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POST COVID-19 SITUATION- A REVIEW

EDITED BOOK

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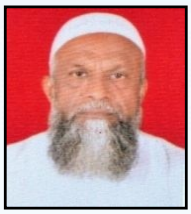

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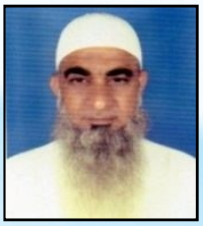

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MESSAGE

It gives me an immense pleasure to know that the Anjuman Islam Degree College of Science, Murud Janjira is publishing a book entitled **"Post Covid-19 Situation – A Review"**. The Covid-19 pandemic situation has affected the whole world severely. On this background, it is very much necessary to sustain ourselves under this critical situation physically, mentally and economically as a society. This book through its 12 extensive chapters covering these aspects in great details in addition to the new regimes necessary in educational system under this changed scenario. I am sure that this book will serve as guideline and provide in depth scientific insights for the readers to face the ongoing pandemic situation in all the aspects of life.

I heartily congratulate the Editor and Hon'ble Principal Dr. Sharad Phulari and his eminent staff for undertaking this exemplary work and wish them ever success for such activities in future.

Prof. Altafhusain Nadaf
Pune

Dr. Anil Kamalakar Patil
Principal,
J. S. M. College, Alibag- Raigad, 402201.

Message:

I am very much delighted to know that Anjuman Islam Janjira Degree college of Science, Murud – Janjira is publishing a ISBN indexed book – 'Post Covid -19 Situation – A Review'. I congratulate the Principal and Management of Anjuman Islam, Janjira and the whole team involved, for publishing their first book.

I appreciate the efforts taken by Principal and Editor of this book Dr. Sharad Fulari in publishing this book. I know him personally for long time. He is an academician, researcher and leader working in the field of Higher Education. I have witnessed his leadership given to many colleges in Raigad district for their development and progress. He always think of some innovative ideas. Publishing of this book is one of these ideas. I am sure he has taken many pains in editing of this book to give the best-refined product to the readers of this book.

I appreciate the efforts taken by all the authors contributing in this book. COVID – 19 has put all of us in an unexpected situation for last whole year. It was very difficult to cope up with the situation. Everybody of us has experienced the situation in one or other way. Every stakeholder of the society has learned a lesson under the pandemic situation. All the twelve authors contributing in this book are experienced teachers has look at the situation in a different angle and presented their views in the book as an academician and a researcher. The literature produced by them will be certainly guide the society, teachers, and students in various aspects of the Post COVID- 19 situation. I wish that more and more people read book and it will become a good reference book.

Wishing you all the best

Dr. Anil Kamalakar Patil
Principal,
J. S. M. College, Alibag – Raigad
And Former, Director BCUD,
University of Mumbai.

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Foreword by Editor

There was severe hit by COVID-19 to world in January 2020 to January 2021 year. It was worst experience to world as COVID-19 situation. Slowly the first wave was settled. The situation in January 2021 onwards, there were least cases of CORONA, so an attempt was made to discuss about Post COVID-19 situations in every walk of life, especially education. The International Conference was held by Anjuman Islam Janjira Degree College of Science, Murud-Janjira with joint venture of Anjuman Islam Janjira Degree College of Commerce of Shrivardhan–Raigad on 30th March 2021. Over 500 delegates registered for International e-conference, about 40 research papers accepted to publish in peer team reviewed International research journal while only '12' chapters were selected, edited to be part of ISBN Book to be publish as PostCOVID-19 situation - a review.

The twelve chapters in this book are different. Each chapter have a purpose. The in all book shows actions are more important than feelings. The contents are related to social image and individual nature of man in pandemic. The content of chapters gives knowledge centred with research and philosophy of concern of society as teacher, scientist, academician and involved human. Each chapter is unique with matter of thoughts.

The first chapter is about the Future of Society based on COVID-19 situation by Dr. Sajid Shaikh and others. Authors illustrated the attack of pandemic COVID-19 on all human developmental constitutive elements such as income, health and education.

The second chapter is by Dr. Swati Deshmukh. It is related with impact and future of higher education in COVID-19 situation. The transition in offline-classroom learning to online-virtual learning is discussed with certain examples in this chapter.

Dr. More Suresh and Dr. Navle Dinesh wrote a third chapter. It is to underline the importance of ICT in post COVID-19 era. ICT did help in forming Virtual word to real world during lockdown period. Only ICT helped as to keep safe distance. ICT in real sense kept going on education, entertainment, administration, economy and to certain extent agriculture. This chapter nicely underlines the ICT establishment in post COVID-19 situation.

The fourth chapter in this book is specifically explains the Post COVID-19 situation in online chemistry education. It is written by Assi. Prof. Mr. Khan Shoyeab and Miss. Damad Niha. Chemistry programme supported scientific basic theories moreover as sensiblebase education is presented in this chapter. Authors made great attempt to offer current situationof PostCOVID-19 state of affairs in chemistry education.

Dr. Prashant Thote penned fifth chapter. His chapter is- A study of COVID-19 - Reality and facts in education. The impact of COVID-19 on school system is highlighted in lucid language. The worries concerns of student's career and standard of educations is written in this chapter in simple words.

Sixth chapter of book is written by Dr. Pathan Amanulla Khan. He presented his thoughts

regarding the impact and issues during COVID-19 pandemic on education system. The unequal access to information and communication technologies leads to huge gap in education due to Post COVID-19 situation is illustrated by author.

Sport Resumptions Amidst COVID-19 pandemic are given by Dr. Hetal Mehta as seventh chapter of this book. Importance of sports and impact of pandemic on sports is pitched in this chapter. Steps to combat the challenges due to COVID-19 in sports are given in this chapter.

The eight chapter is depicting the researchful views of Dr. Jadhavar Vilas. These researchful views are about COVID-19 and its effects on the Environment and Society. The pandemic situations significantly improve air quality, reduces the emission, decrease the noise, water pollution on one hand while increase in medical waste, disposal disinfectants, mask and gloves, affects the environment. Such issues and case studies are given in this chapter.

Assi. Prof. Mr. Rahim Bagwan and Salve A. N focused their thoughts on New strategies adopted by educational system in COVID-19 pandemic. It is chapter ninth of this book. Rapid transition to e-learning its challenges, merits, demerits are given in this chapter. In changed and changing situation of COVID-19, the Indian education policies are also to change. It is given in chapter.

Imagining Education in COVID-19 situation was done by Dr. Hetal Mehta and Dr. Tejashri Kulkarni. These imaginations are penned and incorporated in this book as chapter tenth. This chapter is an attempt to find answers to some questions like – Can we impart these lessons of post COVID-19 and make the world a better place for knowledge transfer? What was the situation like when the pandemic started and where it is going to take education?

The eleventh chapter in this book is stating the biopotential of some aromatic plants to strengthen immunity during post COVID-19. This review discusses about the potential use of aromatic plant content of secondary metabolites as a preventive agent in improving immunity and health of the people against the COVID-19.

Rehabilitation of patients after hospital stays in post COVID-19 situation is discussed by Mr. Javidkahn Vahibkahn Maniyar as last chapter of this book. COVID-19 and inflammaging, imflammaging in older people, physical deterioration, mental health deterioration, hurdles to vital life, outcomes for survivors are discussed in this chapter in very informative manner.

- Dr. Sharad Sahebrao Phulari
(Principal Anjuman Islam Janjira Digree
College of Science, Murud-Janjira)

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Chapter 1

Future of society based on COVID-19 situation

Dr. Sajid F. Shaikh[a], Dr. Bhagvan V. Jadhav[b], Mr. Umar Abdul Rahim Kable[c]

a& c. Department of Chemistry, Anjuman Islam Janjira Degree college of Science, Murud-Janjira, Raigad, Maharshtra, India*Mob.No.7038601376 Email id:-sajidoshaikh@gmail.com*

b. Department of Chemistry, Changu Kana Thakur College, New Panvel, Raigad, Maharshtra, India.

1. Abstract: -

The COVID-19 pandemic which is spread by Corona Virus becomes the biggest health crisis and disruption since the Spanish flu, with profound impacts on every aspect of human life. The COVID-19 situation is one of the widely spread diseases in recent history. This pandemic has launched many challenges for governments across the globe.This crisis is effectively attacking on all ofhuman development's constitutive elements: income, healthand education. Due to this the life of the peoples in the societies has been diverted. How to survive and protect ourselves from such a crisis is now the big questions in front of all the component of the society. In this chapter author is trying write about the future of society based on post COVID-19 situations.

Keywords: -Health Crisis, Spanish flu, COVID-19, Survive, Society.

2. Introduction: -

As all we know, since December 2019, the whole world is fighting against the Novel Corona Virus (COVID-19) earlier known only as the Wuhan virus. First of all, Covid-19 spreads in South Korea, Japan, Italy, Iran and finally reached its routes to India.

The first case of Covid-19 in India was reported on 30th January 2020 originating from China. As of 24thFebruary 2021, the Indian Council of Medical Research and Ministry of Family Welfare is reported the infection rate of COVID-19 in India is to be 1.33, which is remarkably lower than in the worst overwhelmed countries.

This is possibly the least hazardous anticipation one can make about the world that "The world will never be the same again"due to consequence of the COVID-19 disaster. COVID-19 disaster will surely change all societal institutions including the healthcare sector. The accurate nature of that change is, at this time, unknowable.

COVID-19 irritates existing fundamentals issues in many sectors, and in cities it is doing the same. Before the COVID-19 crisis; social quarantine, loneliness and lack of social unity were big issues, and now even more so. These issues will continue because they are at the center of our universal need to connect and belong, and COVID-19 crisisis making this more apparent than ever.

The COVID-19 calamity has revealed the susceptibility of individuals and societies. This crisis teaches us for a reexplore of different ways for systematization social activities. The COVID-19 pandemicexclaims for strong returns based on solidarity, co-operation and responsibility.

In the midst of the lockdown in Indian society, multiple issues related to social, educational, economic, political, agricultural, psychological levels and many more have been noticed which has created the devastating impact on the lives of the people.(Times of India Readers blog).

3. Objectives: -

To gain scientific knowledge about COVID-19 disease.

To know the impact of COVID-19 on society.

To focus challenges faced by society during COVID-19.

To study short term and long-term effects of COVID-19 crisis.

To think innovative ideas for society rehabilitation from COVID-19.

4. Scientific Knowledge about COVID-19:-

Since from end of 2019 the whole world is facing with big challenging viral disease and till date all we facing a lot of problems imparted by COVID-19 crisis. To know more about it this attempt is done as per WHO guidelines on COVID-19 pandemic.

1. What is exact meaning of COVID-19?

The full form of COVID-19 is Coronavirus disease 2019. It is defined as sickness caused by a novel coronavirus popularly known as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), a latest virus in humans which attackson respiratory system of human being. Itcan be spread from person-to-person.

2. At which place, COVID-19 cases found first?

In the beginning, cases infected with COVID-19, an outbreak of respiratory illness found in Wuhan City, Hubei Province, China.

3. Is there any specific age group COVID-19 spreads?

No specific age groups. It has been observed that COVID-19 spreads in all age group stating from new born babies to older peoples.

4. Can COVID-19 spread in Animals?

Coronaviruses are a large family of viruses which leads to give disorders in animals or humans. There are several known coronaviruses that cause respiratory infections in humans. These infectious coronaviruses range from the common cold to more severe diseases such as severe acute respiratory syndrome (SARS), Middle East respiratory syndrome (MERS), and COVID-19.

5. Which prominent symptoms observed in COVID-19 infected person?

A various type of symptoms for COVID-19 have been reported. These include:

Fever or chills

Cough

Shortness of breath or difficulty breathing

Fatigue

Headache

Nasal congestion or runny nose

Muscle or body aches

Sore throat

New loss of smell or taste

Nausea or vomiting

Diarrhea

Generally, incubation period of virus is varying between 2 and 14 days with aaverage of 5 days. It is significantly noted that some people become infected but they do not have any symptoms or feel unwell.

5. Impact of COVID-19 on society: -

The most dangerous Coronavirus which was originated from Wuhan (China) has incorporated a significant impact on almost every society throughout the world. COVID-19 leads to health crisis by inducing various problems to human being all over the world, ultimately the World Health Organization (WHO), has announced COVID-19 as a global pandemic.

The COVID-19 pandemic is a classic "right now" crisis. A new dangerous disease has entered the human population in the society and is rapidlyasserting hundreds of thousands of lives. Hospitals around the world are at their limits. Healthcare professionals are going far beyond their professional responsibility to support the ill and dying. The COVID-19 has imposed many of us to go home and "shelter," which has appeared in sudden, and very large, flows of unemployment.

The pandemic which spread throughout the globe has flashed a light on significant domestic and international weaknesses. This pandemic also exposed some of the myths and fallacies of conventions which was used to explain the world. Whatever the changes that were already happening have been boosted, executing in a few months what might have otherwise taken decades. So far, every change needs not to be a cause for concern. This is the good time for the current and next generation of leaders to make their fingermark and capture the opportunity to fix these mistakes and allow for a true reset.

All we are aware human beings are social animals and we peopleflourish on connection with other peoples which is due to the driving force behind all things whatever we do. The COVID-19 pandemic has crucially slashed the way through which we interact, leaving more people more frequentlysegregated and susceptible. The most dangerous pandemic such as COVID-19 has collided all of us in some way or another. This crisis has intensified imbalance within societyand as a consequence the most high-risk population groups in society have been unnecessarilydistressed.

During the pandemic period, so many peoples of the society taken assistance for help from different agencies through call have fascinated on coronavirus, almost every interaction point out its effects, namely on mental health issues, aloneness,

quarantine, family, finance and joblessness. Everyone aware about the fact that lack of access to crisis squads, appointments and other community services has been a major theme, which has left people feeling more and more distressed, disappointed and hopeless.

Most of the peoples amongst society were already struggling to acquire the support required to stay well, before the pandemic. This pandemic not only affected health of peoples of society but also altered economy due to which an estimated half-million more people likely to experience mental health problems. There is urgent requirement to alter the status and rehabilitation of society's priorities to put wellbeing at the heart of everything we do – encouraging mental health, rather than treating mental illness, must be at the forefront.

The magnitude and duration of Covid-19 produceintellectual loss. A loss of a sense of safety, certainty about the future, jobs and lives means depression has become a universal phenomenon in Covid-19. Regret leadership is dangerous for communities, and involves acknowledging depression, admiringlossesand helping communities look cheerfully to the future.

6. Challenges faced by society during COVID-19: -

So many challenges faced by the society due to the impact of COVID-19 which is diverse and countless. On the reality ground COVID-19 has a lot of impact on our society and that is for sure, but only adversely? Hence what the things happened that everyone needs to analyze carefully and cannot be left without a brief discussion.

a) Lockdown of countries for prevention from COVID: -

Due to rapid rate of spreading amongst the societies so many countries were decided to stop domestic travelling, international travelling and also declared the lockdown within the countries to prevent spread of coronaviruses amongst the different societies.The 'Lockdown' which is only one way was followed by governments to keep peoples of societies apart.

The lockdown has proved that "man is a social being" because continuous lockdown for about four months have impacted people psychologically and the burden has been faced by women and children in the form of domestic violence.In the

lockdown period, multiple calls have been received on the helpline number made for the people going through domestic violence.

b) Challenges faced by migrant workers: -

The impact of COVID-19 is not only limited to society at large but also there is multiple components of the society get affected.All we have seen the big issues being faced by migrant workers which is due to on of sudden declaration of Lockdown inside the country.

Basically, the migrant workers fulfill their own needs which depends on daily earnings, they do not have savings in large amount. Whatever the savings they have which they could spend during any emergency.

Many of the migrant workers have already abandoned this beautiful world. The migrant workers who did not have any resources for daily needs fulfillment, they have started to move to their own villages because of the scarcity of jobs and money in the cities. Migrant workers along with their child, pregnant wife and family walked thousands of miles barefoot.

During this pandemic not only, migrant workers suffered but also gig workers have been faced a similar issue though which was not got much attention in the news. The gig workersincludedelivery boys, cab driver etc.

c) Social distancing (Physical distancing) a big challenge:-

Society is always characterized by physical interactions between people. Peoples in the society is used to working groups, visit places, meet to new peoples, and habitual of making conversations with them on a daily basis.

In the beginning it was ‘Social distancing’ which means peoples of the society do not have to touch any object or persons amongst the society. This social distancing was equivalent to untouchability which created partition amongst the peoples of the society.

According to Orben, Tomova, and Blakemore (2020), “Social interactions are considered to be a basic human need, similar to other fundamental needs such as food consumption or sleep. Due to isolation peoples feeling insufficiently connected to others is associated with profound and lasting adverse effect on physical and mental health, even leads to increase in mortality”

Later on, the word social distancing has been replaced by physical distancing. Of course, the social distancing (physical distancing) was only one solution to prevent the influence of coronavirus and it was introduced but all we have to understand the impact of this pandemic on the society and how it has rehabilitated the social inequitable practices. Physical interactions are an essential part of human social experience which are basically important for the social development of young people.

The social distancing leads very dangerous for the society which boosted social refusal, spreading impersonality and habit of being independent and self-reliant, and the disappearance of a perception of community. It adversely influences learning and growth, and it prohibits people from effective association in the society, which is a crucial human need.

d) Psychological issues faced by peoples in the society: -

Any pandemic or any situation which affects the society at large leads to the problem of psychological trauma.The alarming rate of contamination and death from the virus resulted to establishing more panic, and even paranoia among many peoples amongst the society. This psychological effect exists potentially and remain in our societies, even long after the pandemic.

Due to longterm isolation, the basic human needs unsatisfied and ultimately damage the mental health. According to Orben et al. (2020), "Human adolescents are very much hypersensitive to social stimuli and to the negative effects of social exclusion.

According to Baumeister and Leary (1995), positive social contact is potentially required for psychological and physiological health. Baumeister and Leary also suggest that "human beings have a pervasive drive to form and maintain at least a minimum quantity of lasting, positive, and significant interpersonal relationships." However, selfisolation, the 6 feetphysical distancing, and the use of face masks for protection are preventing these basic interactions from happening.

7. Short term and long-term effects of this crisis: -

From the early days of the pandemic, it was already clear that individualism was one of the many ways that the crisis manifested in our communities.

By closing schools, the pandemic is preventing many children and adolescents from socializing with others. This affects their ability to make quality connections, which impacts their personal growth. Indeed, youth flourishes socially through connections and fulfilling relationships, which are also an integral part of their learning.

The impact of Covid-19 on education is bad and its consequences will be seen in the upcoming future. According to the report of World Bank, school closures during COVID-19 period will have the lifelong impact on the productivity of this generation of students.Children being out of school might forget some facts as well as impact their learning capacity.

But the pandemic, a truly global shock, exposed the fragility of the global economy and its networks. An interconnected economy, rather than reinforcing resilience, amplified the domino effect – spreading economic pain and disruption around the world, as companies laid off employees.

Historically, the adverse mental health effects of disasters impact more people and last much longer than the health effects.

Stress is like a toxin, such as lead or radon. In order to understand its impact, we need to know who is exposed, when, how much, and the impact over time, as well as factors buffering against the stress. Many people are at risk for adverse mental health effects of COVID-19. Health surveillance is critical to better understand risk and protective factors, deliver effective and targeted interventions, and plan for future pandemic waves.

8. Innovative ideas for fighting against COVID-19: -

Currently Covid-19 crisis is very much a part of our normal lives. The improvement of a safe and effective vaccine is a basic turning point in deciding what the global medium- and long-term future looks like.

During the pandemic period the support services and charities are going to play a more vital role than ever. So manyorganizations have responded to the crisis, providing emotional support for those on the frontline and across the country. We must continue to collaborate and find further innovative ideas if we want a mentally healthier society.

The post-pandemic society can become a healthier only if we reshuffle its priorities. There is need to rebuild the society to become a better medium for connection at all times including a pandemic, and that means repurposing public places around genuine, meaningful and safe interactions.

To create a better post-COVID-19 world requires democratic civic universities dedicated to producing knowledge and educating ethical, empathetic students for just and sustainable democratic societies.

It is most important for our future that academics, university administrators, government officials, public authorities and community partners has to come together to promise that how to overcome the different needs during such crisis.

Governments cannot prevent another global shock from happening, but they can make sure that corporations are ready to meet their obligations to society. This starts with workers, the basis of the social contract between business and society. Policymakers need to think about how to transform corporate incentives to build in actual systemic resilience.

Government has to rethink about monetary policy for public good. They have to invest in necessary infrastructure, pay for the public provision of basic needs and public services, and invest in research and development to prepare society for future challenges.

Healthy interpersonal interactions preserve parts of our identity are essential for social wellbeing, for child development and even for the slowing down of cognitive decline in older adults. The society is a player in these interactions through the different settings it provides, enriching shared experiences and grounding their memory in place.

The society in post-COVID-19 must be based on the values we cherish: democracy, human rights and the rule of law as well as social justice, inclusion and equity. Higher education can play important role by renewing our commitment to our core values of academic freedom, institutional autonomy and engagement by students, faculty and staff, and re-emphasizing the role of higher education institutions as societal actors for the public good.

9. Conclusions: -

The COVID-19 pandemic which is spread by Corona Virus becomes the biggest health crisis which disrupted every aspect of human life. This pandemic has launched many challenges for governments across the globe. This pandemic attacked on all of human development's constitutive elements: income, health and education. Due to this the life of the peoples in the societies has been diverted. How to survive and protect ourselves from such a crisis is now the big questions in front of all the component of the society. In this chapter author has written about the future of society based on post COVID-19 situations. Also, there is discussion about scientific knowledge about pandemic, impact of this crisis, challenges faced by society and short- and long-term impacts. The attempt is made to suggest ideas to battle with crisis.

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Chapter 2

HIGHER EDUCATION IN COVID-19: IMPACT AND FUTURE

Dr. Deshmukh Swati Ramchandra[1] and Mahadkar Taskeen Azim[2]

AIJ Degree College of science Murud-Janjira.

Introduction:

Most states around the world have temporary closing educational sectors for avoiding spread of the Covid-19 pandemic. It has largely disturbed the education sector ultimately affected economic future. So, every state started the action plan of lockdown. The education sector including schools, colleges and universities became closed. All examinations of schools, colleges and universities entrance tests were cancelled. According to the UNESCO report, Covid-19 has affected nearly 68% of total world's student population as per the data taken during 1st week of June 2020. Due to Covid-19, about 1.2 billion students and youths impacted. Thus, the lockdown affected the schedules of every student. Though itis a critical situation in the history of education, Covid gives an opportunity to come out from rigorous classroom teaching model to an aware of digital model. The lockdown has compelled many educational institutions to cancel all exams and choosing online modes. But latter on all realized that the lockdown has taught so many lessons to manage with the emergence of such pandemics [1] Governments around the world are making efforts to diminish the immediate impact of closure of educational institutions particularly for more vulnerable and disadvantaged communities and trying to facilitate the continuity of education for all using different digital modes of learning. Thus, Covid 19 created many challenges and opportunities for the educational institutes. [2].Teachers and students to continue their educational activities through online. The teachers assigned work to students via internet, delivered lectures video conferencing using different Apps like Zoom, Google meet, Facebook, You tube, and Skype etc. There are WhatsApp groups of guardians, teachers, students and parents for helping communication through which they are in touch through thise-medium. Some of the students are quick to response to this system and some take longer time to acquire this system. India should not establish a good infrastructure for online education like other countries. The different advantage of such a system is education can become international famous.

Teaching in a Pandemic:

From March 2020, as the novel corona virus spreading rapidly into a global pandemic, schools all over the world made the difficult decision to shut their door. Due to this situation, universal shift to distance learning that proved troublesome for teachers, students, and parents. Emergency precaution quickly gave way to, as students were forced to finish the school year remotely.

The shifting of online education has meant rearrange lesson plans. Adverse effect on remote learning was losing the personal interaction. One positive think that, it has been nice to just sort of calm down and spend time with family, and away from rush of life. At the same time, students also struggled to stay motivate without hectic schedule. And now, all of a sudden, it's up to them to schedule it all. Teachers' biggest challenges has been bringing science to life on a computer screen, something is difficult for teachers on subjects like art and music. So, they're missing a whole emotional experience tied in doing that field work. Communities are now making preliminary plans to reopen schools in the fall, and it's currently looking like to reduce class sizes and cafeteria crowding.Infect,this collective experience may instill in us a newfound appreciation for field trips, friendships and even the classroom or workplace. The excitement of students coming to the school was wondering. It's a really powerful type of emotional day [4]. The pandemic has been steering the education sector forward with technological innovation and advancements. The pandemic has significantly disrupted the higher education sector.

Major changes expected in education sector in post covid-19 era:

It is obvious that in the light of the on going pandemic, changes in the education system, including the introduction of new methods and technologies, and the further active development of distance learning are inevitable, which requires a rethinking of the existing teaching paradigm and identification of key trends in the development of the education system in the current condition. Role of teachers will need to be changed from 'knowledge-giver' to a 'facilitator'. Educators will have to bring in a lot of innovations to bring in the element of interactivity and collaboration in their e-learning modules. Online learning is one of the main best alternatives to learning during the Covid-19 pandemic. This learning has been included at various levels of education. Various studies have shown that online learning was very effective in all types of education.

In Covid-19 pandemic situation online learning industry came into sharp focus [6]. As teachers, students, and parents struggled to grasp remote learning operations in

home. EdTech companies come as partners to schools and colleges. Table 1: Digital platforms used for online learning [6].

Digital Platforms	Frequency	Percentage
Zoom	218	53.4%
Google Classroom	102	25%
Google Hangouts	4	1%
WhatsApp	268	65.7%
Facebook	30	7.4%
You Tube	16	4%
Others (Telegram, Edx, Udemy)	4	0.5%

Source: www.tojdel.net

Learning management systems (LMS) help teachers deliver online lessons, share reading materials, and grade assignments. Top Hat offers teachers an instruction and class management platform where they can share interactive media, virtual classes, and targeted online lessons. The pandemic has served to strengthen the market position. Google's LMS platform, Google Classroom, saw its user base double from March 2020 into April [7].

Massive Open Online Courses (MOOCs) are also seeing renewed interest of gaining higher education. Adult learners in particular are turning to these courses, which are available to any one with digital access. MOOC provider Udemy reported a 42.5% increase in enrolments from February to March 2020. The most in demand courses on the platform feature professional skills (e.g., Adobe Illustrator, technical drawing) and child-oriented content, including art and coding. Coursera, for example, offers classes ranging from business foundations to data science. These are provided by not only universities, but also tech giants like Google, which offers its Career Certificates through the Coursera platform. In addition to learning and improving broad business skills, there has been a rise in interest in learning. Startup like Springboard, which raised $20M in Series B funding in August 2020, helps learners obtain certificates in areas like data science and UXdesign.

Several online platforms provided a supplement to learning offered in schools and universities. India-based BYJU'S which, at a $10B valuation, is the world's most highly valued education technology start-up made free after school closures. Its app helps teach math and science to primary and high school students through short

videos, and also offers personalized learning journeys and tutoring for each student. Since announcing the free offering, BYJU'S has seen a 200% increase in the number of new students using the platform. Companies like Riiid focus on providing online study materials and using AI to help students prepare for standardized tests such as the SAT, GRE, andGMAT.

Virtual reality (VR) creates an immersive 3D environment that a user can explore. Augmented reality (AR), on the other hand, superimposes digital elements. together across education. VR can be used to enhance learning and engagement by allowing students to interact directly with the material. Google Expeditions, for example, allows students to take more than 900 VR tours, including to the 7 wonders of the world and to the Great Barrier Reef. It also provides access to over 100 AR tours, ranging across topics from Shakespeare to magnetism to art history to plants. Florio is an early-stage start-up that is helping students with autism develop their social and communication skills. AR technology has similar applications across education.

On educational campuses Biometric technology, applications could include everything from identifying students to ensuring they are paying attention in class. In addition, the tech can help to ensure the security and safety of students on campus. The Paris School of Business uses LCA Learning's Nestor software to track students' facial expressions and eye movements through their webcams during remote classes to ensure they are paying attention. Similarly, a professor at the Sichuan University in China has been using facial recognition technology to determine when his students get bored during a lecture so he can use this data to teach that specific content in a more engaging manner. TheUS-basedstartup'sfever-screening cameras are already being used in restaurants across the US and are likely to have use in educational institutions as they gradually open [9].

Gamification in education is aimed at increasing learners' motivation and engagement by incorporating game design elements such as storytelling, problem-solving and encourage students to face and accomplish various challenges and goals. This promotes higher student engagement and could help students retain knowledge more effectively. It also helps students reframe subjects they may consider burdensome or boring as engaging and fun. Gamification enables students to receive instant feedback through the use of leader boards and dashboards that can show how students rank among their peers. This can foster a spirit of healthy competition among

students and motivate them to complete assignments to the best of their abilities. This information has been used to research different diseases including Covid-19 and create biological innovations to combat problems such as pollution and waste.

A smart campus is a digitally connected space, where devices and data come together to provide a more intuitive learning experience to students. Smart campuses can help lead to cost savings for an educational institution. For example, buildings fitted with intelligent sensors can detect whether the building is in use and adjust its power distribution accordingly. Including cameras, sensors, student devices, and more. Colleges also need to ensure that their networks are able to withstand and analyze the vast amounts of data that smart campuses generate.

Factors affecting the quality of e-learning:

Though online learning has many up sides, especially during a pandemic, there area number of challenges to consider. Studying online also makes students more distractions like surfing the web or multitasking. In this case, students might not receive the full benefits they would see from in-person learning. Another challenge to consider is the mental and physical health effects that students experience when using digital devices for education all day long. Learning in physical classrooms will resume once the virus passes, but the partnership and technology integrations happening today could bring about long-term changes to how we teach and learn.

Students may have a wider class selection and more flexibility as they choose between on-site learning, remote learning, or a combination of the two. However, even as prices for VR/AR equipment are expected to drop, the high upfront investment required to set up the infrastructure for these technologies often acts as a barrier to adoption for educational institutions. While biometric-based solutions present potential upsides, there are also several challenges to consider, including the lack of regulatory framework and laws governing use of the tech. There is also insufficient evidence to support the long-term benefits of gamification in educational contexts. This takes high upfront investment, which cash-crunched educational institutions may not always be able to supply. Inaddition,schoolsneedtoemploy specialists who can ensure all the technologies deployed across campus are up to date and running smoothly. The education sector is largely lagging when it comes to tech innovation, and events like Covid-19 place an even stronger spotlight on inefficiency and gaps across operations. This point led to an extensive discussion thread, and

overall, parents showed a negative attitude toward this barrier during the COVID-19 outbreak (Table2).

Overarching themes---------- Subthemes

1. Personal barriers-------Lack of training and support, Lack of technical expertise, Inadequate communication, Lack of qualification
2. Technical barriers-----Insufficient investment and maintenance, Poor connectivity
3. Logistical barriers-----Difficulties in using distance learning and lack of studentpreparation, Dissatisfactionwith modalitydistancelearning, Inabilityof distancestudents' needs, learningtomeet
4. Financial barriers----- Inability to buy technology, Inability to pay for internet services

Edtech and digitization at large could greatly supplement the learning process. Beyond seeing a more seamless transition to remote learning scenarios, tech could help provide personalized learning solutions as well as new and engaging avenues for students to participate in school. However, the sector faces significant barriers to increased adoption of tech. These include privacy concerns, lack of specific talent to operate infrastructure, and in ability of many educational institutions to make investments in building out networks. Regardless, as we look to a post-Covid future, we will likely see increased acceptance of technology in learning, especially in hybrid formats that combine classroom learning with digital techniques like live broadcasts and virtual reality. While tech-enable deducation has the potential to help transform the schooling experience, it comes with certain drawbacks including privacy concerns around misuse of technology, high upfront costs for educational institutions, accessibility concerns, and a lack of training, among others. These barriers will need to be addressed alongside tech ad option in the space. A large number of Indian students who are enrolled in many Universities abroad, especially in worst affected countries are now leaving those countries and if the situation persists, in the long run, there will be a significant decline in the demand for international higher education also.

Impact of pandemic Covid-19 on education in India:

In India, more than 32 crores of students have been affected by the various restrictions and the nationwide lockdown for Covid-19 (Wikipedia). Government of

India has taken number of preventive measures to control spread of pandemic Covid-19. The central government declared lock-down of all educational institutions on 16 March 2020. Central Board of Secondary Education, Union Public Service Commission postponed the examination. Similarly, the state Governments and other educational boards postponed examinations due to outbreak of Covid-19. Govt. of India has been extending lockdown periods from time to time adopting different strategies to fight with the pandemic but educational institutions remained closed continuously. Online learning is the best solution during this pandemic Covid-19 situation[11].

The digital initiatives of MHRD for secondary education are Diksha portal contains e- Learning content for students, teachers, and parents aligned to the curriculum, including video lessons, worksheets, textbooks and assessments. Under the guidance of its national boards of education (CBSE) and NCERT, the content created by more than 250 teachers.For higher education, Swayam is the national online education platform hosting 1900 courses covering both school (classes 9 to 12) and higher education (under graduate, post graduate programs) in all subjects. SwayamPrabha has 32 DTH TV showing educational contents. These channels are available for viewing all across the country using DD Free Dish Set Top Box and Antenna. e-PGPathshala is for postgraduate students. Postgraduate students can access this platform for ebooks, online courses and study materials during this lockdown period. Indian education system got the opportunity for transformation from traditional system to a new era [7]. The people residing in rural areas are still very much deprived of the technologies and therefore hampering the cause of onlineeducation.With reference to this statement, many countries are now planning to continue education through distance or virtual mode and India should plan for the same also.

Conclusion:

Learning is no more a straight path. It is not a royal highway with many deviations leading to the success destination. The post Covid-19 education seems to be an education with widely accepted online/virtual education which may perhaps be a parallel system of education. The prominence given to handwritten assignments is gradually diminishing with the birth of the online submitting provision. Virtual classrooms have given a back seat to a good parent-teacher relationship. Things are for sure becoming easy but at the same time it has decreased that zest for listening to a

nice lecture from a scholarly teacher who explains a concept of germination the way it has to be and doesn't just show videos at YouTube or any learning apps as a part of conceptual learning. In India, the Ministry of Human Resource Development is formulating safety guidelines to be followed whenever classroom learning is resumed. This will also prepare school systems to face such pandemics in the future more efficiently and without pro long education disruption, as well as move towards building a strong public education system in the country. In this 'new normal', changed behaviours of people and changed centralized norms and guidelines could lead to a situation where forms of governance and participation may change.

The transition to online learning in the spring of 2020 has become a real test for the entire education system. In a short time, teachers had to adapt to the new working conditions using technical means not within the walls of the university, but remotely from home, which disrupted their usual lifestyle and routine and led to stress. For students, the difficulties of learning in a distance format were to a greater extent associated not with technical problems, but with the lack of the possibility of interpersonal communication with teachers and classmates and the lack of a working atmosphere at their location. This form of training, due to its flexibility, makes it possible to successfully combine work and study at a university, which was an undoubted advantage for working students, especially senior students.the transformations affect not only the field of pedagogy, since the changes are not limited to educational processes alone but extend to the organization of the entire system of human knowledge and forms of human capitalmanagement.

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Chapter 3

IMPORTANCE OF ICT IN POST COVID-19 ERA

Suresh T. More[1]* and Dinesh N. Navale[1]

Stm.vpmkchem@gmail.com, dineshnavale@gmail.com

[*1]Department of Chemistry, Arts Commerce and Science College, Kinhavali, Thane-421403

[1]Department of Chemistry, VES College of Arts, Science and Commerce, Sindhi Society, Chembur, Mumbai-400071

Introduction-

Due to the COVID-19 pandemic we have come across shocking effects worldwide which not only affected health issues but also all spheres of life (i.e., the economy, social security, education, and food production), surrounding deep and negative impacts on the pleasure of economic, social, and cultural rights [1]. Therefore to protect the human rights against COVID -19 the Global Campaign for Education [2] has reaffirmed its place on the requirements for the events in the short, medium, and long term. Interventions should be comprehensive and accurately contextualized [3]. This chapter shows overview about post Covid-19 situation in India in different sectors.

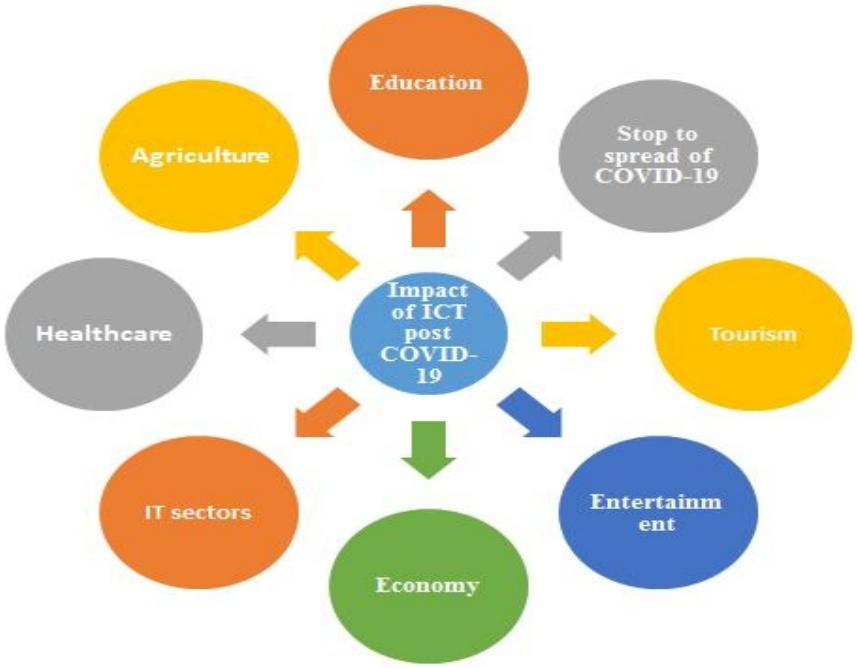

Figure: - Different Sectors which will benefited by use of ICT Post COVID-19

1. Post Covid - 19 situations in education-

The incorporation and implantation of new technology in educational system has to make one of the drastic changes amongst the Covid- 19 pandemic.Due to the increasing cases of the COVID-19 today we are forced to think again how will education works against to wake, educators have and chance to reimaging knowledge and provide students with the cognitive, creative, social, emotional, and physical skills that is required to find the way to make our tomorrow morning a great future for human generations [4].

Educators have to learn the technique to arrange children for life not just for livelihood. However not only inculcating life skills can be put on the back burner but educational strictness is certainly important. The big change is the variation and addition of the knowledge in the classroom education. To generate superior and attractive training educators have been required to advance their technological skills [4].

Attitudinal change of teachers-As it is estimated to fall over beyond the pandemic, this new educational release method will maintain to get upgrade. Digital tools complement, not only made alternate relationship but also created closeness of face-to-face knowledge [5]. Now the valuable classroom time can be more effectively utilized for discussions, debates, and guided practices as teachers are now moving content online. If taken in the right strength, this will not only improve the instructive scenery but also produce a new ecological unit of education. Parents have also stepped up and embraced the new education atmosphere. We witnessed the authority of attractive diverse stakeholders during lockdown which not only stimulated education but also ability to development at isolated locations [5].

Skill development courses on virtual platforms-Today on the effective platform the newest skill development courses are accessible for educational reinventions and encourage more applicable trends in education [6]. To make transitioned to modern aspects of the educational contract many teachers have done these courses which are more appropriate for learners. School needs to train teachers in online education to give students inactive lifestyle. Teachers need to be expert at conducting activities, projects, and assignments, study material, which are student-centric [6].

Developing awareness about e-learning- In Covid-19 situation need adapting new methodology made by ICT tools but important things is that creating interest to adapting technology is challenging task. For adapting the new way of learning need to create awareness and providing sources of e-learning tools is easy and cheapest way for high class to low class people. ICT provide us so many tools for e-learning like Google classroom, zoom, Microsoft office, Google meet etc. it made education easy and smart.

To convincing parent to important of online education-

Most of the time it was observed that in rural and tribal area the guardians of students having poor knowledge about new technology there is need to communicate them and aware about ICT important which help to providenecessary facilities to their child.

In post Covid-19 situation in education need to developed followings parameter-

1. Sources of online educations
2. Support schooling as a common good
3. The privilege to instruction
4. Profession and collaboration on teacher
5. Educator's participations
6. Adapting equality in current degree
7. Social spaces given by schools
8. Free and open source advancements accessible to instructors and understudies
9. Innovative teaching –learning procedure
10. Real time learning
11. Formative assessment
12. Technical input through videos

2. Post Covid-19 ICT stops to spread Covid-19

Recently, we have seen how cutting-edge advancement helps in the fight against COVID-19. It is perceivable that digitalized economies have lower pandemic possibilities and explain a couple of channels through which dangers can be improved [7]. In current circumstance noticed perilous danger of by and large misfortune is pandemic, a gigantically engaging disease that is truly overpowering and may execute various people. The honesty that we have gained through this current COVID-19

situation, we as of now comprehend that we were not ready for this pandemic condition. The accompanying pandemic doesn't include "in case it happens", anyway "when it happens", would we be set up early against the pandemic at an individual and total level [7-8].

What we truly need is speediness. Certainly, the advancement has advanced more and will continue advancing drastically, yet the human foundations and social orders need to accelerate in changing in accordance with it and utilizing distinctive sort of assets for creative thought age. After the COVID-19 episode, clearly, from the development headways are helping with managing the pandemic and better plan to fight future general prosperity emergency in a lucky, methodical, and quiet way [7-8].

Role of ICT in post Covid-19 to stop epidemicity-

Medicine structure determination- Development is transforming into an enabling specialist to make the communication snappier. The critical occupation of ICT in proposing fragments of a counter acting agent by understanding viral protein plans and helping clinical experts scour numerous stores of appropriate investigation papers at a phenomenal speed.

Expanding discernibility and straightforwardness by sharing information-During a pandemic, clear informing to the general population is basic to ensure they are educated and reminded to utilize suitable insurances.

Detecting people by face recognition and collecting large information-In case of pandemic organization, enormous data examination can help in quickly perceiving tainted individuals, partner with them, track that they have interfaced with, and so on

Transportation source availability-During this pandemic situation to avoid face to face communication and maintaining social distance new technology like e automobile, robot, drone etc developed by use of ICT.

Technology helps to temperature controlling-For maintaining fruitful and healthy environment sensors technology it may indicate information about surrounding condition.

Part of innovation to keep up social distance and business development -During the pandemic circumstance for the security and financial strength purposes ICT help

us to creating diverse application for the business purposes and reasonable correspondence

3. Post Covid-19 situation in Tourism

Hospitality industry contributes for larger part of India's GDP. To counter the fast spreading COVID-19 infections majority of the countries across the globe has chosen the path of lockdown. Which mainly include the restrictions on mobility and travel [9]. Lockdown has resulted in the temporarily shutdown of many hospitality business's across the world [10]. Majority of the governments has still make restrictions about only 50% operations permissions for hospitality industries. Restrictions on travel and stat at home orders have resulted in the decline of hostel occupancies along with revenue. Government has given the permission to reopen the dine-in restaurants at reduced capacity with stricter norms of social distancing [9].

Use of the ICT and some proactive plans has resulted in mitigating the impact of pandemic on hospitality industries [11]. The COVID-19 has hastened the industries for use of ICT and Artificial Intelligence (AI). Use of these technologies allow the operations and working with less human contacts [12]. Combination and use of leading edge technologies will surely help in reviewing of hospitality sector [13].

How use of ICT can be useful for reviewing of mobilization [14].

i. Guest can self-check in the assigned rooms with the help of mobile apps and codes.
ii. All the switches and buttons (Fans, Showers, and TV) will be operated on the mobile app which reduces human touch.
iii. Virtual views on the TV of restaurants to avoid crowds.
iv. Use of gourmet food dispensers on floor pantries.
v. Digital payments of bills of foods, accommodations and beverages.
vi. Automated billing.
vii. Self-monitoring gadgets for fever or any ill symptoms.
viii. Software to do the predictions of room occupancy and rates.
ix. Robotic rooms cleaning.
x. Automated dish washing.
xi. Reminder to the customers on mobile app about restrictions in place
xii. Robots to deliver food, beverages, and the like.

xiii. Use of mobile apps for appointment, bookings and orders.

xiv. Online chat windows for customers with service staffs.

xv. Internet of Things software for running back-of-house functions.

Use of this kind of technology will quickly become supreme for hotels just to stay in business.

4. Entertainment Industry

Media and entertainment industry are largely impacted by the stricter lockdown due to increasing COVID-19 pandemic [15]. All the associate business such as cinemas, live concerts, production house, and live theatre related to entertainment industry has already affected badly due to pandemic. It has been observed that entertainment industry has already using different online platforms for streaming. But to overcome the current losses in revenues and reopening of all business ICT is going to play the important role.

The use of ICT post COVID-19 pandemic in entertainment industry will change the way we consume media and entertainment [16]. Due to lockdown and work from home our social life has moved to online mode [16]. Use of ICT in different OTT platforms as shown in **Figure-1** will tremendously help to overcome the worst impact of COVID-19 on entertainment industry. Due to social distancing and adjust to new normal demand for at-home digital media is increased sharply and it is expected the use of ICT can easily meet the growing demand for at home digital media [17]. It is expected that India will have billion digital users by 2030 and it can further increase the numbers due to current pandemic [17].

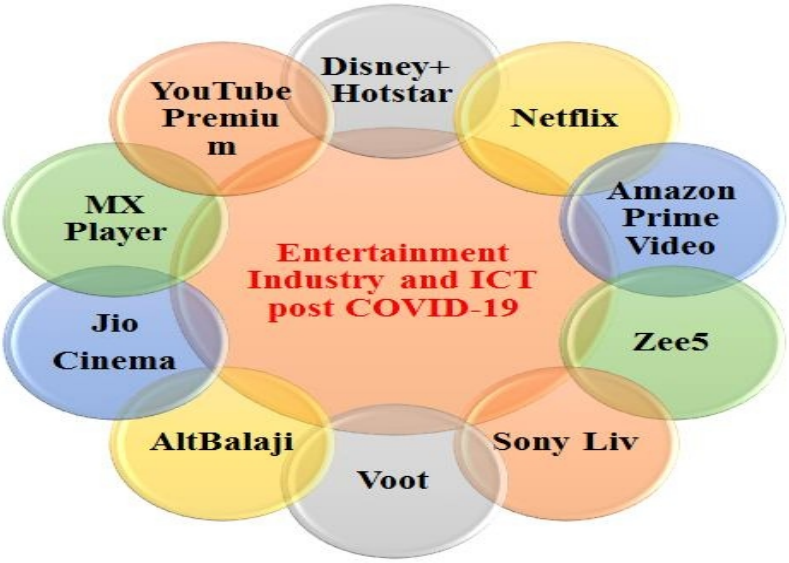

Figure-1:- Different OTT Platforms use by Entertainment Industry.

How use of ICT can be useful for reviewing of Entertainment industry [16, 17].

i. ICT will help in finding innovative ways to develop and distribute content.
ii. Distribution of content on OTT platform will be faster with the help of ICT use.
iii. Marketing, advertising and sales of content from entertainment industry by using different ICT technique.
iv. Use of different apps and websites for solving consumer's problems.
v. Use of ICT will help in expanding digital media production.
vi. Use of ICT platforms will boost the comfort and confidence of the existing digital citizenry.
vii. Lead time required in entertainment industry will be reduced by technology.
viii. Use of technology to create cost efficiencies and revenue enhancement opportunities.
ix. Use of different apps and websites for Production Arrangements which will minimize human touch.
x. ICT techniques will enhance talent engagements.
xi. Higher Speed and agility can be easily achieved by ICT.
xii. Reduce manpower and reduce operating expenses with the help of ICT.
xiii. Deep consumer engagement with online platform supported by good ICT.
xiv. Online Solutions to customer problem if required

xv. ICT will enhance security solutions for the digital space that can scale really well as scamsters and hackers.

5. Post Covid-19 Situation in economy

Covid-19 pandemic hugely effect on economic condition of any single person in the world. As we compare the economic condition of each person single which have less than the year of 2019-20 compare to year 2020-21.In any event, this is the thing that the most recent World Bank speculations advise us. There is enormous, maybe uncommon, financial pain ahead. Both strategy and governmental issues should assume a significant part to reduce this. Poor strategy can delay, even crash of financial recovery. Great governmental issues can guarantee that the enduring of the majority is limited [18].

A three-section arrangement grasped an aspect at the idea of financial test challenging India. Its principle argument was that India needs an interest side intercession. In any case, Indian economy is both enormous and miscellaneous. The arrangement response should be aware of this variety [18]. Really at that time can reasonable measures be applied where they are required? Strategy, particularly in the center of emergency, is likewise an issue of distributing negligible assets among contending needs. In a democracy, a governmental issue impacts this interaction remarkably. This two-section arrangement attempts to address these inquiries. The initial segment will feature how the constriction in development won't be uniform across districts and areas. The subsequent part will talk about potential roads of political assembly [18-19].

In a democracy the situation of economic sector much more affected by political decision. The effective implantation of government policies and support of politician has effectively enhancing economic power. Now a day's observable thing is that for getting sustainability of economy in every area need to improvisation and creating different opportunities. The recovery and stable economic condition for education need to create vacancies, sources their proper utilization to sustain people as well as economy also [19].

In the pharmaceutical field huge chance to developing different areas by proper use of technology which help to rising job and economy also [19].Similarly

effective development has been done in areas like IT sectors, agriculture, and hardware software sector, business sector, entertainment sector etc. which help to survive people and producing good economy also.

Post Covid-19 role of ICT in economy

i. Direct job creation
ii. Contribution to GDP growth
iii. Emergence of new services and industries
iv. Workforce transformation
v. Business innovation
vi. Economic transformation
vii. Cultural evolution
viii. Social contact development

6. Post Covid-19 situation in IT sectors

The data innovation company shows enormous change in development from 1980s. The IT companiesworking depended vigorously on office business sectors designed for request and assets and fabricated profound worldwide binds utilizing co-area with customers, empowered by global travel and transitory on site movement, going about as a critical component in creating psychological closeness.In this Covid-19 situation required to form easy global tourism and relocation extra prohibitive and expensive. The change in outlook makes critical obstructions for IT firms to have the option to keep up psychological vicinity with its customers and could antagonistically affect their worldwide intensity [20].

Recently, most of the accounts observed that the genuine interest issues which firms will glance in the short to medium term and how governments can manage encourage the torment. Regardless, it is firm that tremendous essential changes and new game plans will emerge over the long draw as the economy and society adjust to the adjustment in viewpoint. It is essential for countries and firms to appreciate these fundamental changes to fight reasonably once the current crisis encourages [21].

During the Covid-19 pandemic situation most of companies shifted their offices and look significantly convenient place. So many companies adapted to new technology complete their work virtually. They need to reduce office spaces and set

up vigorous IT frameworks so representatives can get to all applications from home and security isn't an issue [21].In a city like Mumbai, several organizations wind up spending so a lot or more on lease than they do on representative pay rates. In a period like this when endurance has become key, distant work is one way that organizations can take to reduce expenses and most presumably even increment efficiency [22].

"Work can't be unified any longer. Organizations should utilize undertaking class and secure applications that can be gotten to from anyplace. For something like video conferencing which is an ordinary necessity, a protected alternative is required [22].Stanford Professor, Nicholas Bloom's exploration had shown that telecommute prompted a presentation increment of 13% and lower whittling down and surprisingly late examinations by corporates are finding comparable outcomes. A product advancement organization has detailed that half of its representatives say they complete more work from home than the workplace. In any case, for organizations to be sure of this, they should utilize apparatuses that can precisely quantify representative profitability [23-24].

Role of ICT in IT sector development

i. Use of ICT for developing softwares which support digitalization of all business.
ii. Use of bank related softwares which help in reducing crowds at bank branches.
iii. Development of newer software technologies which help in reduction of crowd managements.
iv. Use of softwares for Data-enabled healthcare society.
v. Software for E-commerce industries
vi. Cloud computing
vii. Software developments
viii. Hardware development
ix. Transactions
x. Internet access
xi. Statistical data analysis

7. Post Covid-19 situation in Healthcare

Among all sectors affected by the COVID-19 pandemic, healthcare was arguably the industry most urgently forced to rapidly utilize all available technological advancements. From frontline laborers to back-end managers, the business needed to adjust rapidly to evolving conditions. It needed to take on a two-front conflict: guaranteeing that its help to patients ran continuous, and promising IT and administration conveyance inside as far off work and social separating went into hard-consistence mode.

The making of a 'solitary foundation of stages' to associate different frameworks like electronic comfort records and electronic clinical records into one consistent framework apparently is the key in making medical clinics more proficient [25].At present, we anticipate that healthcare organizations should adopt a hyper-customized strategy in tending to our requirements and furnish them with exceptionally profound information driven experiences about the patient. Innovation can truly do a ton of things and we are there to help cut down every one of the intricacies and improve on the client experience [26]. Driving the reception can be in reality hard when the labor force itself is impervious to change or can't track down that top dog who needs to take the proprietorship to transform it [26-27].

Utilization of robots in medical clinics would be driven by the need to make the positions of medical care experts seriously satisfying. By detracting from them commonplace obligations like manual account of information and conveyance of patients' solicitations for provisions, medical care suppliers can lessen modest assignments and spotlight on clinically significant objectives.It will help both the patient and the individual conveying the medical care administration limit contact, decreasing the chance of contamination [28].

Role of ICT in Hospitality

i. Machine learning and natural language processing
ii. Contact-tracing app development
iii. Security and privacy preserving technology
iv. Targeted public health messaging
v. Social media and online searchers
vi. Digital diagnosis
vii. Sensor development

viii. Syndromic surveillance

8. Post Covid-19 situation in Agriculture-

During the affecting time, the global food as well as the agricultural system has been uncovered to major challenges. The unfurling COVID-19 pandemic is so far affecting worldwide food production network, however that could change for the more terrible. The largest share of income on food is layout by world's poorest households by during the economic crisis of 2008 [29-30].Along with NGOS, many of them became common homeless disadvantage from state and central governments. IN future, the covid-19 affects to our lifecycle as well as to make difficulty in food choices. From farm to fork, therehave been differences in food and agriculture supply chain [29-30].

Universally, there is enough food for everyone to adopt a new normal life; there will necessary to put in new systems and method in coming months and years. The production is affected by the shortage. Agricultural products i.e.-fertilizers as well as the "panic-buying or other words scared-buying is creating worries for industry". Now days, we see that, for many food products the values or prices are increases in large quantity. If a vaccine for COVID-19 is not effect by this year's end, then less food production of high value commodities (like fruits) will lead to differs in value chain [31].

To face or to fight this situation, the governments and governing bodies of respective countries have error advisories and are working to minimize effects on food and food production during or post covid-19. The Covid-19 will affect the food industry in future. For this work, we need to supply large quantity of wheat to mills and flour to bakeries. Including millers, engineers, and drivers, the availability of key staffs are continuing on the hours they can work and delivery time and arrange the continued availability of fuels and electricity [32].

Role of ICT in agriculture [31-32]

i) Agricultural knowledge sharing and extension though few Information and Communication Technology (ICT) based initiatives

ii) Use of ICT for automation in pre-field, in-field, and post-field stage of farming which required minimum human interference.

iii) various ICT tools can significantly help in the dissemination of agricultural knowledge to the farmers

iv) equipped its agricultural extension workers with the android phones

v) New innovation techniques, use of modern technologies, high yielding seeds, usage of improve quality of fertilizers,

vi) ICTs application such as mobile phones helping farmers to changes the exiting attitudes.

vii) Through mobile phone farmers make interaction with market holders, kisan Call Centres, share information with friends, question answer with extension officers and browse internet on smart phone.

viii) Use of ICT in harvesting operations and post-harvest handling of produce in storage and marketing centers which reduces man handling.

ix) Use of ICT based apps for switching production lines and increasing their capacity to manage larger inventories; moving to on-line platforms and direct delivery to households.

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Chapter 4

Post Covid-19 situation in online Chemistry education.

Mr. Khan Shoyeab Mutalib[1]Miss. Damad Niha Hazique[2]

Anjuman Islam Janjira Degree College of Science Murud-Janjira. Dist. Raigad (M.S) India

Abstract:

Maximum students offer preference to the chemistry subject and its job orientating vital branch of science. so, during this topic I centered post Covid state of affairs in chemistry education. For understanding post covid-19 state of affairs we tend to compare chemistry with different on-line education like technical, Arts & commerce subjects Education. Chemistry Programme supported scientific basic theories moreover as sensible base education. In chemistry for practical's laboratory is vital to grasp chemical synthesis, analysis, mensuration, chemical handling and instrument handling. however, in course of covid-19 all student and teacher were taking on-line education because of that sensible base chemistry education settled additional. In on-line education student perceive some conception simply however some ideas needed visual image, in on-line education some tools square measure accessible to grasp chemistry in simple manner however it's some limitation conjointly. the difficulties posed for college kids WHO don't have facility of computers or WHO sleep in remote areas while not electricity or Wi-Fi. These students won't even have house reception wherever they'll work uninterrupted. during this topic I attempt to offer current situation of post covid-19 state of affairs in chemistry education.

Introduction

The coronavirus occurrence came to lightweight on December 31, 2019 once China aware the planet Health Organization of a cluster of cases of respiratory disease of associate unknown cause in Wuhan town in Hubei Province. worry starts to unfold. later on the unwellness unfold to additional Provinces in China, and to the remainder of the planet. The WHO has currently declared it a pestilence. The virus has been named SARS-CoV-2 and also the unwellness is currently known as COVID-19. Arundhati Roy (2020) associate Indian activist has delineate the present COVID-19

pandemic as a portal. it's a pathway that results in a reconfigured future, one that has got to show a discrepancy from the planet we tend to antecedently knew. The pandemic's disproportionate, tragic consequences for health and livelihoods—for people, their communities, and even whole societies—underscore institutionalized types of discrimination nonmoving in race, ethnicity, class, gender, sexual orientation, age, and talents.

These inequities are obviously manifest in education systems round the world. The people most marginalized and discriminated against have suffered the best from the closure of faculties and also the efforts to succeed in students with on-line instruction. Delivery of education this fashion illustrates the difficulties posed for college kids WHO lack computers or WHO sleep in remote areas while not electricity or Wi-Fi. These students won't even have house reception wherever they'll work uninterrupted. what is more, basic services provided by colleges are considerably reduced or unobtainable. I'm primarily a Chemistry professional person, and once taking in thought the adequacy of college science education in an exceedingly time of COVID-19, it's tempting to wring my hands and complain that once I started my faculty teaching career within the 2015s, we tend to did giant amounts of teaching concerning Chemical. we tend to instructed at secondary level a few whole vary of Carbon chemistry, with elaborated mechanism showing the roles of chemistry; we tend to instructed concerning however chemistry helpful for preparation of vaccinium may well be tackled by interference (e.g., nets for malaria) moreover as treatment and cure. we tend to instructed concerning the role of nutrition and general physiological state in reducing kind LaHood of developing bound diseases and enhancing the body's ability to reply fitly if an individual did become infected. we tend to instructed concerning the system and what happens once it fails to acknowledge a brand-new microorganism or once it over-reacts.

Approximately 264 million kids and adolescents don't seem to be in class (1), and this pandemic created this example worst. because the COVID-19 pandemic spreads, there has been associate increasing move towards teaching on-line due to motility down of faculties, faculties associated universities for an indefinite time because the solely possibility left (2). Therefore, this can be the time to gravely rethink, revamp and design our education system in abundant tightened want of new current state of affairs. Informal and non-formal education is additionally hugely affected. However, it's a well-established assumption that no pedagogic approach will

replace the height position of formal education because of having teacher-taught direct interaction. But, the aftermath of COVID-19 crisis, on-line education became a pedagogic shift from ancient methodology to the fashionable approach of teaching learning from schoolroom to Zoom, from personal to virtual and from seminars to webinars. Previously, e-learning, distance education and correspondence courses were popularly thought of because the part of non-formal education, however as of currently, it looks that it might bit by bit replace the formal education system if the circumstances enduringly persist over the time. a number of the foremost fashionable on-line communication platforms that might amendment the destination and direction of the full education system across the planet in post-COVID-19 circumstances square measure begin. me, zoom meeting, WebEx, Neo, Class time, Ted-Ed, Coursera, Google schoolroom, Pronto, Skill share, Nocebo, Feedback Fruits, Udemy, Flipgrid, Adobe attracts, Seesaw, Kilo Edu, and plenty of additional. De-schooling society (4) looks relevant because the current situation tries to stay our kids far from the normal formal education system and supply a chance to flourish on their curiosity.

Besides, on-line teaching mode is providing the sensation of psychological safety to learning community in COVID-19 afflicting amount. The second step is concerning ever-changing method below that 2 choices square measure left either to adopt a brand-new on-line mode in observe in different establishments elsewhere or to introduce one's own. The analysis is often for a more robust implementable model. Here, notably, amendment isn't a happening however a dynamic method as a clear stage in continuity. For any result-oriented amendment, we'd like to own a time suited outlook and a brand-new mental attitude (5) for on-line teaching mode at a private and structure level to supplement the transition part. cap and El-Azar (6) advocated that "resilience should be designed into our academic systems" and conjointly indicated 3 trends that might be seen in future transformations viz. increasing academic innovations, bold public-private academic partnership and digital divide gap. This study has been conducted in related to faculty of Bombay university, placed in geographical area state of Asian country.

Online Education in Post-covid time

Until 2019, on-line lectures weren't quite common in most universities in Republic of India, and lectures in chemistry were typically given in school rooms by

professors, whereas research laboratory sessions were sometimes taught by teaching assistants supervised by professors. thanks to the choice of the many universities that solely on-line lectures ought to lean within the spring semester of 2020, several instructors with none expertise in on-line teaching had to seem seriously into on-line lectures, which may lean in one in every of 2 forms: (7) synchronous (real-time) on-line lectures and (8) asynchronous on-line lectures. within the case of synchronous on-line lectures, instructors and students access video conferencing computer code at the same time throughout the selected category hours and instructors provide lectures on the themes. Students will raise queries throughout or simply when the lectures vocally or via live text chat. several Republic of India universities purchased Zoom service1 for period on-line lectures this year. within the case of asynchronous on-line lectures, instructors create video clips of their lectures so post them sometimes on the educational management system (LMS) web site of the varsity, in order that students will watch the video clips. Even before the all-out on-line lectures, education videos are shown to be effective in teaching chemistry.8-10 whereas we've not accumulated enough information on the effectiveness of the video clips within the all-out on-line lectures compared to the

Most university students in Republic of India have computers (laptops, desktops) or good devices (tablet PCs, good phones) on the market and have access to high-speed web connections, and thus, the required physical conditions for on-line lectures are glad for many students during this country. As most students in college man chemistry categories at Osmania National University are from Republic of India, students having bother with web connections are expected to be quite rare. At the instant, several universities in Republic of India don't have enough facilities and employees' members to form lecture videos in giant quantities in a very skilled manner, and so, several instructors had to record their lectures on their own in their own offices, leading to lecture videos that don't seem to be as fancy as those created with the assistance of specialists. Nowadays, several high school students in Republic of India take web lessons once they harden coming into university, and thus, the faculty students expect that the standard of on-line lectures at universities ought to be of comparable quality because the web lessons they took antecedently, that are created commercially with the assistance of specialists and assistants and are sometimes of prime quality.

Many on-line lecture videos from universities, however, were created while not enough preparation and help during this semester, and a few students got wind that on-line faculty lectures failed to satisfy the expectation of the faculty students on the average. (11) Presentation programs like Microsoft PowerPoint (12) are wide used for lectures in chemistry of late. several instructors have used the PowerPoint program for displays throughout their category hours. practiced instructors typically have generated or accumulated immeasurable course materials already, which may be employed in every semester when tiny modifications, simplifying the preparation of lectures. additionally, to presentation programs, several instructors of chemistry use blackboards (or whiteboards) actively, as a result of the employment of blackboards makes it easier to regulate the pace of lectures and permits students to follow the main points a lot of closely. it's been shown that pill PCs with interactive whiteboard apps may well be employed in teaching chemistry. (13,14) S Even while not refined apps, pill PCs will be terribly helpful in on-line chemistry lectures, providing the chance to write down or draw directly on PowerPoint slides with stylus pens. The author used Associate in Nursing humanoid pill laptop whose screen was reflected onto a Windows ten laptop.

Policy of Indian Govt for Higher instructional institute on on-line Education.

The government of Republic of India started thinking gravely on this matter with accentuation on ICT and use of on-line education because a part of mandatory teaching-learning method at tertiary level. Moreover, it's mirrored on getting ready draft new education policy 2019 that has been considered a proactive and extremely techno-efficient step within the time of this pandemic. Study Webs of Active-Learning for Young Aspiring Minds (SWAYAM) could be a Programme or large Open on-line Courses (MOOC) platform initiated by the govt. of Republic of India hosted on-line courses in numerous quadrants. The SWAYAM PRABHA could be a cluster of thirty-two DTH channels dedicated to TV of high-quality instructional programs throughout the week. Annual Refresher Programme in Teaching (ARPIT) is a web skilled development program launched by the MHRD on Gregorian calendar month thirteen, 2018 exploitation SWAYAM platform. Another initiative of MHRD was e-PG Pathshala go by the University Grants Commission (UGC) that provided

high-quality curriculum-based and interactive e-content in seventy subjects across all disciplines. e-Pathshala could be a portal together go by the MHRD and National Council of instructional analysis and coaching (NCERT) launched on Gregorian calendar month seven, 2015, that provided instructional resources for teacher educators, teachers, analysis students, students and fogeys through a web learning platform. Therefore, it will be same that we tend to weren't unaware of the challenges and prospects of on-line education.

India's apex regulative body of upper education, UGC, has taken this instructional situation terribly seriously and place some efforts proactively to resolve the situation of finishing courses and examinations in on-going semesters in addition as issued circular concerning the tutorial calendar when the recommendations of 1 of the committees habitual by UGC itself. it's conjointly become necessary for all the schools in Republic of India to complete the twenty fifth info through on-line teaching mode and seventy fifth face-to-face interaction (UGC, 2020). the academic situation of the post-COVID-19 occurrence wouldn't be simple to manage teaching-learning things while not exploitation on-line teaching platforms strictly. Having seen the horrendous monster of coronavirus, it will be anticipated that within the coming time student would face multiple challenges of instructional hardships together with quality education, active expertise, laboratory work, library visit, peer tutoring, remedial teaching, analysis and innovation. Hence, the tentative resolution of post-COVID-19 instructional tantrums is to keep up the equilibrium of on-line and offline learning categories (hybrid mode).

Mooc’s courses on the market freed from value on analytical chemistry. The course intends to supply ample data and skills for polishing off letter estimation for many of the common analyses in routine laboratory environments. The techniques that there are examples or exercises embody acid–base volumetric analysis, Kjeldahl element determination, UV–Vis’s spectrophotometry, atomic absorption spectrographic analysis, liquid action mass spectroscopy (LC–MS), etc. it's vital to fret that for booming activity uncertainty estimation expertise (both in analytical chemistry intrinsically and conjointly in uncertainty estimation) is crucial and this will be noninheritable solely through follow. At the university of Taru links are on the market (https://sisu.ut.ee/measurement/uncertainty/) course materials are freely on the market to everybody all the time. The course materials accommodate short video lectures (with slides on the market for downloading), sensible examples and various

tests and exercises for self-testing. The systematic presentation of activity uncertainty in chemistry is split into twelve chapters (occasionally divided into subchapters). A chapter includes a short video lecture (sometimes several), concomitant matter material (including schemes, formulas, etc.) and in most cases one or many self-tests. The self-tests vary from straightforward "ticking" tests to complicated full-fledged letter estimation issues. The self-tests don't want registration to the course, they are doing not influence the ultimate score of the registered participants and there's no limit to what number times a learner will try the self-tests.

Execution of on-line teaching and learning in Higher academic Institute.

There are some difficulties felt within the implementation of the modification method within the education system that has been arisen once COVID-19 crisis; these difficulties ar connected with the novel views of on-line education and their technological complexities. Earlier to the present pandemic, on-line education is taken into account because the education provided by the open universities in Asian country. however, in COVID-19 evoked time, on-line teaching-learning became a vast challenge to agitate, and stakeholders don't seem to be probably appropriate modify with the sudden academic modification as they're not technologically competent to embrace the present state of affairs. Therefore, for booming implementation of academic modification (in this case, it refers to the shift from ancient teaching-learning strategies to on-line teaching-learning methods), implications of modification got to be addressed. Figure one delineates a way to decide the implementation method of on-line teaching learning. The journey begins from the collective vision of UGC and MHRD (supra-system), University and schools (system), and totally different tutorial departments (sub-system) in favor of implementing on-line teaching-learning within the education system.

Within the face of COVID-19, the shared vision of education system completed that in the pandemic amount, academics and students ar intended to adapt on-line teaching-learning platforms in fulfilling the present academic desires. Everyone, either academics or students, were friendly delicate in victimisation social media app viz. WhatsApp, Facebook, Twitter, Instagram, that became sleek facilitation of victimisation on-line academic platforms like ZOOM, Cisco WebEx, Google Meet etc. as a signal of positive transfer of learning. Also, there are some helpful academic apps like workplace 365, Google room and far additional easy

videoconferencing app that may be downloaded freed from value and straightforward to use (24); therefore, to some extent, it appears that there's no reason to urge into a panic to urge new technology all of sudden as a number of the apps ar already embedded in our HEIs. Majority of stakeholders possessed smartphones and solely tidy numbers having laptops ar the required resources to implement on-line teaching-learning. Mizoram University has its ICT center and LMS that helps in seamless watching of on-line teaching-learning modes.

Online chemistry

Molecules and atoms don't be part of political parties or choose elections, and that they don't acknowledge government boundaries, therefore chemistry education shouldn't got to be a political topic. Indeed, the numerous educators United Nations agency believe that chemical data shouldn't be the exclusive domain of governments and also the moneyed elite still create efforts to stay access to public science data free and open, instead of blocked entirely or fastened behind paywalls. yet, it's vital to forever bear in mind that web access with the total and free flow of scientific data and ideas isn't really on the market in several regions of the globe because of censorship. Equally regarding, the present trend during this space is negative: “Internet freedom round the world declined in 2016 for the sixth consecutive year.” whereas the govt. of the u. s., for instance, would be thought of a number one advocate for web freedom in several contexts, it's vital to notice that tides will apace modification as a result of individual viewpoints and social norms within the arena of censorship evolve over time. Indeed, “people’s attitudes toward web freedom and censorship are additional sophisticated and nuanced than assumed.” As educators, we tend to should look outward from our ivory towers and stay watchfully tuned in to the initiatives in our own countries to either additional undermine web neutrality or otherwise censor the flow of latest discoveries and basic, fact-based scientific data.

Free academic on-line resources and websites engaged at increasing data of, and appreciation for, chemistry appeared early within the history of the net with the event of internet sites like Molecule of the Month. The presence of reliable chemistry data on the net became strengthened over time with the later emergence of web sites like Wikipedia, e-resources like spectroscopical repositories, and platforms for interactive visualizations of chemical phenomena. Four vital areas still grow over time: the sheer volume of correct scientific data housed on-line, the supply of easy,

ASCII text file tools for hosting and sharing new data like scientific breakthroughs at lowest value, technical capabilities for looking, and platforms for developing on-line learning tools and open courseware.

The Online high school Chemistry course incorporates all doable learning designs and learning domains. as an example, activities like students writing a literary composition concerning part, composing a song concerning rock oil purification, and planning a marker extolling the virtues of antioxidants area unit a region of the chemistry course. The assignments area unit designed to extend the student's pc skills together with chemistry data. the scholars should construct information tables, incorporate graphics, style a plan map, convert document files to made text files (.doc to .rtf) and use a discussion board together with having the ability to connect a file to show in their assignments. At the start of the course, a review of basic mathematics and pc skills like information assortment, conversions, graphing, and exponent rules that a student must take a web chemistry course is provided. on-line graphing programs and graphing calculator's area unit usually found on the net, free for the scholars to use as required within the course. Students have access to any or all required data at their fingertips - one click away - it does not have faith in the coed to be organized and retain all of the category notes and work.

the net high school Chemistry could be a laboratory-based course. Often, one in every of the primary queries asked by academics, students and fogeys is however the scholars complete this element. many laboratory activities may be custom-made to be performed reception fairly simply - people who cannot be custom-made reception may be found on the net as simulations. it's quite doable to perform most room experiments reception with a measuring system and a few measurement devices. The measuring system is provided to the scholars;however, the measurement devices aren't. If the coed doesn't have measurement cups and spoons with metric measurements labelled, then the coed should use conversions to examine what percentage milliliters area unit in a very tablespoon, teaspoon, or cup. Following area unit some temporary samples of experiments contained within the on-line high school Chemistry course. making Lewis dot models victimization gumdrops and toothpicks. By crushing red cabbage in quandary till the water turns into a hydrogen ion concentration indicator which will be accustomed verify whether or not chemicals area unit basic, neutral, or acidic. If associates} turns red/pink it's an acid, if it stays purple it's a base, and if it turns green/blue the answer is basic. By victimization the

red cabbage indicator, vinegar and a spread of antacids, the coed will compare the effectiveness of the antacids. AN custom-made measuring instrument experiment, employing a burning peanut to heat water in a very suspended can. Discovering the impact of size, temperature, and agitation on the speed of answer by victimization halite and flavoring. This activity is additionally helpful for introducing nanoscience. once vinegar is combined with bicarbonate of soda - a gas is given off and therefore the students area unit asked to style AN experiment to conserve the mass. they're asked to submit the numbered steps together with the balanced equation.

Using gastric antacid and completely different temperatures of water, you'll be able to verify the impact of temperature on reaction rates. to boot, by victimization whole, broken and crushed tablets, you'll be able to verify the impact of extent on reaction rates. part changes may be studied by employing a pan with water on the stove and a measuring system. beginning with ice, the temperature is taken each fifteen seconds, whereas the pan is heated on the burner. At the top students complete a action graph. Students initial study exoergic and endothermic reactions. Then they live the temperature within AN empty jar, whereas soaking a abrasive pad in vinegar. take away the abrasive from the vinegar and wrap it round the tip of the measuring system and place it into the jar. Record the temperature and verify whether or not the reaction is exoergic or endothermic and write the equation. A unreasonable demonstration to indicate the impact of temperature on air (mixture of gases) and therefore the impact of pressure: students heat a can in quandary, so immerse it quickly (upside down) into cold water

Online laboratory in Post covid-19 state of affairs

How we are able to conduct on-line session we have a tendency to taken example one in every of the simplest universities. it's difficult to convert existing science laboratory courses into on-line sessions, and comparatively very little has been according on this matter. Some instructed a home-based work course (27,28) victimization science laboratory kits or materials which will be obtained simply. There are suggestions for virtual to simulate the lab sessions. (29,30) whereas active experiments with chemistry kits can be a stronger choice from a strictly education viewpoint, those kits aren't pronto offered in Chosen, and their area unit issues relating to safety and waste disposal. Whereas virtual work sessions can be a decent different, they're troublesome to implement in a very temporary amount time. within

the case of the science laboratory courses within the spring semester of 2021, at Korean National University, when considering varied potentialities, we have a tendency to set to produce students with video clips of experiments, wherever teaching assistants (TAs) allotted the particular experiments that the college man students were alleged to perform.

As their area unit more or less twelve research lab sessions during a semester in typical chemistry laboratory courses, we tend to made twelve video clips in total for every chemistry laboratory course. The video clips and also the experimental information made by TAs were provided to the scholars so they might learn remotely a way to perform the experiments and the way to method the experimental information in chemistry. the scholars were asked to jot down research lab reports supported the info made by TAs. On the assumption that it's still higher for college students to perform some experiments within the research lab, the chemistry instructors at Puchong National University planned to own a number of actual research lab sessions that students may participate in in-person simply when the top of the spring semester. However, concerning common fraction of the scholars expressed concern concerning attending the active chemistry laboratory sessions thanks to COVID-19, and it had been determined that solely willing students ought to attend these additional sessions. though we tend to don't have a certain measure, it's doubtless that students taking on-line {chemistry research lab chemistry laboratory| chemlab laboratory| research lab| research l laboratory |science lab |science laboratory} courses miss some understood data on experiments which will be nonheritable solely by actual participation within the lab sessions. As we tend to started this semester while not a lot of preparation, we tend to don't have any management cluster to match, however additional elaborate study on this is often to be performed within the future.

Online Learning Resources chemistry education

United Streaming could be a company that has over five,000 video clips (5-25 minutes in length) which will be utilized in a web course fairly inexpensively. A video clip offers the scholar a live or animated version of the science content. otherwise, to deliver interactive experiences for the scholars is by looking and victimization appropriate simulations on the market on the net. samples of net resources follow. http://www.hazelwood.k12.mo.us/~grich art/explore/ds

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Swayam additionally conducting Coordination Chemistry States of Matter and Chemical dynamics. This course 'Coordination Chemistry, States of Matter & Chemical Kinetics' can cater to 4thsemester of CBCS primarily based curricula of B.Sc. Chemistry beneath the paper 'Chemistry-DSC 2D: 'Coordination Chemistry, States of Matter & Chemical Kinetics' and B.Sc. natural science (Physics, Chemistry and Mathematics) beneath the paper Chemistry-DSC 2D: 'Transition Metal &Coordination Chemistry, States of Matter & Chemical Kinetics'. it'll additionally cater to Generic Elective paper particularly 'Transition Metal &Coordination Chemistry, States of Matter & Chemical Kinetics' of B.Sc. Honors with Chemistry CBCS curriculum. Swayam additionally conducting mooc's courses on on-line course of instruction on chemistry, advance transition metal organometallic, approximate methodology in quantum chemistry, basic in chemical science, chemistry main cluster component etc.

Online tools for chemistry education.

The Virtual science laboratory could be a internet simulation of a research laboratory. it's designed to help students link chemical computations with authentic laboratory chemistry. The science laboratory permits students to choose from several customary reagents (aqueous) and manipulate them throughout a way resembling a real lab(http://chemcollective.org/vlabs) you will scroll in address to look out out our assortment of pre-written problems, they have been organized by plan and hierarchical by issue. problems on one. Acid base a combine of. problems on Stereochemistry a combine of. problems on thermo 3. Acid base chemistry four. Solubility 5. Oxidation/Reduction and chemistry six. Analytical chemistry/Lab Techniques. Websites like https://digitallearning.ucf.edu,https://li.wsu.edu/teachingtool,&https://libguidesmines.edu/oer/simulationslabs on the marketplace for Virtual Labs: In these labs, real experiments square measure virtualized or simulated and students can access them on-line Remote Labs: These sorts of analysis research labs modify college and students to access instrumentation and/or computers via information superhighway to perform experiments and laboratory tasks whereas not being inside the physical lab space. UCF Apps: These apps change access to desktop package that is typically on the

market only in field laptop labs or by obtaining and fitting package on a student laptop remotely.

Space jointly a good tool for Chemical structure search - draw and notice chemicals from suppliers worldwide. Chem space provides researchers with associate degree final tool for deciding and each one compounds listed on Chem space electronic computer square measure out there for on-line ordering in post covid state of affairs and many of extra tools square measure out there for chemistry. Chemical equation balancer uses for deed chemical equation and laptop reaction quantitative relation. Molar mass calculator uses to calculate molar mass and elemental composition of any compound. Gas law calculator use to calculate gas properties practice varied gas law (ideal gas, vander walls). pH calculator uses to calculate pH etc. square measure out there on Webqc.org chemical portal.

Online education for lecturers and student.

Advantages:1. permits innovative ways that of teaching with the help of technology and on-line tools. 2.Allows reaching out to associate degree outsized form of students across geographies. notably useful for distance learning. 3.Advantage as a result of the teacher is way extra out there for facilitate once the student desires it chiefly around the clock. 3.Another positive facet is that the limitless likelihood for faculty children to come back and review the info inside the lesson varied times, until comprehension happens.4. Teaching chemistry on-line demands access to a variety of scientific information and so the availability of quality chemical information on information superhighway. Likewise, policies that favor adequate body, business enterprise and tutorial resources for implementing on-line chemistry square measure needed. 5.More analysis and development efforts square measure important to shaping technology as a cost-effective tool for delivering on-line chemistry instruction. 6. the facility to seek out practice wholly totally different on-line tools and ways that. 7.No disruption in learning as a result of the pandemic. 8.Listening to recorded and live conversations and dealing at their own speed

Disadvantages:1. on-line teaching takes time and apply. 2.There is little accord on but students is also evaluated in associate degree extremely truthful manner. 3.Inability to possess a face-to-face connect with students and facilitate free

conversations, discussions, and mentoring. 4.Inability to achieve all students as a result of technological limitations 5. sadly, cheating remains an issue with on-line courses. 6.Chemistry courses demand powerful personal computers for transmission shows, simulations, high-level important interactive discourse, and adequate technical facilitate for uninterrupted delivery through information superhighway. 7. Lack of free-flowing conversations, debates, and discussions eight. Technological difficulties related to weak devices or access to information superhighway. 9.Getting accustomed learning and being evaluated on-line. 10.Studying whereas living reception, with family and totally different distractions

Conclusion:

While taking on-line class teacher is reprimand students, and digitally recording the overall session. Then uploads it to the web, and adds daily supplementary videos, notes, comments, and feedback from students over a quantity of it slow. that may become associate degree perceptive and comprehensive technique. it would be out there on-line and can be viewed by anyone United Nations agency wishes to seek out typically, | this can be} often only one way; there square measure many innovative ways that during which to use technology and improve learning and teaching. Had the happening of COVID-19 occurred decades past, it'd not realizable to grant lectures on-line. on-line lectures became attainable with the advancement of technologies in several areas, sort of a high-speed internet association, the relatively high power of computers, the availability of pill PCs with stylus pens, video conferencing code, etc., all presently out there at cheap prices. There ar difficulties in teaching chemistry on-line, that were extra pronounced inside the beginning, but presently in post-covid-19 many students routinely get correct education or work in chemistry whereas not interruption in times of uncertainty. whereas the form of teaching chemistry this semester is completely totally different from that in previous semesters, it looks that the effectiveness of information superhighway teaching is style of kind of like that of typical lectures for willing students, granting that students miss one issue inside the case of on-line laboratory course. as a results of many pointers from universities and authorities were announced at short notice inside the case of the semester of 2021, it had been hard for instructors to line up the lectures and exams earlier and assess the effectiveness of on-line lectures extra quantitatively. With the weird teaching experience, we have gained

throughout this semester, instructors square measure presently in post covid-19 higher prepared for on-line teaching and may handle things extra smoothly inside the longer term if it's a necessity to point out chemistry on-line all over again.

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Chapter 5

COVID-19: Education from Disruption to Recovery

Prashant Thote

Gyanodaya Vidya Mandir, C/o. Heidelberg Cements Narsingarh, Damoh, 470675 (MP)

Abstract:

World Health Organization has declared the outburst of coronavirus disease as a community health emergency and now the virus has spread to too many countries and territories. Schools are closed till further notice and students are grounded at home with limited contact with friends and virtually no physical activity. Due to COVID-19 pandemic ranging across the world – International Baccalaureate- A level, Indian Certificate Secondary Education and Central Board of Secondary Education all known and recognized boards either post pone or cancel their examination. Likewise, top colleges at international level like Harvard and Princeton etc., have been closed and other institutions in India like Indian Institute of Technology and Indian Institute of Management have closed their campus and moved their classes online. Even standardized test like National Eligibility cum Entrance Test, Graduate Record Examination, Scholastics Aptitude Tests and Graduate Management Aptitude Test remain suspended and the future of many students hangs in balance. Many Parents and educators thus share the common worry, i.e., when pandemic subside students will be back to school with low achievement. The gap between the low achieving and the high achieving students will also vary in high degree. In the present paper impact of COVID-19 on school system is highlighted.

Key words: Lockdown, pandemic, COVID-19, online and classes.

Introduction:

The entire world is defying itself from one of the biggest health risk which leads to one of the largest and quickest restructuring of the world order. At the end of March 2020, pandemic has spread over 185 countries which results in the closure of over 90% of the schools, colleges and universities impacting the life of students globally (nearly 1.38 billion). The spread of pandemic, the closure of the educational institution and the transition to online teaching is so swift and they do not provide an opportunity and time for planning and to reflect on the potential risks and opportunities that they have brought. In such a pandemic situation, it is vital to reflect

on the impact and on what transformation will happen as one move ahead in the field of global education.

The pandemic increases the worries of both parents and teachers also. To address this issue, in the present research pre-test is conducted to know about the students feeling regarding their loss in the learning outcome. The student's loss in their learning due to the present condition and it is expected to continue during the academic year 2020-21 and an attempt is made to calculate the loss.

In this paper attempt is made to investigate about the losses in the expected learning outcomes due to short academic session in 2020. Presently the schools are closed from 24th March till 31st July. Most of the learners are at home and are spending summer without any fact to face interactions with teachers. Most of the teachers are struggling to adapt to both content and the presentation through on line classes. Parents are juggling between their personal responsibilities and their ward's education. Students also face make problems like isolation, anxiety and uncertainty about the future. The present situation is unprecedented for all most people alive today.

As students are away from schools, friends, teachers and they miss the school environment, which indirectly affects their academic achievement. The present paper focuses on the impact of out-of-school time due to the lockdown on learning among school students. To assess the impact, data is collected from the students from grade 3 to grade 8. Totally 240 students participate in the study. The results of the academic calendar year of 2018-19 and 2019-20 are collected. Measured Academic Achievement (MAA) tool is used. The assessment technique is enabled and the tool may be administrated multiple times in a year and the test score indicates the fluency in reading, absenteeism during summer and winter, school closure due to other natural calamities like heat waves, droughts, floods etc., and the academic performance variation due to such factors are measured and anticipated.

Two parameters are considered here, one is reading and the other mathematics in terms of intended learning outcomes. The (*Fig- 1*) shows two lines. The solid lines represent the trajectories in the academic years (2018-19 and 2019-20) before COVID-19 school closure and the dotted lines represent the loss due to lockdown. Expected learning loss takes pace due to the closure of schools. The projections of loss in learning may be overestimated because online classes and home schooling are

taking place. Result of the present paper reveals that 50% of learning is there in comparison with the previous years. In Mathematics it is less than 50% gain when compared to the previous academic years. In lower classes the learners are lagging behind one academic year in Mathematics when they are compared with the normal schooling. The present research is based on the previous research "Absenteeism" and projection of learning based on the various seasonal extreme conditions such as floods, heavy rainfall, cold waves and hot waves. Attempt is made to investigate the fall in more variable achievement and achievement gap between very high and very low achieving learners.

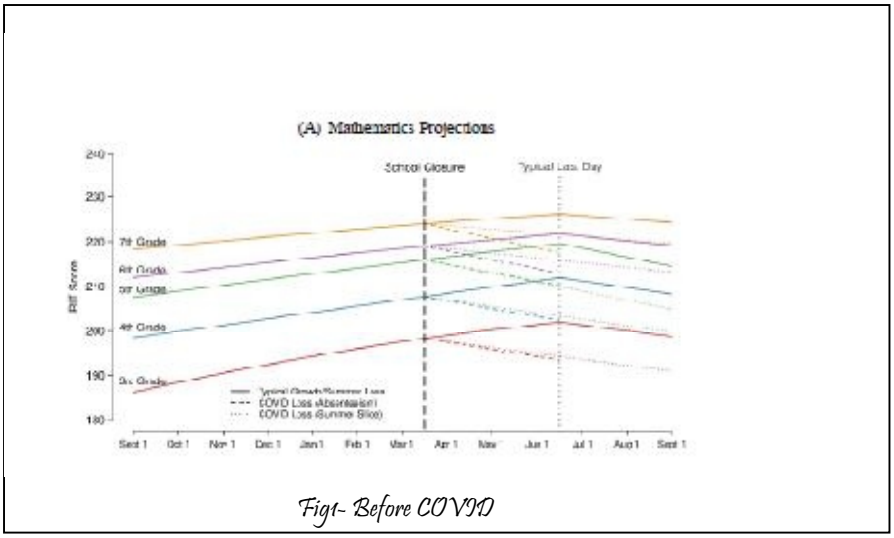


Fig1- Before COVID

The result in (*Fig- 2*) shows the variations in subjects for grade 4 and grade 6. The area under shades shows the spread in expected learning outcomes among students who are in 30th percentile of learning loss, the steep decline and the students who are in 70th percentile which are indicated through flat lines. In mathematics it is observed that there are fair amount of variability in learning rates. In reading there is a wide spread of acquiring learning outcomes with students of 30th percentile and it indicates reasonable learning gain.

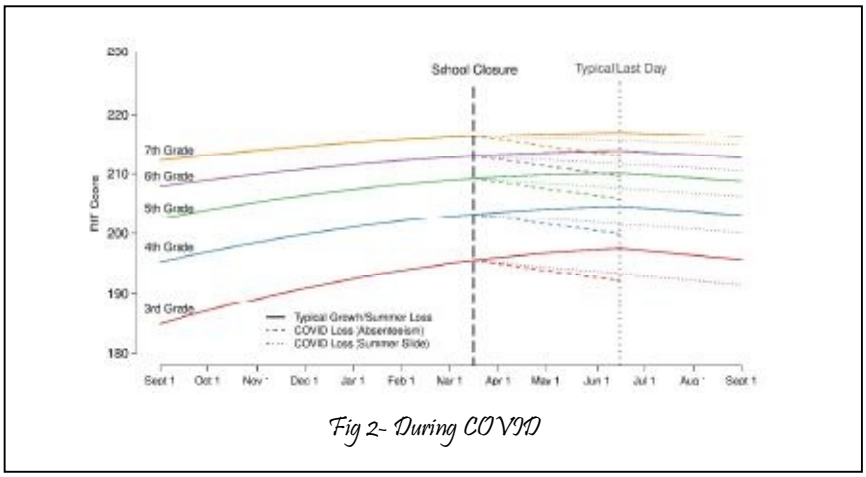
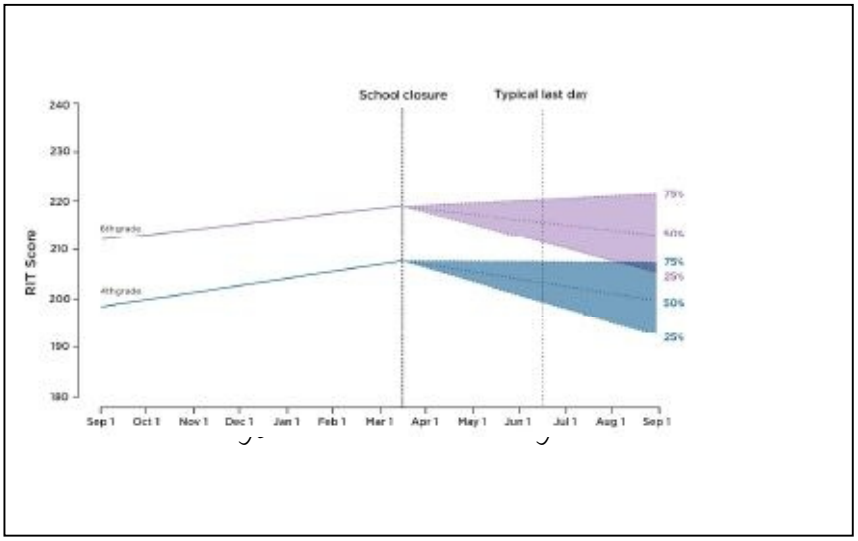


Fig 2- During COVID

The (*Fig- 3*) shows that the extended closing of school due to the lockdown may lead to more variability in academic achievement in terms of learning outcomes. A broader range of learning requirement in terms of individual learning gap will create greater challenges for teachers.



Conclusion:

Students of the 21st century are COVID-19 generation. The present paper is a road guide to recover. The highly positive educational fraternity will consider this projection and will act as a potential catalyst when defining, framing, returning to recovery from the fall. The overall result of the study shows that:

The learners are potentially behind in their core subjects like mathematics. Hence it is essential for the teachers of different grades to find the starting line

of instructions. There will be a need to assess the learners not only formally but also informally and intimately to understand the learner academically.

Students reporting to schools after lockdown have more variability in their academic skills, wide learning gaps than normal situations. Hence the teachers have to consider different ways and approaches to differentiate their instructions and have to provide a variety of learning opportunities for individualized learning.

Students lost complete regular schooling, without home schooling or online classes they might have more loss in their academic learning. The students who are not having access to the technology and internet also face many challenges. The ground that the learners gain during the academic calendar year 2020-21 is improbable due to COVIS-19. The teachers have to walk with the learners to investigate the growth rates that are required to catch up and set learning outcome for the present academic year which are ambitious and achievable.

The school closure due to the natural disaster and its impact on the student's learning indicates that the students have difficulty in concentrating and they often manifest the symptoms of depression in the following months of natural disaster. Teachers must understand the impact and they must support to utmost level based on both emotional and social needs.

Many students may face problems in the post pandemic period due to loss of family income, greater food security, loss of family members due to coronavirus and anxiety of interaction in schools.

The scaling COVID-19 impact of school closure is a need. The inequalities and diversities among schools are unfortunates. The present system is not accountable for the reality that pandemic crisis has created in our communities. The analysis of the present paper is useful for curriculum planning for the academic year 2020-21.

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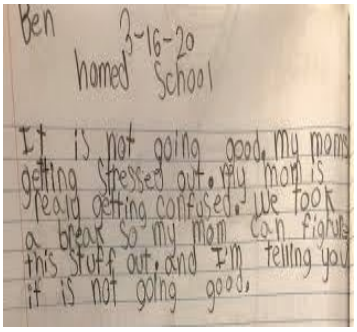
<tr><td> 
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Chapter 6

IMPACT AND ISSUES DURING COVID-19 PANDEMIC ON EDUCATION SYSTEM

Dr. Pathan Amanulla Khan

Assistant Professor, Department of Botany,Anjuman Islam Janjira Degree College of ScienceMurud-Janjira

Email: dramanullak@gmail.com

1.0 Introduction:-

Novel corona virus 19 (COVID-19) has changed the lifestyles of entire human society around the globe, people are advised and even forced to keep their distance and limit travel as often as possible. These security measures effects educational system also to control spread of virus in any conditions. In India all schools are fully closed till end of March 2020. Were in Germany, all schools are closed until April 20, 2020. Nearly all government of world has recommended and forced for social distance. Letter the same regulations of social distance are implemented in learning and additional learning materials via an online system has been imposed meanwhile.

As the Corona virus has been emerges as pandemic first time in China and Korea, governments shut schools and education institutes and prepared to fight against pandemic. Meanwhile to continue education systems online platforms has been prepared in many countries to for school and colleges education. Many universities were canceled their physical classes and start e-learning for safety of their student and faculty (Wang et al., 2020). In India, Pakistan, Shri Lanka, Indonesia, several universities cancel courses and have chosen to continue online learning. Government and private schools administrators are making efforts in various ways to adapt to the new online learning environment. Suddenly the world is being shocked by the COVID-19 (Corona Virus Disease) outbreak which was reported that's it's originated in the city of Wuhan, China since December 2019 (Lee, 2020).

This pandemic of COVID 19 has challenged to entire world education community with health issue. Crawford et al., (2020) studied and reported the higher education's responses from 20 different countries of the world. They decided that to social distancing strategies on higher educational institute and needs a rapid curriculum development which is feasible for online learning. Pujari (2020) reported that due to the school closure, students, parents and teachers are facing various

problems in India. So, for this the currently online teaching is a better solution but it again challenges for poor parents and students to efforts this reform.

As per UNESCO reports the COVID-19 pandemic has interrupted the face-to-face class for at least 9 out of 10 students worldwide and this number us large. Globally, about 195 countries have closed all their schools and educational institute which affecting over 1.5 billion students from pre-primary to higher education level. Worldwide about 50% (826 million), 43% (706 million) of students do not have a computer facility and internet access at their home respectively and hence cannot get benefits of online education system. UNESCO also report about 56 million students cannot use mobile phones, because they are not even covered by mobile networks at their localities may due to remote areas. In Countries of Sub-Saharan Africa around 89% (that's about 216 million), 82%, (that's about 199 million), and 11% (26 million) of students without computer, home internet access, and not covered with mobile networks and facility respectively (Utaminingsih et al., 2020 and Sunitha et al., 2020).

Moreover, around 56 million students live in Sub-Saharan Africa not served by mobile networks in their area. Furthermore, we needs more trained teachers in ICT to effective online learning in this pandemic highlights. Even in developing countries, there is only 1 trained teacher for 56 students in primary education system (O'Hagan, C. 2020, UNESCO, 2020 and WHO, 2020).

2.0: Education and Governments Initiatives' during pandemic:

Governments of various nations are practicing their education via online and distance mode during this pandemic issues that's keep teaching among students someway (Vegas, 2020). Around 90% of high-income countries are delivered online learning and 20% are using a combination of online learning and broadcast system. In the case of upper- middle-income countries, over 70% provides a combination of online learning and broadcast system. Where in lower-middle-income countries provide about 66% of the broadcast and online learning system is practicing. The countries with low-income shows, less than 25% are delivering education using radio and television to their students in this pandemic.

A combination of learning with distance, online and with broadcasting via different modes has been practicing in many countries of Central and East Asia, Europe and in America. In the North and Middle East Africa, about 28% of countries are providing only radio and television teaching, less than 40% provide only online

learning, and 22% are providing a combination of broadcast and online learning. In middle income countries the mode of online and broadcasting learning are not much effective among students due to facilities provided to the (Winthrop, 2020).

As Thomas (2020), reported about 40% of South Asia countries are providing broadcast education, and 50% are providing a combination of online learning and broadcast education. Were in Sub-Saharan Africa, 11% of countries are providing only online learning education to their students (Thomas, 2020).

2.1: Teachers Training Programs by Governments: The country's governments should provide training to teachers on technology- based education during the pandemic crisis. In South Asia, 50% of countries provide training and guidance to teachers. In Europe, Central Asia, North and Middle East Africa, over 50%, the Caribbean and Latin America 48%, and 40% in the Pacific and East Asia provide training to their teachers. As far as teachers training are concerned to the some Saharan regions of Africa, they are not much focused on training to the faculty for online and distance education by their governments (Vegas, 2020).

2.2: Students, Teachers and Parents in Pandemic: The affects of pandemic on schools, students, teachers, and parents is worse which are much tried to resolve by respective governments but not effectually worked in many countries. The COVID-19 crisis increases social inequality among the schools and students. Students those are from more advantaged parents attend schools with better digital infrastructure and teachers might have higher levels of digital technology skills. Were disadvantaged students are attending schools with lower ICT infrastructure and educational resources (Di Pietro et al., 2020). During this pandemic more advantaged students are attending schools to with adopt online learning program by various governments. Schools in disadvantaged, rural areas lack this appropriate digital infrastructure. Also, there is a major difference between private and public schools in technology and educational resources available to them. Students' have not equal access to digital technology and educational materials among disadvantaged students. In the (Woday et al., 2020) survey, the study finds during schools closure stress among students shows the level of depression disorders, anxiety and stress (WHO, 2020).

2.3: Distance learning is an alternative: solution to continue the education system alive, but it is too difficult in developing countries like India due to parents is not

themselves been gone to school in maximum cases. And there is a lack of the necessary Information and Communication Technology (ICT) infrastructures, radio, computers, and television to provide distance learning program. Access to computers and internet is now a basic to successful distance learning system. These facilities are not equally available to all students in developing nations till now (Zhang, 2020). Staff and teachers should also familiar with online and distance teaching platforms which is practically till not possible. Teachers are struggling with difficulties in the area of information and technology due to lack of infrastructure. In some private schools may not pay their staffs' salary and some schools may pay half salary and make economic problems to teachers and their family. In COVID-19 pandemic which affects poor families since many students don't have access to the equipment at home to accesses education. The physical school closure and the implementation of distance education lead the student to spend less time in learning, were might get stress, which may cause lack of learning motivation (Di Pietro et al., 2020).

3.0: Educational Resources and Technology, unequal Access and Issues:

Students from less advantaged backgrounds highly suffered during COVID-19 than advantaged students due to facility and access (Di Pietro et al., 2020). To control the corona virus spread, most countries have been working to encourage parents and schools to help students continue to learn at home through distance learning (UNESCO, 2020). The governments are suggested to the learners to used platform of television and sometime radio from which they can use access to education in distance mode. These strategies are helpful and working among some students and learners belongs to the rural areas and from disadvantage groups. In Ethiopia, around more than 80% of the population lives are situated in remote and rural areas with limited and in some places no electric supply, at these area its much challenging to administration and government authorities to provide even radio lesion and lectures on television too (Tiruneh, 2020). The schools in urban areas are teaching their students from a distance by uploading assignments, books, and reading materials through Google Classroom, social media, e-mail and other applications. It has been found that there is no regular and perfect monitoring system of online education in urban area and due to this the practice was totally ineffective to the students.

There is a difference between urban and rural schools and the private and public schools to keep their students learning from home. Also, public school teachers

and students have limited or no access to the internet (Tzifopoulos, 2020 and Magalhães et al., 2020).

The closure of school brings many difficulties for students, teachers and families of many countries. Disadvantage group of students are more suffer during this pandemic due to poor education level and their available facilities. The children are more dependence than younger children or students on parents because they need basic guidance for their learning process, with advance facilities like social media, digital devices with internet access (Tzifopoulos, 2020). Furthermore, poor and digitally- illiterate families' children are further suffering for theses faculties (Tiruneh, 2020). School closures could further increase the inequalities among the children's (Owusu-Fordjour et al., 2015). Students from the rural and remote areas are lack access to technology like internet facility, electric facility and educational e-resources during pandemic (Di Pietro et al., 2020).

4.0: Assessment and Evaluation during pandemic period:

Distance and open learning is a good opportunity for students. In (Zhu & Liu, 2020) developed actions such as introduced online learning platforms, use Blackboard, TronClass, Classin, Zoom, and Wechat group platforms, and conducted online training, and collected information about many courses. E-learning is not a new mode to convey education smoothly for developed countries and also in some developing countries. But sudden shifting from physical classes to virtual class to the students for online learning is become challenging for students, teachers and parents too. That's majorly effects in undeveloped countries due to financial budget, improper planning, skill for technology, ICT infrastructure; e-resource and internet access (Basilaia & Kvavadze, 2020). Some courses are difficult or impossible to teach and learn through online learning methods such as sport, music, science practical's in laboratories, music, and art courses etc. (Rosário et al., 2015 and Sahu, 2020).

Switching from a classroom course to an online course has a serious impact on assessment and assessment. Depending on the type of course and the type of assessment, managing the assessments and ratings online can be a challenging task. Hence, teachers need to change their assessment types to suit the online mode. It's much difficult to monitor student while online learning and assessments during their online exams (Basilaia & Kvavadze, 2020). Laboratory tests, practical tests, and proficiency tests cannot be done online. In addition, students who do not have access

to the internet suffer from assessments and evaluations (Sahu, 2020). In (Osman, 2020) assessing and evaluating student performance in online learning is difficult for both instructors and students, in particular practical teaching, technical competency and practical skills assessment is difficult. According to the report (UNESCO, 2020 and WHO 2020), the rapid transition to online learning has been a challenge even for students, teachers and parents in countries with reliable ICT infrastructure and internet access. Students, parents and teachers also need training to enable effective online learning. However, this support is particularly limited in developing countries. Educational inequalities endanger the continuity of the education system in times of unexpected closings of the education system (UNESCO, 2020 and WHO 2020). Because developing countries have limited computers, internet access, access to cellular networks and a shortage of ICT-trained teachers (O'Hagan, 2020 and Magalhães et al., 2020). Even if online teaching and learning is a good opportunity to continue education during the pandemic, it is a challenge for developing countries (Sun et al., 2020).

5.0: Physical and Mental health:

School and college closings have a negative impact on the mental and physical health of children, students, parents and teachers around the world, especially in developing countries (UNESCO, 2020). Because during school closings, both boys and girls in most rural areas may be forced to give their families full support in terms of livestock and agriculture. Female students from low-income families and rural areas may be at increased risk of sexual abuse, forced labor, and early marriage. The rapid increase of covid cases all over world has created a fear feelings and uncertainty about what will happen! (Tiruneh, 2020). The blockade due to the corona virus can cause people to experience stress, fear and restlessness, such as the fear of dying, the fear of the death of their relatives (Sahu, 2020). This stress can affect the mental and physical health of students. The pandemic may have a huge impact on careers or may not require college students to complete this year (Niranjan, 2020). Not all students may interact well with online learning platforms and applications (Haleem et al., 2020) as some of the students are active and others may take longer to become familiar with the system.

6.0: Challenges:

COVID19 suddenly appeared in some developing countries with little to no preparedness plans. All sectors, including education, are hard hit by the pandemic. In the case of Guyana, online education, which has become the new normal thanks to COVID19, is currently facing several challenges, some of which are listed below:

6.1: Lack of resources: Digital inequalities between students and staff were suddenly exposed due to the lack of internet access in many inland villages where some students and staff live. No availability of computers, laptops or tablets for the students, who can use these devices to connect with online mode for their study. Some other teachers were also affected by these shortcomings. No or less adequate pre-training on the requirements of online teaching for students and teachers. Many teachers and students have grappled with how to work effectively with new technologies (Hodges et al., 2020).

6.2: Lack of hands-on training for students: The inability to use laboratory or fieldwork due to social distancing for courses that require the use of laboratory, fieldwork or hands-on training; Poor National Infrastructure Slower internet speeds at home due to the sudden and unprecedented internet traffic and the lack of preparation of internet service providers for sudden enormous demands on their services (Magalhaes et al., 2020).

6.3: Inconsistent power supply: Unlike industrialized countries, Guyana still does not guarantee a stable power supply as there are occasional power outages during lectures that affect both students and teachers.

7.0: Problems during course delivery:

7.1: Reduced Student and Teacher Participation: As noted in some of classroom experiences during class, many students no longer participate in the class discussion as is the case in traditional face-to-face teaching, and there is often little or no feedback when questions are asked . As a result, some online courses become long and sometimes stressful. It is the students who learn (Lavy and Naama Ghanayim, 2020, Orkibi and Tuaf, 2017) and if they oppose or minimize their investment, attention, or effort in their participation, they will achieve little in learning.

7.2: Wrong Practices: With the online testing method and the fact that due to the limited number of technological devices, many students are unable to use video services during some of the exercises and tests of the live class, the students can get support and this helps not be aware of the instructor to (Zahra et al., 2020).

7.3: Meeting Deadlines: In many instances where students and staff have not been able to get their jobs done on time using technology tools, they have met deadlines and even that due to other limiting factors they face Standard that was expected of their delivery.

8.0: Student Problems:

8.1: Mental Health Issues: Some students experienced anxiety and restlessness due to the sudden change. Due to the inability of some students to cope with the combination of their academic demands and domestic challenges, depression, mental health issues, and thoughts of suicide were some of the conversations that were held during this period.

8.2: Other Impacts on Student and Parents: The consequences of the closure of education centers have affected the entire population suffering from this situation caused by the pandemic, but especially in the most disadvantaged countries. According to UNESCO 2020, several factors are seriously affected.

(1) Disruption of learning: Since the closure of schools implies a deprivation of the right to education and to their own personal development. Access to education is become limited, and closure of educational institute caused major damage.

(2) Food: As there are a large number of children and young people who only have the food they receive in schools for free or at a minimal cost.

(3) Poor training of parents for distance learning: This circumstance is due to the low educational level of the parents, so that once again, the most disadvantaged families are harmed to a greater extent.

(4) **Unequal access to information and communication technologies**: The lack of resources, once again, increases the digital divide, which leads to a difficult obstacle to overcome to access learning from digital platforms.

(5) **Lack of childcare:** As a result of parents having to leave the house to seek the livelihood of the other family member, the children are left alone in the houses, and with this multiple very negative consequences are arise among them.

(6) **Economic consequences and increased unemployment:** Parents with young children have to stay at home to care for their children, which causes a loss of wages and damages the productivity of the most of the region.

After prolonged closure of education institute and schools, the possibility of the dropping out of students who do not return after the closure order is increases. Some are stated to work due to family financial support and diverted their minds towards money then education. Finally, the report suggests that the pandemic had very large impact on the education system around the globe. Particularly and specifically to the education system with low-income countries are most negatively affected and less able to provide distance learning and training to teachers also (Ali, W. 2020).

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Chapter 7

SPORTS RESUMPTION AMIDST COVID-19 PANDEMIC

Hetal J. Mehta

SVKM's Mithibai College of Arts Chauhan Institute of Science & Amrutben Jivanlal College of Commerce And Economics

Abstract:

COVID-19 has created havoc and affected all walks of life be it social, economic, and human lives as well and the field of sport has been no different.

The barren and silent fields had created sort of a vacuum in our lives in these already tough times.

However, amidst the pandemic, sports has found a way to get back onto the field. The action has slowly restarted with caution. Sports has been an antidote over the years, providing excitement and joy even during the most difficult situations. It has brought some relief as well with its return. While the players are back on the field, trying to get back to their best and provide entertainment, there have been numerous challenges as well that sports has faced in its return. The physical and mental health of the athletes has come into sharp focus as well as the logistical challenges. We need to be patient and sensitive towards these challenges along with employing astute measures. It is a step-by-step process that will require care and perseverance. Yes, there are somethings that will never be the same, but we will need to embrace those changes, live we do with other things in real life. Sports has got back onto its feet for now and with collective efforts, it will be up and running, like always. We just have to believe.

Keywords: Sports, COVID-19, Coronavirus, Global Pandemic

Introduction

The COVID-19 pandemic is like a bad dream we wished we never had. It has created havoc of gargantuan proportions. The entire world was locked down and every day we asked ourselves the question - what next? It has brought so much pain, anxiety and fear and our lives have never been the same since its outbreak. The World Health Organization (WHO) classified COVID-19 as a global pandemic in March 2020 following its outbreak in December 2019. No just the health, it has affected the

social, economic and human lives as well. And one of the integral parts of our lives - sports - has not been any different.

Importance of sports and impact of pandemic on sports

Sports has brought us so much joy. People have emotions attached to it. It was a stress-buster and a source of enjoyment which not just developed minds but also provided physical exercise. We watched it, we played it, the players played it and that fan-sports, player-sports bond was nearly impossible to break. However, the Coronavirus pandemic brought everything to a screeching halt. The sporting action stopped. The fields went silent and barren. Kids and players were confined to their homes and it brought a distinct sense of hollowness. The sporting industry was badly hit financially. People lost their jobs. Big leagues like the Indian Premier League (IPL), English Premier League, the Wimbledon and others were temporarily suspended.

Self-doubts started creeping into the minds of athletes. Will I be the same player as I was earlier? Will I be able to regain full fitness after long period of inactivity? Will I get back the contract I had lost?

The broadcasters has incurred massive losses and hence the sporting teams and leagues. How will they recover from this unprecedented situation?

There was so much uncertainty.

Sports getting back on its feet and action returning on the field

However, there islight at the end of the tunnel during these times. With things getting slightly better, some of the sporting action has returned to the fields. The players are back on the grounds providing entertainment. The fans can watch their heroes and teams play again and cheer for them.

While the return of sports has definitely brought relief and excitement, it has brought along it own sets of challenges as well. Sports has never been the same and we don't know whether it will be the same going forward.

However the administrators have been doing their best to make sure that at least the sporting action stays on the field and doesn't get off it again. There are strict quarantine rules being implemented. Players are made to travel via private chartered flights. They are made to stay in bio-secure environments. No fans are allowed in the

social, economic and human lives as well. And one of the integral parts of our lives - sports - has not been any different.

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However the administrators have been doing their best to make sure that at least the sporting action stays on the field and doesn't get off it again. There are strict quarantine rules being implemented. Players are made to travel via private chartered flights. They are made to stay in bio-secure environments. No fans are allowed in the

stands and in some cases only 50 percent stands are allowed to be filled. Entire leagues have been shifted to different countries where the impact of COVID-19 has been minimal. For example, the 2020 edition of IPL was shifted from India to the UAE by Indian cricket's governing body Board of Control for Cricket in India (BCCI) and it successfully managed to stage a six-week long tournament. Canceling the tournament would have incurred around $536 million losses. Which could have been huge.[1]

The tournament was a hit and according to Star India, the official broadcasters of the IPL, there was 23 percent rise in TV viewership with a staggering 31.57 million average impressions for the tournament. The data was sourced from Broadcast Audience Research Council (BARC) India. Over 30,000 RT-PCR Covid tests conducted on a total of about 1,800 persons including players, broadcasters, administration members and during the league.[2]

The broadcasters have taken the digital route to bring effects without fans with digitally created background fan noise.

Social media has been increasingly used to increase interaction with the fans. The leagues and teams have ramped up their digital and social media activities and increased their social presence. Twitter, Facebook and Instagram have been used as a platform to convey their messages and provide interaction with the fans.

Even the players have found a way to interact with the fans via Facebook and Instagram lives. Digital communication tools have been kind of saviours for the players. They use WhatsApp video calls, Facetime, Skype almost every day to communicate with their families from their hotel rooms. They use these apps to communicate with their personal coaches and physios on a daily basis. Media interactions, press conferences and interviews have been taking place online on zoom calls.

The popularity of fantasy games and Esports has gone up. Even the players have been playing multiplayer games online and even competing in Esports competitions.

Some of the broadcasters have set up digital equipment in homes of the commentators so that they can operate remotely and don't need to travel to offices or grounds or venues. Some have set up production tools in local studios to reduce overheads and people count travelling on tours.

Logistical, mental and physical challenges galore

Managing the logistics has become complicated and the costs have increased. People have found ways though. But it hasn't been easy. It's been far from smooth. There are many aspects that till need a deep look in.

One of the biggest is the mental health. There are so many rules that have been implemented due to the pandemic. Bio-bubbles have been formed where the players stay in a bio-secure hotels and can't meet any one or go out. They are mostly confined in their hotel rooms. And the only travel is from ground to hotel and hotel to ground. It's been mainly implemented in cricket. There are special chartered flights arranged for travel and they have to quarantine themselves for days ahead of a series/tour.

Some of the players have travelled from one bubble to another (one country to another) nonstop for months. They haven't met their families. Some of them haven't had the fortune of seeing their new born, some of them haven't even had the chance of attending the funerals of their dear ones.

That hotel room can be one hell of a lonely place. Imagine following the same routine day in day out in one room, alone! No parties, no socializing and in some cases, no face to face interaction with your own team members while staying in the same hotel.

Players have complained and criticized. Yes, it's difficult but what is another option? Many players have opted to pull out of tours/series/tournaments. They feel insecure both with regards to safety and mental health. You can't blame them as well.

Even after all these measures, it's not guaranteed that things will go smooth. Recently, the Pakistan Super League, a T20 cricket league in Pakistan had to be suspended after a cluster of COVID-19 cases spread among its players and staff despite being in bio-bubble environment. [3]

Almost every sport has witnessed these difficulties and COVID-19 infections. Recently in January this year, Badminton World No 1 Kento Momota tested positive for COVID-19 and it prompted the withdrawal of all the Japan's players from the Thailand Open tournament.[4]

Many players have openly expressed their views on how tough the bio-bubble life is. Players have been counting days to when they could go home and meet their families. India captain Virat Kohli too stressed upon the importance of mental health of the players.[5]

He told his IPL team Royal Challengers Bangalore YouTube channel during the IPL 2020 that it becomes difficult at times because things become repetitive and if it continues for long, it can be mentally stressful. He also emphasized on the fact that regular conversations should take place with the players and there should be feedback taken about how they are feeling. He also asserted on the fact the the boards should consider the length of the tours and series as long tours could be of detrimental effect physically as well as mentally. A team wants its players to be in best state of mind and physical fitness.

Steps to combat the challenges

To combat the mental health situation, teams have started employing mental health experts and psychologists. IPL franchise Royal Challengers Bangalore too roped in renowned sports psychologist Dr. Chaitanya Sridharand also employed a team doctor in Dr. Charles Minz for IPL 2020 who travelled with the team to the UAE for the entire duration of the tournament.[6]

Chairman of RCB Sanjeev Churiwala emphasized on the importance of mental health saying that it is crucial to invest in these areas for the franchise. He told the Times of India that these hirings have been a huge shot in the arm for the team. The major focus during the lockdown was on the players who are susceptible and need help the most – the domestic players and youngsters. The bigger and senior players have the experience of handling tough situations because they have been through difficult times a lot of times and know the mechanism to cope up with and handle things when the going gets tough, through their maturity, understanding, experience and mental toughness.

International teams have started taking the matter seriously. The England's Cricket Team has employed rotation policy to make sure they give proper rest to its players and allow players to spend time with their families. There is a compromise in not being able to field their best teams and it has received criticism for some parts of the cricketing fraternity as well but the England Cricket Board has kept mental health high on priority. [7]

The COVID-19 has disrupted a lot of strategies and teams have had to re-strategise. New seasons have started without real preparations as the earlier seasons had ended late due to the pandemic. Players and managers have had hardly any time to prepare for the new season. The injuries have been growing and this has meant that

teams need to have a strong bench strength to cope with the heavy workload. The team that has a good bench will have its nose ahead. The weaker teams have suffered with lack of good back-ups. Going forward, the managers and coaches and the team management will have to keep these things in mind while rebuilding their teams.

On the flip side, with all those injuries, the young players have been getting more chances which is a big positive.

The pandemic has somehow impacted the onfield strategies as well. For example, players are not allowed to apply saliva on the ball in cricket. It has drastically changed the dynamics of swing for the bowlers and tilted it in favour of batsmen slightly.

Not just the mental aspect, the physical aspect also comes into the picture. The players are not used to inactivity for such a long duration. They have been locked up in their houses for long and it makes it crucial for them to have a smooth transition while getting onto the field. Some of the players have been desperate to get back onto the field and there is a chance that they might overdo things in excitement and desperation, which might lead to long term injuries. [7]

They lose speed, bone density, endurance, strength during the period of inactivity and hence the weight-bearing capacity decreases. A lot also depends on the diet and nutrition the player has had during the lock down. There has to be a gradual shift from homes to the field and that's where the role of physios becomes crucial. Players and team need the right guidance and steps for phased progression and physios need to be employed for right guidance.

There is no doubt that the period of inactivity has had an impact on the players' fitness. The players are exhausted with continuous onfield action. The English Premier League players face a prospect of an exhausting 13 straight months of football after the COVID-19 shut down. Cricket teams have been travelling incessantly to recover the financial losses and lost time. The performances are affected and there are fears of long term injuries as well.

One of the most common injuries have been the muscle injuries in football. In the first five weeks since the league started, there have been 42 percent increase in muscle injuries among the Premier league players as compared to the last season at the same stage. [8]

According to Premier Injuries, there have been 78 instances of the players who play in the Premier League players suffering muscle injuries in all competitions combined

this season so far. Some of the common injuries have been muscle strains, muscle tightness, muscle tweaks and muscle pulls.

In the 2018-19 season at the same stage there were 23 less incidents of reported muscle injuries with 55. It was even lower in 2017-19 with 34 while in 2016-17 season it was 47. This means that there was around 42 percent rise in the muscle injuries from last season while it has doubled as compared to the 2017-18 season. UK's premier Sports reporting website The Athletic was quoted as saying.

Some of the players who contracted COVID-19 and have recovered have found it difficult to regain fitness and sharpness for long. This is where the need for more strategized scheduling comes into picture. The leagues need to look at the calendar and decide on the best outcome not just for the league but the players as well.It is important for individuals to make sure they don't overdo or underdo things. They need to have a smooth physical transition.

While the top leagues are back in action, the smaller sections are left behind due to lower priority. Domestic series have been cancelled because of logistical challenges and it has in turn hit the players, referees, umpires and other stake holders financially. There are so many who depend on their daily match wages and including the scorers, video analysts, club players and leagues.

The administrators need to make sure that they are no overlooked but they are the ones who form the base for talent churn out in the sport and are much more impacted than the ones in the upper echelons.[9]

Pros and cons of fans getting back into the stadiums

Having fans back in the stadiums have had an impact on the results and performances. Home advantage plays a vital role in sports and having the crowd cheer for you from the stands does motivate and pump up the home team and it could be intimidating for the opposition as well. The presence of fans had an impact on the results when everything was normal but with the absence of crowd it did have an impact in football. In the Premier League, teams which had a very good home record started losing at their own grounds. According to a new study by Nielsen's Gracenote in December last year, the home advantage significantly declined. In its analysis of 288 Premier League matches with crowds in comparison with the 190 played since

2020 June without the fans the results showed the away teams scored 12 percent more goals as compared to when there were crowds.[10]

According to Nielsen's Gracenote's head of sports analysis Simon Gleave, the away sides have been awarded more free-kicks than the home sides. There is also increase in cards shown to the home side while there is 27 percent decrease in the yellow cards shown to the visiting teams.

According to Reuters which has published Nielsen Gracenote's report, the away teams are scoring more goals and are being penalized less by the referees. The difference between the home and away wins has come down from 14.6 percent last season to just 3.7 percent. According to the report there is around 3 percent drop in home wins from last season from 44.8 percent to 41.6 percent for the games in which the fans haven't been present in the stands.

Also, the away win percentage has increased from 30.2 percent last season (in the 200 matches played with fans to 37.9 percent (in the 190 matches played without spectators). For a short period when the cases were down, a limited number of fans were allowed in the stand and the difference was palpable. The home team where playing with more energy and verve and the results were also going the way of home teams.

Premier League club Manchester United manager Ole Gunnar Solskjaer said in December that things have been different with no spectators and that the fans act as 12th man and normally the fans at the Stretford Endat their stadium – Old Trafford – generally score a goal for the team.[11]

Even in cricket the crowds mattered. In the recently concluded series against England, two matches were played at the newly refurbished Narendra Modi Stadium at Motera in Ahmedabad. It had a capacity to seat 110,000 people and for the two Tests, 50 percent fans were allowed. India were were looking to take a lead with the series level at 1-1, their captain Virat Kohli called on the crowd to make life more difficult in the 3rd Test. Kohli said that the crowd plays a crucial role and he's experienced that as a batsman when striding out onto the field with 30,000 fans cheering or jeering you or pumping up the atmosphere when the bowler is charging in to bowl. Having that support motivates the team. It gets them pumped up and energized. He said that having an intimidating atmosphere with the fans right behind the team at home does play on the oppositions' mind and makes it tougher for the opposition, putting them under tremendous pressure.[12]

There have been instances in cricket where the intimidating atmosphere has affected the players mentally. In the 2010-11 Ashes, the England fans got under the skin of Australia fast bowler Mitchell Johnson with chants and songs made on him, it affected his performance and after that he was so shattered, he had to seek assistance of the Australian team psychologist.[13]

While fans back in the stands help, managing these crowd is another challenge that needs to be looked into seriously. Most of the times social distancing isn't followed and fans have been spotted not wearing masks. It is critical and needs to be looked into, definitely.

Astute management and collective efforts can bring back normalcy

Yes, these are tough times but we all should relieved that the sporting action is back on the field. The challenges are endless and it will take a decent amount of time for normalcy to return. However, with astute management and administration, things can be made easier and it's not just the administrators and the players, each one of us will have to act responsibly to take those giant steps towards normalcy again.

Believe…Because that's what sports has taught us over the years.

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Chapter 8

COVID -19 and its Effects on the Environment and Society

Vilas R. Jadhavar

Dept. of Chemistry, K.E.S. Anandibai Pradhan Science College, Nagothane,

Tal.Roha, Dist.Raigad.402106 email: vilasjadhavar1974@gmail.com

Abstract: -

The COVID-19 pandemic has affected on every aspect of human life and the global economy. The number of new cases and deaths are increasing at an alarming rate with no signs of control yet. This study indicates that, the pandemic situation significantly improves air quality in different cities across the world, reduces the emission of pollutant gases, decreases the noise and water pollution, and also reduces the pressure on the tourist destinations, which may be very useful for the restoration of the ecological system. In addition, there are also some negative impacts of COVID-19, such as increase of medical waste and disposal of disinfectants, mask, and gloves. Therefore, this study will be helpful for the society to achieve long-term environmental benefits.

Keywords: COVID-19, Public health, Lockdown, Pollution, GHGs emission, Biomedical waste.

Introduction: -

The Government of India confirmed India's first case of Coronavirus disease 2019 on 30th January 2020 in the state of Kerala, when a university student from Wuhan travelled back to the stateGoal of this lockdown is “to contain the spread of Coronavirus outbreak in India"by banning on people from stepping out of their homes and closing of all services (excluding essential services), educational institutions, places of worships, commercial establishments, all types of industries excluding pharmaceuticals and Suspension of all non-essential public and private transport. On 30th May, it was announced that the on-going lockdown would be further extended till 30th June in containment zones, with services resuming in a phased manner starting from 8th June. It is termed as "Unlock 1". An inventory and details of lockdown is as given below (MPCB, 2020).

Phase One- 25th March 2020 to 14th April 2020 (21 days)

Phase Two- 15th April 2020 to 3rd May 2020 (19 days

Phase Three- 4th May to 17th May 2020 (14 days)

Phase Four- 18th May to 31st May 2020 (14 days)

In the above mentioned lockdown period due to COVID-19 pandemic, all human activities were affected.

Methodology: -

During lock down period, all human activities were affected and their impacts were studied by different researchers. This data is reviewed with respect to positive and negative impact on environment and society. Then it is systematically put on record for the study for the reader. Scientific literatures were collected through electronic means for the study.

Environmental effects: -

Due to COVID-19 and its associated lockdowns, there are both types of effects i.e. positive as well as negative impacts on our environment and society is observed. In positive impacts we can definitely confined that our air become pollution free and our water sources like rivers become clean and water can be used for drinking purposes without any treatment.

Besides, increased use of PPE (e.g.face mask, hand gloves etc.), their badly organized disposal, and generation of a huge amount of hospital waste has negative impacts on the environment.

Positive Environmental effects:-

1. Decrease in air pollution: -

Concentration of particulate matter (PM) and Nitrogen Dioxide (NO2) and Sulphur Dioxide (SO2) emissions reduced significantly in the lockdown period

enforced to curb the novel coronavirus disease (COVID-19) outbreak, according to a Central Pollution Control Board (CPCB) analysis of 115 Indian cities. The CPCB monitored the cities between March 16 and April 15, 2020. The air quality index (AQI) of 78per cent cities was 'good' and 'satisfactory' during lockdown as compared to 44 per cent cities in the pre-lockdown phase. "The drop could be attributed to, restrictedvehicle movement, halt on construction activities, less road dust suspension and curb on industrial activities," according to CPCB.

Comparative Statement of Average Air Quality Index of Continuous Ambient Air Quality Monitoring Stations in Maharashtra
(Source:https://app.cpcbccr.com/ccr/#/caaqm-dashboard-all/caaqm-landing/data)

Monitoring Stations	**Pre-lockdown 1/3/20 to 20/3/20**	**Lockdown 21/3/20 to 1/6/20**	**% difference in AQI for Pre & post lockdown period (%)**
More ChowkWaluj	85.29	52.01	39.01
Chandrapur, Chandrapur	78.06	71.81	8.00
MIDC Khutala, Chandrapur	81.82	77.36	5.45
Khadakpada, Kalyan	174.76	81.07	53.61
Bandra, Mumbai	101.67	68.96	32.16
Borivali East, Mumbai	79.56	62.88	20.95
ChhatrapatiShivaji Intl. Airport (T2), Mumbai	153.05	54.41	64.44
Colaba, Mumbai	104.24	56.00	46.27
Kurla, Mumbai	161.95	79.91	50.65
Powai, Mumbai	98.58	59.03	40.12
Sion, Mumbai	164.25	70.16	57.28

Vasai West, Mumbai	121.68	45.18	62.87
Vile Parle West, Mumbai	107.05	58.96	44.92
Worli, Mumbai	108.95	61.17	43.85
Opp GPO Civil Lines, Nagpur	77.73	59.98	22.82
Gangapur Road, Nashik	96.80	57.88	40.20
Airoli, Navi Mumbai	87.85	89.45	-1.82
Mahape, Navi Mumbai	148.95	74.84	49.75
Nerul, Navi Mumbai	148.39	97.35	34.39
Karve Road, Pune	98.75	60.97	38.25
Solapur, Solapur	110.30	63.28	42.62
PimpleshwarMandir, Thane	90.55	60.15	33.57

Good	Satisfactory	Moderate	Poor	Very Poor	Severe
(0-50)	(51-100)	(101-200)	(201-300)	(301-400)	(401-500)

(Source:https://app.cpcbccr.com/ccr/#/caaqm-dashboard-all/caaqm-landing/data, CPCB).

A comparative statement for pre-lockdown & lockdown phases reflects changes in Average AQI at 22 AAQMS datasets suggesting considerable reduction in Average AQI; however at Airoli, Navi Mumbai, it is found to be slightly increased even during lockdown. The reason for the increase in pollutant concentrations at these locations may be due to higher % density of essential service or industries (MPCB, 2020).

2. Decrease in water pollution: -

The absence or slowdown of economic activities during lockdown has supported environment to undergo a self-revival to a certain degree and also realized the extent of contribution of the domestic sources to the river pollution. There are many reasons for media reports suggesting improvement in water quality in rivers and the river water seems cleaner. Though there are many reasons for observational improvement in water quality, Industrial discharge & limited human activities around them are definitely the ones. Improvement in aquatic pollution in rivers in water bodies is a function of both quality and quantity (UPCB, 2020). With reduced consumption by both industries & agriculture i.e. withdrawal from resources there is an expected higher than average relative flow of water enhanced by lowest pollution sources adding more life to the aquatic regimes. Human domestic activities at Ghats of major rivers are also being shut to the public as well as all traditional rituals / Puja waste & other allied waste dumping phenomena around the rivers significantly seems to be reduced during this period. The clear water as per media reports is a result of all these along with many other such factors imposed due to restrictions (MPCB, 2020).

3. Decrease in noise pollution: -

Unwanted noisealso negatively effects on the invertebrates that help to control environmental processes which are vital for the balance of the ecosystem (Solan et al., 2016).The imposition of quarantine measures by governments has caused people to stay at home. With this, the use of private and public transportation has decreased significantly. Also, commercial activities have stopped almost entirely. All these changes have caused the noise level to drop considerably in most cities across the state.

There has been empty road thus no honking, no whirr of vehicular engines, no echo of loudspeakers, no commercial events and no clanking of machineries in factories. These all are the factors for considerable reduction in Noise levels in urban areas of mega cities. However it needs to be considered that this is a temporary impact and as lockdown will be released, in the future, more careful planning and management shall be planned in order to control the unwanted noise levels (MPCB, 2020)

Negative environmental effects: -

1.Increase in biomedical waste generation:-

In this pandemic situation, saving of the life of an individual is having first preference. Our central government has promoted aAtmanirbhar Bharat Scheme to all sectors. With the inspiration of this scheme our health sector researchers have prepared an indigenous PPE kit, masks, gloves, Sanitizers, etc. But due to excessive use of PPE kits, masks, gloves and chemical used for the preparation of sanitizers creates a huge amount of biochemical waste and problem of disposal of these biomedical wastes. It also affecting on our environmental ecosystem.

2. Increase in the use of safety equipment's and disposal of hazardous material:-

Before the pandemic of COVID-19 situation, people were not using regularly the Masks, Sanitizers, detergents, etc. However, now a days the use of these things is more and all these materials are made up by using different types of chemicals. Therefore, there is risk of use such type of material and which is having also disposal issues.Usually, Polypropylene is used to make N-95 masks, gloves, and medical face shields, which can persist for a long time and release dioxin and toxic elements to the environment (Singh et al., 2020).

3. Increase in domestic solid waste:-

During this lockdown period, all outdoor activities were stopped. All peoples were staying at home but for the survival of lives, cooking of foods;uses of different essentials were going on. Due to this there was increase in production of domestic waste, because local municipal daily waste disposal programme was closed. This creates the increase in the generation of domestic waste, which is indirectly affecting on the health of human being in the formation of different types of other diseases.

Conclusion:-

1. As compared to pre-lockdown averages, the air quality has moved to satisfactory from moderate at 11 locations in Mumbai and other cities in India.
2. Due to COVID-19 lockdown, and lessens of economic activities, there is a reduction in the noise pollution around the globe.

3. During the lockdown period river water becomes clean and pollution free, so that water can be used for drinking purposes without any treatment procedures. This leads to reduction in the cost for the purification of water.
3. We also learnt that how we can minimise the transportation means, so that it will help to reduce the level of noise pollution.
4. Whatever the biomedical waste is generated during these days, should be disposed properly by taking the care of human health.
5. Finally, human being has got a very important lesion from this lockdown is about the use of minimum resources for the survival of life.

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Chapter 9

New strategies adapted by educational system in Covid 19 pandemic

[1]Bagwan R.A., [2]Salve A.N.

[1]Department of Botany Anjuman Islam Janjira Degree College of Science Murud-Janjira

[2]Department of Botany Government Institute of Science Aurangabad.

rahimbagwan44@gmail.com , abhaysalve@hotmail.com

In the beginning of dec.2019 the news regarding the corona virus- (Covid-19) was rapidly spreading in the print as well as digital media.

Entire world welcome the year 2020 with lots of enthusiasm and joy but no one was aware of hidden future of the year 2020, which resulted in the pandemic year.

What is the place for single year in the history of any nation? A lot if it was 2020. A year ago, on Jan.30,2020. India's first confirmed Case of SARS Cov-2(severe acute respiratory syndrome corona virus 2) was reported. Experts using a “Modeling based study" projected that the country could have hundreds of millions of cases and a few millions of deaths by July 2020.(The Hindu, 15/02/2021)

People tested positive and viruses were discriminated against and stigmatized. In the year, that is now behind us the, viruses, the pandemic and related intervention changed many things around us. For most, daily day to day routines were disrupted. The lockdown and other pandemic responses resulted in reduction of economic activities, loss of job opportunities, economic slowdown and caused hardship to every citizen.

The Covid -19 pandemic diseases have created social, political and economic impact on all the sectors. The poor, marginalized and vulnerable population were worsely affected. In Covid-19 pandemic, it was the marginal and educational sector workers whose sources of income decreased and many of whom lost jobs. Children's education was adversely affected; woman has difficulty in accessing routine health services. Indian education system has always based upon theoretical and practical approaches for implementing knowledge, skill and perfection in the subject. This has focused attention on importance of skill based education or vocational training from young age. The online Covid-19 pandemic has not only upended the way we socialize, or

interact with each other, but also has altered the learning patterns of lakhs of students in online mode.

In last One year, several zoom meetings, Google meets, hundreds of phone calls and text message, telegram message, what's app thousand of online gaming hours and millions of social media posts had printed up lot of changes in behaviors of people. In the Indian education system during the entire period the pupils used to go to gurus Ashram for education and acquiring the skill. It results in to creation of obedient and discipline relationship between guru and shishya. The same culture is practiced in the school and the educational sector since pre independent and post independent educational system in India. But due to Covid pandemic situation student teacher relationship becomes more fragile.

For the last almost 12 months, students have been glued to their screen for hours on end where, otherwise they would have been in physical classroom interacting with their peers and teachers. The fallout is digital fatigue and an eye –strain to Students, teachers and supporting staff have been complaining of headache, burning eyes and sleeplessness. There has been an increase in number of complaints from children's about vision problems and lack of concentration. Initially there was a lot of enthusiasm for online classes, but now everyone burnt out, many students leads to face psychological problems also (The Hindu, 11/07/2020)

Not only these but it going to be an e-learning ecosystem. Online security is to be critical challenge that has to be address constantly. It is also important in a virtual classroom the major obstacle is to protect student privacy and participants control. More squired and authentic systems need to be developed from sign in to till log out on the various education platforms. Educational section faces the challenges of delivery especially of pedagogical processes, classroom assessment frameworks, students support and basically there is lack of teacher- students engagement which is an important in understanding of subject knowledge, explaining it to others and preparing it according to exam point of view.

A majority of children, especially girl students, have missed out much on the various platforms offered because of poor access to digital data the Childs were burdened with house hold works. It has a significant impact on both students and their families. More in case of vulnerable and under privileged section.

The lockdown happened during the last quarter of the academic year which led to the postponement of examinations and the curtailment of prescribed Syllabi. On their part, government tried to put in place measures to address the Situation. Till date some Students facing the problem accessing the online classes. a field Study done on the efficacy. The accessibility of e-learning has found that more than 60% of the respondents who are enrolled in government Schools could not access online education. Researchers pointed out that 90% of teachers who work with children with disabilities found their Students unable to participate online. more than 80% Surveyed that teachers were unable to maintain the emotional connect with the Students. While it's fact that no meaningful assessment is there. some students unable to complete assignments shared during the online classes, which had led to Serious gaps in learning there is one way communication which made it difficult for them to gauge, whether Students understanding what was being taught. (The Hindu, 11/05/2020)

United nation of Educational scientific and cultural organization (UNESCO) had surveyed 1.26 billion children's worldwide. Their surveyed resulted in to the most affected group is school going children's. This is 72% of the world's student population. India comprises 320 million Learners as the education sector has largely moved online there is surge in the use of language apps, virtual tutoring, video conferencing tools and online learning Software's. India too is witnessing an e-learning boom. (The Hindu, 11/05/2020)

Rapid transition to e-learning has been very challenging- recent unicef reports points out that the massive school closure exposed the uneven distribution of the technology. The chances for an education enabled the Social and economic mobility appear to be grim in the country.(the Indian Express, 27/01/2021;)

Boys become inattentive to studies. While girls with lesser opportunity were more involved in household work. Their educational routine get disturbed. We can say that the abilities of the families and the communities concerned to support educational journey have been found to be most affected.

During these days every information is provided via online mode. There is conduction of workshops, online seminars, meetings and even the assignments and interview also. Conducting this large scale high stake examination however will be more complicated. Most board and entrance examination have been suspended causing

disruption in the academic calendar. The students who are related to appear for next year's board exams for instance have already lost the instructional time. The Researchers and scientist join hands to developed new testing kits, to conduct clinical trials on the treatments regiments as well as vaccines. Eminent scientist Prof. C N. R. Rao, who was former science advisor states that "I am not worried about the quantities of researches done in India but quality is important. Science did not require degree but dedication, doggedness and the future of science deals with young people. but due to this pandemic situation It wont be possible to available facilities for researchers. Extra effort are required for development of 100% secured, parallel treatment system on the (SARS Cov-2) virus few vaccine such as Co-vaccine, covishield need to be tested rigorously. Cov-2 is license and approved by the health department government of India and vaccination drive was initiated in the 2nd week January 2021. The priority given to health care and front line workers while 2nd phase was initiated in the month of March. The doses are being given to those whose age ranging from 45 to above 60 years. It is not possible to provide facilities. Science did not require degree but dedication, doggedness and the future of science deals with youth.(The Indian express, 28 /02/2021)

According to the data of WHO dated on 19th march, 2021, there are 121209510confirmed cases all over the world out of which 2680469 died. It has been recorded that in India, there was11514331 confirmed cases of Covid 19 from which 159370 people embraced to death. The pandemic had spread in 223 countries.

Education sector has suffered a lot due to the outbreak of COVID-19.Several negative impact are being observed in this sectors which are as below:

- Educational activity hampered: Classes have been suspended and exams at different levels are either postponed or taken in the form like multiple choice based (MCQ), answer in one line, short answer, etc. the major sufferers are the science and technology stream students, where the prime focus is on the practical learning experience. As in the online mode it becomes very difficult to teachers to explain the practical details in the online mode.

  Several academic Institute had postponed there examination or modified there evaluation pattern. Descriptive question are reduced to

MCQ type of examination as well as modification in the various entrance test conducted for admission in several courses.

- Admission process got delayed.
- Impact on employment: Most of the recruitment processes get postponed due to COVID-19. Placements for students also be affected in companies. As a result of online examination, cut off in syllabus and no hands-on training (Practical) will result in to unskilled but theoretically qualified candidates. This will certainly leads to increase unemployment rate in near future. Unemployment will be major problems in the education sector as well trained qualified faculties had became asset of the Institution or organization. Many reputed organization offered higher salary to there employee but educational system in rural area wont afford this high costing and as result the system will ruined out.

  (Jena.,2020)Many of the students have little or no internet access and sophisticated devices such as laptop, android phone or 3g 4g networks. Particularly the students residing in the remote villages, or in the hilly and tribal regions who are yet to come in the main stream of the development and education are mainly affected. The lockdown hits the poor students very hard in India as most of them are unable to explore online learning according to various reports. Online mode of payments in the educational institutions and College fees got delayed. Information Technology Infrastructure has to be ready for facing COVID-19 like situations. Even if the COVID-19 crisis stretches longer, there is an urgent need to take efforts on maximum utilization of online platforms so that students not only complete their degree but also will be trained in getting aquanted with the online interfaces. The concept of “work from home” has greater relevance in such pandemic situation to reduce spread of COVID-19. India should develop creative strategies to ensure that all children must have sustainable access to learning during pandemic COVID-19. The Indian policies must include various individuals from diverse backgrounds including remote regions, marginalized and minority groups for effective delivery of education.(Education Asia in 25/05/ 2020)

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Chapter 10
IMAGINING EDUCATION POST-COVID-19

Dr. HetalJigar Mehta* and Dr. Tejashri Kulkarni

SVKM's Mithibai College of Arts, Chauhan Institute of Science &AmruthbenJivanlal College of Commerce and Economics

Abstract:

While education is the most powerful tool available to humankind, there are still sections in our society which do not receive even the primary education. Under these circumstances, in the year 2020 humankind was challenged by most unprecedented situations like pandemic and above all lockdowns of not only certain cities but countries after countries falling its prey. With vaccines have emerged our hopes that there is light at the end of the tunnel. Though almost every student and educator struggled to keep up with the unusual times, there are lessons regarding online education as well as irreplaceable traditional offline education. Can we impart those lessons post COVID-19 and make the world a better place for knowledge transfer? What was the situation like when the pandemic started and where it is going to take education? The current chapter is an attempt to find some of these answers.

Keywords: Education, post COVID-19, teachers, students, online teaching, virtual classrooms.

Introduction:

WHY IS EDUCATION INDISPENSABLE?

Education is birth right of every child. From 'cradle to grave', everyone is entitled to have education. Education enables a person in more ways than the mere piece of paper called "degree" could. In Nelson Mandela's words"Education is the most powerful weapon which you can use to change the world". Education improves the learner's caliber all over the life among people of any age group, religion and sector.It is a tool which expands perception and outlook to see the world. It develops the potential to fight against violence, corruption, injustice and a lot of other bad elements in the society. It gives us a perspective to make our opinions, lends us

courage to express those, helps us keep ourselves updated and catch up with the pace with which our world is changing.

The areas where education helps the society and nation is unfathomable. Some of the very important areas where education plays a key role are: removing poverty, prevention of wars and terrorism, safety and security against crime, establishing law and order, women empowerment, upliftment of economically weaker sections of society, etc. It is well said by Malcolm X that Education is the passport to the future, for tomorrow belongs to those who prepare for it today. It makes us view obstacles as challenges to overcome without fear. In other words, education prepares people for challenges in life. But was education itself prepared for the challenges from its opponent?

PRESENT SCENARIO-HOPES FROM VACCINES

'While the preliminary successes of COVID-19 vaccines offer hope for mankind, the pandemic has challenged us to think divergently. The epoch of post-COVID-19 will be characterized by comprehensive transformation in our styles of living, social interactions and economic transactions, as well as in our relationship with the natural world. What we've learnt the hard way is that it's our responsibility to foster a deeper understanding of our impact on the planet and be more judicious about breaching nature's delicate boundaries.' Expressed by Elias George, theKPMG Partner, Government and Healthcare (Gorge E., 2020).

COVID-19 was test for all including teachers and students. Many a times different regulatory bodies across the world tried to reopen schools, colleges, based on different assumptions related to children being in low-risk category, following protocols of social distancing etc. However, many have to close down again due to resurgence in COVID-19 cases. For example, Maharashtra government considered to reopen the schools/colleges from mid of February 2021 in the view of upcoming board exams. (Joshi S. 2021). However, sudden rise in the cases forced government to delay their plan of reopening. Decision to re-open or to implement the closure are crucial and require consideration of several factors. Re-opening of educational institutes would necessitate the complexity of balancing rights to health, education and work for students, teachersand school staff, including for the most vulnerable in those groups.Where it is not reasonably practicable to eliminaterisks to a worker's health

and safety, employers arerequired to minimize those risks in so far as is reasonablypracticable.

This is particularly crucial in the contextof the widespread pandemic and uncertainty regarding if, orwhen, a vaccine might be available for all. Without a vaccine,it is difficult to completely eradicate the threat of COVID-19 transmission. Education authorities all over the world are indicating awareness of such obligationsby making exceptions to enable vulnerable staff to continueworking from home where possible and by providingadditional cleaning resources to schools. A larger sample of time and experience will tell whether the facilities that have been installed are sufficient to ensure a healthy and safe workingenvironment for all the school staff who will berequired in their workplaces as the pandemic continues to course. The school and college staff might have health, safety and human rights complaints to raise if they contractCOVID-19 at their workplaces.

Even as countries are working harder to inoculate their citizens with the COVID-19 vaccine, a study by the Lancet Infectious Disease Journal says that vaccination alone will not be able to contain the spread of coronavirus. According to the study, nations should also look to relax the control measures gradually and ensure higher vaccine uptake so as to minimizefuture infections. As per a report in The Indian Express, preliminary data suggests that while the vaccine does provide protection, the exact level still remains unclear.

REIMAGINING EDUCATION POST-COVID-19:

Imagine a world free from COVID-19 with no fear of transmission of virus, daily news without the count of positive cases. There will be no restrictions and limitations on any sector of the society or on individuals. Students and teachers are currently haunted with several questions as to how education is going to transform in this situation. We need to understand the situation during pandemic so as to set the course post pandemic. For this reason,we have discussed here in detail the issues and problemsfaced by education sector during COVID-19 period and what will be its impact on the post-covid period.

WAS EDUCATION PREPARED FOR ITS TOUGHEST EXAM?

No one had ever thought that the field of education like other areas will have to struggle to sustain in a battle against its biggest opponent – COVID19.No one

would have even imagined that when each corner of the whole world is busy in creating milestones in the field of science and technology, a tiny virus will suddenly come into existence (somewhere in December 2019) and rapidly capture the whole world badly within no time. COVID19 has created havoc affecting the health of millions across the world. Not just the health, it has impacted social, economic and human lives as well.

In the year 2020, whole world faced a paradigm shift many ways more importantly, so in the education field. E-learning was known for last few decades or so. However, it was limited to a rather small number of institutions, mostly very famous universities or premium institutes, well equipped with the resources and knowledge to run these courses online and again to a much smaller audience or students willing to opt for these courses. Here comes the pandemic and almost every student realizes that education, if anyone is able to get itat all, is only in the form of "online mode". Thus the rapid transition was observed to keep education ongoing. Education moving from offline classrooms to online platform. Was this transition really smooth? Not really so!

In April 2020,the Alternative Academic Calendar for Students guidelines on continuing formal school education in online mode in 2020-21 academic year was presented by the Ministry of Human Resource Development (MHRD).In academia,educators are used to only in-person instructions. Consequently, accepting the virtual world and adapting themselves within a very short notice was not less than a surprise test for teachers.This was never tried before at such a large scale. Also,one needs to think from students' point of view. It is essential to understand the reality of access to digital tools at the household level across the country to know the AAC's operational matrix. Just 10.7% of Indian homes have computers (Tablets, desktops, laptops but excluding smart phones) and only 23.8% of houses have internet provision which included limited mobile data connectivity and unlimited broadband connections (reports from mospi.gov.in).Every stage was crucial. How effectively will teachers and students accept the virtual platform? With time teachers and students may get well acquainted with technical skills but the next big question was will this online environment be able to satisfy the socio-emotional thirst of students? Will there be any impacton students' enthusiasm? The whole world is still struggling to save the motherearth from this virus and eagerly waiting for the end of this pandemic. When

everything normalizes, what will be the impact on education? Could we be able to go back to our physical classrooms? A lot of issues still remain unpredictable.

WILL CHALLENGES FACED DURING COVID19 BE BENEFICIAL IN POST-COVID PERIOD?

Teachers put to test -Adapting technology:

Despite the overwhelming consequences of crisis, this pandemic has also been an extraordinary time for learning. COVID-19 had posed an incredibletask forteachers. But teachers proved that the task, though difficult, was surely not impossible. They were learning to adaptand be as resilient as they could be. However, it was not a cake walk for all teachers. It took lots of efforts to overcome the hurdles. The first step was to make themselves tech-savvy. Depending on the decisions taken by their institutions, they trained themselves to use virtual platform, which had an audio video feature, working with an internet connection support for reciprocal communication. Some institutions moved ahead with Zoom software, Google classrooms, MS Teams etc.

These virtual classrooms looked unfamiliar at the start for many.This was more commonly observed in elder faculties.Some of the faculties reported that they have never usedemail facility or video conference calls, a situation more pronounced in rural areas. Many–a-times they got stuck while handling software/s with their gadgets. They were training with professional trainers. Gradually things started to settle in. Young faculties had to struggle littlecoping with digital world.

Many surveys were carried out for understanding the teachers' psychology in accepting the digital world. Quite a fewwere apprehensive before entering the digital world (Khanakpur R. et al 2020).Some of them really felt that students are more updated with technology and hence used to underestimate their potential. The path was full of doubts withenormous amount of stress and anxiety.

The challenges faced, learning and experience gathered will not go in vain. The pace with which such a change in education system has taken is really commendable. New ways of lecture delivery and assessm ent methods have already geared us up for a blended learning in the post - COVID era.

Software/sprovide data of attendance and not attention!

A teacher is always a stage performer and every performance is time bound. In one of the surveys, a microbiologyteacher from undergraduate level clearly mentioned that “Ours is not a desk job. If my lecture is scheduled for 48 min during a particular time and unfortunately, I am facing internet issues, for even 15-20 min, you can imagine the loss I would be facing. Strength of my class is nearly 110. I really have no follow up on who is joining late or if there are any internet issues at individual student level. I go on with my lecture and download the attendance at end using MS Teams. Thanks to this software, atleast a provision is there that in one click I get the attendance data of my class. But what about the attention data? I really don’t have any idea whether all students who have logged in for my lecture are really listening me. It is next to possible for me to interact with 110 students in such as short span of time. We teachers are always burdened with syllabus completion and we need to achieve the target within the stipulated time.”

In another informal survey, a chemistry teacher unfolded some new concerns in virtual classrooms. A senior Professor was kind enough to share all those episodes where he found himself miserable. “I am a chalk and boardteacher having an experience of 31 years. I am about to retire in next year. I had never thought that in last innings of my career I have to see all this. I have never used computers so much and getting well-equipped with digital word in a short time was never in my dream. With a lot of resistance, I learnt some basics of software – MS Teamswhich was provided by our institution. I learnt to login, logout, download attendance, mute, unmute, schedule a meeting, create a team, etc. People feel this is all enough. With time I found things getting easier. But my next problem was being a chalk-board user, I have never made any power point presentations. Every week my workload includes 11 theoretical lectures and 3 practical's. I started approaching other faculties in my department and I realized that most of them were masters in making power point presentations. Very few like me were hunting for finding solution. I took some suggestions from young staffs and they advised me to put my material on hard copies, scan them, create a pdf and share with students. I won’t lie but for few weeks I kept some of my colleagues busy in helping me creating pdfs for my lectures. Finally, I learnt it. I felt annoyed at times when the computer used to get hanged in between. But our IT support staff were sometimes more annoyed as they were overburdened due to faculties like me. I am thankful to all my colleagues and IT department for the help they rendered me. I didn’t feel shy to ask help from even my students.

After a month I started observing difference in my reaction while facing issues in this online mode. Earlier I used to get panicked and irritated or used to find myself miserable. With time I learnt to tacklethe same with patience andconfidence. Still somewhere, I was not happy. I was not very satisfied because when I used to askestudents to answer anything, I was not getting a good response. Slowly I started picking students from list and to my surprise I found no replies in some cases. This was repeatedly pointed out by other teachers too in departmental meetings. It clearly indicates that the number of students who have logged in is different from the number of students really attending.This became a matter of concern. All teachers had started struggling to interact more and more with students. However, we had limitations of time duration. Survey of students was carried out and we realized that somewhere they were missing the in-person classrooms."

An impressive lecture is always assisted with gestures and facial expressionswhich can help adding life to lecture. Keeping live videos on and delivering lectures would invite internet bandwidth problems. Hence, gestures and facial expressions could unfortunately not find place in virtual platform. People have understood that network issue is not the only concern with teachers. Network issues accompanied by communication gap plays spoilsport(Picciano A. G. 2020). Though teachers are trying their best, social contact is also important and can help with productivity.

Are we all set in for a complete digitalized classroom for learning in the post-covid period? The answer is NO!!! Attention of students is least monitored on online platforms with students keeping their videos off and audios muted. COVID19 has taught a lesson to the teachers that in-person classrooms can never be completely replaced by virtual world. Post-COVID period would certainly be a steptowards blended approach with due credit to online and offline teaching.

Few more technical difficulties in teachingspecialties

Teachers from science discipline complained that teaching derivations,numericals and reaction mechanisms was a difficult task. In physical classrooms, teacherswould use blackboard and make students write each step while dealing with such conceptsso that they get hold of it and understand it better.Monitoring the students was not so easy in the virtual world. Also, typing

reaction mechanisms, derivationsespecially some mathematical symbols was not an easy task.Rapid transitions from offline to online didn't give them enough time to prepare themselves for such situations and teachers from different specialties came across some different concerns and limitations while dealing with their syllabus. There were some advanced software/s available like Chemsketch, Chemdraw (for drawing chemical structures) etc. Then again, learning them was not very easy for all. Dealing with unique issues was more taxing and challenging for teachers.

Post-covid,we look forward to have solutions to these technical difficulties in teaching by development of easily accessible, free softwares and educational tools.

Challenges for teachers in work from home:

Working remotely has its perks- The flexibility to work when you want to,no soul-crushing commute, absolutely no worries on dress code (unless you have online meetings!). But it also has its disadvantages. You aren't working alongside your team. You don't have your colleagues at an arm's length to consult with. All professionals would agree that it is a bit difficult to transform your home into a dedicated space for working longer hours (Stephens N., 2020). It can be hard to stay motivated. When you live your personal life and your professional life, both under the same roof, it's harder to switch off. When does the work day start? End? Author and coach Jeff Gothelfsays that "creating a hard line between work/home is difficult."Teachers also have to face the same fatelike other professionals.

Most of the institutions welcomed all possible ways of communicating with students –SMS, email, WhatsApp messages, Zoom calls, Microsoft teams etc. during the pandemic. As each teacher usually deals with a huge population of students,many of them have been overloaded with number of messages since then.

Another problem amongst students and teacher community is to access the references, textbooks, journals, etc. from library. A surge in the development of e-libraries with access to millions of books at the finger tip of students has been observed. This has widened the arenas of knowledge and has triggered 360 degrees of learning. The start of e - library usage during the pandemic would be more recommended and preferred in the Post – COVID period. Openness for online learning would mean an increase in the number of registrations for online

courses on platforms such as MOOCs, SWAYAM, NPTEL, e-Pathshala, Coursera, etc.

FROM STUDENTS' POINT OF VIEW:

Muthuprasad et al (2021) have examined Indian agricultural students' perception regarding online education and various attributes given the sudden transition from offline to online education in literally a few days' time. The Educational institutions in India had to resort to online teaching soon after Government's decision to impose nation-wide lock-down. Above mentioned authors have also reviewed literature for the reactions of the studentsabout online education in the past that is before COVID 19 pandemic.

Studies have shown both favourable and unfavourable perceptions by students on online learning. Several studies indicate that the instructor's interaction with students has considerable impact on their perceptions of online learning. Well organized course design (Swan et al. 2000), the ease of the interaction with instructors which enhances information processing and its conversion to knowledge (Duffy et al. (1998, pp. 51–78); Hay etal.2004) the frequency of interaction between learner and instructor as well as the flexibility factor of online learning (Chizmar and Walbert, 1999; McCall, 2002); proficiency to use the technology (Wagner et al. (2000)) were considered as important markers of successful online learning.

Above mentioned study from the agriculture students (Muthuprasad et al, 2021) indicate that there was not much difference in the perception of students towards online learning. Around 50% say that online leaning improves their technical skills as compared to face-face classes, whereas about 60% also agree that online classes are not as effective as the conventional in person classes with respect to the communication with the educator. About 30% of the respondents think that both modes are equally good vis-à-vis above criterions.

It has been concluded therefore an effective online class depends upon well-structured course content, well-prepared instructors, advanced technologies (Sun and Chen, 2016), and feedback and clear instructions (Gilbert, 2015).

What did we actually learn during the pandemic?

It is important to note down that not all students have the same facilities when it comes to digital/ online education. However, the current generation is much more

techno savvy than the earlier generation. Hence most of the students do not have much of the issue learning the details of the class joining, quizzes and other related topics. Almost everyone managed to attend the classes without help. In fact, many a times students have helped teacher out of complicated setting of the particular technology when the teacher is not techno savvy.

In addition to attending the online classes, students have also learnt to utilize various online sources for their self-study in the absence of physical resources. Earlier online resource used to be mostly Wikipedia. Also, the information would usually be copy pasted for one or the other purpose. Whenever students are faced with any project work or so, which would require gathering information outside the textbooks, students used to copy whatever information is available online without verifying whether the information is correct or not. Similarly, during examination times, a lot of books were photocopied without any thought and many a times they are not even opened. Faced with unprecedented situation like COVID-19 pandemic, when many students were left to study without physical books, many e-library sources gave free access to students and teachers. With the efforts of Teachers like 'RanjitsinhDisale', QR coded textbooks are now a reality. Equipped with such facilities, at least a few students learnt to study or choose reliable sources for study from ocean of knowledge available online.

Post-COVID we hope to see the same trend regarding using the resources for study wisely and getting more and more technologically oriented when it comes to rec eiving education. That means more enrollments in online courses like those on Swayam portal, Udemy, Coursera etc.

Another positive aspect of the online classes for students is that many technologies like Zoom, MS Teams, Google meet allow teachers/ students to record lectures. That is absolutely wonderful in order to learn certain topics/ subjects at own pace of the student. Post-COVID, teachers may follow this trend of recording lectures for the convenience of students.

One of the positive impacts of online/blended mode of education could be students finding more time for their hobbies or to perceive their other interests. Like many students studying music and related arts sharpened their skills during the spare time in pandemic. Their music education also did not stop and continued in online mode. Many people apart from academia, like arts/ drawing teachers, fitness instructors have opted to continue to instruct their followers through social

media by uploading their videos or conducting live sessions on Fa cebook or Instagram handle. These people may also find it useful to continue with the same platform at least till everyone get used to new normal.

Pitfalls

Even after considering all the benefits of online education, question remains the same. Are we prepared to switch to this mode without any hurdle? India is a country of intense digital divide wherein a fewfortunate people have number of gadgets at home to toy with, other huge part of the population is without access to computers and internet connectivity.Although we have spent almost a year in pandemic now, we do not have much data on how many students have access to internet, computers, smartphones and other technologies absolutely necessary for online classes. When these devices are handy, then again, technological constraint is the major challenge faced by majority of students. Many learners would be left out without online education due to no internet facility at their home. At the same time, slow connections can hinder the flow of the online class. The connectivity issue affects teachers and students alike. Students from the premium institutes have also reported poor connectivity from teacher's side. Slow connections on either side of teacher or student can make online education a frustrating experience.Like electricity, if the internet facility is available within reasonable price and at a good speed for everyone, then only online classes would be successful. (Ray Chaudhuri S. B., 2020)Government can allocate resources to see that educators and le arners from the remote places to the villages to the underprivileged in the metropolis also get benefited from the online education and their education do not stop even in the worst situations like pandemic COVID19.

Distractions also play a major role during online classes. If there is space constraint and there are many people living together or like in this pandemic situation, members of the household have to work from home then the problem becomes dire. Further, many students open the mobile to learn something and end up using social media websites, chatting, sharing pictures or playing video games (Thomes J. (2019)). All in all, it is highly detrimental to the spirit of education.

Although online education is similar to classroom setting with respect to sitting at one place to listen to the lectures, it has serious health implications than that of the classroom education. Today's generation grow up watching different screens. However, online education means staring at a screen for a much longer time. Many

parents have been vocal about this concern. Weak eyesight, bad posture and other physical problems are on the rise in learners due to staying hunched in front of a screen for many hours. It is advised that to enhance the productivity of the learners' 'long duration classes should be avoided and sufficient break should be given between two consecutive classes.' It was supported by Thompson's (Thompson D.,2014) formula of work for 52 minutes and break for 17.

It has been also observed that during the pandemic, isolation due to lockdown has resulted in psychological issues such as excessive anxiety or depression. Many people have started depending on social media a lot which simply amplifies the problem.
Due to above mentioned issues, post COVID19 educators as well as learners may prefer hybrid mode of learning rather than adopting totally online education.

Usually college students (or school students) learn more things from watching peers. We can say debates amongst students, teacher-students' discussions or simply chitchats are integral part of the education. It is challenging to form a comfortable environment for learning or a sense of community in the online sphere. Students also miss the typical college environment wherein there are number of activities apart from simply learning which prepare them for real life skills such as event management, time management, crisis management, team work, leadership skills etc. Online festivals, projects or similar activities does not have the same feel though some students dazzle on online platform also.

Many surveys show that the students find that online classes could be more challenging than traditional classroom because of the technological constraints, delayed feedback and inability of the instructor to handle the online classes effectively. If the teachers are trained properly and they make the online classes more interactive, this problem could be solved to a great extent. Since the teacher won't be able to see and monitor students at one go like the traditional classroom settings, it is absolutely essential to capture viewers' attention by well-structured content, graphics and to retain that attention by making the lecture interactive with the help of quizzes and other means. Follow up of the lectures and feedback from students could be another way for improving quality of lectures and narrowing the gap created due to lack of in person education.

What about examinations and evaluations??

In online education, most of the assignments are objective in nature. Since the assignments are objective there is tendency of students to study superficially and escaping in depth studies. Stating from primary teachers to higher education teachers all have the similar complain that students are losing the writing practice. They don't want to write descriptive answers. This is specially hampering the higher education as students are expected to solve tedious science/ math problems involving long derivations as well as reaction mechanisms/ pathways. There are software's which help in video monitoring with artificial intelligence which is required in case of subjective assignments/examinations. However, in case of larger class size, it is not possible to employ those means as it would be impossible to check the video recordings of so many students. Even in case of project work, the authenticity of a particular student's work is a problem as online just about anyone can do a project rather than the actual student itself.

During examinations, students find it difficult to handle if there is any technical glitch. For example, some of the chemistry teachers were complaining that it is difficult to insert different symbols used in Chemistry in the google form. The size of the file becomes too large to download and at the time of the examination, number of students start reporting about the failure to download paper.

Further, computer like any other machine does not recognize human error. While attempting tests, under pressure, many students accidentally hit submit button before finishing the test and the supervisors or teachers also can't help but only feel sorry for them.

Post COVID19, educational institutes may go back to traditional in person examinations as it will give educators chance to evaluate the students understanding in a better way. However, they would also encourage students to take frequent objective tests topic -wise and also online digital content may follow self-assessment tests.

Virtual labo ratories

The countries, which are digitally/ technologically advanced than India and has better internet connectivity altogether, have not completely shifted to online education before this pandemic. Reasons could be varied but one prime reason could also be related to difficulty in teaching skills, as in practical classes (Muthuprasad et al, 2021). It is difficult to teach subjects which involve a large number of practical classes remotely. The way virtual games cannot replace the actual playing experience

on the ground, the most sophisticated virtual laboratories cannot impart knowledge of practical classes the way students would gain it by actually experimenting in laboratories.

Conclusions:

Looking at the pandemic scenario as of March 2021, it is far from over. Hence, as of now online education is the key to survival and only mean to acquire education in the most unusual times of modern era. At the same time, there are many lessons to learn for many stakeholders of new era of education, right from policy makers to institutions to educators and learners. There was a slow progress in the past for digitalization of education to reach far and wide and to ensure that no one was left behind. However, pandemic gave it an urgency and things moved dramatically fast over the last year. The educators and learners were forced to acquire technical competency absolutely essential to impart/gain online education. Assuming the situation would be under control, with respect to pandemic in a few months' time may be, we would return to 'new normal', wherein rather than switching to complete traditional mode of class room teaching, we may have to go for hybrid mode of teaching. Hybrid mode can have many definitions for different specialties. Simplest form of it would be where theoretical subjects would be taught online and applied subjects would be taught in offline setting, in classrooms or in laboratories.

Various researchers/ policy makers have written numerous articles during the pandemic about the education scenario and have given number of suggestions. Among them, the important ones suggested for post COVID19 education are

1. Encouragement of online education whenever possible as it can reach far and wide and is cheaper than conventional mode of education.
2. Government policies for allocation of better resources to establish high speed internet facilities and broadband connections
3. Ensuring cyber security along with quality online education
4. Thorough Training of teachers and students before starting a new form of education, be it online or hybrid mode.
5. Finding a mean to retain personal touch and fighting the situations like pandemic with all the possible resources in hand.

Considering things actually return to the way it was before pandemic, for example, students taking all the classes in the offline settings, the lessons we have learnt during

pandemic will not go waste. Educators would find more fun and efficient ways to teach, at the same time students would have realized importance of not only gaining knowledge but also of empathy, team work, communication etc. which would help them being a responsible human being rather than an isolated island in the ocean.

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Chapter 11

Biopotential of some aromatic plants to Strengthen Immunity during post covid -19: A review

Dr Rajbhoj B G

Department of Botany Sundarrao More Arts Commerce and Science College Ploadpur Dist Raigad.

Email.drbalajirajbhoj81@gmail.com

saijayu20@gmail.com

Abstract

India is floristically very rich and has huge biodiversity. Attempts have been made to study some aromatic plants which are useful during post covid- 19. It is infectious disease caused due to corona virus was spread throughout the society, social distancing and physical distancing is very effective to control the corona virus, working from home, temporary unemployment, home schooling, lack of physical contact with other family measures friends and colleagues all these factors are leading to stress among people. This review discusses about the potential use of aromatic plant, content of secondary metabolites as a preventive agent improve immunity and health of the people against the covid-19.

Keywords: Aromatic plants, post covid -19, improve immunity.

Introduction:

World is in great depression due to the massive spread of novel corona virus i.e., SARS-CoV-2(severe acute respiratory syndrome), which has affected majority of the countries with more than 15.78 million confirmed cases and about 0.64 million deaths as of 26th July 2020. (Alschuler et al., 2020). Person with weak immune system are found infected with COVID-19 disease including old age persons and patients like diabetes, cancer, respiratory disorders etc. The incubation period is 14 days or even longer the disease is infectious up to a latent period and can spread from one person to another via respiratory droplets, close contact, affect the digestive tract and systemically infect both humans and animals (Malik et al., (2020).

SARSCoV2 is a positivesense, singlestranded RNA betacorona virus with ~28,882 base pairs genome that encodes viral proteins in up to 14 open reading

frames .There are four major viral structural proteins: Spike (S), Envelope (E), Membrane (M), and Nucleocapsid (N). Structural proteins of SARSCoV2 form the viral capsid that encapsulates the genome and also facilitates the entry process to human cells through the ACE2 receptor. Corona virus is single stranded RNA virus, first report in 1960.The strain obtain from bats and spread throughout the country and affects human beings.

31 dec is the day where corona case was first report in Wuhan, China. In Thailand first COVID-19 case reported January 13, 2020. The virus spread to humans, through snakes, pangolins, meat, wild animals and seafood, in seafood markets in China. Now 210 countries are affected by COVID-19, China, the USA, the UK, Spain, France, and Italy on July 15, 2020. Symptoms of COVID-19 include fever, cough, shortness of breath, and diarrhea, pneumonia,

Some aromatic plants help to increase the inherent antiviral immunity of body. Some of the studies have already proven that plant extracts can be used for the preparation of peptides/proteins with the medicinal value, which can be a good source of vaccines and protein/peptides-based treatment. These plants could be an alternative, which is already tested by various ethnic groups since the ancient period (Edelman et al., 2020). Primary source for health care is 85% from plants and 40% from synthetic drugs (Bauer & Brönstrup (2014).

Methods: The articles which were published in different journals such as social media, Google and Google scholar peer reviewed, Scopus index journals and UGC care lists were revieved .We used different strategies for searching information regarding aromatic plants which had different antiviral, immunity buster. The data was searched from google and downloaded full text articles/abstract. The final results was obtained on the basis of we collected aromatic plants from our area.

Result and discussion: Aromatic plants have great potential for use as alternative medicines and are the basis for the discovery of natural compounds for the development of therapeutic agents in pharmacology. Flavonoids are medicinal plants are considered to be powerful immunomodulatory agents Traditional herbal medicines help people in treating skin diseases such as psoriasis, leprosy and digestive disorders such as dysentery, gastric and even many types of cancer. These

plants Such as *Adhatoda vasica Nees,Glycyrrhiza glabra* Linn , *Mentha spicata L* , *Ocimum tenuiflorum* L. possess secondary metaboilites (which are potential sources of drugs) and essential oils of therapeutic importance. Some of the most important bioactive phytochemical constituents in plants are alkaloids, flavonoids, phenolics, essential oils, tannins and saponins. **Krishnaiah** et.al(2009), The medicine from such herbal plants are used in many research institutes to treat deadly diseases such as cancer, , memory loss, anemia, insomnia. During this COVID scenario all these are used as preventive agent and are followed till date.. etc. beneficial antiviral compounds now it is used regularly by people to treat COVID disease. The proper utilization of aromatic plants against COVID-19 Pandemic disease would help people in many ways to safe guard and elevate the immune system.

There are some aromatic plants listed below have high efficacy and medicinal values which have been widely used by the different Indian System of Medicines like Ayurveda, Homeopathy, Unani, Siddha, Amchi, and Allopathy. Some of the species are also used for Cosmetic, Neutraciticals, Food products, Beverages etc. and have tremendous demands from pharmaceuticals and many other Herbal Based Industries. These plants extract have potential to cure asthma, cough, fever, gonorrhea leprosy, chronic Hepatitis, rheumatism, bronchitis, gastric trouble, flu.etc.

1. *Adhatoda vasica Nees:. Common Name :Adulsa* Family: Acanthaceae

A bushy shrubs , Tap roots branched ,stem is erect ,branched, woody cylindrical solid ,glabrous ,greenLeaves are Cauline and ramel simple ,opposite deccuate elliptic –lanceolate,acute coriaceous.

Inflorescence ,cyme.flowers sessile bracteolate hermaphrodite zygomorphic ,hypogynous in short dence axillary ,pedunculate spike ,corolla white with tinge in throat .Androecium consit of two stamens dorsifixed and introse. Gynoecium bicarpellary ,syncarpus ,superior ovary axile placentation Filamentus hairy at base ,capsule clavate ,shortly and bluntly pointed .seeds orbicular oblong glabrous.

The metabolic compounds present such as phenolics, flavonoids, tannins (Prabavathy and Nachiyar, 2013).

Plate 1 :Adhatoda vasica Nees.

Bark, root leaf, flower have good insecticidal property. Leaves & root act as expectorant & antispasmodic. It is used as remedy for asthma, cough, fever, gonorrhea leprosy,

2.*Glycyrrhiza glabra* Linn. Family Fabaceae Common Name: Jethi madhu

The plant thrives in a dry and sunny climate and is cultivated in the sub-tropical and warm temperate regions, chiefly in the Mediterranean region. Propagation takes place with the help of stolen and also with seeds, The plant is under shrub, having height up to 120 cm, leaves are compound and pinnate, stolen 2 cm in diameter ,yellowish brown ,sweet, The flowers purple to pale whitish blue, produced in a loose inflorescence. The fruit is an oblong pod, containing several seeds. (Omar et al., 2012).

The secondary metabolites present such as alkaloids, tannins, steroids, phenols, flavonoids, saponins and Phlobatannins etc.

Chemical Constituents: Liquoric acid, glycyrrhizinic acid, flavonone glycosiderhamnoliquiritin, pinocembrine, prunetin, isoglabrolide and glabranine are found in roots. Total of 27 flavonoids are present in the roots, 3 were characterized as liquiritigenin, liquiritin and isoliquiritigenin. From roots, three new compounds were isolated i.e.7-acetoxy-2-methyl isoflavone, 7-methoxy-2-methyle isoflavone and 7-hydroxy-2-methyl isoflavone.

Plate 2.Glycyrrhiza glabra Linn

The roots contain anti-inflammatory agent , extract of the root provide relief in treating peptic ulcers, glycyrrhizic acid as main constituent and this has showed anti-viral and anti-inflammatory actions. The plant extract is used as a sweetener in tonic, laxative and given in sore throat and in cough remedies.

3. *Mentha spicata L.* Common Name: Pudina Family: Lamiaceae

Erect,glabrous, annual herbs, Flowers whorled interminal thyrsoid panicles, Corolla purple or 4,obovate stamens 4 ,obscurely, didynamous, included, nutles globose brown. The presence secondary metabolites such as tannins, alkaloids, flavonoids, steroids, coumarins, terpenes and terpenoids etc.

.

Plate 3 Mentha spicata L

Roots and leaves given in fever & bronchitis, oil is used for rheumatism

4**.** ***Ocimum tenuiflorum*** Common Name :Tulsi Family: Lamiaceae

Herb with typical aromatic smell, Stem is erect and branched, quatrangular woody covered with soft hairs .

Cauline and ramel simple opposite exstipulate serrate acute ,gland dotted ,aromatic smell.Verticillaster inflorescence,. Flower bractiate hermaphrodite ,zygomorphic ,complete ,hypogynous .Calyx gamosepalous bilabiate ,petaloid ,posterior lip broad and boat shaped ,Corolla is gamosepalous ,bilabiate purplish upper lips pubescent on back ,staens 4 polyandrus ,didynamous,epipetalous ,fifth,posterior stamens ,interpose ,dorsifixed .Gynoecium bicarpellary syn carpus .superior ovary 4 chambered ,axile placentation Fruit .Schizocarpic

The secondary metabolites present in leaf are flavonoids, alkanoids, saponins, tannins, phenols, anthocynins, terpenoids, steroids, , triterpenoids, Seeds Fatty acids, sitosterol.

Plate No 4.*Ocimum tenuiflorum* L.

The leaf juice is applied to cure scabies & other cutaneous diseases. Infusion of leaves is given as a remedy for gastric trouble, flu, colds and bronchial infection.root are used for fever.

Different photochemicals present in plants provide a valued repository of chemicals having substantial antiviral properties.(Lekha) From, the above research survey, it was concluded that aromatic medicinal plants is safe and has many therapeutic applications such as anti viral , immunity enhancing, biological potential property which has used in post covid 19.

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Chapter 12

Post Covid-19 Situation: Rehabilitation of patients after Hospital Stays

Javed V. Khan[1], Dr. Dakshayini[2]

[1] Department of Zoology, Anjumn Islam Janjira Degree College of Science, Murud Janjira

[2] Department of Biosciences, Biotechnology Unit, Mangalagangothri.

Abstract

As the world deals with the COVID-19 pandemic is what the semi permanent sequelae for the many people are World Health Organization endure the hyper inflammatory state characterizing COVID-19 and particularly for the many thousands World Health Organization area unit sick enough to wish hospitalization and particularly social unit care. Even once the pandemic is finally controlled, can COVID-19 survivors face exaggerated internal inflammatory processes, worsening co-morbidities, and raised condition to age-related diseases? Clues for what might happen in post- COVID-19 patients will be evoked from those that recovered from alternative conditions that result in similar hyper inflammatory states like Severe Acute metastasis Syndrome (SARS), acute respiratory illness syndrome (ARDS), protein storm syndrome, and post-ICU syndrome. These conditions suggests that these syndromes result in associate accelerated state of chronic subclinical general inflammation usually seen in aging (termed inflammaging) leading to raised and worsening age-related conditions together with frailty even in younger people. Previous studies of patient survivorship once associate medical aid unit (ICU) keep recommend that several critically sick patients with COVID-19 can face long- lasting physical, psychological feature and/or mental state impairments. This anticipated survivorship expertise highlights the importance of collaboration between the fields of vital care and rehabilitation to optimize post- COVID-19 recovery.

Keywords: Inflammaging, COVID-19, ICU stays, protein (IL-6).

Introduction

COVID-19, a light to severe metabolism syndrome that follows infection with Severe Acute metabolism Syndrome corona virus a pair of (SARS-CoV-2), was initial known in Wuhan, China in Gregorian calendar month 2019 and apace became a virus that affected numerous folks, inflicting substantial mortality round the world. Most people infected with SARS-CoV-2 develop a flu-like, delicate clinical syndrome (non-pneumonia or a light atypical pneumonia), and a sizeable proportion (~ 20%) need hospitalization (dyspnea, low element saturation), with a considerable proportion resulting in a essential un-wellness (respiratory failure, septic shock, and/or multiple organ dysfunction) and death[1,2]. The medicine of the severe Acute metabolism syndrome (SARS) corona virus a pair of (SARS- CoV-2) infection and associated COVID-19 unwellness continues to evolve. Statistics from early within the pandemic indicate that ~1 in five infected people are hospitalized, associate in nursing one in ten could also be admitted to an medical aid unit (ICU), with most of those critically sick patients experiencing acute metabolism distress syndrome (ARDS) and requiring mechanical ventilation[3]. Though most people infected with SARS- CoV-2 appear to be well or expertise delicate symptoms (such as persistent cough, with hurting and chest tightness), the pandemic has resulted in Associate in Nursing unexampled spike within the incidence of adult respiratory distress syndrome (ARDS) wet lung, white lung, respiratory disease, respiratory un-wellness, respiratory disorder and important illness. The success of essential care drugs in reducing mortality can end in an outsized variety of survivors of COVID-19. Up to eightieth of patients living acute metabolism failure when receiving mechanical ventilation within the unit expertise new or worsened physical, psychological feature and/or mental state impairments that persist on the far side hospital discharge, put together referred to as the post- medical aid syndrome[4]. Though maturity, pre- existing physical frailty, psychological symptoms (for example, anxiety and depression) and psychological feature impairment (for example, dementia) are risk factors, even those while not such risk factors are in danger for long- lasting sequelae. In several cases, patients stay bedfast within the medical aid unit (ICU) for extended periods. Patients usually stay during a prone position for several hours, which might cause post-ICU upset, muscle weakness, myopathy, and pathology due to essential un-wellness, still as reduced joint quality, pain within the neck and shoulders, issue standing, and impaired balance and gait, with ensuing limitations in activities of daily living[5,6]. The unit patients that have

severe and prolonged un-wellness suffer from post-intensive care syndrome (PICS) that manifests as psychological feature, psychological and physical disabilities and an outsized proportion of them ne'er absolutely recover their well-being and purposeful status[7]. Physical impairment in PICS usually involves muscle weakness, extreme fatigability, mood disorders, poly neuropathy, and symptoms of deconditioning that solely gently reply to exercise programs[8]. Curiously, these clinical options at just like those fully fledged by older people with inflammaging and frailty-related sarcopenia[9,10]. Indeed, survivors of respiratory disease, ARDS, CSS, and PICS, all elicit physical and psychological feature deficits that might be characterized as accelerated inflammaging raising the likelihood that COVID-19 survivors could face accelerated inflammaging still, with substantial long consequences on their well-being. For the COVID-19 expertise, the long effects on health and purposeful standing could also be additional worsened by the implementation of social distancing, socioeconomic stress, and isolation that's unexampled in world history, and whose long consequences on people and society are going to be the topic of intensive analysis within the years to come back.

COVID-19 and inflammaging

Inflammation could be a physiological response essential to oppose infections and contribute to tissue repair. Systemic, sustained chronic inflammation thanks to persistent tissue harm, environmental stressors, unhealthy manner, and social and psychological stress is related to the danger of developing several chronic diseases (Figure. 1) as well as metabolic syndrome, sort a pair of polygenic disorder, non-alcoholic sickness disease, disorder (CVD), sarcopenia, pathology, immunosenescence, response disorders, cancer, chronic nephrosis, neurodegenerative disorders, depression, and probably accelerated psychological feature decline and dementia[11]. The mechanisms by that cellular harm and dysfunction cause ailments like arterial sclerosis, chronic anemia, central fat or chronic diseases are represented and area unit comparatively clear. However, in older people these “direct” mechanisms solely justify a comparatively tiny portion of the pro-inflammatory state that's ascertained increasingly more often as folks age. Different conditions related to a chronic inflammatory response area unit more “ complex” and still not well understood. Mechanisms embody isolation, mental state issues, chronic stress, disturbed sleep, poor diet, dysbiosis, obesity, physical inactivity, and xenobiotics[11].

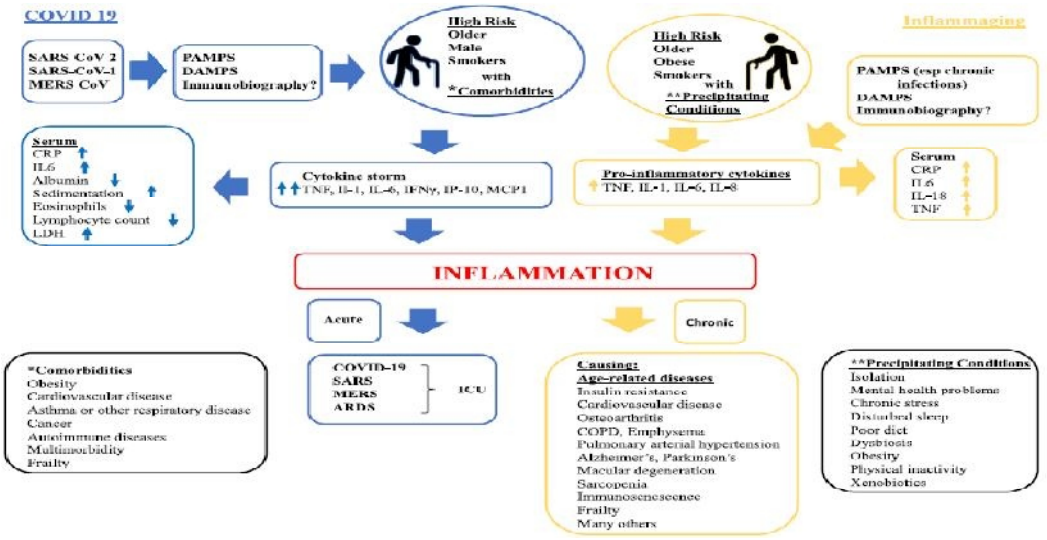

Figure 1: COVID-19 and inflammaging[12]

Inflammaging in older people underneath the threat of COVID-19

In addition to SARS-CoV-2 touching older people a lot of severely within the short-run, there's some initial proof that COVID-19 might have bigger long consequences in older folks through biological processes set in motion once the acute infection has subsided sustaining inflammaging (Figure. 2). we've antecedently projected that the dysfunction of the essential mechanistic "hallmarks"[13] and/or "pillars"[14] of aging, as well as adaptation to fret, genomic instability, mitochondrial dysfunction, epigenetic alteration, molecule harm, metabolism/deregulated nutrient sensing, altered living thing communication, loss of proteostasis, somatic cell exhaustion, cellular senescence, and regeneration, ends up in inflammation fifteen,[16]. there's explanation to expect that COVID-19 infection might negatively impact many hallmarks of aging, namely: 1) COVID-19 infection produces excess aerophilic stress, metabolic derangement, and DNA harm which will trigger cellular senescence in multiple tissues; 2) The infection directly causes severe tissue harm with unleash of PAMPs and DAMPs, that activate inflammation; 3) The undisguised activation of the response against the virus and also the oft superimposed microorganism infections might represent an awesome challenge to the system and exhaust or deregulates a number of the physiological system, directly contributory to immunosenescence.

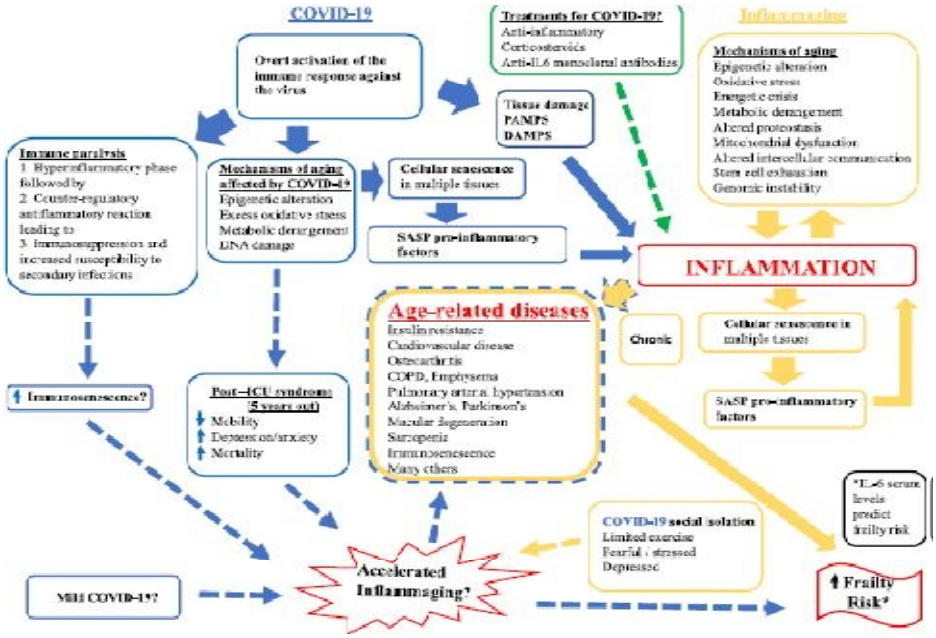

Figure 2: COVID-19 and mechanisms of inflammaging in older individuals[12].

Optimizing the COVID-19 survivorship expertise, supported this data, demands careful implementation of evidence- based mostly essential care interventions combined with sturdy rehabilitation programs that begin within the unit and continue when discharge.

Physical deterioration

Critical unhealthiness and its treatments have necessary, typically under-recognized, effects on the fiber bundle system. Physical impairments when essential unhealthiness will last for months or years and usually embody joint contractures and substantial muscle wasting and weakness, with associated limitations in physical functioning[17]. Severe metabolism failure occurring with COVID-19 could need long durations of mechanical ventilation, deep sedation, fiber bundle blockade and therefore the associated immobility, that increase the danger of physical impairments. Within the setting of COVID-19, virus- connected or medication- connected (for example, hydroxychloroquine) pathology will occur, together with alternative essential illness- associated poly neuropathy or pathology. To boot, patients is also repeatedly captive between supine and prone positions with potential shoulder luxation and nerve plexus injury, resulting in higher extremity sequelae. Moreover, prolonged mechanical ventilation could lead to diaphragm pathology, together with speech organ injury, upset and speech disorder from prolonged catheter cannulation which will be under- recognized while not systematic screening and assessment[18].

Mental health Deterioration

Survivors of unit keep usually expertise long- lasting mental state impairments. Clinically vital symptoms of tension, depression and post- traumatic stress disorder (PTSD) could occur in one- quarter to one- third of survivors and persist for up to five years, with half survivors coverage prolonged symptoms in a minimum of one in every of these categories[19]. Though pre- existing psychological symptoms are related to new or worsened post- unit mental state morbidity, the severity of the essential unhealthiness is mostly not related to psychological outcomes. These findings recommend a necessity to screen all survivors for mental state impairments. COVID-19- connected changes within the hospital setting could cause Associate in nursing accumulated risk of negative psychological symptoms. For example, reduced access to members of the family, pleasant activities and rehabilitation could lead to anxiety and demoralization in patients. Contact isolation has been related to accumulated symptoms of depression and anxiety, yet as concern and hostility towards medical suppliers. Literature from previous outbreaks (for example, respiratory disease a subtype H1N1 virus and hemorrhagic fever virus) could give insights for the present pandemic. Notably, survivors from the 2002–2003 SARS epidemic [20] reportable stressors that are relevant to the COVID-19 pandemic, together with constant media coverage accentuation high death rates, stigma thanks to community or members of the family blaming survivors for the unfold of unhealthiness, the concern of infecting darling ones, death of shut members of the family and survivor's guilt. Such stressors could have necessary implications for psychological outcomes in survivors of COVID-19.

Hurdles to vital life

The interaction of physical and mental state impairments will result in necessary purposeful issues, like persistent fatigue, chronic pain and sleep pathology, and reduced health- connected quality of life[21]. Moreover, globally, at 1- year follow-up, one- third of antecedently used survivors of unit keep are jobless[22]. The money burden of job loss is worsened by direct or indirect health- care prices and lost

financial gain of patients' caregivers. Moreover, patients' darling ones are in danger of latest and protracted mental state impairments, a development referred to as post-medical aid syndrome–family[23]. Several of those sequelae is also modifiable with adequate access to rehabilitation that promotes each engagement with health- care groups and self- management of symptoms.

Outcomes for survivors

To optimize each survival and survivorship of critically unwell patients with COVID-19, meticulous attention to delivering evidence- based mostly essential care interventions is needed, yet as early and sustained comprehensive rehabilitation that targets physical and psychological science recovery together with adequate social support. best essential care interventions embody evidence based mostly management of ARDS (for example, lung- protecting mechanical ventilation and prone positioning) and consistent implementation of guideline- suggested ways for assessing and managing pain, sedation, delirium, immobility and sleep. Comprehensive rehabilitation services embody physical and activity therapists, speech language pathologists, psychologists and physiatrists. Advantages of early and intensive rehabilitation embody reduced muscle weakness and length of mechanical ventilation, with potential for reduced delirium and improved psychological feature operate. Moreover, participation in rehabilitation could enhance patients' mental state by providing a way of normalcy and management over their recovery. Rehabilitation initiated within the unit ought to continue throughout hospitalization and when discharge, via multi- disciplinary out- patient care, home health services and peer support groups[24]. Throughout COVID-19, telehealth is a crucial adaptation for delivering these post- discharge assessments and interventions.

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