concepts and the relationship of these concepts. These teaching strategies help students assimilate concepts, and as a result, their learning process shifts towards meaningful learning. Soto, Chata, and Jiménez (2014) and Mendonça (2013) proved that the concept map technique positively influenced significant learning. Initially, Concept maps were created by Joseph D. Novak in 1972; as a graphic technique, the technique was based upon the cognitive theory of David Ausubel. In 1963 Ausubel presented '*The Psychology of Meaningful Learning*', which is also called 'Assimilation Theory'; this theory was opposed to rote learning. According to this theory, learning occurs meaningfully when learners connect new knowledge to relevant concepts they already know. The primary objective of this theory was to explain human learning. According to Ausubel, 'meaningful learning' involves the acquisition of new meanings.

"Concept maps are graphical tools for organizing and representing knowledge." Novak (2006). The concept maps represent organized knowledge visually and demonstrate relationships among the topics, sub-topics, and related details. In constructing a concept map, we enclosed the central concept and sub-concepts related to this central concept enclosed within a box or circle; this box or circle is called a node. Then the central concept is connected with the subconcept with a labeled arrow (this arrow with a linking phrase is called a cross-link). These linking phrases connect two concepts meaningfully, and this meaningful relationship is called proposition. In concept maps, the concepts are arranged hierarchically. As Novak and Gowin (2006) described in their book **'***Learning How to Learn'*, "Concept mapping is a technique for externalizing concepts and propositions." e.g., A concept map of 'Motion and Measurement of Distance' is shown in fig. 1 as following:

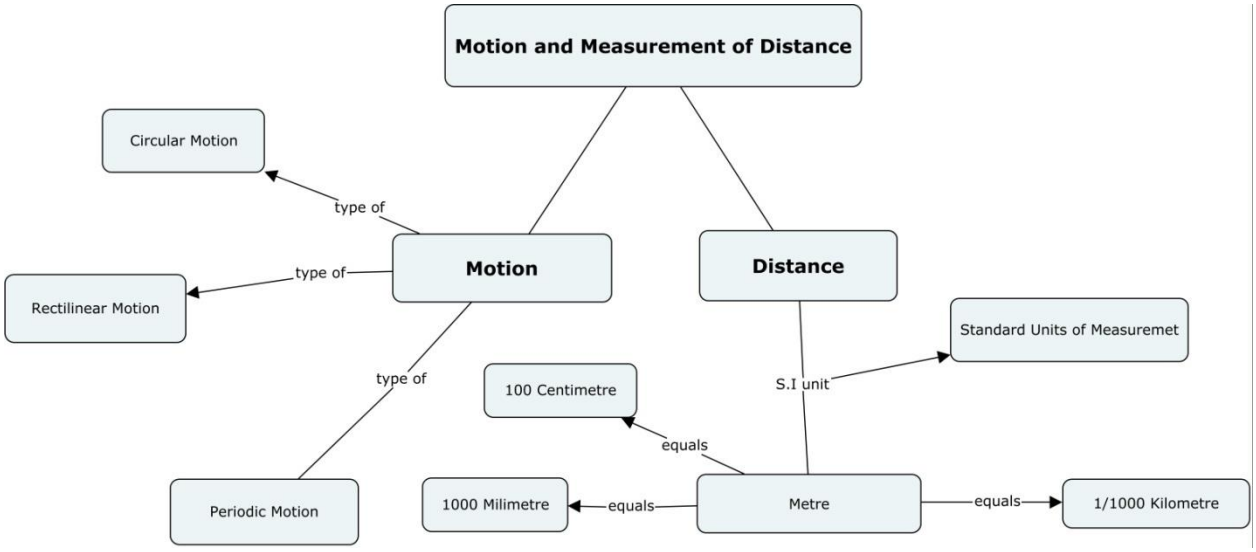

Fig.1 Concept Map of 'Motion and Measurement of Distance'

Woldeamanuel, Abate, and Barhane (2020) analyzed the effectiveness of the concept mapping-based teaching method on the conceptual understanding of eight grade students. Chawla (2015) found the effect of concept mapping strategy on achievement in the chemistry of IX grade students. Katagall et al. (2015) described the use of concept mapping in education as following:

- Users distinguish between essential and nice–to–know outcomes.
- It will be easy to find the theme.
- It established a framework of thinking.
- It is possible to identify key concepts from multiple disciplines.
- A concept map provides the foundation for discussion.
- It is easy to explain the conceptual relationship employed for the intended program and course outcomes.

Concept mapping teaching strategy has not only determined the positive effect on meaningful learning in Biology (Briscoe C. & Lamaster S.U., 1991). However, it has also been found to enhance achievement (Smith& Dwyer,1995, John & John,1998).They are also effective among IX class students in learning mathematical concepts (Lakshmi,1997) Kalaiyarasi (1998)investigated higher secondary students and found that concept mapping was an effective teaching strategy in Botany. Kumar (2014)

found that concept mapping had a significant effect on social science achievement. Kumudha (2000) reported concept mapping to be more effective than the lecture method in Physics at a higher secondary level. Investigations among 600 students of IX class on collaborative concept mapping in reference to their achievement in economics concluded that concept mapping was more effective than the conventional method. (Singh and Sharma, 2016)

Concept maps have been demonstrated as an aid to improve meaningful learning (Otis, 2001), but it is also concluded that concept mapping could be used to develop learners' meta cognitive skills **(**Carroll & Timpson, 2002). Concept Maps are found to be effective on academic achievement, cognitive skills, and concept attainment. Some findings proved that concept mapping positively affected the achievement and cognitive skills in science, and students showed a positive attitude towards concept mapping (Rao, 2003). When compared the effectiveness of concept mapping to conventional methods in relation to learning and retention of concepts, concept mapping found concept mapping more effective than conventional methods (Ahuja Amit, 2007).

Keeping such studies in mind, the investigators decided to conduct a study on upper primary students and see how they learn if they are taught through concept maps.

Research Questions following were some questions for which the study was conducted.

- Can the concept mapping strategy be implemented on the upper primary students?
- If implemented, is the concept mapping strategy effective on upper primary students?
- Does the concept mapping teaching strategy improve the quantitative achievement of the students?
- What are the qualitative improvements that can be observed while teaching from concept mapping?

Objectives of the study

- To find the effectiveness of concept mapping strategy on students of class VIII in EVS subject.
- To find out the qualitative improvements achieved through concept mapping strategy on class VIII students in EVS subject.
- To compare the mean scores of the boys' and girls' students of class VIII in EVS subject.

Research Design

The present study was conducted with the quasi–experimental design. Keeping the pandemic COVID 19 guidelines in mind the investigator found it feasible to go with one group pre–test post-test design.This design provides some improvement over the first, for the treatment effects are judged by the difference between the pre–test and the post–test scores. However, no comparison with a control group is provided. (Best & Kahn, 2006),

$$O_1 \quad X \quad O_2$$

O_1 = Pre – test

O_2 = Post-test

Sample of the study

Investigators purposively selected all the 25 students (15 boy and 10 girl students) of subject EVS of VIII class of Noble Public school located in Meerut district, of State Uttar Pradesh, India.

Methodology

Investigators selected topics from EVS book being used in the selected school. The five topics were selected from the NCERT book of VIII class. The topics are as follows –

1. Crop Production and Management
2. Microorganisms: Friend and foe
3. Synthetic Fibers and Plastics
4. Materials: Metals and Non – Metals
5. Coal and Petroleum

Keeping the above-mentioned topics in mind, the investigators constructed concept maps. Concept maps on particular topics are as presented in the following figures:

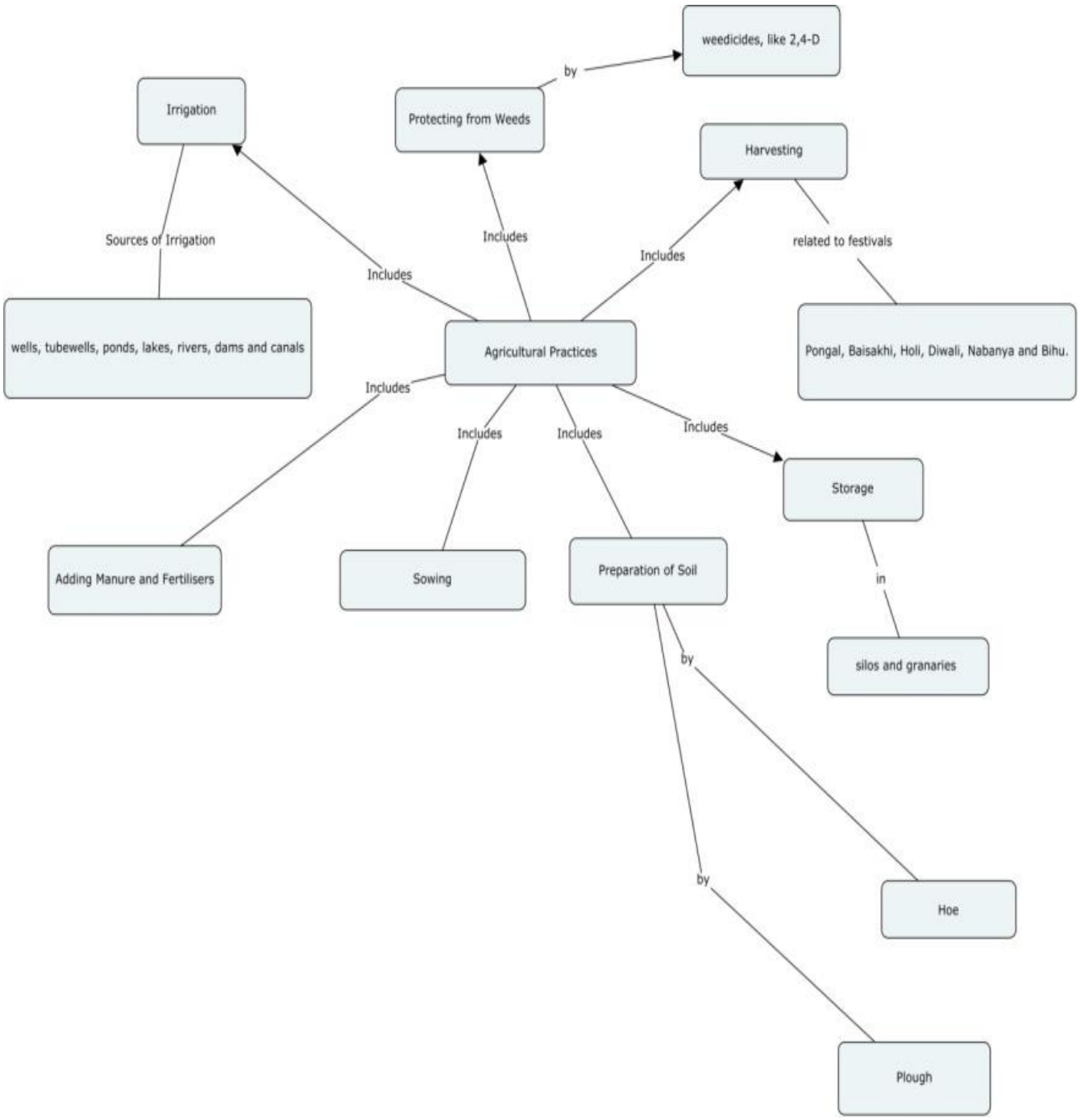

Fig. 2 Crop Production and practices management (Agricultural)

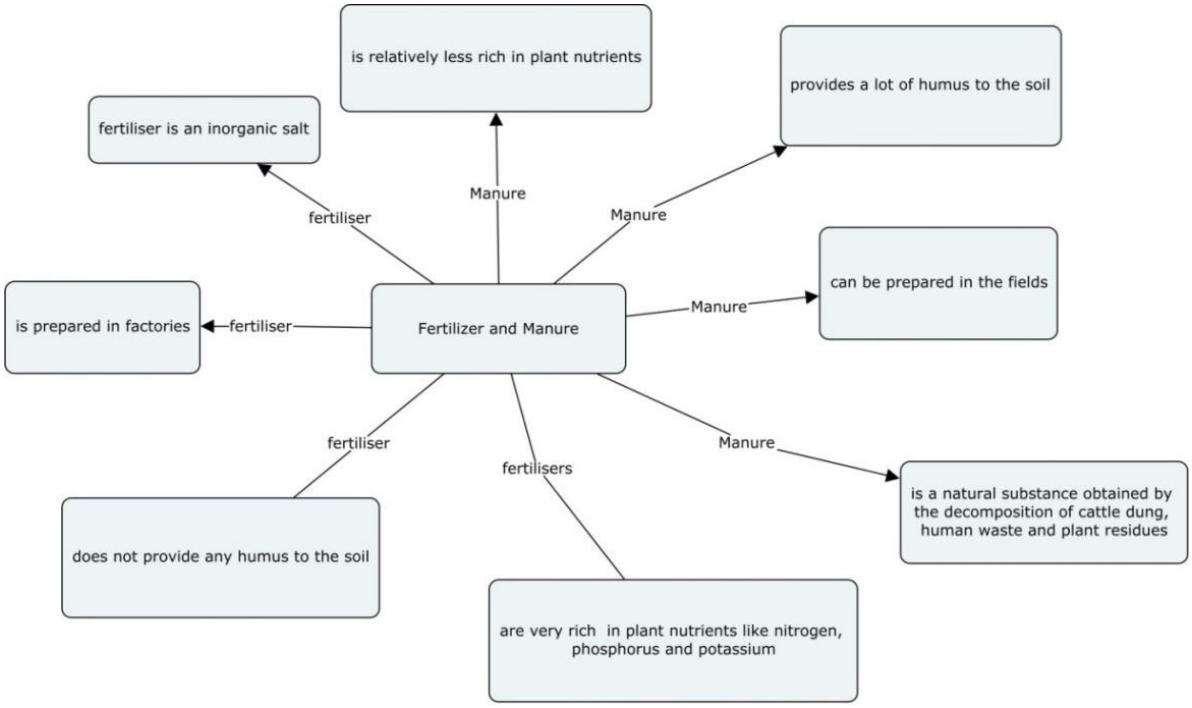

Fig.3 Crop Production and Management (Fertilizer and Manure)

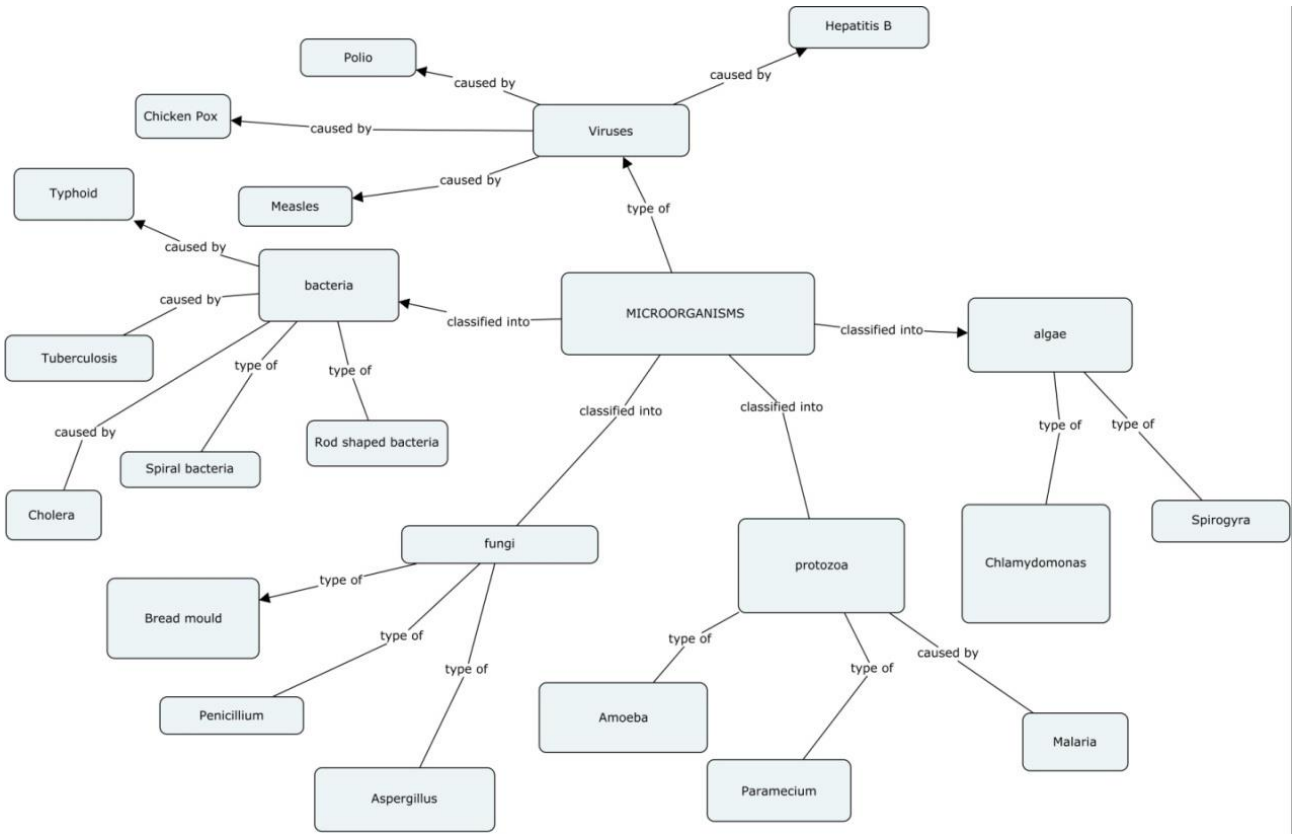

Fig. 4 Microorganisms

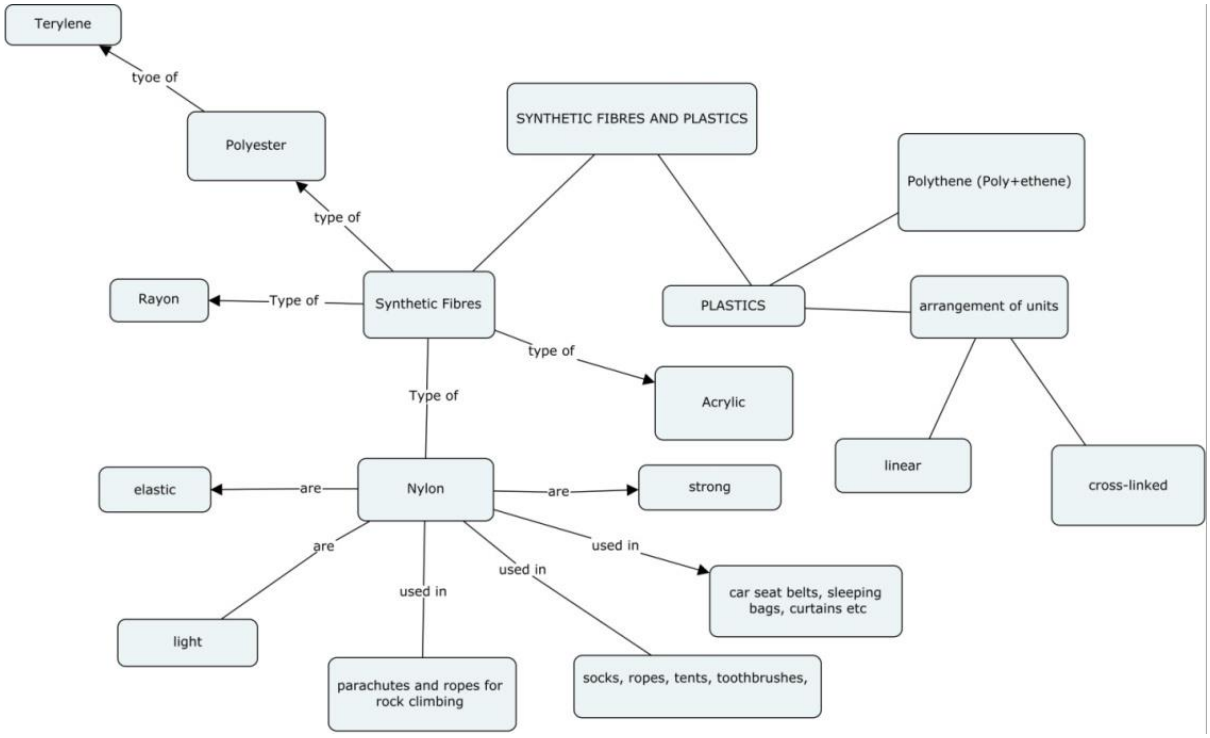

Fig.5 Synthetic Fibers and Plastics

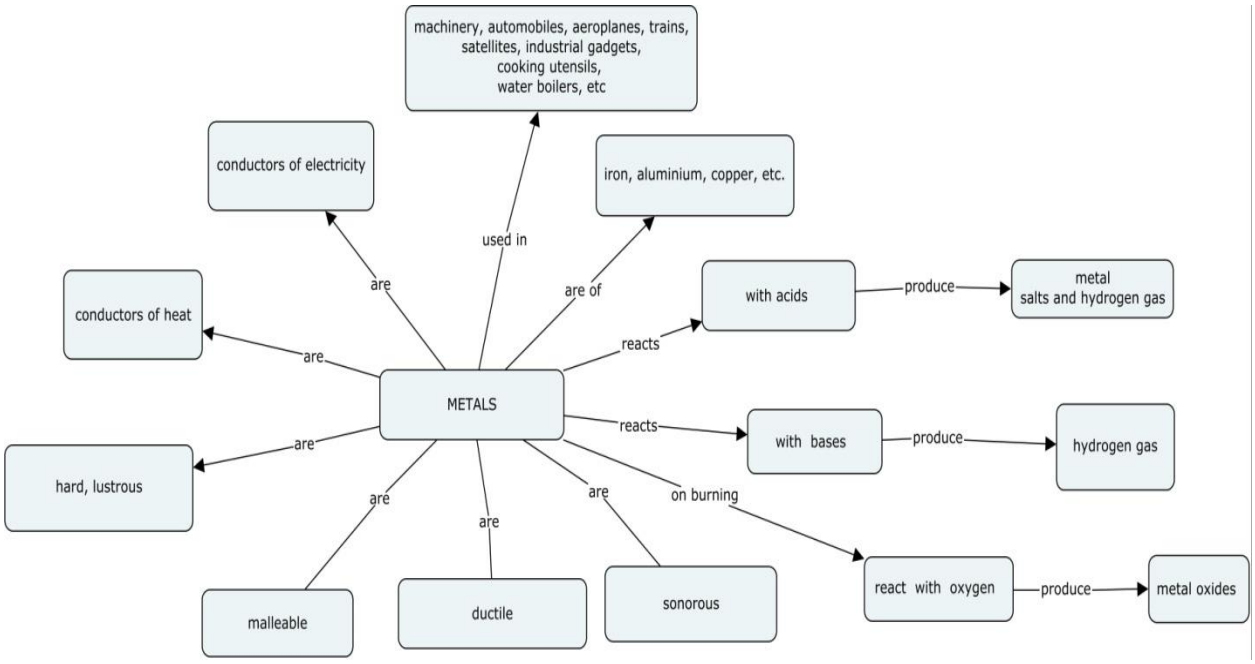

Fig. 6 Metals

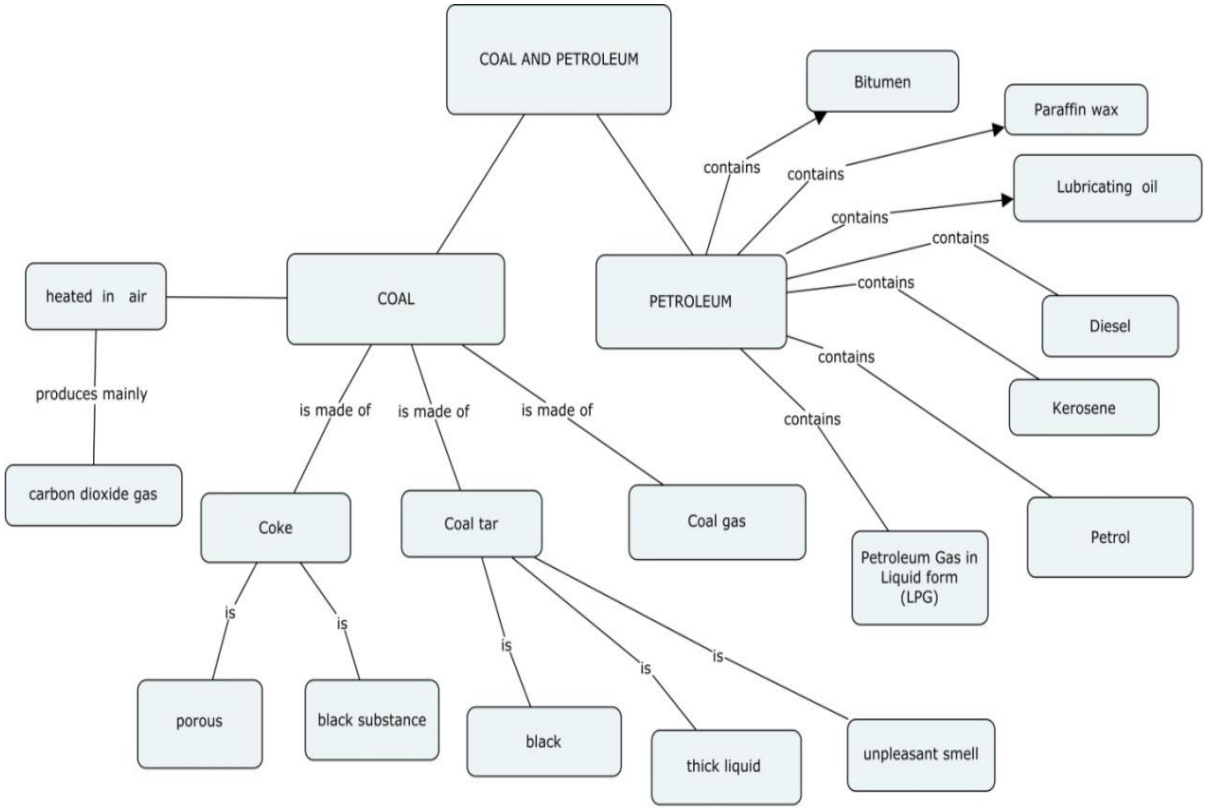

Fig. 7 Coal and Petroleum

These maps were used as a tool to collect the data. These particular topics were taught using a concept mapping strategy to the selected sample of the sampled school. Before implementing the concept mapping teaching strategy, the investigators prepared two achievement tests in the form of question papers as test A and test B. The tests were of equal difficulty level and comprised of objective type twenty-five questions. Care was taken to have five questions from each selected topic. Each question had one mark. Initially, a pre–test (test A) was administered to measure the students' previous knowledge. After administering the test A, the selected topics were taught with a concept mapping strategy represented in the following table. The administration of the concepts was done. When the topics taught were found to be assimilated, the next topic was started; hence, there are differences in the duration of the implementation of the teaching.

Day	Duration	Topics
Monday	01 day	**Pre–test (Test A)**
Tuesday, Wednesday, and Thursday	03 days	Crop Production and Management
Friday and Saturday	02 days	Microorganisms: Friend and foe
Monday and Tuesday	02 days	Synthetic Fibres and Plastics
Wednesday and Thursday	02 days	Materials: Metals and Non – Metals
Friday	01 day	Coal and Petroleum
Saturday	01 day	**Post – test (Test B)**

Table 1 Table representing the teaching chart developed after the implementation of the experimentation.

The Marks of Pre – test and post–test have been shown in the appendix in Tables 3, 4, 5, 6, 7 and 8. Investigators wanted to analyze the effect of concept mapping strategy of total students and gender-wise by comparing the mean of total students, boy students, and girl students. Investigators also analyze qualitatively the effect of concept mapping strategy on understanding, assimilation, and retention of concepts.

Data Analysis and Interpretations:

The mean value of the score showed that there was an improvement in students' post–test scores. The mean value increased from 7.08 to 10.24, showing a significant effect of concept mapping teaching strategy on student achievement. Investigator also measured the change in achievement on a gender basis. The mean value of boy students was changed from 7.067 to 10.73, and the mean value of girl students changed from 7.1 to 9.5.

Students	No. of Students	Mean (Pre–test)	Mean (Post–test)
Boys	15	7.067	10.73
Girls	10	7.1	9.5
Total	25	7.08	10.24

Table 2 Table showing comparative means of scores of Pre-test and Post-test.

It can be inferred from the above table that concept mapping teaching strategy enhanced the achievement of students, as has also been observed by Danmole & Adeoye (2004) that concept mapping had a positive impact on student's achievement and enhance meaningful learning. Investigators also qualitatively observed that the understanding, assimilation, and retention of knowledge of the students got levitated by linking the concepts with each other. They were not only able to speak about a concept but were also able to cross-links among them. The students had their explanations of understanding the concepts. It was marked that how some of the students assimilated the concept maps even without a second explanation. It was also found that the concepts maps developed the student's interest to explore more. They were able to ask questions that hinted upon the meaningful learning that represented their assimilation and retention. The test administrator faced an ample number of questions by the students; this indicated an increase in the inquisitiveness among students. One more striking qualitative observation was that boys and girls had separate groups of interaction. However, due care was given to have a heterogeneous group.

Keeping in view of the objectives and research questions of the study in mind, the investigators deduced that the concept mapping teaching strategy can be implemented on the upper primary students with appropriate planning. The concept mapping strategy is effective on upper primary students too. The concept mapping teaching strategy improved the quantitative achievement of the students. Hence it an excellent tool to enhance meaningful learning among the upper primary students too. There are vital observable qualitative improvements that show understanding, assimilation, and retention while teaching from concept mapping. Comparing the mean score of quantitative achievements of the boys' and girls' students of class VIII in EVS subject boys shows more enhancements.

Conclusion: This study examined the effect of concept mapping strategy on achievement and found a positive effect. The results show a substantial improvement in achievement in EVS**.** As has been observed by Moreira (2011) also that concept mapping facilitates conceptualization from the standpoint of the meaningful learning theory.

It is also found that concept mapping as a strategy helps assimilate concepts and have a deep understanding. Students also understood the relationship between concepts and retained them. With a hope that Teachers will use concept mapping in different ways, the investigators can foresee shifting learning from rote learning to meaningful learning and enhance the teaching-learning process in the times to come.

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Tables

Students	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Marks	6	8	5	7	5	4	8	11	7	6	4	9	11	6	9

Table 3 Marks of boy students on pre – test

Students	1	2	3	4	5	6	7	8	9	10
Marks	7	9	6	11	4	6	4	5	8	11

Table 4 Marks of girl students on pre – test

Students	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Marks	9	11	16	8	14	12	9	13	10	8	6	11	14	8	12

Table 5 Marks of boy students on post – test

Students	1	2	3	4	5	6	7	8	9	10
Marks	9	11	8	13	7	8	6	9	11	13

Table 6 Marks of girl students on post – test

Students	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Marks	6	8	5	7	5	4	8	11	7	6	4	9	11	6	9	7	9	6	11	4	6	4	5	8	11

Table 7 Marks of total students on pre – test

Students	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Marks	9	11	16	8	14	12	9	13	10	8	6	11	14	8	12	9	11	8	13	7	8	6	9	11	13

Table 8 Marks of total students on post – test

Impact of Digital Transformation of Education System on the Mental Health of Students

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Abstract:

Due to the globalized digital world and especially during the Covid 19 situation, there was a rapid transformation in the world of Education. The Education system has become totally dependent on technology for teaching, training, and assessments. This Renaissance taking place in the education system has affected not only the educators who are learning to teach digitally at this advanced developmental stage but also their pupils. Even though most of the students today are born in a digital world, but this new alteration in the education system required intensive cognitive adaptation and accommodation. In reference to the current scenario, this study will explore the impact of use of technology-assisted teaching, including online learning, web-based classes, etc., on the student's mental health. All these new generational approaches have brought mixed responses amongst the student fraternity as it has a plethora of positive as well as negative outcomes. The studies done during these times of COVID 19 suggest that with the increased screen time, students are having physiological, behavioural, and cognitive issues which require intervention by doctors as well as mental health professionals. The present study reviews the impact of digital transformation of Education on the mental health of students. The aim of the study is to identify the factors which are negatively affecting the students for planning intervention and management.

Keywords: Digital Transformation, Education System, Mental Health, Students, Intervention

Introduction

The COVID-19 Pandemic has brought with itself a plethora of biopsychosocial issues; with unprecedented disruptions in healthcare, economic and social domains, and to manage these challenges, multiple measures have been brought up (Krishnamurthy, 2020). Be it preventing the spread of the virus from one person to others, the Government initiated lockdown, social distancing, which have, up to an extent, controlled the spread of the virus. In the meantime, it badly impacted the educational and other sectors. In this scenario, adjustment to the changing situation is required, which involves digitalization in the education sector. This sudden change has also affected the mental health of students. The transformed lifestyle has totally restricted social life where people are not able to meet their friends, no social gatherings, no outings, students cannot meet their peers and this sudden change has brought elevated level of distress in all the age groups.

In a matter of weeks, entire education systems from elementary to higher Education had to completely transform activity to evolve to an online teaching-learning scenario (Mishra et al., 2020). The educators and the students extensively followed the 'new normal' trends. The 'new normal' trend in the educational sector involves online class sessions, personal to virtual instruction, and seminars to webinars (Mishra et al., 2020). People started focusing on technology-based education, as they also got an opportunity to bring out and express their talent and innovate the education system in an online mode. Various online platforms were developed and opted by schools and universities to provide quality education to the students. Digitalization of education was one of the effective ways to provide quality education in the pandemic situation (Bilyalova, et al., 2019).

Digital education during the pandemic situation was considered successful by some students. Bogdandy, et al., 2020 surveyed the students' overall experience related to digital education and found that nearly 50 % of the students enjoyed digital education and are willing to continue it in the future. Few of them do not want to continue online education because of technical issues faced during the classes and inaccessibility to smartphones, laptops, or computers. Findings also reported that digital transformation in

the education system during the pandemic situation was not smooth for students, and they also faced challenges (Livari, et al., 2020). The present study reviews the impact of digital transformation of Education on the mental health of students. The aim of the study is to identify the factors which are negatively affecting the students for planning intervention and management.

NEGATIVE IMPACT ON MENTAL HEALTH OF STUDENTS

It has been argued that technology has a positive impact on our thinking. Various studies discussed the effects of technology on our brains and its positive and negative impact on our thinking and behavior (Olsen, 2005). In one of the books, 'Everything Bad is Good for You' by Steve Johnson (2005), he posited that technology plays a vital role in enhancing our cognitive functioning and improving our understanding and analyzing information. Technology also affects students' achievement and motivation in a positive way. A study reported that technology might act as a catalyst for students to achieve higher levels (Harris, et al., 2016).

Studies reported a number of advantages and disadvantages of online teaching and learning to the students as well as teachers. It was easier for students to participate in the online classes actively, and they also got the opportunity to explore digital textbooks, research articles, and other material. Teachers adopted new approaches, methods, and models for teaching and training the students to provide quality education (Bilyalova, et al., 2020). The concept of flipped classroom was also implemented by the teachers extensively and is also beneficial for the growth of the students. Students accessed online libraries and other platforms for study material. Online teaching provides instant access to the appropriate information and brings up relevant and essential skills to work with different sources.

- ***Experiencing psychological distress due to inaccessibility of smart devices***

Shifting to the new normal and adjustments in the same situations while fulfilling the requirements of others were very challenging for the students during the pandemic lockdown situation. It was undeniable that few students could not attend the class because of multiple reasons. The sudden shift from offline learning to e-learning was appreciated and relished by some students. In contrast, few students also experience

distress due to inaccessibility to the Internet, technical glitches, and limited knowledge about the digital platform. Other factors associated with discomfort were the absence of physical interaction and camaraderie (Carolan et al., 2020).

The pandemic led the students and educators to the 'new normal' with significant changes in their habits, daily activities, and engagements. Students belonging to low socio-economic status could not access smartphones and internet connectivity, leading to frustration, anger, anxiety, and depressive symptoms (Aristovnik, et al, 2020; Abi-Jaoude, et al., 2020; Kazmi, et al., 2020; Lattie, et al., 2019). During the lockdown, few students had also committed suicide because of their inability to access online education (Balachandran, et al, 2020; Lathabhavan & Griffiths, 2020). Children were also dependent on elderly family members as they have to take smartphones from them to attend online classes. There was much dependency on family members to connect and for the phone to be available (Iivari, et al., 2020).

- ***Increased screen time and addiction to electronic devices***

Students' also gained access to smartphones or electronic devices for a longer duration, leading to gadget addiction. It was difficult for family members to reduce the amount of time the child is spending on smart devices. Students also developed issues related to attention and concentration because of gadget addiction. They tend to forget the information more quickly than they could remember (Bilyalova, et al., 2019). Their ability to make decisions and do brainstorming also got affected than those not addicted to electronic devices. Technology impacted students' creativity as they were not involved more in written work like they were during offline classes. Using digital textbooks, the student will learn minor grammar, less spelling, and punctuation as every smart device has an auto-correction function. It also impacted their imagination skills (Bilyalova, et al., 2019).

- ***Physiological problems due to over usage of electronic devices***

Students also developed physiological problems which were directly associated with prolonged use of smart devices. Studies reported that children are more vulnerable to develop an addiction of electronic devices or the Internet. A study concluded that the children aged between 11 to 17 years carry their phones with themselves before

sleeping as they were involved in browsing the Internet or playing games, or spending time on social media applications (Abi-Jaoude, et al., 2020). Students are also suffering from screen addiction in different degrees, which is further impacting the students' mental health. It is now quite evident that the digital transformation in the education sector will further increase, which may lead to more screen time or dependency.

- ***Disturbance in cognitive functioning and sleep patterns***

A study reported that young individuals in high proportion are involved in heavy usage of smartphones, which further leads to difficulty in sleeping, and it is also negatively affecting the academic performance, social functioning, emotional functioning as well as control over cognitive functioning (Abi-Jaoude, et al., 2020).

- ***Decrease in social skills***

Living without a social network is difficult for the students, and hence they feel lonely more often. It has been found that the young generation is more involved in social media platforms and physically less connected to society (O'Day & Heimberg (2021). Maintaining genuine relationships might be difficult for students who communicate more on the Internet and maintaining virtual relationships. During the pandemic, students spend their time online and spend less time with family members. Communication over the Internet is an alternative of physical interaction. In the lockdown duration, people maintained their interaction with others over the Internet. Over involvement in technology negatively impact the social skills in students (Kim, et al., 2009). Several researchers have noted that overuse of technology can result in mental overload and disconnect people from nature, play and people.

Conclusion

To conclude it can be said that the digitalization of education has both negative and positive consequences for the students. The negative consequences are evident to the naked eye but the positive consequences are subtle and latent. Studies mentioned in the paper have already pointed out the negative psychological and emotional consequences arising due to the digital transformation of education. Digital mode of education has lead to an over use of ICT. Students are staying isolated from the peers and family, while being away from the enriching school environment. Their physical and the co-

curricular activities are also missing. Over exposure to screen time has negative impact on their eyes and the sleep cycle is reportedly affected in majority of the cases. The pre-schoolers are missing out basic learnings like adapting to the environment and staying away from their homes. Their social-skills are also not developing due to lack of exposure and peer interaction. This situation is also frustrating for the students who have entered the college virtually and are eager to enjoy the college life but are not able to do so owing to the virtual mode of learning. Talking about the positive consequences of digitalization, it has proved that how flexible and adaptable human beings are and how capable they are while facing challenges like COVID-19 and coping with it using whatever technological resources one had, for example this pandemic has pushed the least tech savvy person to learn and operate digital modes of education.

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Virtual Learning: A Boon During the Pandemic to Continue The Learning Process

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In the uncertain times during the Covid-19 pandemic, where not only our nation but the entire world was locked down and had no unified approach how to continue teaching. All the sectors had stagnated the ongoing activities. However, teaching through the usage of online platforms which came out as a marvel and assisted the student's forum to continue their learnings. During this phase of imparting the knowledge many of the non-technical facilitators, who were not acquainted with the online learning tools have come up with an excellent understanding of using the online learning tools and tried to compensate the educational loss of the students through the transformed teaching pedagogy. There at times, these learning technologies were a nightmare but now it has become an integral part of our daily routine. However, many challenges and issues took place in the journey of using online teaching technologies but at last it was clearly being understood that there was no such other way to made the learning sustainable. Now right from basic learner to the educationist nobody can deny that through the usage of online teaching pedagogy the learning continued. Certainly, we can't compare real learning with the virtual one, but online learning has proven to be an outstanding alternative during the pandemic.

Keywords: Pandemic, Online Learning, Learning Tools, Teaching Pedagogy.

Introduction: The pandemic of Covid-19 has made a disaster and affected the economy of the entire globe. In the pandemic situation of Covid-19 where the entire world is facing lot of challenges in all the sectors. Education sector is also being affected with this pandemic as it has transformed the pattern of education and emphasized more on virtual learning that has given a huge support to the teaching and learning process. We all have witnessed that each and everything was stagnated and there was no such alternative arrangement to execute the tasks. Stirring the academic performances during this pandemic, we get to know that how the virtual learning has supported the ongoing learning process. Where in all the other sectors kept on discussing about the precautionary and preventive measures, but in the education sector we have experienced

that online learning has transformed the situation into a new normal for everyone. This virtual learning has enabled most of the non-technical academicians and learners to adopt the virtual teaching pedagogy. Now in this new era of online learning it is very tough to predict that when the normal teaching in the classroom will resume. Virtual learning is the only best possible solution to continue the learning process where social distancing is the major concern.

However, considering the ground reality virtual learning process is not being appreciated by many of the individuals. There are various factors that limits the smooth and fruitful functioning of online learning like limited accessibility of internet facility, usage of educational applications to teach the students, availability of electronic gadgets, electricity connection to name a few. Hence, keeping all these factors, if anyhow everything is being managed then the question arises regarding to generate the interest amongst the students and make them more focused, dedicated and disciplined during the online session. In this research paper all the factors are discussed that are favourable or adverse to online teaching. It is said that online learning process is easily manageable and can even made feasible in the rural and outskirts localities. It is measured to be a comparatively inexpensive means of education in relations to the transportation cost involved to commute, hostel expenditures, and the overhead cost of institution like electricity expenses. Elasticity is another stimulating feature of online learning; a student can plan or schedule their time for accomplishment of courses accessible online. Compounding face-to-face addresses with expertise gives growth to blended learning and flipped tutorial room; this type of learning atmosphere can rise the learning probabilities of the students. Students can study anytime and anywhere, thus emerging new skills in the procedure leading to life-long learning. The government also recognizes the increasing importance of online learning in this dynamic world.

In the current scenario of uncertainty due to Covid-19 pandemic the online learning has proven its worth as to be a great support in the academics.

Literature Review

In this technological era the education through online mode is one of the easiest sources of imparting education. Through laptops, PC’s, tablets and mobile a perfect environment for education has been build up as an alternative arrangement to keep the

learning mode on. This online education system is more of student centric, flexible, feasible and innovative. Only we need to open a platform generate a link and numerous students can be benefited by joining that link. Simultaneously, all sort of instruction modes can be implemented in the form of blended learning as a whole.

Virtual learning is no more an alternative now, it is taken as necessity in the current scenario. Almost the entire globe is facing the pandemic of Corona Virus where all the schools, colleges and higher education institutions are closed but with the assistance of technological advancement, all the academic institutions are functioning through online mode of imparting education. Even though who were non-tech savvy have now build up their knowledge by actively participating in the usage of information technology. But still the rigid ones not ready to get involved in the blended style of learning are creating a big challenge for the learners as well as for the instructors. Their concern is accepted, however all of such souls must understand that there is no other alternate arrangement to continue the teaching-learning process. Only the parameters of adopting online teaching-learning in the institution is still an unfinished task.

It's a human nature that even a minor change is accepted slowly and gradually, whereas the change in teaching style is a huge transformation which will take some time to accept but it will have to be accepted by majority of the institutions. Stirring thoroughly, we get to know that virtual learning has enough solutions and more of generating interest towards the given topic. Digital literacy is the real essence to meet the set academic standards and knowledge creations.

Objectives of the Study

- To understand the scenario of online teaching significance.
- Analysing the online learning during the Covid-19 on the parameters of SWOT analysis.
- Suggesting some valuable inputs towards the direction of conducting smooth online learning.

Research Methodology

This is a descriptive research based on the study of imparting online learning during the tough times of Covid-19. Challenges and possibilities in online learning is also being identified. Detailed analysis on the base of SWOT is also being conducted to get the facts. The research tool being used to analyse the data accumulated from various sources is a foundation for the descriptive research methodology. Qualitative aspect of the research is being emphasised in this study. It is majorly based on the secondary source of data like various reports, journals, search engines, various websites and academician's articles.

Virtual Learning During the Covid 19

Learning in the different times has its own significance, it did not stop in past even amidst several disasters that took place and even in the current times of Covid-19 challenge. Because any of the challenge or disaster cannot stop the learning like when the entire world was quarantined and were blocked in their homes but then also the teaching learning process was on due to the pervasiveness on virtual learning. For almost two years the world has witnessed that in order to continue the learning process virtual learning mode is the biggest support to continue the teaching learning process. However, in the current scenario Byju's is one of the live examples of imparting virtual learning to the students across the country. There are various other platform where imparting education continues through the virtual learning platforms. Although, talking about schools, colleges and higher education institutions where online learning has started and now slowly and gradually it is becoming an user friendly technique in imparting quality education. It is being said by Li Kang, Ai English Executive Director that 'Online learning is the future and if there was no virus, that realization would have taken another few years but this has accelerated the process' UNESCO also suggested that the online learning through the virtual mode is really helping the students in this tough times.

It has been observed that any change had not been easily accepted and brings some change that is good for the society like the demonetization has accelerated the use of digital transactions, same in this pandemic after experiencing that no other alternative to continue the teaching-learning process exists then adaptation of virtual learning has

started. It has come up with uniqueness and learning approach where both the learners and guides are embracing the new style of teaching-learning process. The best part of online education is the convenience to all the individuals, enabling everyone to join the session as per their convenience. These days students are increasingly accessing the internet anywhere and everywhere, hence, they can access the internet for their academic development by joining the scheduled classes. Often with the discussion with the guides classes are rescheduled as per the convenience of both the links.

However, the affordability and availability of internet facility and electronic devices is a great matter of concern. It has also been observed that the social outreach programs conducted by many of the welfare agencies and government is assisting the individuals to afford the online learning and enabling the areas to have the accessibility of internet connections. A surplus boon on virtual learning is the flexibility of learning remotely, a talent that poises many of the students to be uniquely created for a professional marketplace where remote options are commonplace. As the pandemic of Covid 19 pushed the students to alternative education routes, online learning has provided the benefit of easing the financial burden of the traditional institutions. It is also considered as perfect amalgamation of technology and time as the usage of technology has increased in a very short duration and still its growth can be stirred in the near future.

SWOT Analysis of Online Learning

The entire globe is facing the Corona Virus (Covid-19) pandemic which is unpredicted emergency and has affected all the sectors including academics. With the implementation of Covid-19 preventive norms – social distancing, putting on mask, using sanitization, vaccination etc. has shown some sign of improvement in the situation but still the risk is on and can turn into disaster at any point of time. Hence, it is not very much feasible for educators and students to attend lessons or assessments as it was there in the past. This pandemic of Covid-19 has breakdown our traditional educational practices and has caused a crucial necessity for numerous academic institutions to rapidly implement alternative educational and assessment policies. While considering the factors of implementation of online education and its necessity various mixed results generates. Its quite challenging to predict that whether it’s a right approach towards imparting knowledge or it’s the best alternative in the current scenario keeping the view

of Covid norms. In this context SWOT analysis can make the paradigm clear to understand it in a better way.

Strength

Online education is found to be the best form of imparting education in the current times, as there is no other alternative. This system has enabled to continue teaching and learning process without any gap. Moreover, the kind of development in the use of technology in academics we are observing today was just a dream in the past decades. Emerging the transformed style in education system has accelerated the enthusiasm in both the entity – teacher and learner. Those who were not quite familiar with the usage of information technology and teaching applications they have now adopted it and made as a part of their daily routine in academic development. It has boosted a morale of everyone and proven that academic activities can never stop due to any of the disaster. This online education system has also accelerated the installation of internet facility in the areas where it was never possible in the past. Now-a-days a young student of primary section is also found to be capable enough to attend the online class without any hinderance. Many of the new applications, teaching software tools and gadgets are now being used by all conveniently. Furthermore, it has activated the expansion of new skills in assessment modalities. As all the institutions have accepted an online approach to written examinations, new skills in applying the full capabilities of Virtual Learning Environments are being explored. Virtual Learning Environments allow academics to easily build question banks and design assessments that can be marked automatically or manually. Virtual Learning Environments also enable randomized presentation of questions, time restrictions, and prohibit backtracking in order to prevent collaborative answering. This transformation has really redefined the scope and possibilities of teaching learning process.

Weakness

The major factor that is found in the online learning process is unawareness about the utilization of online resources in imparting online education. In some cases, it is analysed that people don’t want to come out of their comfort zone and are bond to follow the traditional approach of learning process even in this pandemic. Their approach towards the online education is not very favourable. In many of the online

classes it is found that control over the session is a big challenge for the instructor. The online learning process requires sound and uninterrupted internet facility, that is a big challenge in most of the places. Many places have the problem of power cut, that is a great challenge in most of the cases. Many cases it is also found that individuals are unable to afford the electronic gadgets required for online learning. Furthermore, talking about the assessment criteria its still very challenging to check the sanctity of the examination conducted through online mode, whether in the form of multiple-choice questions or proctored examination.

Opportunities

The Covid-19 pandemic offered opportunities for online alliance between academic peers, both within and between institutions to increase "insight and inspiration" from others that "are facing similar challenges." Keeping the positive approach towards the usage of technology this is a quite good time to accept this challenge as an opportunity and get familiar with the new concept of blended learning. The opportunity that we are getting today in imparting online education would be only imaginative but the ample of possibilities are there to show the skills and talent towards attaining the objectives of our institutions. There is a potential to pool proficiency among institutions. It gives departments the prospect to have "online networks made between peers," to share expertise and to showcase cutting-edge skills and teaching skills across satellite campuses, and indeed across institutions worldwide.

Threat

A commonly uttered apprehension is reduced student assignation as a function of the quick execution of distance learning. On consideration, this may be compounded by the statistic that many institutions are no longer pursuing distinctive compulsory attendance policies for teaching sessions. Additionally, the current Covid-19 crisis may cause an increased risk of isolation, anxiety, and boredom among the individuals. This is also highlighted by one institution as a major concern among the student population where they were concerned about the levels of "anxiety" that students face on "the future of their education." Specifically, the highlighted concerns are "creating resources that students will actively involve with" as well as how to "inspire and maintain student assignation." Thus, academics adapting their approach to education should consider the

need for support, interactivity, and social engagement with and between the students. A reduction in these elements may ultimately impede academic progress and student satisfaction. Ultimately, one academic expressed they wanted to ensure that students "were getting value for money" from their course. Additionally, technical issues, for example, unstable internet connections or lack of suitable electronic devices, will also impact student engagement.

SWOT ANALYSIS

STRENGTHS	WEAKNESS
1. FLEXIBILITY IN TIME 2. FREEDOM IN LOCATION 3. IMPARTING EDUCATION TO LARGE GROUP 4. COURSE MATERIAL AVAILABILITY 5. FEEDBACK MECHANISM	1. TECHNICAL ISSUES 2. LEARNING ATTITUDE 3. TIME MANAGEMENT ISSUES 4. DISTRACTIONS DURING THE SESSION 5. LACK OF PERSONAL ATTENTION
OPPORTUNITIES	**CHALLENGES**
1. INNOVATION IN TEACHING-LEARNING 2. FLEXIBILITY IN DESIGNING PROGRAMS 3. NO STRENGTH LIMIT 4. LEARNING APPROACH	1. ICT INFRASTRUCTURE 2. QUALITY EDUCATION 3. DIGITAL AWARENSS 4. AVAILABILITY OF RESOURCES 5. ABILITY TO AFFORD THE TECHNOLOGY EXPENSES

Conclusion and Suggestion

It has been observed that most of the institutions have become more resilient to online learning after the disastrous pandemic Covid-19 and undoubtedly technology has helped to overcome the hurdles in teaching learning process in those difficult times. It is strongly suggested that robust Information Technology (IT) infrastructure is mandatory prerequisite for online learning. Infrastructure plays a vital role while performing online learning. This pandemic Covid 19 has changed the paradigm of the entire education system where willingly or unwillingly we get to know that online learning process is the

only option that is available to continue the learning process. Teachers have become habitual to the traditional mode of teaching like face-to-face teaching in the classrooms, hence, quite a time they hesitate in accepting the change. But understanding the fact amidst the situation, we have no other alternative left beside accepting the transformed style of teaching through online mode. We cannot deny the ground reality that many of the students are not in position to afford the basic infrastructure as a prerequisite for online learning process. These students are less affluent, have financial constraints and belong to non tech savvy families, hence, they are being deprived of online education.

This tough scenario has given us a lesson that nothing is predictable and we must be prepared for any challenge. However even in this uncertainty, we must not lose our courage and focus on to the accomplishment of the targets. Challenges were there, challenges are there and challenges will be there but if we have the optimistic approach towards resolving the situation then certainly, we may get the desired goals, hence we must be always having plan B ready beside execution of plan A. It needs meticulous planning and proper vision. This pandemic has also taught us that we all have courage to do anything and everything in order to continue the learning process.

Now we have sufficient time to introspect the learning process and re-think on e-learning tools and assessment mechanism. Institutions must organize regular FDPs on digitalization of imparting quality education to our students. All the cadre of the students must be thoroughly taken into consideration while designing the strategies for the upcoming session through online mode of teaching. Government and welfare agencies assistance must be taken to assist the students who are unable to afford the basic infrastructure. E-learning can support in providing inclusive education even at the time of crisis. Such systems need to be developed in educational institutions that make sure that no student is getting deprived of education due to their location, social class, ethnicity, and so on. Online methods of teaching support and facilitate learning–teaching activities, but there is a dire need to weigh the pros and cons of technology and harness its potentials. Therefore, once the basic infrastructure is managed for all the students then certainly we can easily say that ‘Virtual Learning: A Boon During The Pandemic To Continue The Learning Process’

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Digital Transformation of Education: Covid 19 Pandemic Spurting the E-Learning for Creation of an Intelligent Learning Space

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Abstract

Background: When lockdown was imposed last year in March 2019 the biggest question that grappled the education sector was the continuity of regular classes and syllabus completion. In order to stop the spread of this deadly virus and to break the chain lockdowns were imposed in different parts of the world prohibiting the movement of people outside their homes which resulted in finding out new ways and means to carry on everyday activity including office work, teaching activities at schools, colleges and universities, buying everyday's household items etc. Education sector completely adopted the E- Learning concept thereby connecting Educators and Students through technology. The use of Disruptive Technologies like Artificial Intelligence, Block Chain, Virtual Reality, Augmented Reality etc have been in Education sector since the advent of Industry 4.0 that bought a new revolution and the outbreak of Pandemic spurted the massive usage of these technologies leading to a creation of an intelligent learning space.

Purpose: The present study aims at understanding that how the outbreak of Pandemic spurted in creating an intelligent learning space aligned with disruptive technologies for developing and enhancing education with learner at the center further facilitating remote teaching during the current scenario.

Methodology*:* For the purpose of study secondary source of data including research papers and news articles based on similar theme were referred and analyzed for drawing identifying the suitable gaps and drawing meaningful conclusion

Conclusion: The Intelligent learning space created through the application of emerging technologies like Artificial Intelligence, Virtual Reality, Augmented Reality, Mixed Reality, Mobile Learning etc have helped the Education Sector to address the challenges

that have cropped up due to the pandemic by connecting learner and educators virtually even if they are located at the remotest geographical locations and has enabled customized learning as well. Its no more the policy of "one size fits all" but customizing the learning process as per the capabilities of the learner making the entire scenario as learner centric.

Keywords: E- Learning, Disruptive Technologies, Mixed Reality, Artificial Intelligence, Virtual Assistants, Pandemic, Customized Learning

Introduction

Information and Communication Technology (ICT) has been identified as a dependable vehicle for facilitating educational reform and development, a platform for communication, and a means to achieve the Sustainable Development Goal Four (SDG 4) that aims to "ensure inclusive and equitable quality education and promoting lifelong learning opportunities for all". The Covid-19 Pandemic forced all the levels of education to transform their working model from traditional to remote learning or e learning specifically which has been given the term emergency remote teaching. Before the outbreak of Covid-19, the edtech Industry has witnessed a high growth potential with the investments in the same reaching a height of US $ 18.66 billion in 2019 with a projection for online education to reach $ 350 Billion by 2025. There has been a significant increase in different tech enables apps like language apps, virtual tutoring, video conferencing tools like Microsoft teams, Zoom, Google meet, Google classroom etc. or online learning softwares. (Li. et al 2020).The use of disruptive technologies that was promoted through Education 4.0 has also acted as a facilitator for the same because technological driven solutions is the need of the hour specially with the education sector.

With this backdrop, the present chapter aims to:

- To identify and understand the role of disruptive technologies as the drivers of E- Learning.
- To study the transformation bought in Education Sector in form of E- Learning due to Covid-19 Pandemic.

- To understand how the disruptive technologies including Artificial Intelligence, Virtual Reality, Augmented Reality, Block chain etc have facilitated the creation of an Intelligent Learning Space for learners thereby promoting E Learning.

Literature Review

Online learning is defined as "learning experiences in synchronous or asynchronous environments using varied devices (e.g., mobile phones, laptops, etc.) with internet access. In these environments, students can be anywhere (independent) to learn and interact with instructors and other students" (Singh & Thurman, 2019).

Recent technological developments have made e learning easier (McBrien et al. 2009).It has a common ability to utilize a computer associated with a network that allows it anytime and anywhere (Cojocariu et al. 2014). Online learning is a tool that can produce the teaching–learning process more student-centric, innovative, and flexible. Online learning is defined as "learning experiences in both synchronous and asynchronous platforms by varied devices like mobile, laptops, and phone with internet access (Singh and Thurman 2019).

The synchronous learning platform is structured because students can attend live lectures and there is real-time communication among teachers and students. It has the possibility of instant feedback, whereas asynchronous learning platforms are not that properly structured. Synchronous learning offers many opportunities for social communication (McBrien et al. 2009). Among this deadly virus transmitted, such virtual platforms are required that can provide facilities of (1) video conferencing with a minimum of 40 to 50 students is possible, (2) conversation with a student can perform to keep classes organic, (3) internet connections are good, (4) lectures are handy in mobile phones also and not just laptops, (5) opportunity of watching already recorded and stored lectures and (6) Immediate feedback from students can attain and assignments can be taken (Barboni 2019).

E-learning tools have played a very important role during this pandemic, helping schools and universities in facilitating student learning during the closure of universities and schools (Subedi et al., 2020). There is no one-size-fits-all methodology for online learning. Variety of subjects have vared needs. Different subjects and age groups

require different approaches to online learning (Doucet et al., 2020). Online learning also allows physically challenged students with more freedom in participating for learning in the virtual environment, requiring limited movement (Basilaia & Kvavadze, 2020).

The flipped classroom is another simple yet innovative strategy for providing learning resources like articles, pre-recorded videos and YouTube links before the class. The online classroom time is then used for deepen understanding through live discussion with faculty and peers (Doucet et al., 2020). The virtual classroom platforms like videoconferencing (Google Hangouts Meet, Zoom, Slack, Cisco, WebEx) and customizable cloud-based learning management platforms such as Elias, Moodle, BigBlueButton and Skype are increasingly being used. Use of such disruptive technology have facilitated the e learning which is the most effective solution for the current disturbance being created by the Pandemic resulting in movement restriction and confining the learners and the educators at their homes. But is it a spurting the e learning or creating the digital divide that is yet to be seen.

Role of Disruptive Technologies as Drivers of E- Learning

Disruptive technologies are those that disrupt the set established practices, often starting with small number of users and eventually growing over time to the extent that they displace a previously dominant, incumbent technology. Christensen and Raynor (2003) subsequently changed the term ‘‘disruptive technology’’ to ‘‘disruptive innovation’’, with the justification that disruption is not an intrinsic feature of the technology, but, instead, emerges through practice. ‘Even when computers were introduced in the classroom, they were used in enhancing the existing instructional approaches, rather than to supplement them. Lectures, for example, were amplified with computer graphics, but the lecture itself existed in its fundamental form.

Disruption is driven by convergence of forces: from the capabilities of new technologies, to the changing demands of customers, or rapidly evolving practices of competitors. When it comes to students, there are some significant innovations disrupting the way their higher education experience is being delivered as discussed below:

Mobile Learning: As mobile devices become more effective and affordable, and as ownership reaches ubiquity in different countries, the options for engaging learning experiences are becoming limitless and boundless. The augmented usage of augmented reality (AR), virtual reality (VR), and mixed reality (MR) has enabled the entire process of mobile learning to be more active and collaborative. Mobile learning has evolved from an option of supplementing course content with stand-alone applications of occupying a strategic consideration for access to the course and delivery. Some of the examples of mobile learning in use that have direct implications for higher education are The GLOBE Zika Education and Project Prevention, Gamified Learning Using Kahoot, Cloud Class Room to name a few.

Analytics Technologies

Analytics technologies are primary element for student success initiatives through institutions and a motivating force behind the collaborative, targeted strategic planning and improved decision-making for higher education leaders. Analytics capabilities that comprises of dynamic, connected, predictive, and personalized systems and data. The increase of data-driven human society has brought with it enhanced interest and investment in data- and analytics-based competencies, as well as in technologies and systems for helping facilitate and improve our complex practices of collecting, analyzing, and interpreting data. Institutions of higher education are also affected from the data-analysis interests and investments. The examples of analytics technologies in use that have direct implications for higher education includes Crowdsourced Adaptive Platform for Recommendation of Learning Activities, Jefferson Competency Assessment Tool, Student Relationship Engagement System etc.

Mixed Reality

At the intersection of the online and offline worlds is an emerging and dynamic environment like mixed reality (MR), where digital and physical objects coexist together. This hybrid space is integrating digital technologies into the physical world thus creating virtual simulations of physical spaces, blurring the difference between worlds. Mixed reality (MR) is an umbrella term for a variety of technologies. MR technologies are well suited for experiential education. Through simulations and 360° video, VR can enable users to visit places they might otherwise not be able to access,

like art museums, archaeology sites, a refugee camp, or Mount Everest, as well as places that are entirely inaccessible. By dramatically expanding the variety of tasks and activities with which a learner can gain experience, MR technology enables experiential learning where it may not have previously been possible. Reflection and self-assessment are also critical aspects of experiential learning but are not necessarily enabled by MR technology. Examples of mixed reality in use that have direct implications for higher education are: Virtual Immersive Teaching and Learning (VITaL), Parsons Fashion Study Collection in Virtual Reality, Virtual Field Trips

Artificial Intelligence

Artificial intelligence (AI) involves computer systems for achieving tasks and activities that have mostly historically relied on human cognition. Right from e-commerce to healthcare to education, in each and every sector, the intervention of AI has increased by multifold. Many companies are now investing in developing their own version of AI and Machine learning Using big data, AI applies foundations of algorithmic machine learning for predicting issues that allow for task completion like human beings and decision-making. Artificial intelligence (AI) and Robotics have challenged the conventional methods of businesses and every other related operations. For instance, AI bots are increasingly being used to handle routine customer queries and some intelligent machines are even able to monitor faults and security breaches. Engagement is not something which is new but a high-visibility conundrum. The *Chronicle of Higher Education* recently profiled Georgia State University's use of the AI tool AdmitHub as a successful option of connecting with prospective and incoming students, addressing issues about enrollment, financial aid, and many more. Engagement is also basic for student success and support initiatives. Examples of artificial intelligence in use that have direct implications for higher education are Student Data Science & Machine Learning Platform, IU Boost, Edulai

Blockchain: This technology works as a decentralized digital ledger and is currently used primarily for supporting the cryptocurrencies. The technology involves usage of a distributed data structure where the records in ledger are replicated in various locations.

Most of the current thinking about blockchain in higher education would be issues of transcripts and records of achievement. Blockchain could extend that model thus creating a permanent, detailed record of formal and informal learning allowing

individual users in controlling what is included in their learning record and by whom information can be accessed. As education increasingly becomes a lifelong activity, that involves not only formal academic settings but workplace training, courses from professional associations, workshops, online learning and numerous other formal and informal models, block chain could be of great help that could provide means for individual students in maintaining an accurate and perfect record of their knowledge and skills. Some of the examples of block chain in use that have direct implications for higher education are FlexchainEdu, Woolf: Building a Borderless University, EdRec: Next Gen by Design etc.

Virtual Assistants

In the 1987 Knowledge Navigator and 1988 Future Shock videos, Apple envisioned a future where users of different ages and abilities can naturally interface with a device screen by speaking commands, asking questions or using gestures for learning, working, and remain connected to others in the virtual environment. AI-augmented machine learning has spectacularly increased the accuracy of both automatic speech recognition (ASR) and related language processing and the underpinnings of virtual assistants like Siri, Alexa, Bixby, or Google Assistant.

Amazon Echo Dots are being piloted at several US universities to provide students with information ranging from academic advisory services to help with financial aid. The examples of virtual assistants in use for higher education are Alexa@SLU (Saint Louis University EchoDot), Voice-Activated Apps for University of Colorado Denver and Anschutz: VoxScholar, LibChat @ Victoria University Library etc.

Covid -19 Pandemic Spurting E Learning transforming the Education Sector

As of July 2020, 98.6% of learners worldwide were equally affected by the pandemic, representing 1.725 billion children and youth, from pre-primary to higher education including colleges and universities, in 200 countries (United Nations, 2020). Therefore, it was the need of the hour to develop E Learning and make it available from their respective homes.

This disruption in education has their severe economic implications as well. A World Bank report, 'Beaten or Broken: Informality and Covid-19 in South Asia', has quantified

the impact of school closures in monetary terms-India is estimated to lose around $440 billion (Rs 32.3 lakh crore) in possible future earnings.

To fight back the disruption and damage, educational institutes across the country adopted the digital mode of education as a solution to fill this void which was left by classroom teaching. With this, peripheral digital education in India came centre stage and is now increasingly getting integrated into the mainstream. The National Education Policy, released by the Union government in July 2020, has also emphasized on the significance of online education, blended with the traditional mode.

Before the Covid-19 outbreak, the online education market was estimated in India to grow to $1.96 billion (Rs 14,836 crore), with 9.6 million users by 2021, from $247 million (Rs 1,870 crore) and 1.6 million users in 2016. The coronavirus-induced lockdown further propelled the market demand for EduTech players. India has even cropped up as the second biggest market for massive open online course (MOOC) in the world after the US. Government has endorsed India as the flag-bearer of the digital revolution and it has also acknowledged it to be a diverse and multilingual country, as supported by the recently drafted new education policy. Still e-learning platforms cannot replicate the varied dialects, varied contexts and different living experiences that are brought together by physical classrooms. Online education provides flexibility and ease of providing the options of learning anytime and anywhere in normal situations. The pandemic resulted in an emergency transit from traditional classroom teaching to creating an intelligent learning space through e learning teaching or in better words emergency remote teaching. (Hodges et al., 2020). This emergency remote teaching was created in response to a set of challenges faced due to pandemic and the situation was very different from the well-placed traditional method to online learning pedagogy as it was unexpected as well as unplanned for teachers, students, parents and for all other stakeholders.

EdTech Start-ups are tapping all the right opportunities by providing online courses to students amidst this crisis. As suggested by UNESCO, these EdTech Start-ups and learning apps can help students during such crucial times where physical access to libraries and class room teaching is not possible. Digital payment companies, such as Paytm, Mobiwik, Tez, PhonePe, and so on, grew rapidly during and after

demonetization. Now, in this pandemic outbreak, EdTech start-ups are hoping for improved performance that means crucial emergencies imposed have always created wonderful opportunities for businesses too. EdTech start-ups are trying hard to make most out of this situation by providing several free courses and e-resources to the students like Coursera for Campus. Although the availability of electricity and a stable internet connection is still a bigger challenge in their way as a lot of Indian cities especially small cities still face frequent electricity shortages. As per the reports, initiatives by these companies are already bringing them gains.

Byjus which started in 2011 is now the world's most highly valued edtech compay. It witnessed an increase of about 200% in terms of new students using its products. Other companies have also reengineered themselves for providing a one stop solution of different requirements of teachers and students equally. For example, Lark which is a Singapore based collaboration suite initially developed by ByteDance as an internal tool for meeting their own exponential growth, began offering teachers and students service like unlimited video conferencing time, auto-translation capabilities, real-time co-editing of project work, and smart calendar scheduling, amongst other features.

Emergency remote teaching or E Learning has been criticized for failing to adhere to sound pedagogical principles, best practices (Hodges et al. 2020). Various experts have questioned the reasons for driving individuals, organizations and companies eagerly towards providing guidance, considering whether their motivation are market reasons (Siemens 2020). Others have noted the potential negative outcomes if educational technology are implemented without balancing their consequences or after effects and side effects (Selwyn 2020; St. Amour 2020). Quickly jumping on board with learning platforms and online learning has also raised concerns about privacy and surveillance and the impact on students' lives and human dignity (Harwell 2020).Along with this, increased screen time has also posed a health hazard for students and educators equally.

A tech-enabled education system is a pandemic-proof solution that can be continued after the pandemic but in blended form. It has enabled the schools and colleges to widen their outreach through collaborations and reach thousands of students, by simply following the digital curriculum. Similar to that of a physical classroom, a student follows a time-table for their virtual classes, teachers switch lessons, students get

breaks, they take assessments designed for an online mode and now with the help of AI, its possible to go for customized assessment as well.

Conclusion

As e-learning becomes the "new normal", the authorities have been taking steps to make digitisation of education accessible and affordable for all. The Union government is banking a lot on the Bharatnet project, aiming to provide broadband to 250,000 gram panchayats in the country through optic fibre for better connectivity which will further help rural schools in providing online education to students who do not have internet access at home. Besides building the digital infrastructure, training also needs to be given to the teachers for using the system in providing authentic and seamless education to the students. Successful delivery of education is also in question because learning in colleges varies from that in schools.

If the Indian education system has to transit to online learning without creating a digital divide, the responsibility on the Centre and state governments is to raise the spending on education to at least 6 per cent of GDP which is less than 3 percent at present.

Going digital became an instant and efficient response to the current situation. However, It is essential to build robust online environments as it is a necessity for providing stability in learning. However, in developing nations like India, with huge differences in student's social-economic circumstances and the quality of education institutions, the changes are not convenient and easy. The digital divide has further enhanced the gap and requires immediate support from both the public and private sectors as the crisis continues. The scope of e-learning is enormous and can actually help in realizing the potential of each student. There exist both opportunities and challenges for the government as well as the private sector. The aim should be to ensure equal and adequate access to such platforms. If the Indian education system aims to transit to online learning in the future, it must emphasize policies that bridge the digital divide and move the country closer to achieving the Sustainable Development Goals i.e. equal education accessibility to all.

The lesson learnt from the COVID-19 pandemic is that teachers and students/learners should be oriented on use of different online educational tools. After the COVID-19 pandemic when the normal classes resume, teachers and learners should be encouraged

to continue using such online tools to enhance teaching and learning and use of disruptive technologies is definitely going to be a facilitator for the same.

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A review of novel COVID-19 and their impact on education system

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Abstract:

In December 2019, a pandemic of virus COVID-19 was started from Wuhan capital, China. It is also named as novel corona-virus. This virus can easily transfer from one human body to another while sneezing, coughing and touching of infected surfaces. The coronavirus gives a symptom of high fever, dry cough, headache, chest pain and pneumonia. In due course of time, this virus creates difficulty in breathing and cause acute respiratory syndrome failure which causes death of the people. Till now there is no definite treatment is available for this novel coronavirus. To prevent spreading of this coronavirus, avoiding close contact with infected people and maintaining social distance is the most excellent alternative. Due to COVID-19, all schools, colleges and Universities got closed and worldwide it has affected the educational systems. Disable students are most affected amongst all, as they require specific assistance for study which is always not easily available for them. In the present review paper, the mechanism of communication of virus through airborne droplets, from one body to another body is explained. In addition to this, spreading history, death rates of human body with time, preventions strategies and impact of COVID-19 on educational system is reviewed.

Keywords: Coronavirus, Health, COVID-19, Pandemic, Social distancing

1. Introduction

Recently a new virus in human is spread out in whole country and is identified as corona-virus which is also known as novel COVID-19. The outbreak of Corona virus

was identified in Wuhan city in December, 2019 which is situated in China **[1-4].** Because of the symptoms of COVID-19, it is being assumed that this virus have been started from bats. However, a solid proof about this statement is still under observation. In due course of time, WHO declared COVID-19 as a deadly disease. Scientists from different countries are doing their great effort however, till now no vaccines or specific drugs are available to stop this disease. When a coronavirus infected individual sneezes or coughs, virus transmitted through air droplets. This virus breaks through into human cells via Angiotensin converting enzyme peptidase receptor **[5-6].** A communication through airborne droplets from one body to another is shown as follows figure 1.

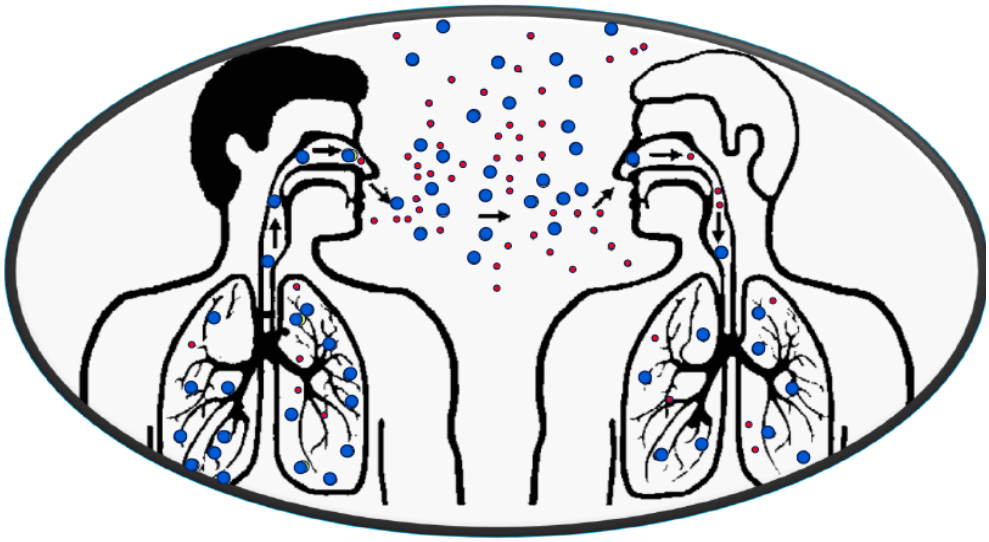

Fig. 1. Schematic diagram of transmission of virus through airborne droplets.

In due time, this virus create problems in breathing and cause respiratory failure which is mainly a cause of death of the people. To slow down this death rate, avoiding close contact with infected people and maintaining social distance is a great alternative. Along with social distancing, it is very essential to talk about hygiene standards like sanitize or wash your hands over and over again, keeping mouth covered by mask especially when you are travelling through public transport or through disinfect area. Make a practice to sanitize your hand each time after touching the surfaces of handles of

doors as these are commonly touched by the infected peoples. The coronavirus can live on the metallic surfaces from some hours to some days. This virus attacks preferably on low immune contains people i;e. on kids and on older peoples. However, it effects on young age people too if they have low immune system body. A brief report of spread history, confirmed cases, death cases from January 21, 2020 to May 19, 2020 due to COVID-19 and their impact on education system in INDIA is explained as follows:

2. Spread history and report of COVID-19 (Jan 21, 2020 to May 19, 2020)

In the whole world, the most populated country China firstly informed to World Health Organization about the unknown virus on December 31, 2019. A total of 44 infected people by unknown virus were detected in China till January 3, 2020. On January 7, 2020 Chinese research Scientists were declared a new virus named as COVID-19 which was spread from Wuhan city, China.

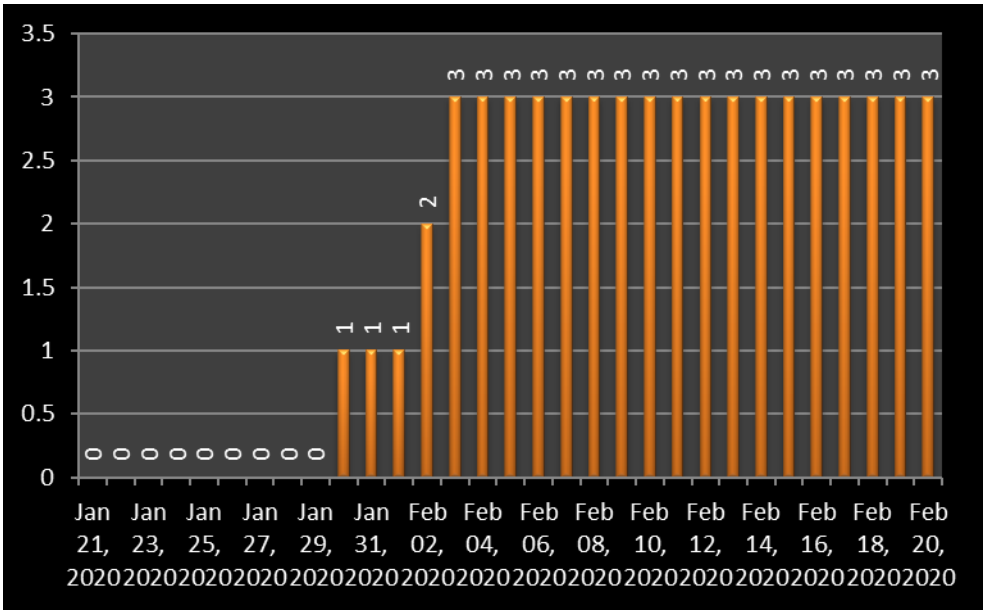

Fig. 2. Confirmed COVID-19 cases from January 21, 2020 to February 20, 2020 in INDIA.

Till January 29, 2020 not a single case of COVID-19 was found in INDIA. The first case of coronavirus was found in INDIA on January 30, 2020. With time, a case of 3 infected people were found from coronavirus in India and after that till March 4, 2020 it was found almost constant. However, unexpected rises of infected peoples were confirmed from March 5, 2020 and subsequently the cases of infected people from coronavirus were increases in INDIA.

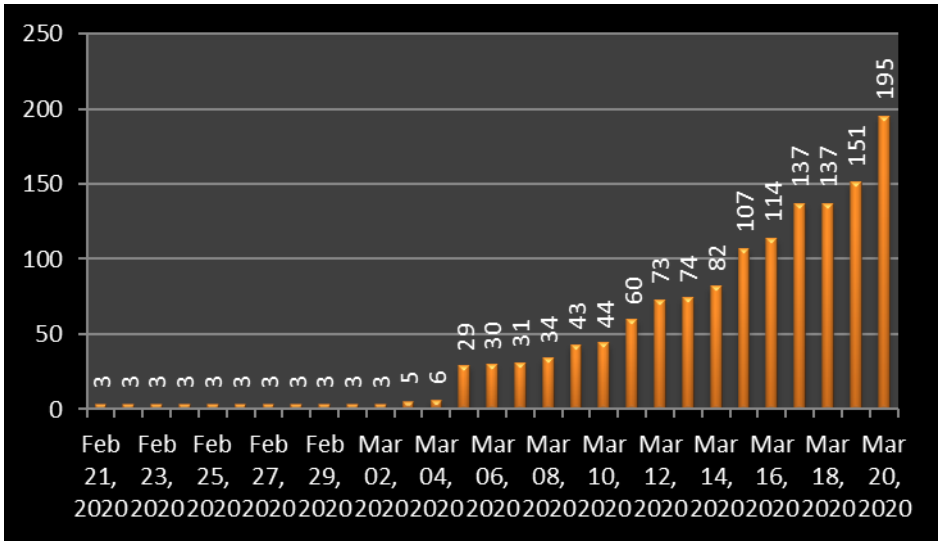

Fig. 3. Confirmed cases in INDIA from Feb 21, 2020 to Mar 20, 2020 due to COVID-19.

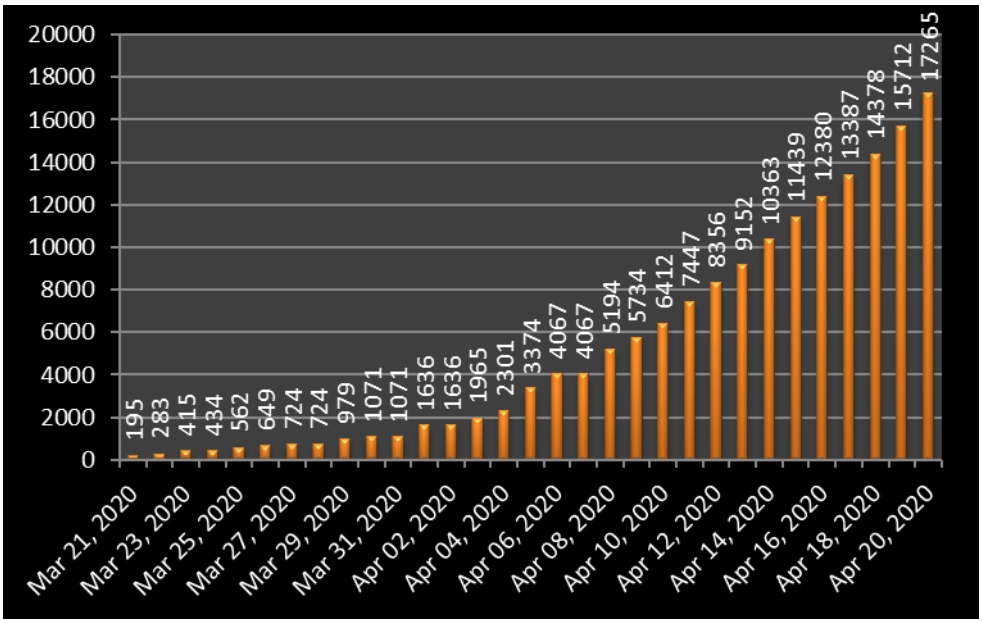

Fig. 4. Confirmed cases in INDIA from Mar 21, 2020 to Apr 20, 2020 due to COVID-19.

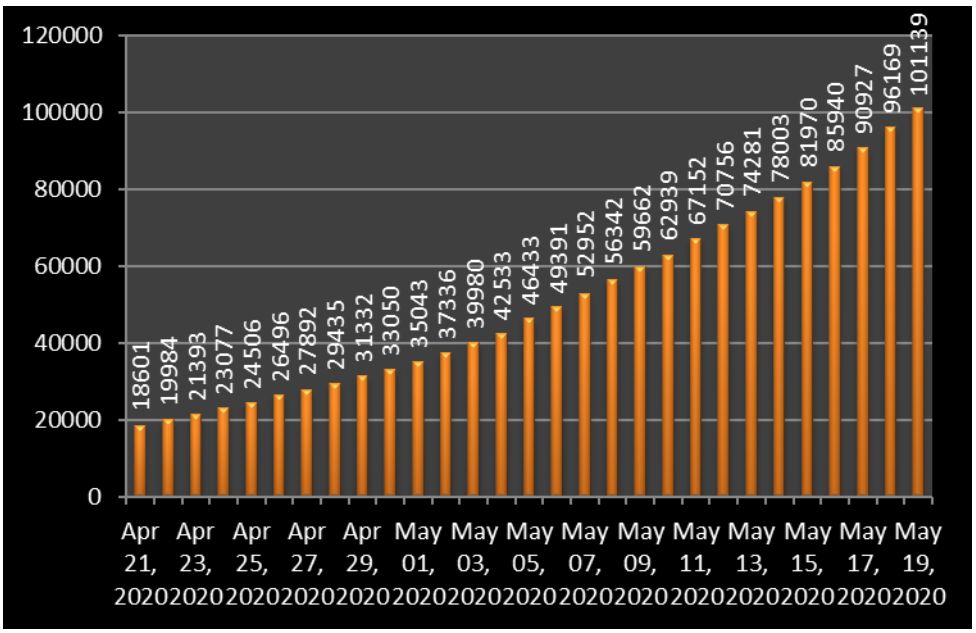

Fig. 5. Confirmed cases in INDIA from Apr 21, 2020 to May 19, 2020

A graphical representation of confirmed cases in INDIA due to coronavirus from January 21, 2020 to May 19, 2020 is presented in figure 2 to figure 5. The graphs show a gradual increase for the confirmed cases. The details of confirmed cases and death cases due to COVID-19 in INDIA are tabulated in the table 1 to table 3. It is observed from table 1 to table 3 the death cases increases in India due to coronavirus. This death rate can be slow down and with time it can be stopped if we will maintain social distancing from the infected people. Moreover, after getting a proper drug or a suitable vaccine which is not developed yet by any countries for COVID-19 can be another option to stop this death. The honourable Prime Minster of India announced a complete lockdown from March 25, 2020 in all states of India to stop spread of coronavirus and till now it is well maintained. Though, INDIA allows people to travel for those who

have installed the Aarogya Setu app on their phones. It shows a green band declaring the person is safe.

Table 1: Detail of confirmed and death cases from Jan 21, 2020-Feb 29, 2020 due to COVID-19 in INDIA

Date	Total Confirmed cases	Total Death cases	References
Jan 21, 2020	00	00	07
Jan 22, 2020	00	00	08
Jan 23, 2020	00	00	09
Jan 24, 2020	00	00	10
Jan 25, 2020	00	00	11
Jan 26, 2020	00	00	12
Jan 27, 2020	00	00	13
Jan 28, 2020	01	00	14
Jan 29, 2020	01	00	15
Jan 30, 2020	01	00	16
Jan 31, 2020	02	00	17
Feb 01, 2020	03	00	18
Feb 02, 2020	03	00	19
Feb 03, 2020	03	00	20
Feb 04, 2020	03	00	21
Feb 05, 2020	03	00	22
Feb 06, 2020	03	00	23
Feb 07, 2020	03	00	24
Feb 08, 2020	03	00	25
Feb 09, 2020	03	00	26
Feb 10, 2020	03	00	27
Feb 11, 2020	03	00	28
Feb 12, 2020	03	00	29
Feb 13, 2020	03	00	30
Feb 14, 2020	03	00	31
Feb 15, 2020	03	00	32
Feb 16, 2020	03	00	33
Feb 17, 2020	03	00	34
Feb 18, 2020	03	00	35
Feb 19, 2020	03	00	36
Feb 20, 2020	03	00	37
Feb 21, 2020	03	00	38
Feb 22, 2020	03	00	39
Feb 23, 2020	03	00	40
Feb 24, 2020	03	00	41
Feb 25, 2020	03	00	42
Feb 26, 2020	03	00	43
Feb 27, 2020	03	00	44
Feb 28, 2020	03	00	45
Feb 29, 2020	03	00	46

Table 2: Detail of confirmed and death cases from Mar 01, 2020-Apr 09, 2020 due to COVID-19 in INDIA

Date	Total Confirmed cases	Total Death cases	References
Mar 01, 2020	03	00	47
Mar 02, 2020	03	00	48
Mar 03, 2020	05	00	49
Mar 04, 2020	06	00	50
Mar 05, 2020	29	00	51
Mar 06, 2020	30	00	52
Mar 07, 2020	31	00	53
Mar 08, 2020	34	00	54
Mar 09, 2020	43	00	55
Mar 10, 2020	44	00	56
Mar 11, 2020	60	00	57
Mar 12, 2020	73	00	58
Mar 13, 2020	74	01	59
Mar 14, 2020	82	02	60
Mar 15, 2020	107	02	61
Mar 16, 2020	114	02	62
Mar 17, 2020	137	03	63
Mar 18, 2020	137	03	64
Mar 19, 2020	151	03	65
Mar 20, 2020	195	04	66
Mar 21, 2020	195	04	67
Mar 22, 2020	283	04	68
Mar 23, 2020	415	07	69
Mar 24, 2020	434	09	70
Mar 25, 2020	562	09	71
Mar 26, 2020	649	13	72
Mar 27, 2020	724	17	73
Mar 28, 2020	724	17	74
Mar 29, 2020	979	25	75
Mar 30, 2020	1071	29	76
Mar 31, 2020	1071	29	77
Apr 01, 2020	1636	38	78
Apr 02, 2020	1636	38	79
Apr 03, 2020	1965	50	80
Apr 04, 2020	2301	56	81
Apr 05, 2020	3374	77	82
Apr 06, 2020	4067	109	83
Apr 07, 2020	4067	109	84
Apr 08, 2020	5194	149	85
Apr 09, 2020	5734	166	86

Table 3: Detail of confirmed and death cases from Apr 10, 2020-May 19, 2020 due to COVID-19 in INDIA

Date	Total Confirmed cases	Total Death cases	References
Apr 10, 2020	6412	199	87
Apr 11, 2020	7447	239	88
Apr 12, 2020	8356	273	89
Apr 13, 2020	9152	308	90
Apr 14, 2020	10363	339	91
Apr 15, 2020	11439	377	92
Apr 16, 2020	12380	414	93
Apr 17, 2020	13387	437	94
Apr 18, 2020	14378	480	95
Apr 19, 2020	15712	507	96
Apr 20, 2020	17265	543	97
Apr 21, 2020	18601	590	98
Apr 22, 2020	19984	640	99
Apr 23, 2020	21393	681	100
Apr 24, 2020	23077	718	101
Apr 25, 2020	24506	775	102
Apr 26, 2020	26496	824	103
Apr 27, 2020	27892	872	104
Apr 28, 2020	29435	934	105
Apr 29, 2020	31332	1007	106
Apr 30, 2020	33050	1074	107
May 01, 2020	35043	1147	108
May 02, 2020	37336	1218	109
May 03, 2020	39980	1301	110
May 04, 2020	42533	1373	111
May 05, 2020	46433	1568	112
May 06, 2020	49391	1694	113
May 07, 2020	52952	1783	114
May 08, 2020	56342	1886	115
May 09, 2020	59662	1981	116
May 10, 2020	62939	2109	117
May 11, 2020	67152	2206	118
May 12, 2020	70756	2293	119
May 13, 2020	74281	2415	120
May 14, 2020	78003	2549	121
May 15, 2020	81970	2649	122
May 16, 2020	85940	2752	123
May 17, 2020	90927	2872	124
May 18, 2020	96169	3029	125
May 19, 2020	101139	3163	126

3 Impact on education system due to COVID-19 in INDIA

The COVID-19 deadly disease has affected a lot educational systems in INDIA, because of total closures of schools, colleges and universities. Disable students are most affected amongst all, as they require specific assistance for study which is always not easily available for them. At different levels from early age to young age impact on education due to COVID-19 is explained as follows:

3.1 Early babyhood education

Early babyhood educational programmes like; preschools, nursery schools, play schools are generally planned for kids below the age of three. Due to impact of coronovirus, these educational programmes are closed. However, some countries have not been closed until now these day cares and preschools as they considered it is necessary services for early childhood. Online learning by comparison of offline classes, is quite different. The closing of schools created gap and widen the learning abilities between the children who comes from low income and the families who comes from high-income.

3.2 Secondary education

Due to this COVID-19 influence, all the national institute of private/government postponed all kind of assessments/examinations for career-related programme and for diploma programme. The higher authorities like principals of schools taken decision to issue these students their certificates based on previous performance or previous internal assessments.

3.3 Undergraduate education

Undergraduate degree generally starts after secondary school and previous to post-graduation education. In many colleges along with in universities by the students contacted to refund the cost of tuition and hostels fee. The last semester of undergraduate students have their great loss as they would not apply for the upcoming fresh vacancies.

3.4 Higher education

In the midst of lockdown, some universities are weighing options to conduct online exams for students, in order to wind up academic career. Recently, the examination branch of different Universities issued notification to students for filling online examination form, which has created panic among students. Majority of students from poor background are sheltering in their homes in the rural areas and they hardly have access to the Internet. The brazen attempts by the university to conduct online classes may not be conducive for students who don't own a laptop or computer. The online examination modules developed by third party vendors are grappled with loopholes and defects that may hamper the academic results of students.

4 Conclusions

Coronavirus which is named as COVID-19 was transmitted from one human body to another while coughing and sneezing via airborne droplets. To stop spreading of corona-virus, social distancing and avoiding close contact from infected people is the best alternative. Along with social distancing, sanitizing or washing hands over and over again, keeping mouth covered by mask while travelling through public transport. Keeping these practices in daily life can decrease the mortality rate of the human without using any pharmaceutical medicine or vaccine. Due to COVID-19 virus, many

schools, colleges and higher education got closed and affected a lot educational systems in INDIA. Disable students are most affected amongst all, as they require specific assistance for study which is always not easily available for them.

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Influence of Digitalization on Education: An Overview

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Absolute and complete use of digital skills are changing the needs of modern learners who are eagerly looking for learning opportunities beyond the conventional classroom-based approach. With the growing developments of technology in contemporary lives ,there is a rising need for following and adapting digital technologies in the education process. Digital transformation in education can enhance the traditional classroom teaching learning environment. It can enable teachers to innovate and make attractive pedagogical models for creating better connect with students.

KEY WORDS: Educational Ecosystem, Digital Skills, Contemporary, Social Media , Fescos of Ajanta ,Sculptures .

Technology has given a level playing field for students from all zones of society. Continual technological developments with the growing popularity of social media and the Internet of Things are driving the educational ecosystem.

Digital transformation and developments in education process can furnish instructional learning, especially in higher education by creating a blended learning experience that fuses both traditional /conventional classroom-based methods and modern technology. The role of digital technologies and resources and its constant development have added more value to the learning and teaching processes in global contemporary society.

Anew methodology of digital learning after being altered, has completely changed frame of mind for the generation of the lecturers. The new education system has forced the youth to think that there are far more opportunities beyond conventional classroom-based teaching. With evolution of technical enhancements and expansion of users' friendly platform. The digital learning has been forwarding itself compelling the present society in adopting digital technologies in the education process. The enhancement in digital modification has relatively aided in enhancement of traditional classroom learning as well. Accompanied by the digital growth in the education, mentors and professors can now make learning more innovative and thought provoking by making pedagogical models for engaging students in intellectually challenging works and for effective participation of each learner in the process. From every zone of society student can now equally engage themselves in technological aspects of learning. The growth in social media popularity and the internet of things is playing a major role in the fundamental growth of learning and teaching The higher education has been experiencing many benefits as it is getting to taste all possible modes of education not

based on conventional and traditional mode of teaching process .Digital education learning is not only allowing students to access more and more information but also ensuring that the information in the question is customizable and suited to their personal needs. The opportunity to help every student learn at the best place and path for them is the most important benefit of digital learning. Digital learning tools and technologies enable educators to rapidly share information with other educators in real time. By adopting learning digital devices and students became more advanced and familiar with their course content.

Connected classrooms around the globe can not only coordinate with one another to share insights but also boost learning, experiences and communication skills.

Digital Learning has various effects on academic performance of learners and because of the digital learning a mentor can help the students to develop and improve performance in classroom. Digital learning really makes students work easier. Because of this, the students may have advanced knowledge by smoothly searching their study materials using this advancement. Analysing the use of digital advancements offers teachers the chance to layout engaging learning opportunities in the course they teach and these can take the shape of combined online course and programs .

Digital learning needs a blend of technology instruction and digital content. The incorporation of digital learning in the classrooms can depend on simply using tablets rather than of paper to using intricate software program and equipped. Digital learning has various effect on the academic performance of the students and this learning method also helps students in classroom teaching.

Online education is institutional delivery process that includes any learning that takes place via internet. Online learning enables educators to communicate with students who may not be capable of enrolling in traditional lesson courses.

Every student is registering a surge in the volume with distance learning and imparting of online degree with remarkable pace. Schools and colleges that offer online education are also growing in number. Students pursuing degree through online must be scrupulous in ensuring their course work is completed through a valued and esteemed university. There are many online platforms where people can enroll themselves in which ever courses they want. A person who wants to seek knowledge can go to get different subjects. The online education is known for offering the benefit of synergy. Through these communications sources are shared. This way the traditional teaching is compared with digital mode of teaching. This online teaching platform is available to every corner of society. The online education provides illustrative figures to students and teachers use illustrative figures make easy the contents for leaners. 3D figures are also represented through online teachings by the educators. With online platform we don’t need to travel to place to place to collect data as we can stay where we are to view different places.

As an Art educator I have experienced that through online platform I can show the Artifacts of every corner of world to my students during online classes. Students can get view of Greece, Rome, Egypt, Iran, Iraq so on and so forth in the same time without travelling and any travelling expenses. Online education therefore become more inserting than the traditional teaching. Artifacts from National as well as International Museums are viewed by the students through online teaching which created an attraction towards classes. Frescos of Ajanta, Sculptures from Ellora, Khajuraho , Konark , Tanjore, Sarnath , Mathura , etc are witnessed by the students during online classes and they came to about the rich culture of India .Not only the Indian Artifacts but also the temples of Ellora, Tanjore Bhubaneshwar and Puri are also viewed by the learners simultaneously during online class .

Hence it is proved that online class has given a new genre and advanced teaching to present generation and society.

CHALLENGES OF ONLINE LEARNING AMONG STUDENTS WITH INTELLECTUAL DISABILITY

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Introduction

Education is the right of every child irrespective of the condition of the child. Education aims at "maximum development of abilities and skills of which the individual is capable" (Hutt and Gibby, 1976) "complete social, physical and emotional development" (Leeming, Swann, Coupe and Miltler, 1979) all round preparation for life" (Tansley and Fulliford, 1960). These statements have the virtue that they are universally applicable to all children regardless of their capabilities or limitations and apply to all ages and stages of development. They emphasize the fact that education is appropriate and justifiable for all children. Right to education and work is mentioned in Article 41 of Indian Constitution. In addition, Article 45 quotes "Free and Compulsory Education for all children up to the age of 14 years". Therefore, children whether abled or disabled have a right to "appropriate" education. "Appropriate education" means that education which enables them to exercise the greatest possible degree of personal independence and allow them the fullest possible participation and maximum benefit from their physical and social environment. To fulfill this, there is a need for appropriate methods and physical environment setups for imparting education to Children with Intellectual Disability.

Intellectual Disability

American Association on Intellectual and Developmental Disabilities (AAIDD), define "Intellectual disability is a disability characterized by significant limitations in both **intellectual functioning** and in **adaptive behavior**, which covers many everyday social and practical skills. This disability originates **before the age of 18".**

As per the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), "Intellectual Disability (Intellectual Developmental Disorder) is a disorder with onset during the developmental period that includes both intellectual and adaptive functioning deficits in conceptual, social, and practical domains".

As per International Classification of Disease (ICD-X), "Intellectual Disability is a condition of arrested or incomplete development of the mind, which is especially characterized by impairment of skills manifested during the developmental period, which contribute to the overall level of intelligence, i.e. cognitive, language, motor, and social abilities".

Classification of Intellectual Disability based on Intelligence Quotient (IQ)

- **Borderline Intellectual Functioning** has Intelligence Quotient (IQ), 70-84.

- **Mild MR** has Intelligence Quotient (IQ), 50 to 69.
- **Moderate MR** has Intelligence Quotient (IQ), 35 to 49.
- **Severe MR** has Intelligence Quotient (IQ), 20 to 34.
- **Profound MR** has Intelligence Quotient (IQ), less than 20.

Learning Problems of children with Intellectual Disability

Depending on the degree of disability, the Persons with Intellectual Disability exhibit certain difficulties in learning. Some of the problems in learning are poor in academics, difficulty in paying attention, problem solving, poor memory, difficulty in understanding abstraction, needs repeated instructions, poor understanding of cause – effect, inability to generalize and impulsivity which hindered their learning. Professional uses various approaches, methods, strategies, and techniques to overcome their learning problems.

Teaching learning during COVID-19 pandemic

COVID-19 pandemic compels all the children including children with intellectual disability to restrict to their home for the unknown period. In this situation online education is the only option remains for everyone to impart education to the children. Thus, everyone is dependent on educational technology for teaching and learning. Parents, teachers, and service providers for children with intellectual disability

at every level want to know what options could expand the potential of their children or student to interact, learn and develop. This was again broadened when the new approaches in the form of system – approach, micro teaching, interaction analysis and computer Assisted Instruction came into existence. Educational Technology is regarded as an application of systematic knowledge about learning and instruction to teaching and training with the aim of improving their quality and efficiency.

Needs and Significance of the study

Teaching learning process follows systematic and sequential steps and that too for children with intellectual disability for whom one has to follow well defined steps arranged sequentially and in a hierarchal order one after the other. While teaching, every step needs to be followed systematically if any of the steps are missed out or not performed in order then it affects learning. Students with intellectual disability need individualized and continuous support for learning. In online learning in virtual classroom it is difficult to provide individual learning time and required support to the students. In this situation students are unable to involved directly. In view of the above reasons the present study has been undertaken to explore the various challenges of online learning faced by the students with intellectual disability during this COVID-19npandemic. Findings of the study will help administrators, parents, teachers, and other professionals to plan appropriately to overcome these learning problems.

Objectives of the study:

1. To explore the challenges of online learning faced by the students with intellectual disability.
2. To compare the domains wise challenges of online learning among students with intellectual disability.

Methodology

In this present study survey method is used to find out the challenges of online learning among students with intellectual disability.

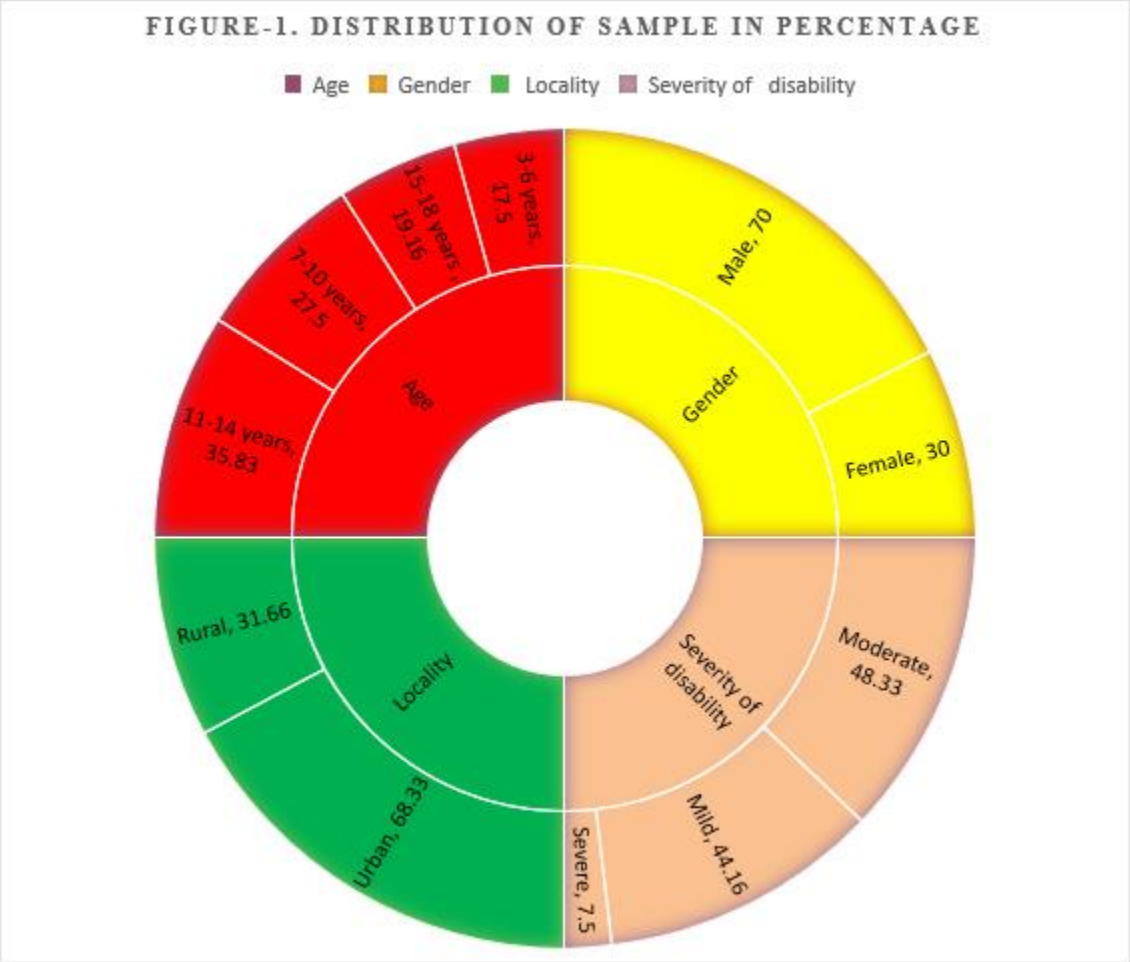
Research Design

The present study is an exploratory study in which survey method is used to explore the challenges of online learning faced by the parents of students with intellectual disability and by the students themselves.

Sample and sampling technique

Non-probability purposive sampling technique was used to select sample. Total one hundred and twenty sample were selected for this study. Only those parents of children with intellectual disability were selected for the study whose child attending online classes. The distributions of sample (children with intellectual disability) with respect to their age, gender, locality, and severity level of disability are presented in figure-1.

Figure-1. Distribution of sample in percentage



Tool

The researcher developed a format to collect the demographic details of students with intellectual disability. This format consists of two parts: Part-I includes profile of the special students such as name, age, gender, locality, severity level of the intellectual disability and name of the school attending. Part-II includes profile of the students with

intellectual disability such as name, gender, age, educational qualification, occupation, income, and residential localities. Part-III of the tool consist of the items related to different area to be assessed to explore the challenges of online learning among students with intellectual disability.

Validity and Reliability

The items in the tool were framed keeping in view the objectives of the study. The tool was circulated among the experts in the fields of special education for validation and suggestions were incorporated. The experts felt that the items included were relevant to the area selected and are without any ambiguity. Thus, it may be stated that the tool possesses content & construct validity and reliability.

Data collection

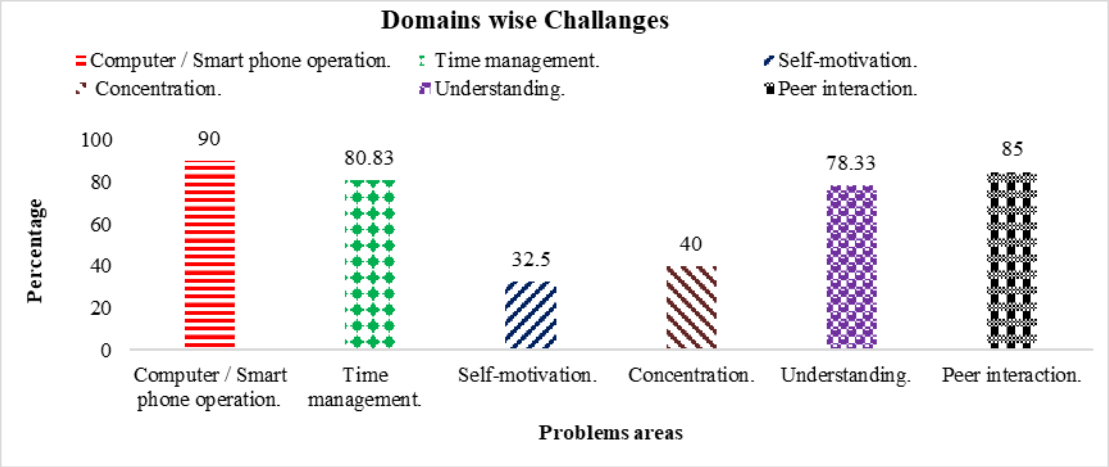
Researcher took prior appointment from head of the institute on phone call. Before administering the tool, close rapport was built up with the parents of students with intellectual disability by talking and discussing about their child. The researcher administered the tool and collected data through observation and asking information from the parents.

Results

Table-1. Challenges of online learning among students with intellectual disability.

Table-1 indicates challenges of online learning among students with intellectual disability. Majority 108(90) of samples reported challenges related to the operation of the system among students with intellectual disability. Total 97 (80.83%) sample reported problems related to time management. Only 39(32.5%) of the sample reveals problems related to self-motivation among students with intellectual disability. Problems related to the concentration among students with intellectual disability reported by 48 (40%) of the sample. Total 98 (78.33%) of sample reported that students with intellectual disability facing problems related to understanding in online learning. Majority 102 (85%) of sample reported that in online learning students with intellectual disability facing problems related to peer interaction.

Figure-2. Domains wise challenges of online learning among students with intellectual disability.



*Multiple responses admissible

Figure-2 indicates domain wise challenges of online learning among students with intellectual disability. Maximum (90%) of samples reported challenges related to the operation of the system were as minimum (32.5%) of the sample reveals problems related to self-motivation among students with intellectual disability. Total (80.83%) sample reported problems related to time management. Problems related to the concentration among students with intellectual disability reported by (40%) of the sample. Majority of sample (78.33%) reported that students with intellectual disability facing problems related to understanding in online learning. Majority (85%) of sample also reported that in online learning students with intellectual disability facing problems related to peer interaction.

Results

Result of the indicate that majority of the students facing challenges of online learning in six major areas which include computer / smart phone operation, time management, self-motivation, concentration, understanding and peer interaction. Maximum (90%) of samples reported challenges related to the operation of the system at the same time minimum (32.5%) of the sample reveals problems related to self-motivation among students with intellectual disability. In time management area total (80.83%) sample reported problems. Problems related to the concentration among students with intellectual disability reported by (40%) of the sample. Majority of sample (78.33%) reported that students with intellectual disability facing problems related to understanding in online learning. Total (85%) of sample also reported that students with intellectual disability also facing problems related to peer interaction in online learning.

Conclusion

The findings of the study provide a foundation for an improved understanding of the emerging challenges of online learning among students with Intellectual disability in COVID-19 pandemic. Students with intellectual disability are having limited cognitive capacity. They need systematic, supportive, structured teaching learning facilities and environment. Online learning lacking in all these. Thus, students with Intellectual disability facing challenges in computer / smart phone operation, time management, self-motivation, concentration, understanding and peer interaction. Therefore, every effort must be made to help students with intellectual disability to involve in systematic, supportive, structure teaching learning facilities and environment so that their challenges of online learning will reduces. All the stack holders including administrators, teachers, professionals, and parents needs to work closely to overcome the challenges of online learning among students with intellectual disability in COVID-19 pandemic. This will help students with intellectual disability in optimum learning.

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Table-1. Challenges of online learning among students with intellectual disability.

N=120

Sl. No.	**Domains**	**n**	**%**
1.	Problems in Computer / Smart phone operation.	108	90
2.	Problems in Time management.	97	80.83
3.	Problems in Self-motivation.	39	32.5
4.	Problems in Concentration.	48	40
5.	Problems in Understanding.	94	78.33
6.	Problems of Peer interaction.	102	85

LEVELS OF ANXIETY AND JOB SATISFACTION AMONG TEACHING STAFF AND NON- TEACHING STAFF

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ABSTRACT

Job Satisfaction refers to a person's feeling of satisfaction on the job, which acts as a motivation to work whereas anxiety refers to an emotion characterized by feelings of tension, worried thoughts and physical changes. The purpose of this study is to compare the levels of Anxiety and Job Satisfaction among teaching and non-teaching staff in university premise.80 participants of age group 23-42 years of age working in reputed private university were selected for the study. The tools used in this research were DASS21- Depression Anxiety Stress Scale (Syd Lovibond and Peter Lovibond) which is the short version consisting of 21 questions and MSQ- Minnesota Satisfaction questionnaire short version (Weiss et al.) The results indicated that there was no significant difference between the mean anxiety scores of Teaching staff and non-teaching staff as well as mean job satisfaction scores of Teaching staff and non-Teaching staff.

Key words: **Levels of Anxiety, Job Satisfaction, Teaching Staff, Non-Teaching Staff**

Introduction

Employee work fulfillment is basic to confront the dynamic and ever-expanding difficulties of keeping up efficiency of the association by keeping their workforce constantly motivated and engaged. The primary duty of any management is to observe their work roles and guide them to achieve their best potential. Nations which are in the development process have enormous and Human Resources however because of inappropriate administration, financial advancement is less and unsatisfied representatives come to presence in an organisation. Crafted by the executives in an association is to keep up great condition so representatives can cooperate to accomplish shared objective with productivity.

Job Satisfaction

Studies on job satisfaction have found that personal determinants such as organisational status and seniority, and general life satisfaction influence an individual's experience of job satisfaction (Van der Walt, F., & De Klerk, J. J. 2014). The character factors which have been seen as identified with work fulfillment incorporate an individual ' s confidence (Locke, 1976), adapting to stress (Scheier et al., 1986), locus of control (Stout et al., 1987; Surrette and Harlow, 1992), patience or tolerance (Bluen et al., 1990), and social trust (Liou et al., 1990). As per Maslow ' s (1954) hierarchy of needs theory, an individual has the need to grow and develop until the person reaches at the most elevated level of the self-actualization, which stated as where an individual experiences complete scholarly, emotional and spiritual satisfaction (Quatro, 2004). Despite the fact that this isn't valid for all people, individuals endeavour to accomplish self-actualization. The theoretical connection among job satisfaction and employment fulfillment can likewise be sufficiently clarified from a need fulfillment perspective.

Luthans (1998) set that there are three significant dimensions to job satisfaction:

1. Job fulfillment is an emotional reaction to a work situation. All things considered it can't be seen. It can just be inferred.

2. Job satisfaction is frequently determined by how well result meets or surpasses expectations. For example, if organisation members feel that they are working a lot harder than others in the department are receiving less rewards they will most likely have a negative demeanour towards the work, the boss and organization. Then again, if they believe that they are paid equally, they are probably going to have positive attitude towards the job.

3. Job satisfaction represents to a few related attitudes which are generally significant qualities of a job about which individuals have effective response. These to Luthans are: the work itself, pay, promotion opportunities, supervision and peers.

Job satisfaction is either a global inclination about the job or a related constellation of frame of mind about different aspects of the facets of the job. The facet approach is utilized to find which parts of

the job produce satisfaction or on the other hand disappointment. For most employees, work likewise fills the requirement for social interaction thus, friendly, supportive employees also lead to expanded work satisfaction (Drago, Wooden, and Sloan, 1992).

As per Maslow ' s need theory (1954, 1970), it appears that spiritual people will likewise be the individuals who have a dominant need to accomplish self-actualization, which will lead them being satisfied. It likewise appears that organisations would need to persistently satisfy deeply established spiritual needs, all together for self-actualizers to encounter satisfaction.

Anxiety

It is an emotion portrayed by a disagreeable condition of inward disturbance, frequently joined by nervous conduct, for example, pacing to and from, somatic rumination and complaints. It is the emotionally disagreeable sentiments of fear over foreseen occasions. It is the expectation for future risk. It is an inclination of disquiet and stress, typically summed up and unfocused as an overreaction to a circumstance that is just emotionally observed as threatening.

Anxiety at work is a psychological part in an association. Regardless of the expanding number of accessible offices, individuals frequently show emotional tension and apprehension. Their activities are set apart by insecurity and fear. Such conduct appearances have psychological bases, in which a reference to the situation which is prevailing in setting of the individual can hardly be ignored. As a rule, their conduct shows an emotional fear and inappropriate dread, emerging out of the individual's imaginary inclusion in their situational settings. In mental parlance, their patterns of behaviour are alluded to as Job anxiety (Kanungo, 1981).

THEORETICAL DEFINITION

Job Satisfaction

Job satisfaction is the degree of satisfaction an individual feel with respect to their Job. This inclination is fundamentally founded on a person's view of Satisfaction. Job satisfaction can be affected by an individual's capacity to finish required assignments,

the degree of correspondence in an organisation, and the manner in which the board treats employees.

Anxiety

The term ―Anxiety, an interpretation from Freud's (1936) ―angst, depicts the impact of consolidated (emotion)negative affect, and physiological excitement. It is the unpleasant subjective sentiments of fear over foreseen occasions, for example, the sentiment of inevitable death. They may likewise have physical indications, for example, perspiring, dizziness, trembling, or a fast heartbeat. Anxiety is the point at which feelings do not slow down – when they're continuous and exist with no specific explanation or cause.

OPERATIONAL DEFINITION

Job Satisfaction

The scores obtained on the MSQ- Minnesota satisfaction questionnaire (short form) will be used as level of Job satisfaction in this study.

Anxiety

The scores obtained on the DASS21-Depression Anxiety Stress scale will be used as level of Anxiety in this study.

REVIEW OF LITERATURE

Job Satisfaction

In a study by **Curl Jason (2015),** he examined Job satisfaction of teaching staff and non-teaching staff in school setting, so that differences between both could be determined.

Sample size of 75 non-teaching staff whereas 150 teaching staff was selected and MANOVA was utilized to examine whether there were any significant differences between the two groups. The results concluded that level of Job satisfaction was significantly different for both the groups.

Khudaniya (2014) studied Level of anxiety and Job Satisfaction among Secondary School teachers, the purpose of the study was to discover the level of anxiety and satisfaction of job among the teachers of Ahmedabad city, Gujarat of Secondary school. Sample of 120 educators, where 60 are from primary secondary school and 60 from government school, and 60 female and male were chosen Randomly. Again, out of participants of 120; 50% female educators and 50% male educators have been chosen for both the categories. The information from the research was analysed by utilizing Standard deviation, T-test and Mean and Comprehension Anxiety Test created by L.N.K Sinha and A.K.P. Sinha and Job Satisfaction Scale created by Dr. T.R. Sharma and Dr. Amar Singh was utilized. The outcome shows that there is no critical contrast found between secondary school teachers in various kind of school for example private and government and sexual orientation corresponding to their level of anxiety and job satisfaction.

Chitale Mohanty and Dubey (2013) in the book Organizational Behaviour Text and Cases characterizes that work or job fulfillment relies upon the enormous extend on the attitude of the employee. Job satisfaction is the consequence of different attitude possessed by a worker. In limited sense these attitudes are identified with the job and are concerned about such factors as fair treatment by employer, wages, steadiness of an employee, advancement opportunities, supervision, conditions of work, fair evaluation of work, quick settlements of dispute and grievances, recognition of ability, societal relations on the job. Indeed, even family relationship, societal position, recreational outlets, social and political exercises, and so forth., add to job fulfillment. It additionally referenced about the five theories of satisfaction of job for example the Maslow's Theory, Herzberg's Theory, Instrumentality Theory, Social Influence Theory and Equity Theory. The two Measurement of Job Satisfaction are Faces job satisfaction scale and Job description index technique.

Indermun and Bayat (2013) have clarified in The Job Satisfaction - Employee Performance Relationship: A Theoretical Perspective that associations face huge stress in serious situations to be effective and simultaneously produce results of significant worth. By guaranteeing that their workforce is ideal consistently most organisations can increase competitive advantage. Employees who are satisfied structure a bond with the

organization and invest wholeheartedly in their organisational enrolment, they have faith in the objectives and values of the organisation. Accordingly, these workers show significant levels of execution and profitability. Disappointed workers show qualities of low profitability, turnover, absenteeism. These attributes are profoundly expensive for the organisation. Subsequently, an examination is done to decide the connection between employee performance and job satisfaction for the betterment of the organisation.

Kim (2005) analysed the differences of gender in employee fulfillment. Data gained from a survey of 5,128 public workers in Seoul Metropolitan Government pointed that women were happier with their employments than were men. Among the demographic factors sexual orientation was the main huge predictor of employment satisfaction; men emphasized extrinsic rewards while women emphases more towards intrinsic rewards.

Kapoor and Rao (1969) had contemplated the Job fulfillment of 146 female workers. He had inspected attitude and age towards officials, in the study. He concluded through this examination that more than twenty-five years married female employees and female employees consistently restrict against struggle and injustice against the board as well.

Morge (1953) studied white collar jobs for the employee's job satisfaction. He discovered through this study that fifty-five male educators were happy with their work while thirty five percent female workers were not happy with their work. In this manner, the female workers were more fulfilled than male workers; accordingly, the conclusion of the research was that sexual orientation was affected on work satisfaction.

Shaheen, (2014) studied the male and female employees in public sector organizations about their Job satisfaction, i.e. two government hospitals, one in Rawalpindi and one in Islamabad. Sample of (N=50) half male and half female medical officers. Job Descriptive Index (JDI) (Smith, Kendall, Hulling, 1969) was re-designed in the context of cultural values and administered as a measure of Job satisfaction of respondents. The findings demonstrate that factor of gender prompts measurably huge contrasts of medical officers in overall job satisfaction, as male are progressively happy with their

job contrasted with female medical officials. Test gives off an impression of being increasingly happy with

pay, advancement and supervision. While no distinction in job satisfaction were found with individuals and work. Pay, advancement and supervision contribute more towards satisfaction of job when contrasted with individuals and work.

Rao (1996) examined managerial effectiveness, work motivation, organizational climate and job satisfaction of two public enterprises in the state of Andhra Pradesh. 60 supervisors and 40 managers of each were included for the sample of the study. Sampling strategy: Multi purposive sampling method was utilized to choose the sample of the examination. A questionnaire was utilized for the information assortment. The data being analysed with various factual procedures like, standard, average deviations and co-efficient of variations etc. and so forth so as to test the impact of financial factors on job fulfillment, Chi-square test have been utilized. A finding of the examination was that high fulfillment among managers results because of elements like feeling of accomplishment, enthusiasm for work, obvious outcomes, salary and interpersonal relations. While, work fulfillment of supervisors is affected by factors like duty, specialized supervision, nature of work, pay and so on.

Anxiety

Ahmad, Bharadwaj, and Narula (1985) evaluate feelings of stress among 30 officials from both private and public sector employees, utilizing an ORS scale to measure 10 dimensions of job stress. Their examination uncovers huge contrasts among private and public sector employees in three elements of job pressure—Self- role distance, job ambiguity and job isolation. The researchers also additionally build up the unimportant impact of a few foundation factors, for example, age, educational level, salary, work experience and marital status.

Baruch and Lambert (2007), seeks to exhibit a dual-level system for creating the theory of change management, in light of the idea of anxiety as an organizational phenomenon and its potential for avoidance, acknowledgment and treatment. While experiencing emergency, disarray, and difficulties, both people and associations can

experience problems related to anxiety. The investigation has indicated that a model of individual anxiety can effectively be created to give an exact model at the organizational level of real-life experience, and that organizations encountering anxiety can ruin hierarchical learning and execution.

Bano and Jha (2012) point of their examination was to investigate the distinctions in stress related to work among private and public sector employees, in view of ten role stressors. It likewise looks at the role of variables of demographic on the feelings of anxiety of both public and private groups. Sample of 120 private and 182 public sector employees in the state of Uttar Pradesh, India, whose responses are estimated by an Occupational role stress scale. They investigate the information by utilizing t-test and ANOVA, on finding they discovered that both private and public sector employees face moderate degrees of stress. While there is no huge distinction by and large among private sector and public sector employees regarding all out feelings of anxiety, certain individual stressors, for example, work understanding and educational qualifications has a distinction.

Aldosari, Alhajri, et.al (2015) aimed to build up an instrument dependent on the 5Rs model for dealing with the anxiety that outcomes from organizational change. The 5Rs are Researching, Recognizing, Reducing, reconstructing anxiety, and Restructuring reality. The examination test (n = 163) was a haphazardly chosen test speaking to the organizational pioneers of public sector inside the State of Kuwait. Acquired discoveries demonstrated that the created instrument was legitimate and reliable. Organizational pioneers along these lines can utilize the 5Rs model for management of anxiety to better encourage change in their company and deal with the anxiety of employees for better change of projects.

Jayashree explored and attempted to compare the degree of stress experienced by the workers of the Nationalized banks in Chennai. The investigation intends to discover the degree of stress and to break down the different qualities which impact bank employees due to organizational stress. The sample populace chosen for the examination is workers from public segment units in Chennai. Public sector contains State Bank of India, Union bank of India and Vijaya bank. A pilot testing was led by administering a questionnaire

on around 10 of respondents. The discoveries were that around 97 % of the respondents believed that they face elevated level of stress, which might be because of both professional and individual reasons.

Ladderud (2015) in her study of Depression and Anxiety Accommodations in the Workplace infer that anxiety and depressive disorders hinder an employee work execution and absenteeism just as work place relations. As expressed by law, bosses need to give reasonable accommodation without causing the organization undue hardship. This can be practiced through assessment of the employees individually upon the situation through assessment of effect on basic occupation capacities to decide whether the worker can in any case play out those activities with the aid of accommodation. While there are
a limited number of researches on the impacts of reasonable accommodation on anxiety and depressive disorders, different disorders, for example, bipolar disorders have demonstrated that sensible convenience does improve paces of absenteeism and performance of employees.

RATIONALE

At a certain age when work starts to play the key role in life to fulfil the capitalistic needs, job satisfaction starts determining how an individual is able to manage other domains of their life i.e., Personal and Social life. However, all three domains of life are interrelated and dependent on each other – Personal, Social, Occupational. When one isn't functioning properly other domains start getting affected.

Considering this point of view in a university, teaching staff as well as non-teaching staff deal with a lot of administrative, non- administrative commitments and stress which determine how much truly satisfied they are with their work. The level of pressure generated through these commitments can affect their Job satisfaction and also increase their anxiety through stress in case of failure to fulfil any such commitments.

In such a view this topic was chosen to study the levels of anxiety and job satisfaction among two groups – teaching and non- teaching staff.

METHODOLOGY

Objectives of the Research:

- To compare the levels of anxiety among teaching and non- teaching staff.
- To compare the Job satisfaction among teaching and non- teaching staff.

Sample Profile: Participants of the present research were a sample size of 80 adults working in a Private University.

Variables:

Independent variables (IV)- Teaching and Non- Teaching staff

Dependent variables (DV)- Anxiety and Job satisfaction

Sampling technique: Incidental Non- Probability Sampling

Incidental Sampling which is also known as Convenience Sampling is the one in which the researcher draws sample from the population that is easiest, convenient and close to hand. It is a type of non-probability sampling (where the individuals do not have equal chances of being selected) technique and is mostly used in pilot studies.

Age Norm: 23 to 42

Hypotheses: Null Hypothesis

1. There is no significant difference in the Levels of Anxiety of Teaching staff and Non-Teaching staff.
2. There is no significant difference in the Job Satisfaction of Teaching Staff and Non-Teaching staff.

Research Design: Ex post facto.

An ex post facto research design is a method in which groups with qualities that already exist are compared on some dependent variable. Also known as "after the fact" research, an ex post facto design is considered quasi-experimental because the subjects are not randomly assigned - they are grouped based on a particular characteristic or trait.

Statistical tool: A t-test is a type of statistics used to determine if there is a significant difference between the means of two groups, which may be related in certain features. A t-test is used as a hypothesis testing tool, which allows testing of an assumption applicable to a population.

Tools Used:

- **DASS21 - Depression Stress Anxiety Scale:** The DASS21 is a measure of mental health focusing on the three traits of **depression**, **anxiety** and **stress**. The DASS was designed by Syd Lovibond and Peter Lovibond at the University of New South Wales in 1995. DASS21 is the shorter version of the 42-item scale, each of the three DASS-21 scales contains 7 items divided into subscales with similar content.

  The Rating scale is as follows:

0 Did not apply at all
1 Applied to me to some degree, or some of the time
2 Applied to me to a considerable degree or a good part of time
3 Applied to me very much or most of the time

  The depression scale assesses dysphoria, hopelessness, devaluation of life, self-deprecation, lack of interest/involvement, anhedonia and inertia. The anxiety scale assesses autonomic arousal, skeletal muscle effects, situational anxiety, and subjective experience of anxious affect. The stress scale is sensitive to levels of chronic non-specific arousal. It assesses difficulty relaxing, nervous arousal, and being easily upset/agitated, irritable/over-reactive and impatient. Scores for depression, anxiety and stress are calculated by summing the scores for the relevant items and multiplying the total by 2 for the final score. The reliability of DASS-21 showed that it has excellent Cronbach's alpha values of 0.81, 0.89 and 0.78 for the subscales of depressive, anxiety and stress respectively. DASS-21 convergent validity was confirmed with moderate correlation coefficients -0.47 to -0.66

- **MSQ - Minnesota Satisfaction Questionnaire:** The Minnesota Satisfaction Questionnaire (**MSQ**) is designed to measure an employee's satisfaction with his or her job. In 1967, Weiss et al. developed the short version of the MSQ Three forms are

available: two long forms (1977 version and 1967 version) and a short form. It is a 5-point Likert-type scale with 20 items.

Very Satisfied, Satisfied, Neutral, Dissatisfied, Very Dissatisfied. The Cronbach's reliability is 0.91 and its average validity is 0.89.

Procedure

For this study, 80 samples were drawn from a Private University through convenience sampling method. The two questionnaires mentioned were administered simultaneously on all the samples and the scoring was then done. With the help of Independent sample T test, the results were analysed to compare the levels of anxiety and Job satisfaction among two groups i.e., Teaching and Non-Teaching staff.

ANALYSIS OF RESULTS

Use of statistical tests for analysis and interpretation of all collected data through the sample size was done using the statistical tool t-test through SPSS software.

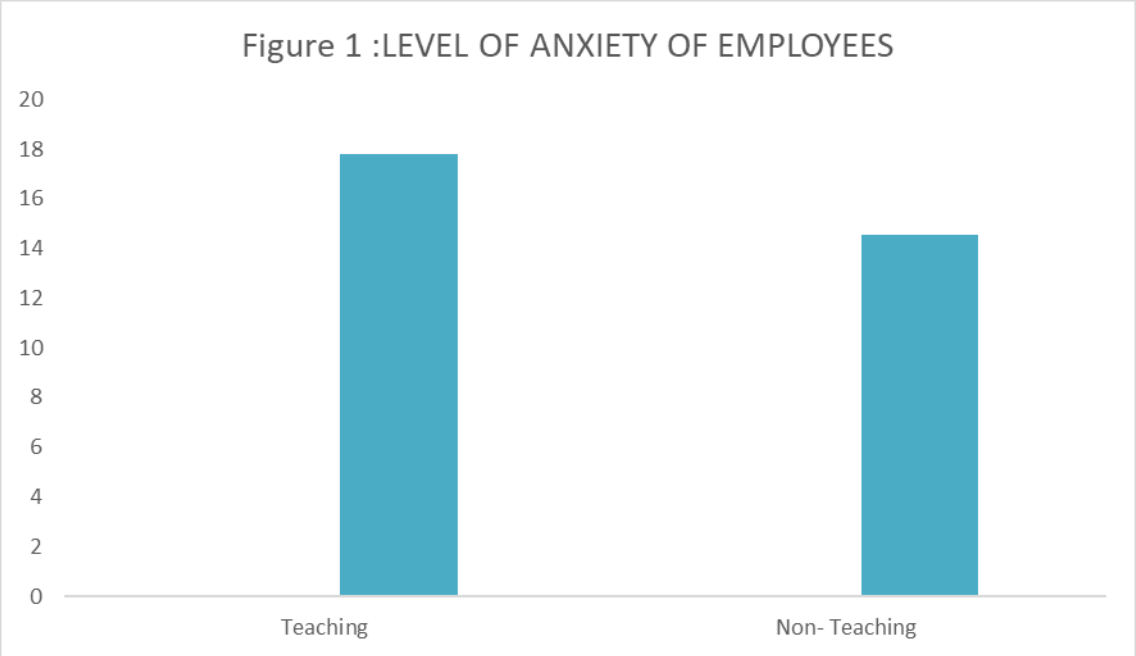
Table 4.1: SHOWING THE COMPARISON OF MEAN OF ANXIETY ON THE BASIS OF STATUS OF EMPLOYEE

Anxiety	Status of Employee	N	Mean	Std. Deviation	Std. Error Mean
	Teaching	40	17.80	9.03	1.42
	Non-Teaching	40	14.55	3.53	.55

Table 4.2: SHOWS INDEPENDENT SAMPLE t-TEST OF ANXIETY

Anxiety		t	df	Sig. (2-tailed)	Mean Difference
	Equal variances assumed	2.11	78	.037	3.25

*p ≤0.001



- The null hypothesis suggests that there will be no difference between the levels of anxiety of teaching staff and non- teaching staff, the value of t calculated by statistical analysis is 2.11 which is found to be non-significant, which means that there is no significant difference between the levels of anxiety of teaching and non-teaching staff.

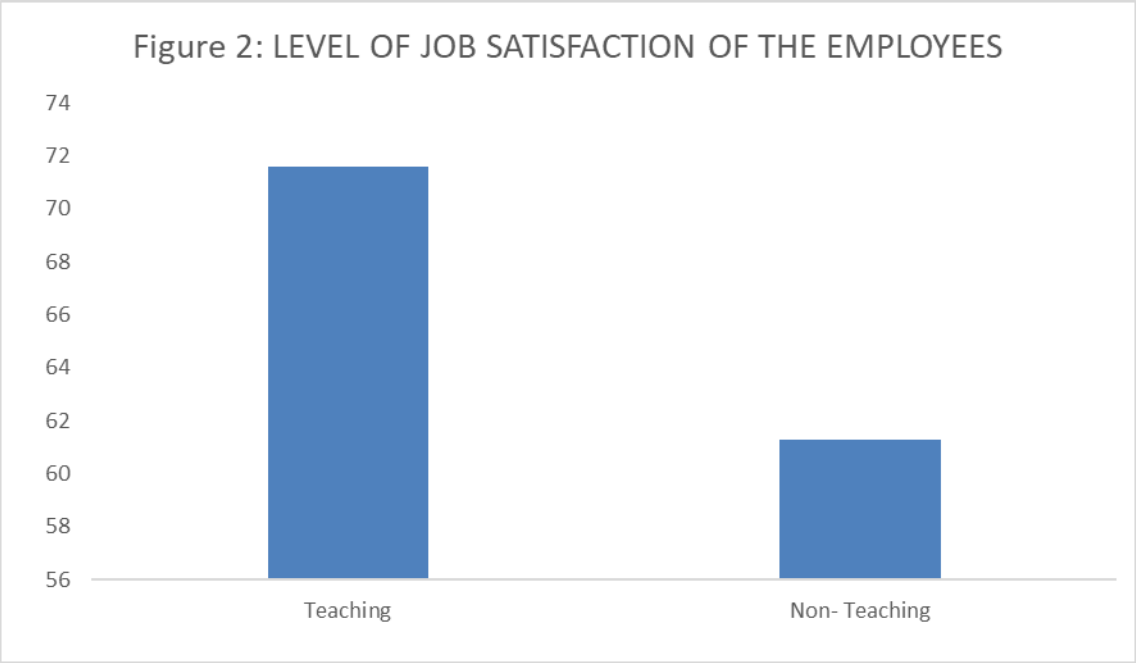
Table 4.3: SHOWING THE COMPARISON OF MEAN OF JOB SATISFACTION ON THE BASIS OF STATUS OF EMPLOYEE

Job Satisfaction	Status of Employee	N	Mean	Std. Deviation	Std. Error Mean
	Teaching	40	71.57	10.13	1.60
	Non-Teaching	40	61.27	13.91	2.20

Table 4.4: SHOWS INDEPENDENT SAMPLE t-TEST of JOB SATISFACTION

Job Satisfaction		t	df	Sig. (2-tailed)	Mean Difference
	Equal variances assumed	3.78	78	.001	10.30

*p ≤0.001



- The null hypothesis suggests that there will be no difference between the levels of job satisfaction of teaching staff and non- teaching staff, the value of t calculated by statistical analysis is 3.78 which is found to be non-significant, which means that there is no significant difference between the levels of anxiety of teaching and non-teaching staff.

DISCUSSION

The study was done to compare the levels of Anxiety and job satisfaction among teaching and non- teaching staff. The research was carried out as study on adults over the age of 23 years till 42 years of age. It was conducted on 40 teaching staffs and 40 non -teaching staffs.

In the book Organizational behaviour **(Chitale and Mohanty, 2013)** text and cases characterise that work or Job fulfilment relies upon the attitude of the employees. It is the attitude possessed by an employee. These attitudes are identified with the job and are concerned about factors as fair treatment by employers, salary, consistency, promotion opportunities, supervision, condition of work, fair evaluation, quick settlements of disputes and grievances, recognition in the organisation.

The group statistics in Table 4.1 show that the average/mean of Anxiety scores of Teaching staff is 17.80, whereas for Non-teaching staff, the average mean score is a bit lower and reaching the value of 14.55. On account of statistical analysis in Table 4.2, the t-value came out to be 2.11 with a two tailed significance level of .037. This shows that although the Level of anxiety is higher in Teaching staff than those of Non-Teaching staff, but no significance difference exists in the levels of anxiety of teaching and non-teaching staff.

The figure 1 suggests that after the comparison of means of Anxiety levels of teaching staff and non- teaching staff, although the trend shows that teaching staffs have higher levels of anxiety compared to the levels of anxiety of non-teaching staff, these differences are not significant.

The group statistics in Table 4.3 show that the average/mean of Job satisfaction of Teaching staff is 71.57, whereas for Non-teaching staff, the average mean score is a bit lower and reaching the value of 61.27. On account of statistical analysis in Table 4.4, the t-value came out to be 3.78 with a two tailed significance level of .001 This shows that although the Level of Job satisfaction is higher in Teaching staff than those of Non-Teaching staff, but no significance difference exists in the levels of Job satisfaction of teaching and non- teaching staff.

In the figure 2, the trend between the levels of job satisfaction shows that teaching staffs have a higher level of job satisfaction compared to those of non-teaching staff, these differences in both the groups are significant.

The findings in this study is similar to the findings concluded by **Khudaniya (2014)** which shows that there exists no significant difference in relation to job satisfaction

among teachers, however in contrast to study conducted by **Curl Jason (2015)** he discovered that level of Job satisfaction was significantly different for both the groups.

Therefore, this study shows that there lies no significant difference between status of employee and levels of anxiety and Job satisfaction among them.

LIMITATIONS

- This study focuses on the adult 23-42 years population only, and thus the conclusions cannot be generalized on all the age group.
- The sample size is limited to 80 only and hence it may not be generalized for a large population.
- The study is not gender specific and hence it does not evaluate the differences of gender.

SUMMARY AND CONCLUSION

This dissertation was done to study the levels of anxiety and job satisfaction among teaching and non-teaching staff in a university. For this, 80 samples were taken from university premise itself among which 40 were teaching staff and 40 were non-teaching staff. The results were then calculated and using independent sample t-test between both the groups.

The results suggest that no significant difference exists between the means of anxiety scores of teaching staff and anxiety scores of non- teaching staff and no significant difference exists between the means of Job satisfaction of teaching staff and non-teaching staff.

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शोधार्थी -प्रेरणा कुमारी

एम० एड०(बौद्धि क अक्षमता)

सं स्था-डॉ शकं ु तला मि श्रा राष्ट्रीय पुनर्वा स सं स्थानलखनऊ

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शीर्षक-आभासी कक्षा- डूबते को ति नके का सहारा

शब्द कं ु जी-1-आभासी कक्षा, 2-तकनीकी शि क्षा, 3- प्रायोगि क कार्य, 4-सैद्धांति क भाग

शोध वि धि -सर्वे वि धी शोध योगदान- कोवि ड महामारी काल में प्रशि क्षि त कि ए जा रहे वि शेष शि क्षकों हेतु आभासी कक्षा के अनुकूल उपयुक्त पाठ्यक्रम के सं सोधन की आवश्यकता पर प्रकाश एवं सुझाव ।

नोबेल कोरोनावायरस को w.h.o. ने 11 मार्च 2020 को एक वैश्वि क महामारी के रूप में घोषि त कि या जि सके बाद सभी सार्वजनि क स्थलों को नि षेध करने की नि र्णय लेने पड़े। जि समें सभी अस्तर के शैक्षणि क सं स्थान भी शामि ल थे। शैक्षणि क प्रक्रि या को पुनः प्रारंभ करने के लि ए इस परि स्थि ति में शि क्षावि दों एवं वि शेषज्ञों ने इंटरनेट के माध्यम से शि क्षण प्रारंभ कि या।जि समें आभासी कक्षा के द्वारा शि क्षण अधि गम क्रि याकलाप को अधि क से अधि क प्रभावशाली बनाने का प्रयास वि भि न्न जनात्मक बुद्धि जीवी कर रहे हैं। आभासी कक्षा एक ऑनलाइन आधारि त डि जि टल शि क्षण अधि गम वातावरण है ,जो अधि गमकर्ता एवं शि क्षक को एक साथ - एक समय में अं त:क्रि या करने का अवसर उपलब्ध कराता है ।यह एक वीडि यो कॉन्फ्रेंसिं ग हो सकती है ,ऑनलाइन व्हाइट बोर्ड और स्क्रीन शेयर साथ ही यह लाइव व्याख्यान जि समें फाइन सांझा तुरंत प्रति पुष्टि एवं आभासी अं तः क्रि या जैसे सुवि धाएं उपलब्ध होती हैं।यह शि क्षक और वि द्यार्थी को एक ही समय में सक्रि य सं प्रेषण एवं शि क्षण में सहयोग करने के अवसर उपलब्ध कराता है। यह उच्च स्तरीय अनुकूलन के योग्य है तथा आसानी से अधि क यं त्रों के पहुंच में होती है जैसे लैपटॉप, एं ड्राइड डि वाइस अन्य। वि भि न्न शि क्षण सं स्थाओं में शि क्षण प्रशि क्षण प्रि या हेतु आभासी कक्षा इन दि नों चलन में है।अध्यापक शि क्षा हेतु भी आभासी कक्षा एक वि कल्प के तौर पर उभर कर आया है। अध्यापक शि क्षा-अध्यापक + शि क्षा =अध्यापक के लि ए शि क्षा। जि सके अं तर्गत शि क्षक प्रशि क्षण कार्यक्रम भी सम्मि लि त रहते हैं।शि क्षा व्यक्ति के ज्ञानात्मक एवं भावात्मक योग्यताओं के वि कास में सहायता प्रदान करती है ,वही प्रशि क्षण कि सी व्यवसाय वि शेष में नि पुणता एवं उचि त सं पादन हेतु वि शि ष्ट ज्ञान, अभि वृत्ति ,कौशल एवं व्यवहार के वि कास पर बल देता है। भावी अध्यापकों को अध्यापक शि क्षा के माध्यम से दार्शनि क सामाजि क मनोवैज्ञानि क आधारों का ज्ञान देकर उन्हें उनके वास्तवि क चरि त्र तथा वं चि त मूल्य के नि र्धा रण में उचि त दि शा प्रदान करने में सहायता, शि क्षण के प्रति सकारात्मक अभि वृत्ति एवं शि वम ज्ञान को अपने अनुभवों से जोड़ने की स्वतं त्रता तथा शि क्षक जीवन में नि रंतरता एवं नवीन ज्ञान के नि र्मा ण में सक्षम बनाती है।प्रशि क्षण शि क्षण कार्य

को सरल -उपयोगी और प्रभावी बनाती है ।प्रशि क्षण द्वारा अध्यापक प्रयास में होने वाले अपव्ययो से बचा जाता है।

अध्यापक शि क्षा नि काय एवं सं स्थानों का एक बड़ा समूह वि शेष शि क्षा में अपना योगदान तय कर रहा है। वि शेष शि क्षा एक शैक्षणि क एवं सामाजि क सेवा है जो शैक्षणि क सं स्थानों तथा व्यक्ति गत तौर पर वि शेष आवश्यकता वाले अधि गमकर्ता को उपलब्ध कराई जाती है जि नकी आयु 3 से 21 वर्ष की होती है।वि शेष शि क्षा के कार्यक्रम अधि गम कर्ता ओं को केंद्र में रखकर तैयार कि या जाता है जो शारीरि क वि कलांगता जैसे श्रवण हीनता ,नेत्र हीनता या कि सी प्रकार की व्यावहारि क वि कलांगता बौद्धि क अक्षमता,डाउन सिं ड्रोम एवं स्वलीनता से प्रभावि त हो,अथवा गं भीर चि कि त्सकीय इलाज जैसे ऑक्सीजन पर नि र्भरता ड्रामा और अन्य कोई व्यवहारि क दोस्त जैसे एडीएसडी और अर्जि त कि ए गए वि कलांगता साथ ही सामाजि क आर्थि क सांस्कृति क रूप से वि शेष आवश्यकता वालेबच्चे तथा प्रति भाशाली बालक शामि ल होते हैं। वि शेष शि क्षा एक परि मार्जि त सं शोधि त कार्यक्रम होता है जि सके अं तर्गत कुछ वि शेष एवं यूनि क उपकरण तकनीकी एवं शोध प्रयास से लक्षि त अधि गमकर्ता के वि शि ष्ट आवश्यकताओं का पता लगाकर शैक्षणि क उद्देश्यों की पूर्ति हेतु हस्तक्षेप कार्यक्रम का प्रोग्राम प्रारूप तैयार कि या जाता है।यह अभि भावक वि शेष शि क्षक वि द्यालय एवं सेवा प्रदाता समूह के बीच की एक व्यवस्थि त ,क्रम बद्ध ,नि योजि त समझौता होती है। जो अधि गमकर्ता के शैक्षणि क- समायोजन हेतु की जाती है। शि क्षा का उद्देश्य वैसे नागरि कों को तैयार करने सेहै जो अर्थ पूर्ण जीवन व्यतीत कर एवं समाज में अपने योगदान को तय कर सके।जि सके उद्देश्य की पूर्ति हेतुवि भि न्न शि क्षकों द्वारा प्रयास कि ए जाते हैं और यह शि क्षक अध्यापक शि क्षा के द्वारा तैयार कि ए जाते हैं। वि शेष आवश्यकता वाले बच्चों को प्रशि क्षि त या शि क्षि त करने हेतु वि शेष शि क्षक शि क्षा द्वारा वि शेष शि क्षक तैयार कि ए जाते हैं। वर्तमान काल को डि जि टल ऐरा कहना ग़लत ना होगा।

परि स्थि ति वश सभी कार्यो को आनलाइन करने का चलन प्रारंभ हो गया है। जि समें अभाशी कक्षाओं को शि क्षण शि क्षा कार्यकलापों को सुचारू ढं ग से सं चालि त करने के लि ए एक वि कल्प बनाया है। पि छले एक साल इन्हीं ऑनलाइन कक्षाओं द्वारा शि क्षण प्रशि क्षण कार्यक्रम को नि रंतर गति में रखा गया है।

परन्तु भारतीय पुनर्वा स केंद्र द्वारा नि र्धा रि त डि प्लोमा स्तर के बौद्धि क अक्षम शि क्षक शि क्षा र्यक्रम के पाठ्यक्रम के सं चालन हेतु शि क्षण वि धि यों के चयन हेतुकेवल व्याख्यान एवं चर्चा वि धि तथा प्रोजेक्ट वर्क का सुझाव नहीं दि या गया है अपि तु प्रदर्शन वि धि के साथ-साथ वि भि न्न वि द्यालय एवं पुनर्वा स प्रोजेक्ट में अधि क सक्रि यता के अवसर ,सामुदायि क मीटिं ग में भागीदारी ,चि कि त्सकीय कैंप में एवं समुदाय वि कास कार्यक्रम में भागीदारी, वि कलांगता के क्षेत्र में शि क्षण एवं हस्तक्षेप कार्यक्रम के जमीनी स्तर पर अभ्यास के सुझाव दि ए गए हैं। जो अब तक आभासी कक्षा द्वारा सं भव नहीं दि खाई दे रहा है।

पाठ्यक्रम की सेमेस्टर के आधार पर अगर प्रायोगि क कार्य एवं सैद्धांति क कार्यों (पेपर) की तुलना की जाए तो पहली सेमेस्टर में सैद्धांति क समयावधि 360घं टे है ,वही प्रायोगि क कार्य की समयावधि 300 घं टे हैं। दूसरी सेमेस्टर में सैद्धांति क समयावधि 1800घं टे है,वही प्रायोगि क कार्य की समयावधि 480 घं टे हैं। ति सरी सेमेस्टर में सैद्धांति क समयावधि 360घं टे है ,वही प्रायोगि क कार्य की समयावधि 310 घं टे हैं। चौथी सेमेस्टर में सैद्धांति क समयावधि 180घं टे है ,वही प्रायोगि क कार्य की समयावधि 470 घं टे हैं।

इस प्रकार हम देखते हैं कि कुल 2640 घं टे के कोर्स में 1560 घं टे का प्रायोगि क कार्य तथा 1080 घं टे का सैद्धांति क कार्य हेतु समय नि र्धा रि त कि या गया है। इसी प्रकार भारतीय पुनर्वा स केंद्र द्वारा नि र्धा रि त डि प्लोमा स्तर के दृष्टि अक्षमता शि क्षक शि क्षा कार्यक्रम के पाठ्यक्रम कि कुल 2650 घं टे के कोर्स में 1480 घं टेका प्रायोगि क कार्य तथा 1170 घं टे का सैद्धांति क कार्य हेतु समय नि र्धा रि त कि या गया है।

और भारतीय पुनर्वा स केंद्र द्वारा नि र्धा रि त डि प्लोमा स्तर के श्रवन अक्षमता शि क्षक शि क्षा कार्यक्रम के पाठ्यक्रम कि कुल 2640 घं टे के कोर्स में 1560 घं टेका प्रायोगि क कार्य तथा 1080 घं टे का सैद्धांति क कार्य हेतु समय नि र्धा रि त कि या गया है। अब मुद्दा यह उठता है कि क्या आभासी कक्षा के माध्यम से इन प्रायोगि क कार्यों की पूर्ति सं भव है या केवल सैद्धांति क भाग को पूर्ण कर लेने मात्र से वि शेष शि क्षक के सारे कौशल से छात्र अध्यापक -अध्यापि का परि पूर्ण हो जाएं गे? जवाब स्पष्ट है कि अब तक नहीं ।इस एक वर्ष में आभासी कक्षा के माध्यम से जो वि शेष शि क्षक प्रशि क्षि त कि ए जा रहे हैं, उन्हें सैद्धांति क पक्ष को वि कसि त करने में ही कई कठि नाईयो का सामना करना पड़ा है। परंतु प्रायोगि क पक्ष के नाम पर केवल उसके सैद्धांति क पहलू जानना न्याय सं गत ना होगा। प्रायोगि क पक्ष के महत्व को वि शेष शि क्षक के क्षेत्र में हम इस तरह भी समझ सकते हैं कि बौद्धि क अक्षम बालकों के शि क्षा व्यवहारि क वि धि यों द्वारा सं भव है, और समस्याएं भी व्यावहारि क स्तर की ही होती है जो केवल सि द्धांतों के अध्ययन से जानना-समझना सं भव नहीं है।जि समें कौशल प्राप्त करने हेतु एक वि शेषज्ञ के पर्यवेक्षण में अभ्यास आवश्यक है । प्राथमि क स्तर की दृष्टि बाधि त बच्चों को प्रशि क्षि त करने हेतु उनके मन स्थि ति , मूलभूत समस्याओं ,उनके दैनि क जीवन से सं बं धि त एवं समुदाय में पुनर्वा स हेतुवास्तवि क अनुभव शि क्षण के कौशलो को प्राप्त करने में सक्षम करता है । प्राथमि क स्तर के श्रवण बाधि त बच्चों के शि क्षण हेतुजि न कौशलो एवं अनुभवों की आवश्यकता है वह केवल आभासी कक्षा द्वारा उपलब्ध करना सं भव नहीं है। को भी काल में तैयार कि ए जा रहे हैं देश नि र्मा ता अर्था त वि शेष शि क्षक क्या उनका सुनहरा भवि ष्य आभासी कक्षा नि श्चि त कर सकने में सक्षम है? साथ ही अगर यह तैयार कि ए गए शि क्षक अपने शि क्षण व्यवस्था में जुड़ जाते हैं तो इनके द्वारा शि क्षा प्राप्त कर रहे अधि गमकर्ता उचि त शि क्षा प्राप्त कर पाएं गे या नहीं यह तो एक हद तक भाग्य पर ही नि र्भर करेगा।

सुझाव-

1-आभासी कक्षाओं के लि ए कोवि ड काल हेतु वि शि ष्ट शि क्षक शि क्षा पाठ्यक्रम तैयार कि ए जाए ।जो आभासी कक्षा की सीमाओं को ध्यान में रखते हुए तैयार कि ए गए हो ।

2-प्रायोगि क कार्यों में प्रशि क्षकों को शि क्षण हेतुघर-घर इंटर्नशि प का कार्य दि या जाना चाहि ए एवं वि शि ष्ट बालक ना होने पर अन्य वि कल्प चुनावों को सम्मि लि त कि या जाना चाहि ए ।

3-सामुदायि क अनुभव हेतु प्रशि क्षण सं स्थानों को अपनेसत्र के प्रशि क्षुओं को वि भि न्न ऑनलाइन सक्रिय स्वयं सेवी सं स्थाओं से पूरे बैच को जोड़ना चाहि ए ।

4-हस्तक्षेप सं बं धी कौशलों हेतु वर्तमान आपदा को भी शामि ल करते हुए ऑनलाइन नि यमि त वर्कशॉप आयोजि त कि ए जाने चाहि ए, जि समें वि शेषज्ञ के तौर पर वि कलांगता के क्षेत्र के साथ-साथ एक मनोचि कि त्सक ,सामाजि क कार्यकर्ता तथा सरकारी प्रशासनि क अधि कारी भी शामि ल होने चाहि ए ।

5-प्रशि क्षण सं स्थानों में कार्यरत सभी प्रअध्यापकों को सेवारत प्रशि क्षण के अं तर्गत तकनीकी आधारि त शि क्षा एवं वि शेष शि क्षा के नए तकनीको का प्रशि क्षण अनि वार्य रूप से सं बं धि त नि काय द्वारा सीमि तसमय के भीतर पूर्ण कि या जाना तय कि या जाना चाहि ए। पूरी शि क्षा वि भाग को अधि क सचेत -सतर्क एवं सक्रि य होकर आवश्यक सं शोधन एवं सृजन करने की आवश्यकता है। शि क्षक शि क्षा बहुत ही सं वेदनशील क्रि याकलाप है,इसे कि सी भी प्रकार की महामारी के प्रभाव में आकर गलत तरीके से दि ए जाने के कारण भवि ष्य में केवल भावी शि क्षक एवं उससे शि क्षा प्राप्त करने अधि गमकर्ता ही प्रभावि त नहीं होगा ।अपि तुपूरे वि श्व की शि क्षण व्यवस्था प्रभावि त होगी जो एक नई महामारी का कारण बनेगा।

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Review on Automated Machine Learning and Its Applications

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ABSTRACT

Automated Machine Learning describes approaches and processes to make Machine Learning available for non-Machine Learning experts, to improve the efficiency of Machine Learning and to accelerate research on Machine Learning. The primary goal of this paper is to provide readers with a series of high-quality research articles that discusses automated machine learning applications and represent evolving developments in state-of-the-art algorithms. Here, a review of 7 articles/research papers is included. The main goal was to show the broad reach of Automated Machine Learning and its implementations in different fields.

KEYWORDS: Auto ML, IoT, Blockchain, SME, Artificial Neural Network, Convolution Neural Network, Biological Ecosystem Networks (BENs), Shannon entropy information measures, hyper-parameter optimization.

INTRODUCTION

Machine learning is an application of artificial intelligence that allows systems to automatically learn and improve from experience without being separately programmed Machine learning is concerned with the development of computer programs that can access data and learn on their own. Machine learning has had a lot of traction in recent years, and it's now used in an increasing range of fields. However, this success crucially relies on human-machine learning experts to perform complex tasks such as preprocessing and cleaning the data, selecting and constructing appropriate features, selecting an appropriate model family, optimizing model hyperparameters, postprocessing machine learning models and critically analyzing the results obtained.

Traditional machine learning model development is resource-intensive resources, domain knowledge and time to produce and compare dozens of models. As the complexity of these tasks is often beyond non-ML-experts, the rapid growth of machine learning applications has created a demand for off-the-shelf machine learning methods that can be used easily and without expert knowledge. We call the resulting research area that targets progressive automation of machine learning Auto ML. It is the process of automating the time consuming, iterative tasks of machine learning model development. It allows data scientists, analysts, and developers to build ML models with high scale efficiency, and productivity all while sustaining model quality.

BACKGROUND

Auto ML research began in the early 1990s, and 2018 was the year that the definition of Auto ML became more widely discussed. AutoML has been expressed as a "quiet revolution in AI" that is set to transform the data science world by automating a significant portion of the machine learning process. Google Auto ML Vision, a

computer program that automatically created machine learning models on image data, was released in January. Then, in July, Google introduced Auto ML, a machine translation and natural language processing platform.Long-term development of automized machine learning is driven by the slant that it is getting to be available to every technology user.Data scientists will use it to speed the adoption of machine learning in business processes for full business value.

LITERATURE SURVEY

In the paper by Zhi Li (IEEE) and Hanyang Guo (IEEE), a customer service platform based on the IoT, blockchain and Auto ML is proposed which is open and automated. Here they used Auto ML to computerize the process of data analysis, which can easily be performed by a non-ML expert too. This led to a decrease in the dependency on a specialist, who is highly expensive. Hence, reduces the time and cost to perform such tasks. In this article, open Auto ML is introduced by collaborating blockchain, IoT, and Auto ML to enable multiple parties to exchange their major customer data and models, which will exploit others' work and thereby reduce the expense of implementing automated customer support .In comparison to conventional customer service practices, the proposed platform creates a collaborative and trustless atmosphere for data trading, which is particularly beneficial for SMEs in acquiring enough data to achieve automated customer experiences while still improving their core customer service expertise [1].

Maria Tsiakmaki (University of Patras) and Georgios Kostopoulos (University of Patras), along with fellow writers, explored the potency of Auto ML for the assignment of anticipating students' learning results based on their support in online learning stages. The outcome imparts affirmation that tools optimizing hyperparameters instead of selecting the default values accomplish advanced execution in educational settings as well. Using Auto ML methods for online education remarkably refined the productivity of typical algorithms. Their research is driven to the conviction that the utilization of Auto ML strategies and its tools like Auto-WEKA can offer assistance to individuals within the education industry- both experts and amateurs within the field of data science [2].

Another paper is by Enrique Barreiro, Cristian R., Munteanu. To forecast BENs, they suggested a new method for selecting ANNs using Auto ML. Twelve different classifiers, including vector, Bayesian, trees-based, multilayer perceptron, and deep neuronal networks, were evaluated with the proposed net-net model. A deep completely integrated neuronal network with a test accuracy of 0.866 and a test AUROC of 0.935 was found to be the best Net-Net Auto ML model for 338,050 outputs of 10 ANN topologies forties of 69 BENs .This work paves the way for Net-Net Auto ML to be applied to other systems or ML. Until training a linear Auto ML model, the latest Net-Net Auto ML technique showed how to choose which ANN topology will correctly predict the connectivity of BEN nodes. Finally, Net-Net Auto MLs with Sh_k information indices could be used to screen ANN topologies that predict biological

network links. This could result in better use of computational power by prioritizing the preparation of the best ANN topologies [3].

RyotaSawaki used Auto ML to create a basic and fast tool for analyzing zebrafish images. ML algorithms were performed on vascular- and macrophage-Enhanced Green Fluorescent Protein fish under normal and pathological conditions. Although machine learning can detect anomalies in both strains of fish with greater than 95% accuracy, the macrophage-EGFP fishes' images must be pre-processed before the learning protocol can begin. They developed a protocol for evaluating zebrafish phenotypes using traditional machine learning platforms, allowing for fluorescence-based, phenotype-driven zebrafish screening. Auto ML procedures measure performance values that are comparable to humans, ensuring that this programme can be used for high-throughput scanning in conjunction with ZF-ImageR, a batch uploading software [4].

Auto ML for Model Compression (AMC) is suggested in a paper by Yihui He (MIT), which uses reinforcement learning to effectively sample the design space and boost model compression efficiency. They were able to produce futuristic model compression outcomes in a completely automatic manner, requiring no human intervention.On ImageNet, the proposed model was 2.7 percent more accurate than the hand-crafted model compression system for VGG-16. The compressed model performs well in a variety of functions, including classification and identification [5].

Che-Min Chung in his paper presented Decanter AI, a new approach to machine learning, uses automated machine learning methods to address the vast data challenge in the rapidly growing Internet of Things industry (IoT). This IoT data solution is applied to a real-world model of a smart building with over 100 linked sensors, and the results are compared to industry standards. Because of the automated analytic method and pre-mode construction, Decanter AI could save data scientists a significant amount of time and improve their productivity. While the framework can now serve as a starting point for data analytic novices, a domain expert is still needed to define the query [6].

Another paper by Joshua, Spangenberg and Kant, examined the application of Auto ML for image-based plant phenotyping using wheat lodging evaluation as an example of unmanned aerial vehicle imagery. Auto Keras, an open-source Auto ML platform, as compared to transfer learning using current convolutional neural network (CNN) architectures in image recognition and regression tasks. The results show that transfer learning with modern CNNs worked better than Auto ML, though the differences were minor. Auto ML is a suitable alternative to manual DL approaches for time-critical plant phenotyping applications that produce image datasets outside the normal RGB three channels. It should be in the toolbox of both beginner and experienced users [7].

CONCLUSION

By automating machine learning activities like pipeline construction and hyperparameter tuning, Auto ML assists data scientists in increasing their productivity and realizing their full potential. Auto ML's high level of automation enables non-

experts to use machine learning models and methods without having to become machine learning experts. Automating the whole machine learning process has the added benefit of providing simplified solutions, quicker development of such solutions, and models that often outperform hand-designed models. The main goal was to show the broad reach of Automated Machine Learning and its implementations in different fields. Auto ML has enormous potential to change the machine learning environment, as shown by the growing excitement and debate around it, as well as early industry adoptions.

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Innovative Teaching Trends During Covid-19 Crisis:

Refocusing Learning though flipped classroom

By

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Abstract

The Covid-19 pandemic has raised an urgent and unexpected request for the education community worldwide to shift from previously face-to-face teaching to be online. Online teaching and learning imply pedagogical content knowledge designed and organised for better learning experiences and creating unique learning environments, using digital technologies. Teaching is going through a momentum of great transformations, and there has been dynamic role of technology helping the teachers to use innovative methods to connect with the students for academic learning. This paper makes an attempt at providing understanding innovative teaching trends for professional development of students, by use of various learner- centered approaches such as flipped classrooms and other innovative teaching methods. It is based on the secondary information obtained from various research studies, documents and reports; aimed at explaining how these approaches helps to provide quality education and create favourable learning environment in the classroom. At the end of the study, the advantages and disadvantages of using FC Model are, and necessary suggestions made.

KeyWords: **Innovative teaching trends, flipped classrooms, teaching learning process, professional development**

Introduction

“Technology is just a tool. In terms of getting the kids working together and motivating them, the teacher is most important.” - Bill Gates

Teachers are the ultimate asset of an education structure, where they stand as an interface for disseminating knowledge, skills and values to the learners. They are described as the backbone of an education system. The Education Commission (1964-66) of India explicitly stated that “No system can rise above the status of its teacher". According to the great educationist Rabindranath Tagore, “A teacher can never teach truly, unless he is still learning himself; just as a lamp can never light another lamp unless it continues to burn its own flame”. When teachers discover new teaching strategies through their professional development, they can go back to the classroom

and make changes to their teaching styles to better suit the needs of their students. Professional Development for teachers makes them more efficient in their presentations and course evaluations, as it exposes them to new delivery methods, evaluation styles and record-keeping strategies. Using blended mode of e-learning helps teachers to become better educators and develop themselves into competent future administrators.

During COVID-19 pandemic, higher education has been pressured to shift towards more flexible, effective, active, and student-centered teaching strategies that leads to increased motivation, engagement, and effective learning of the students. A blended mode of e-learning methods are practised to mitigate the limitations of traditional transmittal models of education

Literature Review

The use of the e-learning methods, such as blended learning and flipped classroom has the potential to be effective and beneficial methods of education. By replacing the direct instruction technique (the explicit scripted presentation or delivery of a lesson or an information) from the class time, with video lectures observed in and outside of the classroom allows for a further increased class-time to be used for active learning. Active learning techniques generally include activities, classroom discussions, student-created content, independent problem solving, inquiry-based learning, and project-based learning (Bergmann, Overmyer, & Wilie, 2012). Such use of class-time creates a classroom environment which uses collaborative and constructivist learning, blending with the direct instruction used in the classroom (Tucker 2012). Constructivist learning takes place when students gain knowledge through direct personal experiences suchas activities, projects, and discussions. (Ultanir, 2012). The frequency of these constructivist classroom experiences can be increased in a flipped classroom through the use of activities, thus creating students who are active learners (learning by engaging in analysis, synthesis, and evaluation), rather than passive learners (learning by the absorption of information from just hearing, seeing, and reading) (Minhas, Ghosh, & Swanzy, 2012; Sams, 2013). The passive learning of a flipped classroom happens during the video lectures outside a class, thus freeing up in class time for student's active learning and participation (Tucker, 2012). Active learning of the students has been found to produce better grades than passive learning (Minhas, Ghosh, & Swanzy, 2012). Collaborative or cooperative learning takes place when two or more people learn something together, thus holding one another accountable for their learning (Roberts, 2004). Collaborative learning can create students who are more invested in their own learning, desiring to succeed in order to meet the expectations of one’s peers (Roberts, 2004). Through group activities, discussions, and group problem solving, blended learning and flipped classroom methodologies can achieve a high level of collaborative learning.

What is Flipped Learning?

Flipped Learning is defined as “class work at home and home work at class”. Flipped Learning is a pedagogical approach in which direct instruction moves from the group learning space to the individual learning space, and the resulting group space is transformed into a dynamic, interactive learning environment where the educator guides students as they apply concepts and engage creatively in the subject matter.

The flipped classroom model is based on the idea that traditional teaching is inverted in the sense that what is normally done in class is flipped or switched with that which is normally done by the students out of class. Thus, instead of students listening to a lecture in class and then going home to work on a set of assigned problems, they read course literature and assimilate lecture material through video at home and engage in teacher-guided problem-solving, analysis and discussions in class.

The Four Pillars of F-L-I-P

- **F – Flexible Environment**

Flipped Learning allows for a variety of learning modes; educators often physically rearrange their learning spaces to accommodate a lesson or unit, to support either group work or independent study. They create flexible spaces in which students choose when and where they learn. Furthermore, educators who flip their classes are flexible in their expectations of student timelines for learning and in their assessments of student learning.

- **L - Learning Culture**

In the traditional teacher-centered model, the teacher is the primary source of information. By contrast, the Flipped Learning model deliberately shifts instruction to a learner-centered approach, where in-class time is dedicated to exploring topics in greater depth and creating rich learning opportunities. As a result, students are actively involved in knowledge construction as they participate in and evaluate their learning in a manner that is personally meaningful.

- **I – Intentional Content**

Flipped Learning Educators continually think about how they can use the Flipped Learning model to help students develop conceptual understanding, as well as procedural fluency. They determine what they need to teach and what materials students should explore on their own. Educators use Intentional Content to maximize classroom time to adopt methods of student-centered, active learning strategies, depending on grade level and subject matter.

- **P – Professional Educator**

The role of a Professional Educator is even more important, and often more demanding, in a Flipped Classroom than in a traditional one. During class time, they continually

observe their students, providing them with feedback relevant in the moment, and assessing their work. Professional Educators are reflective in their practice, connect with each other to improve their instruction, accept constructive criticism, and tolerate controlled chaos in their classrooms.

While Professional Educators take on less visibly prominent roles in a flipped classroom, they remain the essential ingredient that enables Flipped Learning to occur.

Flipped lessons replace teacher lectures with instructional material—often a video—that students watch and interact with at home. They apply what they learned in class the next day through a variety of activities or assignments that could once have been homework, with the teacher working as a coach or guide.

The benefits include allowing students to work at their own pace, to determine for themselves the material they need to review, and to apply concepts in different contexts in class to ensure that they thoroughly understand of the content.

But this model can be unsuccessful if students don't do the advance work—if they don't have access to reliable internet outside of school, for example. Students who are unable to complete the advance work the evening before find themselves either unable or ill-prepared to participate in class activities the following day.

Tools for a Flipped Classroom

The teacher moves from being the "sage on the stage" to the "guide on the side" by providing individualized help for each student. While some teachers may prefer to avoid whole-class direct instruction, others may find it helpful for their students when reviewing content or demonstrating or revisiting a concept. Part of the beauty of the in-class flipped model is that it provides a great deal of flexibility for teachers based on their students' needs.

Structure of a flipped lesson

Flipped lessons can take a variety of forms. Some flipped lessons stand alone, meaning that students learn the content presented in an instructional video or text and demonstrate their understanding through an assessment, project, etc., before moving on to the next concept. Other lessons may take the form of a unit HyperDoc that requires students to progress through a series of lesson components designed to encourage them to engage with and explore content, apply the learning, and extend their knowledge.

Google Classroom: Google Classroom can be used in a variety of ways—to deliver assignments to students and to provide effective and efficient feedback, for example—and it can be a great landing page for students as they navigate assignments. Classroom can also be used to distribute a lesson's digital texts and other resources.

In flipped environments where students take notes on instructional videos digitally, Classroom can be used to assign a unit Google Doc to students for that purpose. Teachers can establish this procedure as a norm at the beginning of the school year so students know that they should begin each class period by going to Google Classroom.

Edpuzzle: Instructional videos are an important component of the flipped classroom. While there are many schools of thought concerning teacher presence and action in these videos and how long they should be, most teachers would agree that students should be held accountable for the video content and that teachers should have a way to monitor student progress and provide timely feedback. Edpuzzle allows teachers to do just that, and it provides teachers with the ability to embed a variety of formative assessments into videos they create or use from other sources.

Padlet: After students have viewed an instructional video, it's a good idea to provide them with an opportunity to reflect on the content. Padlet provides teachers with a way to have students not only review and reflect on content, but also collaborate with their peers.

Quizizz: Formative assessment is extremely important in any classroom, and flipped classrooms are no exception. The flipped strategy puts more responsibility for viewing and interacting with content on the students, and formative assessment is therefore needed after every video.

With the help of these tools, teachers can implement a flipped classroom approach—with students working on their own either at home or in the classroom—and provide a more individualized learning experience for all of their students.

Why are teachers flipping for flipped learning?

1. **Flipped learning allow students to consume lecture materials at their own pace.** Unlike traditional lectures in which students are beholden to the instructor's pace, students in flipped classrooms can rewind and replay the video as many times as needed to improve their understanding of difficult concepts.
2. **Students apply new knowledge using the instructor as a resource.** In traditional classroom environments, students usually apply new knowledge on their own through homework. By bringing homework assignments into the classroom, students are able to get help quickly, and teachers can identify common problem areas in order to adjust material accordingly.
3. **Flipping the classroom works.** A growing number of studies show that flipped classroom scenarios can improve student achievement in a subject. For educators planning to make the flip, one question to resolve is the technology needed to deliver course content to their students. Video plays a major role in the majority of flipped classrooms, and as such, schools must consider the technology that will be used to record and share classroom videos with their students. Without a plan to manage the technical aspects of a flipped classroom, educators risk limiting the benefits of this new pedagogical style.

Advantages And Disadvantages of Flipped Classrooms

Flipped classes or lectures are a new style of teaching focusing on the student rather than the lecturer. It is recommended that the lecturer or teacher chooses the right classes or lectures to flip for effective learning.

Advantages of flipped classrooms/learning

- **More one-to-one time with teacher or lecturer-** The flipped classroom model provides more time for one-to-one between the teacher and students, giving more time to the students to ask queries.
- **More student collaboration/interaction time-** Students have more student collaboration time to cover subject activities, discussions and peer reviewing.
- **Self-paced learning-** Student learning can be self-paced to help them learn at their own pace and in their own time, which can be particularly effective for slower learners.
- **Improved engagement-** Students are more engaged with flipped classrooms as they are researching, completing activities or discussing the subject. With traditional teaching, the teacher would generally be providing all of the information to them.
- **Deeper subject understanding-** As students are researching and discussing themselves, the students gain a deeper understanding of the subject and related subjects.
- **Work accessibility-** Homework and work tends to be more accessible with the flipped classroom or lecture model. Teachers have to provide learning materials for the subject making the work provided available over the school, college or university's intranet system.
- **May improve test performance-** Some recent studies have shown that flipped classrooms or lectures can improve test performance. The Flipped Learning network completed a survey in 2014 that showed 71% of teachers had seen test score improvements from using a flipped classroom model.
- **Transparency for parents-** Parents have more access to the learning materials and their performance so far. Parents can help if there are any issues with the student's understanding.
- **Absences aren't as problematic-** A student can catch up on missed lectures or classes using the flipped classroom model. The initial information required for the class will be online and the student can catch up themselves.
- **Richer content-** Flipped classrooms or lectures encourage richer content. With traditional teaching, the students would be provided with one way of looking at the subject, whereas flipped lectures or classrooms encourage the student to find many ways of looking at a topic including different diagrams, wording and videos.
- **More freedom for teacher-** Teachers or lecturers have more freedom to spend with the students they feel need more support or assistance using the flipped classroom method.

Disadvantages of flipped classrooms/learning

- **Relies on student preparation-** The flipped method does rely on students preparing for their classes ahead of time. If the student is already a social loafer then this method will mean they don't complete their own work or learn.
- **Increased screen time-** Due to the nature of the research, activities and discussion required, computers or tablets tend to be used more using the flipped teaching method. This can add to an already high screen time in students.
- **May exacerbate digital divide issues-** Lack of access to the internet or a home computer can result in a lack of access to the learning materials provided. This may exacerbate digital divide and learning issues already caused by students coming from lower income families.
- **Time and effort for teacher-** The time and effort required from a teacher's perspective initially when creating the flipped class material is higher than for a traditional class. However, the material can be re-used the next year.
- **May not cover everything required for a test-** Students in flipped classes may not cover the entire subject required for a test. The depth of the subject can be dictated by the student themselves or the group the student is working with.
- **Keeping everyone on the same subject can get tricky-** The relaxed atmosphere of the flipped classroom enables students to be one different levels of their education, but education must continue. It will be a lot to handle when students of a class are all on different levels of the class lessons and you need them to be caught up to introduce a new lesson.
- **Internet accessibility fluctuates-** A flipped classroom requires of internet accessibility outside of the class room. Internet is not always easily accessible for everyone which can make it difficult for some students to access lectures.
- **Promotion of a lackadaisical learning environment-** Flipping a classroom will encourage students to slow down their engagement of classroom material. This can have long term effects such as students may begin to slow down their learning rate which would decrease the amount of material they learn in a given amount of time.

Conclusion

The calls for reforming traditional higher education teaching, and for transforming the sage on the stage into the guide on the side in order to pave way for student-centered active learning strategies have probably never been as loud as now. In this context, flipped classroom has been proposed to answer these calls. Several studies have demonstrated that flipped classroom as a teaching method may promote student engagement and a more active approach to learning in higher education. Despite these issues, the flipped classroom can still a very effective, hands-on approach to improving student achievement and involving them in their own education.

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Online Education: Challenges and Opportunities

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Abstract

The revolution in communication and education technology in the past has transformed face-to-face teaching and learning to online education. The Covid-19 pandemic of last year has made online education a normal practice at all levels. To realise the objective of making education accessible to a large section of the young population educational institutions in India have taken a number of initiatives. With a population of 1.35 crores and limited resources, it is not an easy task. Online education has issues of technical infrastructure, trained human resource, technical support, internet, power supply, finances, outreach and assessment of academic performance. There is a need to understand these issues in order to assess acceptance of online education. It is observed from the content analysis of literature and some studies that online education has brought new opportunities of expansion, development of e-content, skill development and improvement in quality. But there are challenges of infrastructure, trained human resource, learning material, technical support and maintenance, equipment, as well.

.***Keywords:*** *Online Education, Educational Technology, Online Teaching and learning and, information and communication technology (ICT), academic performance, effectiveness.*

Objectives

- To conduct an Strengths, Weaknesses, Opportunities, & Challenges (SWOC) analysis of online education
- To provide an efficient and less expensive education.
- To meet the demands of the new digital era.
- To find performance of online education.

Introduction

Today science and technology has intensively influenced human life and its attitude and methodologies. Now the learning is not limited to the walls of the classroom only. It involved the encounters of infrastructure economic and physical barriers to have a right

of entry to education. ICT made over the e-learning set ups to address the needs and complete multiple roles in education to assist the participants. Online education is a flexible instructional delivery system that encompasses any kind of learning that takes place via the Internet. Online learning gives educators an opportunity to reach students who may not be able to enrol in a traditional classroom course and supports students who need to work on their own schedule and at their own pace. Online education has increased the avenues through part time and distance learning schemes in spite of the challenges being faced i.e cost issues, teaching issues, quality education and distance barriers. It has spread the knowledge, interaction between the participants exceeding borders through networking structures.

The Covid-19 pandemic outbreak has deeply affected the education sector. This has forced many educational institutions to discontinue in person teaching. Social distancing is important at this stage. The situation makes us understand the environment and arrangements are the dire need for the academic institutions. Online education serves as a panacea during this pandemic. The government is supporting online education in India because of its potential to improve education quality and reach through the Digital India initiative. Government of India has initiated a programme named SWAYAM (Study Webs of Active –Learning for Young Aspiring Minds) that is designed to achieve the three fundamental objectives of Education Policy i.e., access, equity and quality. The main objectives of this effort are to take the quality teaching learning resources to all, including those who cannot afford. It is thought that some people agree that Online Education has come a long way and opened new opportunities in the field of education, some researchers are still questioning the value of learning through non-traditional means. This study will investigate academic performance of Chandigarh University based on inputs and outcomes in various domains and evaluate the strength of teaching and research activities.

Review of Literature

In the past, a number of research studies have been conducted by scholars to understand the difficulties faced by teachers in teaching mathematics online. However, these studies differ in their objectives, samples, scope and methodologies. A few important studies are reviewed here to assess the status of research on difficulties in teaching mathematics through online mode.

Tyagi, et. al. (2009), evaluated the performance efficiencies of 19 academic departments of IIT Roorkee (India) by applying Data Envelopment analysis (DEA) technique and suggests the possible improvements to the inefficient departments.

Mogha, S. K., (2020) used DEA to measure the relative efficiencies of the academic departments of Private University in Gurgaon (India) using the DEA-based dual CCR model.

According to Stack, Steven Dr. (2015), online education has proliferated in the last decade. His research has not found any major difference in the scores of the students taking online course and face to face classes. According to a report by Google and KPMG, the online education market in India at the end of December 2016 was $247 million and it will reach $1.96 billion by 2021. Also, India's online Education market is the second largest market after US. The findings of the report also states that the paid user base for online education services will also grow at least by six times i.e. Approximately 9.6 million users by 2021.

Challenges in Online education

In India, the digitization initiative has encountered many problems. Government tried to boost the online education system and implemented various education policies, but they were not sufficient to set an example for the universe. UGC is continuously working and focusing on quality education in the education sector. We are to overcome the challenges of online education system which are:

i. **Lacking of digital infrastructure**

Although the Government of India is taking initiative to develop e- learning but a lot needs to be done in this direction. High speed internet and stable power supply are the biggest problems. 5G networks technology is the requirement of today's which will increase the speed of downloading the data.

ii. **Limited Social interaction**

Since online education can be accessed at home or any other suitable place, there is very limited direct interaction with the teacher and other people doing the course.

Most of the discussion takes place through email, chat room or discussion groups. So, you are not able to develop any social links which do help in career growth.

iii. Problematic integrity of degrees

Although the industry has started recognizing online degrees, there are still a lot of fake and non-accredited degrees being offered online. The number of scam operators is rising who are offering fake certificates which do not have any authorizations. These scams not only losses the credibility of the online certificates but also the faith of forthcoming employer in online programs

iv. Possibility of distraction :

Learners can easily distract from their studies in online education since there are no face-to-face interaction between lectures and classmates. Until and unless learners keep themselves motivated it takes a long time to complete the course. Students always make internet connectivity an excuse for not attending the online class.

v. Impossible to pursue Lab/Workshops oriented courses

Engineering course or other courses like paramedical, nursing and MBAs where On-Job-training is included, requires labs or hands-on workshops. Teaching mathematics without practice is not possible. Theoretical subjects are possible to teach through online mode and students can easily understand but that is not the same in case of practical subjects. Practical subjects are not effective through online mode of education

vi. Motivation

Some students need the push to get to the class. In the case of self-paced online programmes, students may dawdle. The dropout rate in online education is very high. Self-motivation and discipline is required to complete the assignments and upload them timely and for attending online class.

vii. Language of the Course

India is a multi-linguistic country, and a vast majority of the population comes from rural areas. The content offered by most of the online courses is in English. Hence,

those students who are not able to speak English language struggle with the availability of language content.

viii. Quality

Government is continuously concentrating on quality education. A large number of colleges and universities in India are unable to meet the minimum necessities laid down by the UGC and our universities are not in a position to mark their place among the top universities of the world.

ix. Faculty

Faculty shortages and the inability of the state educational system to attract and retain well qualified teachers have been posing challenges to quality education for many years. Large numbers of NET / PhD candidates are unemployed even though there are a lot of vacancies in education, these deserving candidates are then applying in other departments which is a biggest blow to the education system.

Nearly 40% of the population do not know how to operate computers. Though learners need devices for online mode of education, they cannot afford the same. Sometimes teachers as well as students are not familiar with technology or devices, which sometimes are obstacles for growth of education. Limitation of resources is also another major reason for conducting teaching through online mode. Few courses have demand throughout the year but are not possible to conduct in the digital model. Due to poor connectivity of Internet connection, sometimes it is not possible to conduct online mode of teaching from desired places. Not so effective for children below age 17 years due to lack of concentration and skill required. Problem in finding willing skilled manpower to train illiterate rural areas of India. Very less computer-based courses/skills taught to students in government primary schools to increase their knowledge about ICT importance in rural development

Opportunities in Online Education

No doubt online education has many challenges but also benefited a lot to the participants. Change in technology is offering many opportunities for all participants in the online education sector which includes entrepreneurs, education providers and learners. Some of the factors offering different opportunities in this domain include:

i. Mobile Learning

Today the vast majority of students in the future will have access to e-learning through mobile phones because now 4G internet service is almost available everywhere on mobile.

ii. Overcome the shortage of faculty

ICTs provide the opportunity to overcome the shortage of faculty. Through online mode a teacher can more than one place by recording audio and video material in advance.

iii. Improving Quality

The education sector has faced the criticism of producing poor quality graduates, with poor employable skills. ICTs may be utilized to develop competencies, such as critical thinking, problem solving, and complex communication - skills that are must for today's fast-changing labour markets.

iv. Learn from anyplace, at any time

E learning only requires a laptop, desktop or a smartphone with an internet connection, learners can learn from anyplace & anytime. These special features are effective for learners, especially working professionals to pursue new courses without leaving jobs. They can learn at weekends or any time which is convenient for them. All the course materials are readily available as soft copy. As online education is through the internet, it can be easily accessed anywhere, anytime. You can access the content early morning, late evening, at home, in the cafeteria, or on the train. As the content is generally preloaded, you can download the lectures / videos and watch them at your convenience time and again. Also the cost of online education is very low in comparison to face to face education. Also there is a great savings on hostel and transportation fees. Since all the content is available online, so you need not buy books also

v. Cost Effective and Times

Online education is much more cost effective than pursuing a regular on-campus degree. It helps students, those who are not in a position to afford a regular college degree to accomplish their goal without spending much time and money.

vi. Learn at learners' own pace

In a regular class, learners are taught together, many learners find it difficult to follow the lessons. This is a major demerit of regular mode of teaching. Online education solves this problem. In online education course materials are provided in advance, students learn as per their convenient time. Students can clarify their doubts by live chats or forums as well.

vii. Recognition of online degrees

Online degrees are valid and accepted by the employers in India if it is accredited by Distance Education Council (DEC) of India. Many employers are still encouraging their employees to pursue courses through online mode of education.

viii. Ease of doing courses for working professionals

Online education offers great opportunities for working professionals as they cannot leave their jobs to pursue higher education. Online education offers them a variety of courses to choose from and this can help in finding new career options for them.

ix. Bridge the gap between education level and industry expectations

Online education is one of the alternatives to bridge the gap between what industries expect and what the educational institutes are delivering. Online education offers an opportunity to enhance skills through advanced courses available in different domains.

Research Methodology

This review paper is conceptual and exploratory in nature. In order to meet such objectives a secondary method is adopted. The secondary data was collected through books, periodicals, and journal and published material related to digital learning for the challenges and opportunities of online study.

Online initiatives to promote e – learning in India

Online Education system is more likely to be meaningful to learners when it is Learner centered, easily accessible, clearly organized, well written and has a facilitated learning environment. India is the second most populous country in the world and has a great responsibility of educating its masses with diverse backgrounds. Many initiatives have been taken by the Indian government to provide and support the concept of open education. Initially, the objective was to provide libraries, educational media files, e-books, etc. These were made accessible for everybody. Some of the efforts in this direction started as the National Digital Repository of IGNOU, SAKSHAT. EDUSAT, a satellite launched for education in India using the power of television to act as means of educational knowledge distribution. A Massive Open Online Course (MOOC) is a web-based platform which provides unlimited number of students worldwide with a chance of distance education with the best institutes in the world. The University Grants Commission (UGC) along with the HRD (Human Resource Development) Ministry has launched the MOOC program in India for higher secondary, bachelors and master's degrees. This will cover a wide range of subjects that may or may not be taught in regular campus studies. Government set off to offer online courses on developing their own platforms. Currently, in India only a handful of universities and institutes have the facilities to start or support such an initiative.

SWAYAM

Study Webs of Active-Learning for Young Aspiring Minds (SWAYAM), is a Web portal where Massive Open On-line Courses (MOOCs) are available on all kinds of subjects. SWAYAM is the Indian electronic education platform which proposes to offer courses through an ethnic cultivated IT platform which simplifies hosting of knowledge conveyed in classrooms from 9th class till post-graduation to be accessed by anyone, anywhere at any time. All the courses are prepared by the best teachers available from the country, and are free of cost to the residents of India. Across the Country More than 1,000 specially chosen faculty and teachers have participated in preparing these courses. The course section of SWAYAM is divided into four quadrants (1) video lecture, (2) specially prepared reading material that can be downloaded/printed (3) self-assessment tests through tests and quizzes and (4) an online discussion forum for clearing the doubts. On successful completion of the course delivered through SWAYAM, learners, who want certifications need to be registered, shall be offered a certificate, with a little

fee. UGC has already issued the UGC Credit Framework for online learning courses which advises the Universities to identify those courses where credits can be transferred on to their academic record of the students for courses done on SWAYAM.

NPTEL

It is a joint initiative of IITs (Indian institute of technology) and IIS (Indian institute of science) funded by Ministry of Human Resources Department (MHRD) under national mission on education through information communication technology provides e-learning through online Web and Video based courses in engineering, science and humanities streams. The Mission of NPTEL is to enhance the quality of education in the country by providing free online courseware. Over 800 courses are complete and made available on the NPTEL website.

National Digital Library (NDL)

MHRD has initiated the National Digital Library (NDL) pilot project to develop a framework of virtual source of learning resources with a single-window search facility. It is being arranged to provide support for all academic levels including researchers and life-long learners, all disciplines, all popular forms of access devices and differently-abled learners. It is being developed to help students to prepare for entrance and competitive examinations, to enable people to learn and prepare from best practices from all over the world and to facilitate researchers to perform inter-linked exploration from multiple sources.. It is being developed at IIT Kharagpur. National Digital Library will ensure "uniform high standards" of e-content free of cost on a single platform.

e-Gyankosh

Indira Gandhi National Open University (IGNOU) is the central Open University that offers distance and open education to millions of learners in India. It produces self-instructional study materials for various programmes and also hosts a number of educational broadcasting channels. IGNOU has initiated the establishment of a National Digital Repository of learning resources namely e-Gyankosh. The repository supports seamless aggregation and integration of learning resources in different formats such as self-instructional study materials, audio-video programmes ,television -based live interactive sessions.

e-PG Pathshala

This is one of the initiatives by MHRD under national mission on education through information communication technology (NMEICT) which offers high quality, curriculum-based, interactive content in 70 subjects across all disciplines of social

sciences, arts, fine arts & humanities, natural & mathematical sciences, linguistics and languages. It is a single gateway to 2523 modules which includes e-text, videos, tests etc.

Suggestions Improving the System of Higher Education:

There is a need to implement innovative and transformational approaches from primary to higher education level to make Indian educational system more relevant and competitive. Educational institutes need to improve quality and reputation .There should be a good infrastructure of colleges and universities which may attract the students.

There is a need to focus on the graduate students by providing them such courses in which they can achieve excellence, gain deeper knowledge of the subject so that they will get jobs after recruitment in the companies which would reduce unemployment . Universities and colleges in both public and private sectors must be away from the political connections, money making process should be out of the education system etc.There should be a multidisciplinary approach in higher education so that students' knowledge may not be restricted only up to his own subjects like new education policy.

Observations

While delivery costs of e-learning are significantly reduced compared to costs associated with classroom learning, especially when large numbers of learners are involved. The initial development and purchase of e-learning products represents a major barrier to the adoption of e-learning training within organizations. The lack of time as an obstructing factor comes second, after the cost barrier. Long development cycles disallow many institutions from engaging in production of custom e-learning training. In consequence, shortage of high-quality content, especially for the soft skills area, is hindering the adoption of e-learning by institutions that still rely on e-learning as a short-term solution. The interest for e-learning technologies is limited for those who do not have the skills to use the technology, think it is more difficult than traditional tools or simply prefer the human interaction provided in instructor-led training.

CONCLUSION:

It has been seen that despite certain limitations /disadvantages of online education, it is still popular for learners those who are working and also due to cost effectiveness,

learners those who cannot afford regular courses, due to high fee structure, opt for this alternative mode of education.

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Innovative teaching and learning efficiency: Opportunities and Challenges

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Abstract: Innovative teaching these days has become the need of the hour in the present online era particularly post COVID-19. Therefore, online teaching has attracted the interested of the researchers and policymakers both in the recent past. Online teaching may be monotonous and ineffective as long components of innovations are not added to it for better learning outcomes. This has been emphasised in NEP-20 as well, where NEPTL-SWYAM are the platforms providing online teaching with different innovative methods. Present paper is an attempt to analyse innovation in online teaching and its impact on effective learning. Content analysis id done based on extensive review of literature. It is explored that- Audio Visual tools, Creative teaching, E-Content, Brainstorming, outside classrooms, Flip Classes , role plays, cases and simulations are the top innovations that have enhanced interest in teaching for better learning effectiveness and outcome.

Key Words- Teaching, Learning, Online, Innovative, NEP-20

Introduction

The main emphasis of educational innovations should be on teaching and learning philosophy and practices, on the learners, parents, neighbourhood, society, and its ethos. It is very critical these days to reduce the cost aspects involved in teaching along with efficiency of the learning. Learning is a cognitive process which is ongoing, but efficiency of learning must be enhanced by inducing it by way of using different ICT tools particularly in post covid era when technology has become inevitable part of modern education system.

In recent years, worldwide trends in economic development have also brought significant reforms in educational paradigms. These reforms have been complemented by changes in the ways educational experts or educators create the program. Associated with subject-centred approaches, learner-centred and problem-centred models are often described as having greater potential to convey to the comimg generation. With the passage of time, there has been a huge change in the thinking procedure of educational philosophers. Major policies are more apprehensive about equality of prospect for education and employment chances for graduates.

Globally, government and private education institutions are focused towards diverse needs of students, and thereby they are more focused on learner-centred teaching in modern time. But tis is only possible with teaching innovations in term of delivery, content, Time, Flexibility and assessments. Teaching methods and strategies mut be more flexible now for better cognitive learning on multiple dimensions. Close interrelatedness between the diversification and flexibility patterns of higher education reflects the need of ICT tool to be implemented at large scale in education more sepecifcally in higher education. The more diversified and flexible higher education systems will exercise a universal access to upgraded knowledge to meet diverse needs of the society in the growing economy like india.

Objective-

The proposed study has the following objectives.

1. To Understand different ICT tool to be used for outcome-based learning in higher education institutions.
2. To study the awareness of students about ICT Teaching and learning practices and it’s acceptability.

Scope of the study

This study was conducted in 7 higher education institutions in the city of Lucknow imparting management and technical education. Understanding of ICT tools and their application is the scope of current study. Scope may further be extended to understand the perspective of teachers and other stakeholders in future researches.

Methodology -

The traditional or innovative methods of teaching are analytically examined, evaluated for the better understanding of students. A well-structured interview schedule was prepared to understand the acceptability of students of such tools for effective leaning leading to employability.

Primary data were collected from the students studying in the colleges. Secondary data were collected from published reports, journals and magazines. The researcher used convenience sampling method to select 390 students studying in the colleges in Lucknow District, Tamil Nadu, for this study.

Analysis-

i- To Understand different ICT tool to be used for outcome-based learning in higher education institutions.

Following are the most popular ICT tools among the students of Higher education in the city of Lucknow. Ranking is dine based on mean score.

Table 1- Rank- Mean Score of Different ICT tools

ICT Tool	**Rank- Mean Score**
Audio visual Mode of teaching	4.23
Recorded lectures	4.21
Online games and Quizzes	4.19
Role plays, case study	4.01
E references	3.9
Discussion Forums	3.04
Online assessments	3.02

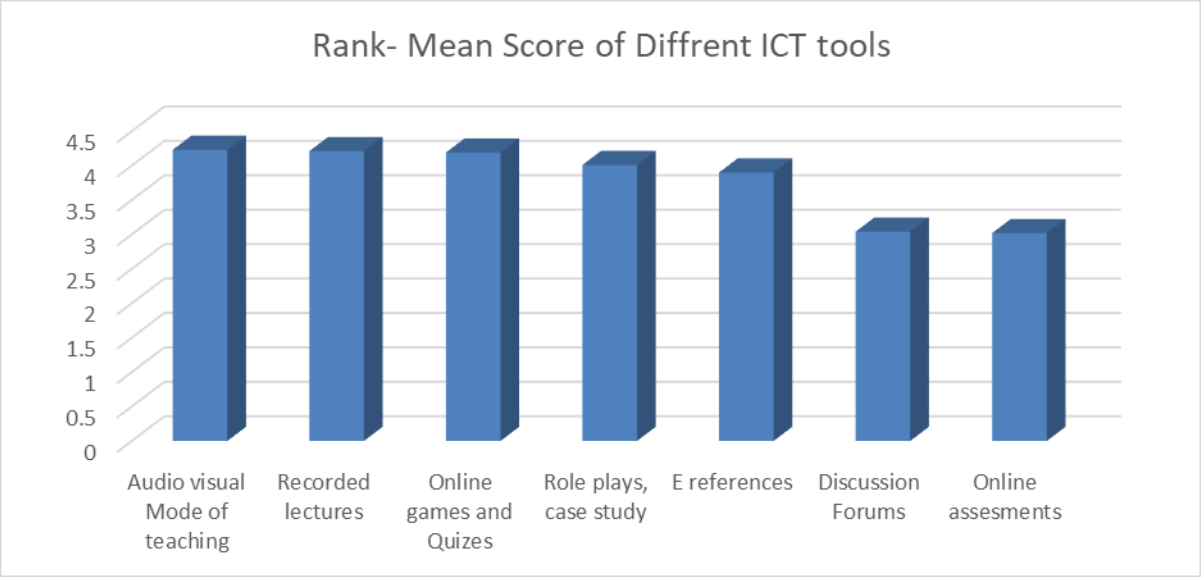

Figure 1: Rank- Mean Score of Different ICT tools

Audio visual Mode of teaching is the most preferred mode of learning followed by Recorded lectures, online games and Quizzes along with role plays, case study. References are also found to be much accepted among students. Online assessments is the area of challenge where monitoring of students while exam in case of remote examination is a challenge.

Mode of teaching which is most popular and acceptable is summarised as following-

Table 2- Acceptability of mode of teaching Online Vs Traditional

Method of Teaching	**Number of Teachers**	**Percentage**
Traditional	56	14.30%
Innovative Method (ICT)	121	31%
Both the Methods	213	55%
Total	**390**	**100**

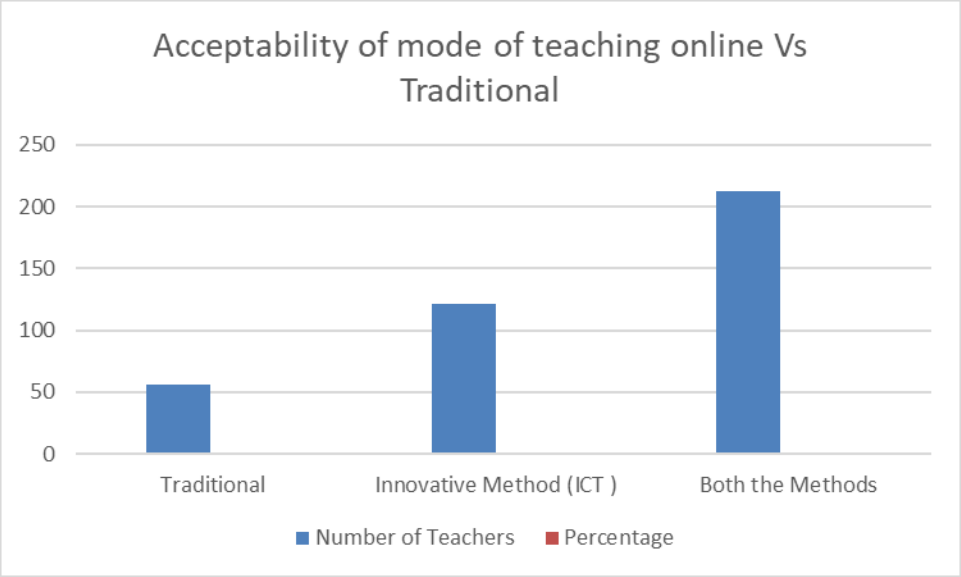

Figure II- Acceptability of mode of teaching online Vs Traditional

14% students are willing to have traditional education while rest 86% students are interested either for ICT based teaching only or based on blended mode of teaching.

ii-To study the awareness of students about ICT Teaching and learning practices and it's acceptability.

It is summarised as following-

Table 3- **Awareness Awareness and acceptability of online teaching with ICT tools**

Awareness Awareness and acceptability of online teaching with ICT tools	**Number of Teachers**	**Percentage**
Yes	189	96%
No	11	4%
Total	**200**	**100**

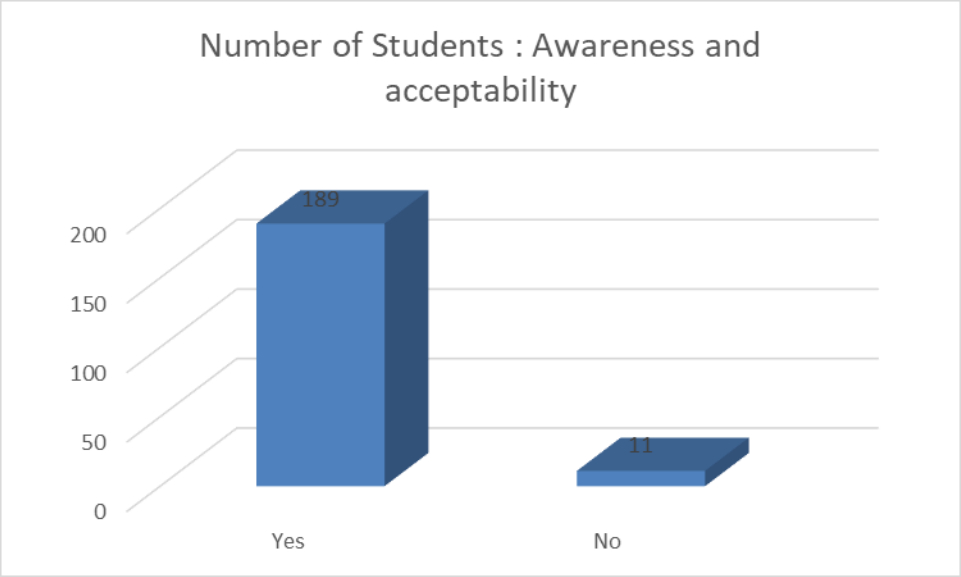

Figure III- Awareness Awareness and acceptability of online teaching with ICT tools

Above analysis reveal that innovative teaching based on blended mode is acceptable by almost 95% of students in higher education is very encouraging and giver rise to create a good digital infrastructure for enhanced and value-added learning.

Findings and recommendations-

Audio visual Mode of teaching is the most preferred mode of learning followed by Recorded lectures, online games and Quizzes along with role plays, case study. References are also found to be much accepted among students. Online assessments are the area of challenge where monitoring of students while exam in case of remote examination is a challenge. It is recommended that online platform like- MS Teams, Google meet, Google class rooms, Zoom classes should be used as a tool of blended learning for enhancing learning efficacy. 14% students are willing to have traditional education while rest 86% students are interested either for ICT based teaching only or based on blended mode of teaching. Blended mode of learning must be encouraged by increasing more digital literacy and digital infrastructure to have the best possible output of different teaching inputs for outcome-based leaning. Skills of Subject knowledge, Expression, Presentation, Positive attitude, Technology friendliness are to be kept as major outcome of different courses.

Innovative teaching based on blended mode is acceptable by almost 95% of students in higher education is very encouraging and giver rise to create a good digital infrastructure for enhanced and value-added learning. Innovatine and bledded teaching is the future of education to enhance inclusive education covering the students form low-income group as well. As the cost of teaching and managing the related activities goes down by using the ICT tools. This gives rise to bringing better teaching resources closer to the students even in remote area for better learning. Awareness and digital infrastructure in rural part of the country is also much required to facilitate ICI and Outcome based leaning leading to employability.

Conclusion-

At present, Education plays a vital role in all over the world including India. Now a days effective teaching and learning has become very important to facilitate various schemes of government related to MSME and handicrafts of make in India mission of government. Outcome based learning with dual assessment based on different direct and indirect methods would produce quality work force bridging the skill gap in India.

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IMPACT OF SMARTPHONE'S ON SOCIETY

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Abstract

Nowadays, Smartphone are popular among people for the applications they offer to users. Smartphones make communications with people quite easier. It is one of the most successful inventions of the 20th century, which has become a convenient means of communication. Mobile phones turn out to be a major part of our life due to its advanced features. It is difficult to avoid such new technologies, while we all know the effect of mobile phone on our society and also on environment. Some advantages smartphones provide – better means of communication, learning options to users, great exposure to the latest things, and many more things. Today's world is a world of technology and inventions, and there are many tools which essentially facilitate our life. Mobile phones play an important role in the development of human civilization, but their excessive use brings severe problems. To reduce their harmful effects, one should always remember that mobile phone is a friend, not a master, and it should never be used too much. On the other aspect of that there is also a negative impact of that which is damaged our society and many more things in life. Today's trending ratio of smart phones users worldwide have reached **3.8 million in 2021**, and the number is still increasing. Hence, it is not surprising to find everyone around us buried within their smart phones , from eating to waiting on the bus stations. And these negative impact is shown in every segment of ages from children and adult both are addicted in smartphones. The study will primarily focus on impact of Smartphone on business, education, health sectors, human psychology and social life. The intention of this study is to understand all the positive and negative aspects of Smartphone on the society

besides this in the present scenario of COVID-19 the mobile phone has been become a essential component of our life i.e, every economic and social activity is being completed with the help of mobile phone hence there is intense need of such type of study in present time.

Keywords- Smartphones, Technology, Students, Addiction, mobile, Behavioural intention, Society.

- **Introduction-**

Cell phones have become a sole means of communication for individuals and in the same sense, a distraction as well in the last decade. Smartphones have taken away the more personal conversations that we used to have when they were not around. Now, individuals will plan to spend time with others while actually spending time together on their cell phones. The first Smartphone was invented by IBM in 1992 known as a Simon Smartphone. This was a big breakthrough in the field of technology and for the requirements of people. Smartphones as name itself indicates something special, facilitates easy, quick and affordable world of information resources. Nowadays, most people have classic cellphones or smartphones and they are still buying it. Smartphones are spreading worldwide like an epidemic and as a result of this; our life styles have started to change. Now, people are living with their smartphones, they are taking selfies, organizing their accounts, playing games, find their ways to home as a navigation. According to Pew Internet Project's research, as 2014 January 90% of American adults has cellphones and as 2014 October %64 of these adults owns smartphones. In other words, smartphones had become a necessary part of our lives. As a result of this, our lives had been affected by smartphones in different ways, with beneficial and detrimental effects of smartphones; they provide new business areas, online education systems, healthcare assistance and more. They make life easier for us. However, they ruin our social lives, make us lazier and sillier than before and they make us addicted to their selves.

- **How smartphones helped in corona pandemic situation-**

The coronavirus disease 2019 (COVID-19) pandemic caused by the novel coronavirus (SARS-CoV-2) has created an unprecedented challenge for governments, public health agencies, medical officials, and populations globally. As a result of the rapid spread and grievous toll exacted by the COVID-19 pandemic, there has been increasing interest in

developing innovative methods and tools to inform public health response through digital data, including mobile phone data both passively collected by mobile phone operators and actively collected via recently developed applications. Mobile phone data remain one of the best sources of information on large-scale population behaviors. These data can be collected in high- and low-income settings and can capture, in near real-time, changes in mobility and clustering patterns for large swaths of the population. The mobile phone helped most of the citizens of our country in registration of vaccination drive as well as it works as a tool for maintaining physical distancing and keeping everyone connected socially. Now a days every student is studying online with the help of mobile and other digital tools. Doctors are facilitating the patients through telemedicine and mobile is the key component in these activities. We know that we can't stop upcoming pandemic but we can prepare ourselves for upcoming disasters so that there is minimum loss to flora and fauna and mobile phone is the most important tool in the upcoming battle hence we need to make some intensive and dedicated study on the optimization of mobile phone and its uses.

- **Advantage of smartphones-**

  Smartphones have changed people's lives over the years. Many years back we would have to take extra effort in sending simple text messages or we would need to buy a camera just to take pictures. Today, these functionalities are integrated into one, revolutionary technology that keeps getting smarter and smarter every day.

  Keeping all this aside smartphones have following advanced and disappointing points.

  i. **Communication-** Mobile phones provide the means to communicate with friends, family, coworkers, and indeed most of the world's population instantly. Unlike previous communication devices, they can be on hand for the caller at all times and used in any place where there is a signal

  ii. **Camera-**.In this "selfie" generation, the camera is so important. It saves people from buying a separate digital camera to take photos and videos. Having a camera on your smartphone is almost a requirement in today's world and an important consideration for Millenials when purchasing a new mobile phone

iii. **Entertainment-** As long as you have your mobile phone, there is no reason to get bored. There is a multitude of games to download and play; you can read an online article or get involved with social media to pass the time. Smartphones allow video watching, as well as listening to radio, podcasts, or music. Plus, if you attend a real-life event, you can often store your ticket on your phone to display at the door.

iv. **Maps, Navigation and travel-** Finding our way around has never been easier since phones started using GPS to direct us to our destinations. Whether driving, cycling, or walking, we can get live updates on our location, roadworks, accidents, and other causes of slow-moving traffic, plus information on nearby facilities, such as restaurants, gas stations, and hotels. When traveling by plane or train, you can use your phone to explore timetables, purchase and display your ticket.

v. **Learning and research-** Finding our way around has never been easier since phones started using GPS to direct us to our destinations. Whether driving, cycling, or walking, we can get live updates on our location, roadworks, accidents, and other causes of slow-moving traffic, plus information on nearby facilities, such as restaurants, gas stations, and hotels. When traveling by plane or train, you can use your phone to explore timetables, purchase and display your ticket.

1. The positive impact-

Smartphones are equipped with multimedia phone features, which include camera function, sound recording function, video function and many others. These features assist students to drive their learning process and dreams effectively. As we know that smart phones are relatively cheaper than other devices like laptops and desktops hence the smartphones are becoming most helpful tool for the poorest of poor section of our society and it helps in abridging the digital divide in our country.

The online education is bringing revolution and it is cheaper than conventional way of teaching methods hence in upcoming years it is quite sure that a revolutionary positive change in education sector will be brought by teachers as well as students.

1.1- Impact on Business

Smartphones create new dimensions for business. It is not only the smartphone vendors enjoying business but also created a new domain for app development companies, Internet service providers, and other related sectors.

1.2- Impact on Education

Smartphones provide a unique way to improve the quality of education. The use of the Internet has become a part of life for every student. Internet together with Smartphones – provide an alternative channel to deliver education services and distance education.

1.3- Health Impact

According to surveys, more than 10 million users in the USA use Smartphone to search for health information and facilities. 27% of the users use smartphones for online activities. Today there are several apps to manage prescriptions, promote alternative treatment options, provide price comparison, and validate prescriptions. Today several apps are available to track exercise, diet and blood pressure – enabling smartphones to play a key role in the health sector.

1.4- Psychological Impact

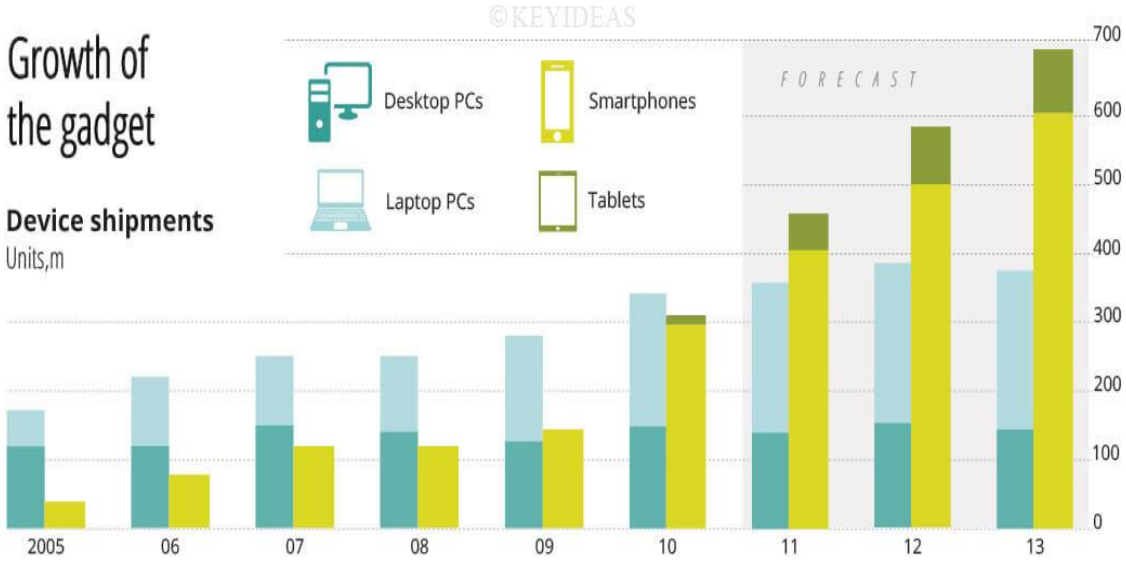
Smartphones are said to reduce stress in busy work life. I today's busy schedules mobile phones provide a means to interact with friends and families as an when they get time. The smart use of Smartphone increases your brain's functioning helping to stay active. Instead of using Smartphone only for entertainment it could be used to access useful information, for example, access the news headlines, latest technology updates, and more.

1.5- Social Impact

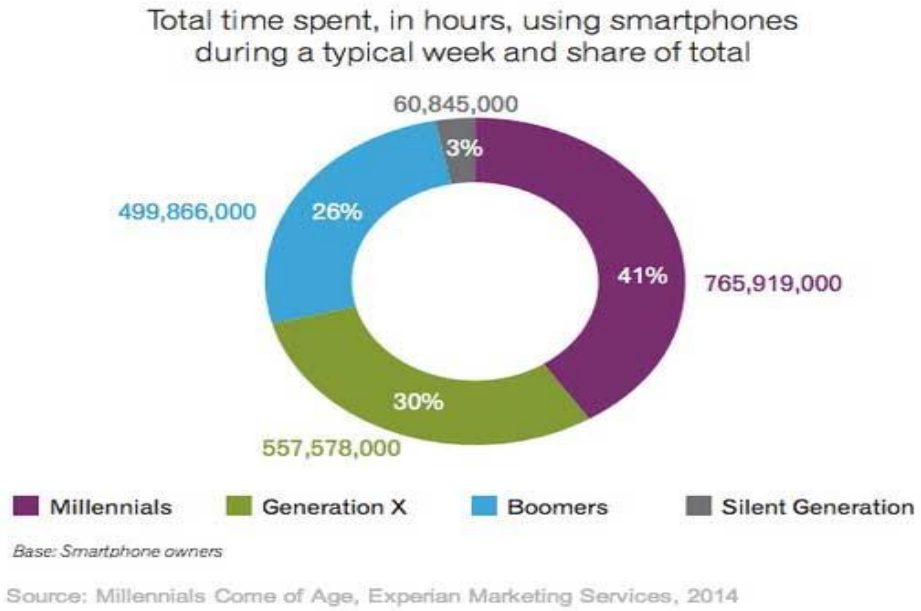
Social life has been drastically changed with the introduction of smartphones and this domain has encountered most of the impact from the use of smartphones. Smartphones play an important role in the integration process of people with special needs, elderly age and with some sort of disabilities.

- **Smartphone Growth-**

Below figure shows the growth of Smartphones compared to PCs.



❖ **Below figure shows the time spend on smartphone**



1.The negative impact-

According to Mount (2012), people use smartphones at least 5 hours a day and also usage of Apps increases significantly and with the result caused degradation in Physical Social interaction, Distraction, Addiction, health problems etc. Leonard (2015) has expressed a great concern and says that smartphone use has become a serious addiction phenomenon, it has been found that female college students use phones on an average

of ten hours a day. Another survey found that three out of five smart phone users can't go more than 60 minutes without checking their phones. A new phobia has been developed known as NOMOPHOBIA (fear of being without a phone) another health-related issues like Nerve problem, Back problem, Anxiety and Depression are seriously concerned. We live in a world where even a newborn is smart enough to operate a smartphone, or maybe it is just the carelessness of the parents who let the newborn child near a phone, of which he clearly has no apparent need. Some parents even give their phones to the children to distract them from crying. Smartphones have changed our world in many ways and, they have a massive role in making our daily life convenient. We can now do countless things using a smartphone which wasn't possible before. However, we can't deny the **negative effects of smartphones** on society and our lives.
Over the past years, researchers have found many direct and indirect negative effects of smartphones on Youth. The children of this age group are often the most affected ones. They either use it to waste their time endlessly scrolling through social media or playing games. These findings are discussed below in detail:

2.1- Peer Pressure

Many parents notice that their children ask them for the latest smartphone in the market or the most expensive one after different intervals. It has emerged to be equivalent to smoking or using drugs under peer pressure. Children see their friends or the social circle leaders using the newest version of smartphones. To be accepted in the group, they feel the need to possess that version.

2.2- Cybercrime

It is not a hidden fact that children are being bullied, stalked, and even kidnapped using their social media accounts. It has been made easier for the bullies and stalkers when children have smartphones, and they can post their every move using pictures and Check-Ins via their social media accounts using smartphones.

2.3- Affected Relationships

Social networking websites have become more accessible, thanks to smartphones. But it has also impacted how our youth interact and make relationships in real life. They find it easy to make friends online and converse with them via messaging instead of offline.

2.4- Social Media Addiction

Youth are using social media platforms to share and update others about their activity. They share everything, from where they went to what they ate, and then wait for people to like and comment on their posts. If they don't get as much like or comment on their friends, they start feeling useless and worthless. Deciding one's self-worth on several likes and comments on social media isn't healthy.

2.5- Fear of Missing Out (FOMO)

Comparing our lives with others isn't a new concept. But mobile phones and social media sites have made it worse. We all know that social media is not always accurate and is often an exaggerated version of reality. But smartphone affects young minds, and they get sucked into the FOMO concept.

2.6- False Idolization and Expectation

Today, our youth is so much indulged in smartphones that they developed false expectations. With so many editing and beatifying apps available, people present themselves as perfect. Our youngsters get affected so quickly that they start idolizing them and set false standards. They buy products, follow dieting, and do all the famous influencers' activities without giving it a second thought.

2.7- Cyberstalking

Our dependency on smartphones has reduced our ability to talk with others in-person. Youngsters face the same issue, especially when they like someone. Instead of approaching them, they start stalking their social media profiles to know more about them. Some become so addicted to this activity that it can lead to harming oneself or the other person.

2.7- Difficult to Make Friends in Real Life

Accessibility to social media on smartphones has made it easy to make friends globally. But it affects how students behave and interact with other children in real life. They prefer making friends online (even on gaming platforms) but don't actually know how to make other friends in real life anymore.

2.8- Increased Mental Laziness

Children prefer using mobile phone calculators even for small calculations instead of pen and paper due to instant access to smartphones. Additionally, too much smartphone use can reduce students' thinking process.

2.9- Conflicts and In-personal Communication

Nowadays, people prefer to communicate through instant messaging services instead of in-person conversation. They avoid all kinds of confrontations. Sometimes, a simple discussion on the chat can turn into a conflict. It is because the mood, the tone, gestures, etc., aren't visible through messages.

2.10- Not Good for Mental Health

According to researchers, smartphone affects our mental health. Addiction to a cellphone can lead to depression and social anxiety. Research done on college kids claims that the increased use of smartphones has affected their well being . They have become more buried in their smartphones and also stay inside their room most of the time.

2.11- Effect on Eyes-

A new study says that smartphones may ruin your eyesight. Researchers at the University of Toledo, in Ohio, have found that exposure to blue-light — the glow emitted from most smartphones, tablets and laptops — promotes the growth of "poisonous molecules" in your eyes, leading to macular degeneration. "It's no secret that blue light harms our vision by damaging the eye's retina," professor and study co-author Ajith Karunarathne said about the study, which was published in the journal Scientific Reports. His team explains that blue light is especially dangerous for our eyes because, unlike other types of light, the eye's cornea and lens cannot block or reflect it

- **Mobile Phone Safety Tips to Decrease the Risk**

➢ Avoid giving cell phones to children to the minimum as Young children's are vulnerable to effects of the radiation.

➢ It is advised to take extra care if there is a mobile phone tower on your building or nearby or even close to the child's school since their exposure to radiation is more than usual.

➢ Completely restrict your child from taking phones to the school. Keep the school's contact number and provide them yours in case of an emergency.

➢ Keep your mobile phones safely with you and out of sight of your kids at night. Children may quietly try to get a hold of it and use it without you finding out.

➢ Parents should monitor whatever their wards watching on such devices. And also parents obligation to educate their wards about pros and cons of Smartphones.

- **Conclusion-**

It is true that the smartphone has a sizeable impact on society and other aspects of life. Smartphone has impacted almost all walk of human life. The prominent areas, where impacts of Smartphone are obvious include business, education, health, and social life. Mobile technology has drastically changed the cultural norms and individual behaviors. The impacts are both on the positive side and also on the negative side. There are several ways that can help control and minimize the negative impact of Smartphone use in society by educating users on how to use Smartphones smartly. The Smartphone is only a pocket-sized PC today but the device seems to have limitless potential. The technological power of the smartphone is tremendous and it is quite a learning tool for all especially youth These technological gadgets have made our life very comfortable. As it facilitates one to do a lot of work pertainent to Education, Research, Business, Entertainment, Sports etc. Besides it, smartphones keep one connected with social networks and enable one to online shopping, latest news updates and sports. However, it has also proved negative effects when not used properly. Especially, Teenagers are mostly addicted to it and causes negative results on them both health problems (like Eye sight problems, neck and back pain, Alienation, Brain tumour) and also financial issues. A new phobia has been developed known as NOMOPHOBIA (fear of being without a phone) is very common problem found among teen ages. Further, health related issues like Nerve problem, Anxiety and Depression are other seriously concerns. Overuse of smartphones may lead to psychological and physiological complication. However, keeping things in moderation and restricting usage hours goes a long way in ensuring their well-being as well as inculcating good behavioural habits, moral valves, and education.

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