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Contents

1. **Effects of ICT on TVET Education During the Covid-19 Pandemic** 3-11
Authors
MUSTAPHA Aliyu
ABDULKADIR Mohammed
HASSAN Abdullahi Mohammed
RAJI, Abdullahi Egigogo
MUSA Abdurrahaman Ewugi
2. **Using Complete Blood Count Examination General Health Status Study of Normal Young Male Adult** 12-18
Authors
Swaraj Mahadev Landge
Prof. Dr Mahadev Gangaram Landge
3. **Technological revolution in the Educational sector – A post Covid scenario** 19-27
Author
Dr Tripura Sundari.C.U
4. **Post COVID-19 Paradigm Shift in Social Science, Technology and Public Health** 28-37
Author
Sagar Sanap
Surekha Bhor
5. **Solar energy in Iran** 38-42
Author
Simin Shahbazi Ahmadi
Lyudmila Kuzinkova

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Research Article

Effects of ICT on TVET Education During the Covid-19 Pandemic

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ABSTRACT

Every aspect of modern life has been impacted by technology, including education. Today, technology can offer various formal and non-formal online learning opportunities globally. Technology breakthroughs have made learning to go beyond the traditional classroom and now occur in various virtual classrooms where the teacher and students are physically apart. This has made the scope of learning opportunities unprecedented. Today, technology breakthroughs and access to learning opportunities are unprecedented in scope. In light of the Coronavirus (COVID-19) pandemic, the primary goal of this research is to elaborate on the crucial role that ICT plays in Technical Vocational Education and Training (TVET) education. This is because TVET is one of the critical sectors where Information Communication Technology (ICT) integration can boost productivity. This paper outlines the benefits of ICT adoption for school administration, teachers, and students. A conceptual analysis of the factors influencing ICT usage from the perspectives of teachers, students, schools, and society is also included in this study. The findings of this study include, among others, that ICT played a critical role in teaching and learning during the outbreak. However, several issues in the implementation process, such as teacher mindset and economic level, remain unsatisfactory.

Keywords: COVID-19 Pandemic, ICT, Learning, Teaching & TVET

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INTRODUCTION

With the advancement of technology, information and communication technology (ICT) is becoming increasingly crucial in our daily lives. ICT is a broad term that refers to a collection of resources and

technology used for communication. ICT integration, particularly in education, significantly increases students' academic performance (Iglesias-Pradas et al., 2021). The integration of ICT has impacted the globe in various ways during the last few decades. As



ICT technology advances, people progressively incorporate ICT into different disciplines, such as industries, public and private sectors, economic growth, and education (Yang & Gu, 2021).

When ICT is integrated into advanced tools in factories and industries, workers can use advanced machines to help them increase production efficiency and effectiveness (Kelley et al., 2020); when ICT is applied to management systems, digital library management systems are beneficial to improving library management efficiency (Ho & Kuvaas, 2020); As a result, the proper use of ICT may assist all industries in enhancing their production and management, consequently boosting their worldwide competitiveness. A country's total ICT level grows swiftly, which benefits the country's overall long-term economic growth. With the growth and popularity of online education in recent years, more and more academics have begun to recognize the relevance of ICT integration in education. When ICT is integrated into classrooms, interesting online education applications can be practical (Nartiningrum & Nugroho, 2020). One of the primary areas in education where ICT integration might improve productivity is Technical, Vocational Education and Training (TVET).

TVET is an essential avenue for college students' skill development. Furthermore, TVET has grown in importance to ensure students' lifelong learning. One of the most essential aspects of ICT integration that has a beneficial influence on TVET education is the availability and utilization of Open Educational Resources (OER). This is because OER considerably assists teachers' growth by allowing them to apply innovative, flexible learning methods to improve TVET students' skills, education and training (Yeap et al., 2021). Furthermore, incorporating ICT into TVET education can provide instructors access to infinite outside resources. To provide an education system that fulfils all of the labour and industry objectives, vocational education reform that began in

2013 focuses on industrial or technical abilities and increases work chances for students' professional growth (Okolie et al., 2020). Education institutions, particularly those involved in training, produce qualified workers and excellent human capital for the future using the TVET education system.

ICT integration in the classroom has a long history of the study. Incorporating ICT into the classroom can significantly improve classroom structure and administration (Hayes et al., 2020). ICT is one of the most potent weapons of educational reform and revolution (Yang & Gu, 2021). It is being used more and more successfully in teaching, learning, and evaluation. According to Bera (2015), combining ICT with the teaching process may help education evolve better, promote equity in education, enhance teaching quality, and encourage professional development.

Furthermore, integrating ICT into TVET is critical for improving the outcomes of TVET students. Courses in TVET assist students in learning 21st-century skills like problem-solving and critical thinking (Mutohhari et al., 2021). These hands-on classes can help students get the skills needed for their future careers while also increasing their employability. The sudden emergence of COVID-19 has made the importance of ICT in education more obvious. ICT was essential in supporting teaching and learning throughout the outbreak.

Even though the integration of ICT and education has a long history of constant innovation, COVID-19 has been wreaking havoc on countries throughout the world's economic and educational progress since its abrupt emergence in December 2019 (Song & Zhou, 2020). To avert the virus's continued and fast spread, nations worldwide have launched school closures worldwide. The federal, state and local government has also established related laws, urging people to minimize gatherings and travel to prevent the virus from spreading from person to person. During the epidemic, activities such as attending class, working,

and shopping were suspended (Jiang et al., 2021). The global suspension of courses, on the other hand, has had a significant impact on the development of education in countries all over the world.

PROBLEM STATEMENT

Since the first case was identified in 2019 and the global outbreak started in 2020, one of the world's most pressing health issues now is COVID-19 (Yezli & Khan, 2020). Many actions have been implemented in order to effectively stop the development of COVID-19, including social withdrawal, border control, and closing of schools (Karasmanaki & Tsantopoulos, 2021). Vaccinations have undoubtedly significantly altered our lives and behaviors in many ways, including our involvement in physical activity, our interactions with friends, and the teaching and learning processes at educational institutions, despite the fact that they were introduced to combat the COVID-19 pandemic (Dutta & Smita, 2020).

As a result of COVID-19's sudden emergence, the importance of ICT in education has become increasingly visible. ICT played a crucial role in supporting teaching and learning during the pandemic. However, obstacles and roadblocks in the implementation process, such as teacher mentality and financial status, remain unsatisfactory. At the same time, TVET education must be handled seriously as one of the most essential fields of education (Ghavifekr & Yulin, 2021). Many poor or disadvantaged children lost access to school and training during COVID-19 because of the abrupt stoppage of education.

Furthermore, during COVID-19, the abrupt stoppage of TVET education had severe consequences for society (Shyamal Majumdar & Inigo Araiztegui, 2020). Due to the unexpected blockage, many individuals have lost their jobs and even gone hungry. To solve the food and clothing dilemma, these artisans cannot balance revenue and spending and commit

unlawful and criminal activities such as robbery and kidnapping, increasing worldwide crime rates. The aim of this study is to determine the effects of ict on tvet education during the covid-19 pandemic. The following are the precise goals that this study aspires to achieve:

1. Elaborate on the critical role of ICT in education
2. Offer an overview of the advantages of incorporating ICT into TVET education.
3. provide a conceptual overview of the factors that influence ICT usage from various perspectives, such as instructors, students, schools, and society,

METHODS

The findings of relevant resources on ICT use in education were summarized using a conceptual review approach in this study. Through a complete, critical, and objective investigation, this approach assisted in gaining valuable knowledge about the issue. The narrative review, an essential aspect of this research, assisted in developing a theoretical and conceptual framework for the use of technology in TVET education. The narrative review assisted the researchers in achieving the study's goals, which included expanding on the critical significance of ICT in TVET education. It also emphasized a conceptual assessment of the elements influencing ICT usage from multiple perspectives, including instructors, students, schools, and society.

RESULTS AND DISCUSSION

Benefits of Using ICT in Education

In recent years, there has been a growth in the amount of literature on the use of ICT in education. There are three categories of ICT beneficiaries: teachers, students, and school administration. (Li et al., 2020). This study also provides an outline of these three factors:

Uses of ICT by Teachers during COVID-19 pandemic

- i. **Support teaching:** Using ICT resources in the educational process can aid instructors in providing high-quality instruction (Mishra et al., 2020). Using a virtual teaching environment (VLE) may give instructors effective and easy virtual classrooms, which can assist teachers in better conducting teaching and classroom management, especially during epidemic periods (Ghavifekr & Yulin, 2021). Furthermore, according to Niem et al. (2020), using ICT in education makes lesson preparation easier for instructors. Teachers can utilize ICT tools like PowerPoint, Google Classroom, and interactive whiteboards to help them prepare for exams.
- ii. **Promote relationship:** According to Jiang et al. (2021), integrating ICT into education is conducive to enhancing students' interest in studying, mainly by deploying high-quality applications that may significantly increase students' academic performance. When student performance improves, teacher evaluations and teacher evaluations will improve dramatically (Gonzalez et al., 2020). Meanwhile, (Hew et al., 2021) conducted research in South Korea and found that students are enthusiastic about flipped classrooms. This level of passion can motivate learners to become more engaged in their studies and promote cooperative relationships between instructors and students.
- iii. **Enhance the quality of instruction:** The growth of ICT in education contributes to the enrichment of educational resources available to students and instructors (Wen et al., 2021). Most teaching resources, particularly during the pandemic, are available online (Umar & Ko, 2022). The disparity in teaching resources between

urban and rural areas has narrowed significantly due to this policy because all schools have equitable access to high-quality educational materials like open ICT resources. Hence, the continued growth of ICT is beneficial in closing the gap in education resource allocation between urban and rural areas. At the same time, it provides a terrific opportunity for rural instructors to get more educational materials.

Uses of ICT by Students during COVID-19 Pandemic

- i. **Student-centered:** ICT in the classroom necessitates a shift in mindset from teacher-centred to student-centred (Díaz, 2020). Using ICT to learn is a self-directed activity. Because all pupils have computer access, the instructor cannot monitor everyone's dynamic engagement. Students must be able to study alone and maintain tight self-control to avoid distractions from the online world, such as pornographic websites and games when using ICT (Abusalim et al., 2020). ICT can assist pupils in improving their ability to learn on their own.
- ii. **Conducive to the growth of a student's abilities:** Long-distance synchronous learning can inspire timid students to share their thoughts and answer questions. Teachers can also engage in online connections through various fun, interactive tools (Jiang et al., 2021). Active engagement in class can help pupils enhance their learning and thinking skills. According to Hatmanto and Purwanti (2021), optimal ICT integration in the teaching and learning process stimulates students' interest in ICT while also guiding them to master ICT skills independently. Therefore, incorporating ICT into the classroom can aid students in developing their ICT leadership skills. ICT

skills are vital not just for study but also for future jobs.

- iii. **Create a more conducive learning environment:** The integration of ICT has allowed tens of millions of children who had been driven out of school to return to school (Fontenelle-Tereshchuk, 2021). The use of ICT technology provides a secure learning environment for children unable to attend school due to the outbreak (Lorente et al., 2020). The virtual teaching environment provides a safe and effective atmosphere for students who were forced to miss school due to the outbreak. Furthermore, even when there is no epidemic, online asynchronous learning options (Huang et al., 2020).

Uses of ICT by School Management during COVID-19 Pandemic

According to Caliskan and Zhu (2020), ICT has been more successfully employed in teaching, learning, and evaluation as a potent instrument for educational innovations and reforms. According to Ermenc et al. (2021), combining ICT with education benefits teachers' professional growth. ICT is beneficial to teacher team development for school leaders. Furthermore, according to the Ministry of Education of China's notice on informatization education, government departments at all levels have completed informatization construction work, which will assist managers in better managing the entire department (Song & Zhou, 2020). At the same time, ICT can help with technological issues.

Factors Affecting ICT Use in the classroom

The primary factors influencing the usage of ICT in education may be broken down into four groups:

Teacher Aspect: According to Guillén-Gámez and Mayorga-Fernández (2020), teachers' attitudes regarding ICT significantly impact the ICT use's success. ICT integration is only regarded as successful

when instructors are willing to accept change (Hakim, 2020). As a result, the teacher's perspective is critical for ICT integration. According to a study by Anderson and Putman (2020), the attitude of teachers is a critical component impacting the effectiveness of ICT integration and the role of teachers' mindset in teachers' technology usage. Integration outcomes will be significantly harmed if teachers have a nasty attitude toward using ICT. Much research has been conducted on the efficacy of instructors with ICT. Goh and Sigala (2020) stressed the link between the capacity of the teacher and the impact of ICT integration. Park and Son (2020) agree that instructors have a critical and complex role in using ICT in teaching and learning. Teachers serve as learners and instructors in the information transfer process (Carless, 2020). As a result, instructors must ensure that they assist students in creating a positive learning atmosphere while ensuring that the teaching content and curriculum are successful.

Student Aspect: Students are major benefactors of ICT integration in education. Students' attitudes have a significant role in the success of ICT use in education. According to research by Tian and Xiong (2020), low-performing students in online classrooms were only 48.9% happy amid the current pandemic crisis. This demonstrates that a student's mindset directly impacts their academic success. Learning ICT is more challenging for kids who lack self-discipline (Babinčáková & Bernard, 2020).

School Aspect: The school is undoubtedly one of the significant determinants of ICT integration in education. According to Goh and Sigala (2020), the successful integration of ICT necessitates a suitable learning environment. Although all classes during the epidemic will be online, schools should monitor and govern the virtual teaching and learning environment and the online platforms utilized by instructors. Furthermore, at the school level, staff collaboration and satisfaction are also criteria for ICT integration eligibility (Karasmanaki & Tsantopoulos, 2021).

School leaders have to be good at what they do and also have to be good at what they say.

Social Aspect: The quality of online education has always been influenced by network speed, accessibility, security, and dependability, especially during the epidemic. According to World Bank data, because everyone needs to study offline to online during the pandemic, even the best education system and economic level will not be able to accomplish such a large-scale transition (Abusalim et al., 2020).

CONCLUSION

To cap it all, ICT is critical for education stakeholders such as students, instructors, and administrators. However, due to the COVID-19 pandemic, the importance of ICT in education has grown even more. With the quick advancement of ICT, many issues have emerged to obstruct it. As a result, this paper examines the problem from various perspectives and firmly believes that our society will improve with the continued advancement of ICT.

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Research Article

Using Complete Blood Count Examination General Health Status Study of Normal Young Male Adult

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ABSTRACT

“ White Blood Cells as the ‘Armed Forces’ of the Body ”

An attempt has been made to study the general health status of normal adult patient using complete blood count. The number of tests such as Red blood cell count, White blood cell count, Abs. Eosinophil count, Packed cell volume, Mean corpuscular volume, Mean corpuscular hemoglobin, Mean corpuscular Hb concentration, Red cell distribution width, Neutrophils, Lymphocytes, Eosinophil, Monocytes, Basophils, Platelets, Hemoglobin, Hematocrit, etc were done on Semi Automatic Analyzer. The abnormal increases or decreases in cell counts as revealed in a CBC may show that the patient underlying medical condition that calls for further examination. The results of these tests observed were used to advice the patient health status and diagnose a medical condition to monitor medical treatment. The observations of tests were compared with known reference value range, which may show positive or negative divergence with child stage, young stage, old age stage and also with male-female difference in sex. The positive deviation of means corpuscular volume and negative deviation of mean corpuscular Hb concentration were well explained.

Keywords: Complete blood count, red blood cell, white blood cell, platelets, hemoglobin, diagnose, patient

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OBJECTIVE

- To discuss blue print of blood tests.
- To study the physiological mechanism of cells.
- To know the health status of patient.
- To promote the awareness of CBC.

INTRODUCTION

A complete blood count (CBC) or full blood count (FBC) or full blood examination (CBE) is one of the most commonly ordered blood tests used to monitor patients overall health and find a wide range of disorders including anemia, infection and leukemia etc. It is the calculation of the cellular or formed elements of blood. The special type of machine is used to do these calculation of component of blood in less than minute. This assessment of medical laboratory group tests gives the blue print of cells in a patient blood which are mainly used by doctor to check or monitor health problem or to do diagnose the different diseases.

The cells in the CBC (WBC, RBC and Platelets) have special unique functions. In general way of condition the white blood cells or leukocytes are mainly the important part of the immune system and help to fight against the infections by attacking bacteria, viruses and germs that caused due to different unfavorable conditions invade the body. Each and every component of WBC plays vital role in increasing the power of immune system. The WBC originates in the bone marrow but circulate throughout the bloodstream. A WBC count can find hidden infections of patient body and give alarm to doctors to un diagnosed medical conditions, such as autoimmune diseases, immune deficiencies and blood disorders. The important application of WBC tests are found supportive study in cancer treatment also. Many medicinal study shows that the infants are often born with much higher number of WBC. There are five major types of white blood cells. According to the Leukmia and Lumphoma Society (LLS), the

normal percentage of WBC count are usually found in following ranges.

Table 1: Types of WBC and their Normal Percentage of Overall Count in Normal Male Adult

Sr.No	Type of WBC	Normal percentage of overall WBC count
1	Neutrophils	55 - 73
2	Lymphocytes	20- 40
3	Eosinophils	1- 4
4	Monocytes	2- 4
5	Basophils	0.5- 1

Literature survey reveals that the lower or higher numbers of WBC than normal can be a sign of an underlying medical condition. The symptoms of a low WBC count includes body aches, fever, chills, headaches etc, while high counts don't often shows any symptoms. The leukopenia is the medical term used to describe a low WBC count, on other hand, the leukocytosis is the medical term used to describe a high WBC count. No specific diet or food increase WBC count in the patient body, but vitamin B-12 and folate are also required to produce the WBC. Generally the doctor's advice the good source of protein diet plan with multivitamins and mineral supplements. The doctor's mainly suggested 15 foods that boosts the immune system are citrus fruits, garlic, spinach, ginger, almonds, turmeric, yogurt, red bell peppers, sunflower seeds, poultry, kiwi, papaya, green tea, shellfish, broccoli etc.

Red blood cells (RBC), also known as erythrocytes or haematids, or erythroid cells deliver fresh oxygen to the tissues in our body via blood flow through the circulatory system converted into energy and our tissues release carbon dioxide to lungs for exhale. They are made in bone marrow and with richest source of proteins. The RBC typically live for about 120 days and then die. The structure of RBC are round with a flattish, intented center like doughnuts

without a hole. The food rich in iron help to maintain healthy RBC. Generally, vitamins B-12, B-3 found in eggs, whole grains and bananas are needed to build healthy RBC. Also the folate found in fortified cereals, dry beans, lentils, orange juice, and green leafy vegetables are the good sources for the supplement of RBC. They suffers due to illness or a lack of iron or vitamins in our diet, while some diseases of the RBC are inherited. The diseases of RBC include many types of anemia and symptoms of anemia are tiredness, pale skin, feeling cold, fast heart beats and in severe case heart failure etc. The experimental observation shows that the children with unhealthy RBC grow and develop more slowly than other children.

The platelets or thrombocytes are tiny, colorless cell fragments in our blood that forms clots and prevent or stop bleeding. If due to some accident our blood vessels get rupture or damaged, then it send signals or message to the platelets, which immediately rushes to the particular site of damage and forms plug or clot to fix or adhere the damage. If by some underlying medical condition patient don't have enough platelets in blood, then body can't forms so required clots. In medical term low platelet count may also called thrombocytopenia, i.e. infections with protozoa, bacteria, and viruses which may range from mild to severe depending upon illness caused to patient. In such condition, doctor suggests generally following balanced things to increase the blood platelets count as, eating leafy vegetables, fatty fish, citrus, iron rich foods, use of chlorophyll supplement, folate rich foods, food rich vitamin B-12, C, D, K and avoiding alcohols, vitamin E and fish oil supplements etc.

MATERIAL AND METHODS

For the measurement of CBC examination directly you can give the blood sample to medical care taker

staff, it means you can eat and drink normally before the test or fast for a certain interval of time as per doctor's suggestion. The medical care taker staff collect a blood sample by inserting a needle into a vein in your arm or a finger stick or heel stick (new born), usually at the bend in your elbow. The blood sample is then sent to clinical pathology laboratory for the analysis purpose by taking precaution of patient code name or well labeling. Sometimes, in addition a drop of blood is spread thinly on a glass slide creating a blood smear. This is stained with special types of dyes and examined under medical microscope to observe the appearance of individual cells. After this there is no need to wait for the samples and patient can go for his routine activities.

The semi-auto biochemistry analyzer measures biochemical indexes by analyzing blood samples and other body fluid samples which combines with clinical information to help diagnose different diseases. This instrument is a compact, simple, reliable semi-automated biochemistry analyzer capable to perform different tests on whole blood, serum, plasma, cerebro spinal fluid and urine etc as samples. The applications of this instruments were found in both clinical analysis and in industrial analysis as a continuous flow analysis (CFA) method quickly and with minimal human resources. This photo metry is the most common method for analyzing the amount of a specific analyte in a sample. In this technique the sample undergoes a reaction to produce a color change, then measures optical density or absorbance concentration by using ion selective electrodes as sodium, calcium or potassium present in the samples. Generally routine methods are followed to analyze all types of samples taking precaution safety of medical care taker staff.

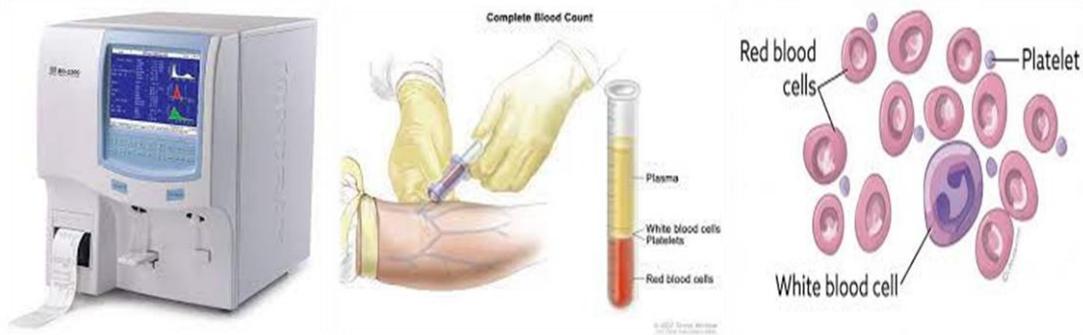


Figure showing a-semi auto biochemistry analyzer, b-blood tests sample , c-complete blood count

For the present study, we considered following 15 numbers of tests made by normal young adult of age 22-23 years. The weight and height of adult was 60 kg and 165 cm respectively. As per medical history, he has no any health problem but due to lockdown period some acidity and fever symptoms are under observation. He is a college going regular final year graduation student. So far, his daily routine is good with regular morning walk of about 45-60 minutes, with some physical exercise warm up, to play cricket for 60-90 minute on play ground. Good breakfast at

9.30-10.00 a.m.and routine online classes from 10.30 - 2.30 p.m. followed by lunch. Reading, writing, assignment, record book completion etc with some rest up to 5.00 p.m. Evening walk, observing TV cricket match, discussion, debate or news, program, preparation of study notes and lunch at 8.00 p.m. The evening study up to 11.00 p.m. with sleep up to 6.00 a.m. and so on. As per doctor's advice, following clinical laboratory tests were carried out for the purpose to see the complete blood count.

Table 2: Complete Blood Count Examination of Normal Male Adult Patient

Sr. No.	Tests	Results	unit	Reference range
1	R.B.C.count	5.02	mil/cmm	4.5 - 6.5
2	W.B.C.count	5000	/cmm	4000-11000
3	Haemoglobin	14.30	gm/dl	14-16.50
4	Abs.Eosinophil count	150	/cmm	40-440
5	Red cell absolute value			
	Packed cell volume HCT	48.20	%	40-54
6	Mean corpuscular volume	96.02	cu micron	76-96
7	Mean corpuscular hemoglobin	28.49	picograms	27-32
8	Mean corpuscular H _b conc.	29.67	g/dl	32-36
9	Red cell distribution width	12.30	%	11.50-14
10	Differential count			
	Neutrophils	50	%	40-70
11	Lymphocytes	40	%	20-45
12	Eosinophil	3	%	0-6
13	Monocytes	7	%	0-8
14	Basophils	0	%	0-1
15	Periphral smear Examination			
	Platelets	151000	/cmm	150000-450000

* All tests are carried out at Prasanna Pathology Laboratory, Jay Nagar, Parli-vajinath District Beed 431 515.

As all the above tests are compared with standard reference range, only two tests i.e. mean corpuscular volume (MCH) = 96.02 cu micron and mean corpuscular H_b concentration (MCH_b Conc.) = 29.67 g/dl shows positive deviation and negative deviation from the reference range value respectively. The probable reason behind this is that, the high level of MCH means, their red blood cells are larger than usual, so the patient have macrocytic anemia, but macrocytosis occurs in people with an MCH level higher than 100 femtoliters. This caused due to the deficiencies in vitamin B12 and folate vitamin B9. The low level of MCH_b Conc., means the patient red blood cells do not have enough hemoglobin, because is an iron rich proteins and lack of it may shows anemia. The hemoglobin is responsible for red color in blood and for circulating oxygen around body. In order to cover the medical health situation doctor advised ten

days prescription dose of different medicine, injection and tablets. All other remaining tests indicates good reference range so, results are in favour of normal young man adult.

CONCLUSION

The complete blood counts refers for variety of reasons, i.e. to review patients normal health, to diagnose a medical conditions, to monitor a medical underlying, to check overall medical treatment such as an anemia, leukemia, weakness, fatigue, fever, inflammation, brushing bleeding, thalassemia, nutritional deficiencies, sickle cell disease, hemoglobin abnormalities, dehydration, bone marrow disorder etc.

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Research Article

Technological revolution in the educational sector - A post Covid scenario

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ABSTRACT

Technology plays an essential role to deliver education to the students. It plays a vital role in today's digital economy. In educational sector Information Communication Technology (ICT) provides a platform for distance learning, online learning and certification to enhance additional and intense knowledge. It can shape the educational policies and bring educational revolution. "With the spread of the Coronavirus disease (COVID-19), 180+ countries mandated temporary school closures, leaving 1.6 billion children and youth out of school at its height and affected approximately 85% of children world-wide (world bank)". Education was made to reassess in this new Covid environment to make online teaching easier. The education institutions were made to follow the guidelines and recommendations by government agencies, while keeping students encouraged to continue learning remotely during this tough environment. Children and students have had to dependent on their own resources through the Internet, television or radio. This new weapon of Teaching-Learning refers to the technology that are used to communicate, store, generate, share, exchange valuable knowledge and skills around computing and communications devices. Hence the current paper attempts investigate the technological achievements and advancement in the educational sector after the Covid period. Primary data for about 300 samples from School and college children, teachers and parents are collected. Also, secondary data regarding technological advancement is collected from magazines and other published books, simple ratio, percentage method and data visualization technique is used to verify the above objective. The result vividly reveals that the technological advancement was a revolution in the post covid situation.

Keywords: Education, School, Technology, COVID, Primary data

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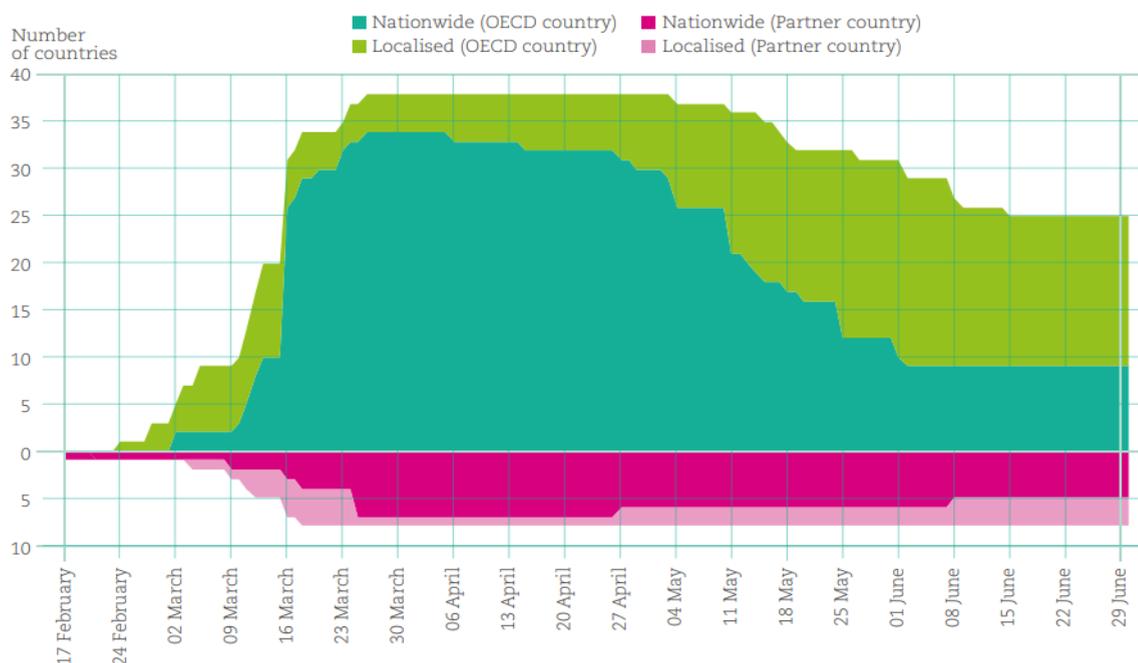
INTRODUCTION

Education and health are the two backbones of any system. Covid-19 pandemic has affected almost all the sectors of the Economy regardless of nationality, education, income, gender etc. This crisis has led to many shortages and inequalities in our education system, this has transformed many aspects of human lives. Shut down of schools, businesses and workplaces and forced millions to stay at home for extended lengths of time. Government recommended limits on social contact trying to altered the way many worked, learned, connected with loved ones, carried out basic daily tasks along with joy

and sorrows. For some, technology played a role in this transformation.

Reduction in family income, limited access to digital resources, and high cost of internet connectivity have disturbed the academic life of the students. Students, Teachers and Parents felt a changes in their daily routine like social distancing, loosing connectivity with the outside world, lack of outdoor activity and complete change in life style called lockdown which had an influence on mental and physical well-being of the individuals. The burden on teachers and parents increased and this had an impact on students.

Graph I: Number of countries with school closures due to COVID-19 (17 February 2020 and 30 June 2020)



Note: This figure covers educational institutions from early childhood education to tertiary education. Localised school closure refers to school closures of some levels of education only and/or for some subnational entities.
Source: UNESCO (2020_[24]). COVID-19 educational disruption and response, <https://en.unesco.org/covid19/educationresponse>; Education at a Glance 2020, Figure D1.4.

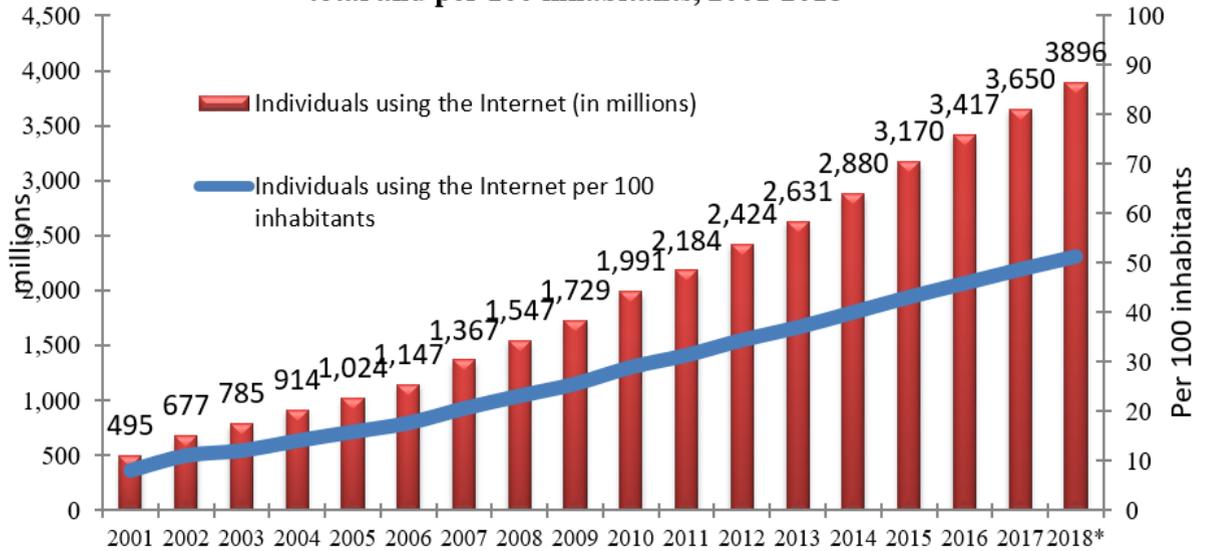
“By the end of June 2020, some degree of school closure was effective for at least 7 weeks in 2 countries (4%), 8-12 weeks in 6 countries (13%), 12-16 weeks in 24 countries (52%), 16-18 weeks in 13 countries (28%) and more than 18 weeks in China”, (UNESCO, 2020). There was need for a rapid transition from physical learning to the digital learning.

In this digitalized world, the digital technology can enable a revolution in this educational sector. A rigorous effort was made by the educationalist to continuity learning during this period, a variety of remote learning resources were suggested. The goal must be (1) real-time lessons on virtual meeting platforms (2) Online support services for parents and students for which teachers also had to familiarize to new educational concepts and modes of delivery of teaching, for which they may not have been trained and finally, (3) online learning has been observed as a possible alternative to traditional learning.

Education was made to reassess in this new Covid environment to make online teaching easier. The education institutions were made to follow the guidelines and recommendations by government

agencies, while keeping students encouraged to continue learning remotely during this tough environment. Children and students have had to dependent on their own resources through the Internet, television or radio. This new weapon of Teaching-Learning refers to the technology that are used to communicate, store, generate, share, exchange valuable knowledge and skills around computing and communications devices. Marginalized groups, who do not have the access to digital learning resources experienced larger negative impact due to Covid-19 outbreak. India has the world's largest higher education system, about 45,000 higher educational institutions which has increased by four-fold since 2001. However, the National Education Policy 2020 put emphasis on students' mental health and well-being in order to provide a complete development. Also, it is important to ensuring optimal performance both, in and outside school life. Positive impacts of this online. Education can be Collaborative work, virtual meetings, distance learning, digital literacy, e-conferencing, use of electronic media, time management, learning management, use of learning material and its frequency, blended learning and attending the meeting from your comfortable places itself.

Graph 2: Global numbers of individuals using the Internet, total and per 100 inhabitants, 2001-2018*



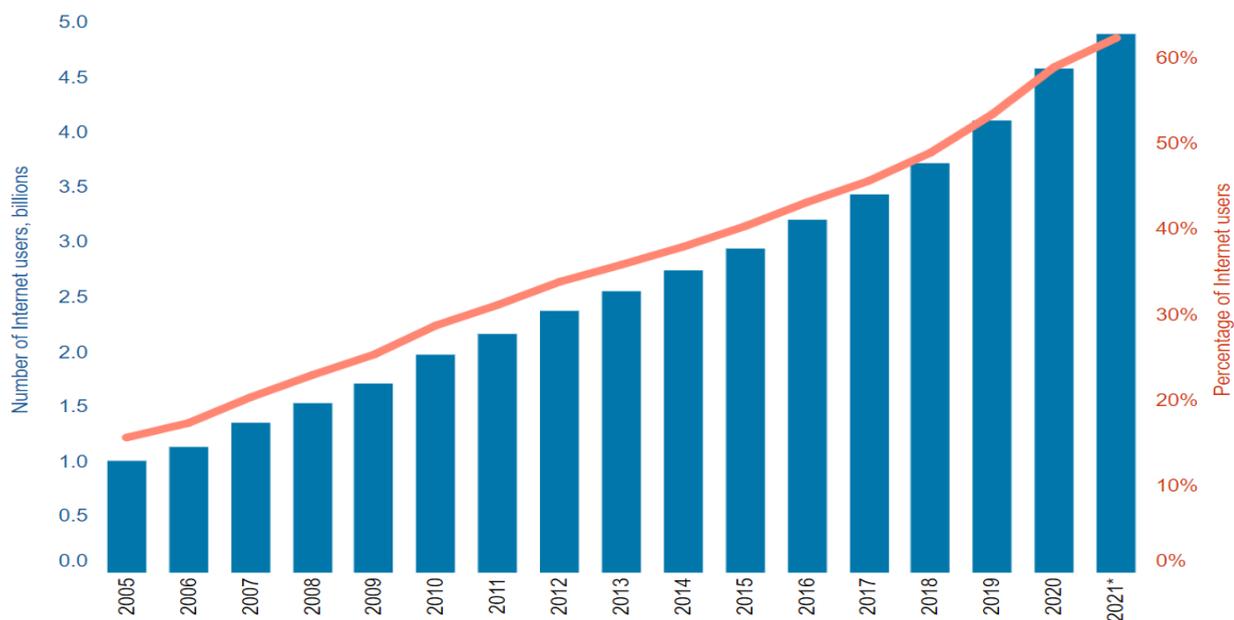
Note: * Estimate

Source: ITU World Telecommunication /ICT Indicators

Graph 2 presents the percentage Global numbers of Internet users, total and per 100 inhabitants, 2001-2018. The graph clearly reveals that the internet usage has reduced to half of its usage globally, when compared to 2000 and 2018. Graph 3 also reveals the data on usage of Internet by individuals (in Billion) from 2005 to 2021. It is clear from the graph that the Internet has long been a source of countless opportunities for personal satisfaction, professional development and value creation. During the pandemic

situation, it has become a vital necessity for working, learning, accessing basic services and keeping in touch. The latest ITU data confirms the uptake of Internet usage during the pandemic. In 2019, 4.1 billion people (or 54 per cent of the world's population) were using the Internet. Since then the number of users has increased by 782 million individual using Internet has reached 4.9 billion in 2021, or 63 per cent of the population.

Graph 3: Individual using Internet



Source:ITU

“There were few people living in developing countries who remain offline, due to lack of access that remains unconnected (ITU). In 2020, the first year of the pandemic, the number of Internet users grew by 10.2 per cent, the largest increase in a decade, driven by developing countries where Internet use went up by 13.3 per cent. In 2021, growth has returned to a more modest 5.8 per cent, in line with pre-crisis rates”, ITU. India’s spending for IT sector services was 15.7 per cent in 2017 and reached \$12.6 billion, an increase of 13.8 per cent in 2018 to reach \$14.3 billion after covid it has increased to \$16.35 in 2020 and a further increase to 18.12 in 2021 (Gartner, 2019 and 2022).

National and International studies during the pandemic situation (2020 and 2021) was

enormous regarding this impact of COVID-19 on education. Studies by Aucejo et al. 2020, Bao

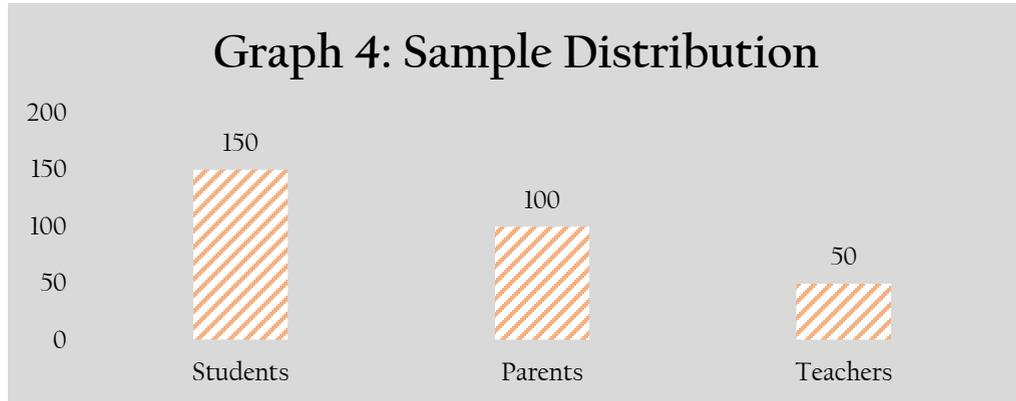
2020, Cao et al. 2020, Dnan and Anwar 2020, Hasan and Bao 2020, Kapasia et al. 2020, Lee 2020, Mahdy MAA(2020), Odriozola-gonzález et al. 2020, Rahul De et. al., 2020, Robin Donnelly et.al., 2020, Kunal et.al, Paunov, C. and S. Planes, 2021, Yadav 2021, etc identifies the achievements or problems faced by this sector during this pandemic situation. On the basis of the above background, the current paper investigates the technological achievements and advancement in the educational sector pre and post Covid period. Primary data for about 300 samples from School and college children, teachers and parents in and around Pondicherry are collected. Simple ratio, percentage method and data visualization technique is used to verify

the above objective. Introduction and Review is provided in Section 1 and the Methodology and results are provided in Section 2 and finally the concluding remarks and policy suggestions are provided in Section 3.

RESULT AND DISCUSSION

Primary analysis

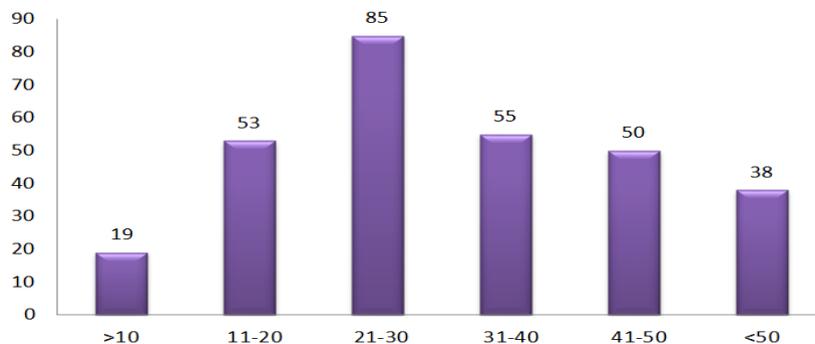
To check the objective, primary data in form of questioner has been collected from 150 students (including schools and Colleges), 100 Parents and 50 teachers. Graph 4 reveals the sample distribution of the study. Few questions were asked pre and post pandemic situation



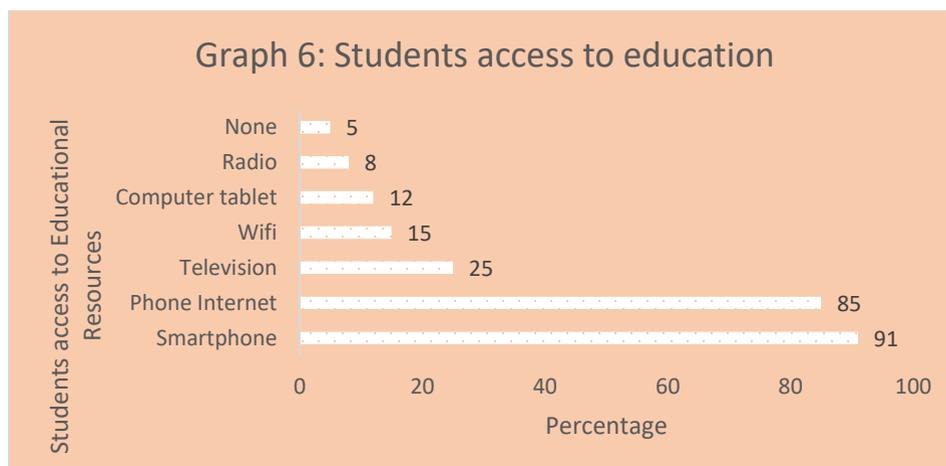
Graph 5, reveals the age distribution among the 300 respondents most of the respondents belong to the age group between 21 to 30. Also for the question “How long you spend in smartphone”, for pre covid situation around 33% of the sample use smart phone in their day to day life are less

than 30 years of age and 67% of the population are above 30 years. And during the pandemic situation almost 95% of the respondents students admitted that it has become a part of their life.

Graph 5: Distribution of Age group



Source: Authors computation



Source: Authors computation

Graph 6 presents the students access to continue education during this pandemic situation Smartphone and internet played a leading role to access their studies. A paired t-test is used to analysis the mean usage of technology pre and post pandemic situation. The result reveals that the p-value is significant at 1 percent level and the technological use is greater during the post covid period.

Consolidated opinion of Parents, Teachers and students:

Parents Opinion regarding the online education:

Parents opine that about 99 percent of the students have faced problem in their eye sight due to long hours of online lecture. Also, in offline class, students have some physical activity which was missing in online class. And those parents who hesitated or restricted their children in using this smart phone felt that the mobile has now become a part of life during and after Covid. Due to the over usage of this mobile not only physical issues, mentally also it had affected the students. Students' confidence can be greatly boosted through interactive classroom sessions,

allowing them to become more creative and knowledgeable. Also few parents feel that they were able to view the teachers performance in live which was not possible earlier.

Teachers Opinion:

Sudden and difficult transition to working from home was associated with initial high stress and low self-confidence. Later case this has been replaced with lower stress and higher morale as they realized that this is the future.

Students Opinion:

College students feel Loss of interest, availability of internet, speed and cost, lab subjects, less interactive with fellow friends and teachers. about 90% of higher classes and college students feel that they were happy to get the degree by writing the online exam and they were against offline exams. The level of education required for many jobs is increasing day by day. So technological change in the wider world both increases the number of people who need an education and changes what it is they need to learn as well. Finally the lower and middle school students feel that, online class they missed the

presence of their friends, teachers, playground, snacks and lunch time, chatting etc.

CONCLUSION AND POLICY SUGGESTION

The coronavirus has transformed many aspects of human lives. Education also brings a reduction in inequalities and functions as a means of improving their status within the family and develops the concept of participation. The analysis reveals that, COVID situation has brought many technological revolution especially in the educational sector, some traditional teachers struggled in the early stage, everyone seemed to excel and travel along with technology. Initially this system was new to adapt and due to low attention many students become passive learners. It will be up to instructional designers and educational technologies to make the most of the opportunities provided by technology to change education so that effective and efficient education is available to everyone everywhere.

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Article

Post COVID-19 Paradigm Shift in Social Science, Technology and Public Health

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ABSTRACT

The WHO announced the novel coronavirus disease 2019 (COVID-19) an 'emergency of international trouble' on 30th January 2020 and a pandemic on 11th March. According to WHO's statement Report - 79, as of 8th April 2020, the epidemic has give rise to 79235 deaths all over the world. Although it is surely nearing its end in China, where it was first noted, it is still on the stand up in Europe, in the USA and in other parts of the world, as well as in many low-income and middle-income countries (LMICs). The pandemic has triggered unprecedented measures worldwide. Many countries have put travel bans, restrict and lockdown scheme. These reactions have been accepted in an 'emergency' way, and are largely reactionary, intended at diminishes the expansion of the disease while waiting for a specific prevention and/or vaccine to be developed. Here we don't want to put down the risks produced by the pandemic, nor to question the measures taken by the WHO and governments. But we would like to convey our problems regarding four COVID-19-related issues, and support for a 'paradigm shift'— that is, a revolution in scientific technology, basic concepts, changes in the human health and experimental practices on technology —to prepare for future crises.

Keywords: Coronavirus, transmission, health, prevention, vaccine

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INTRODUCTION

A shift in focus: Covid-19 in the broader global health picture-

It is prime to think of additional accept and preventable health determine, when compared with the focus that COVID-19 has activate at global and national levels. Respiratory diseases have breathe leading causes of demise and condition in the world before COVID-19. It is evaluate that, generally, four million people die ahead of time from chronic respiratory disease each year; 210 000 deaths per year was related with correctable injury in hospitals.⁷

Whereas transmissible infection seem to stimulate the most fright between the general and departmental, non- communicable illness are accountable for nearly 70% of all loss of life. Sadness influence 300 million people generally and is the leading cause of disability international, and nearly 800 000 people die from suicide every year.⁹ The universal boom in untimely mortality and morbidity from non-communicable diseases has now reached a point where some have even suggested it to be a pandemic.¹⁰ Moreover, climate change (through enlarge heat waves and disasters) and meteorological and environmental contamination are anticipate to increase deaths and injuries, especially in LMICs.¹¹ In some debates, climate change has become more than a risk factor, with expand calls for the WHO to announce it a public health accident.

From a general fitness position, COVID-19 needs to be appraised as part of a much bigger health picture. For instance, beyond the accident and direct impermanence rates of COVID-19, awareness should be paid to the interaction with

other pathogens, as well as to the more indirect effects of its reduction measures.¹³ Indeed, the pandemic and its containment measures interact with, and impact on, other health order and will have system-wide effects, spotlight the significance of adopting a 'systems approach' to its purpose.

A paradigm shift in global health governance-

The universal health company, national safety organization and all governments have known that a prevalent like COVID-19 was likely to come, yet global health policy has endure woefully unprepared nor fit-for-purpose. In 2015, the G7 members signify that Ebola had been a 'wake-up call' for the need for better general cooperation. It was also recognized that antimicrobial resistance (AMR) threatened to kill 300 million people by 2050, thus difficult urgent action. Yet little has been done to inscription these existing universal health governance short advancing.

For example, the lauded G7 and G20 response, the international Health reliability Agenda, continues to speak in the terms of expensive 'counter- measures' versus blockage and fitness system strengthening. Moreover, the Pandemic extremity Financing Facility (PEF) pandemics/ brief/ prevalent- emergency- financing- potential), meant to deliver up to \$500 million in epidemic assistance to curb extension into a pandemic, sits idle as a complicated 'loan mechanism' at the World Bank, accessible to only a few countries (e.g., China and India do not certified for the money). There is also significant ambiguity about how the PEF divide and/or supplement the WHO's Contingency Fund for

accident (CFE). The CFE is available to more countries for more possibility, and more rapidly.

In terms of bacterium observe and reaction, the 2005 International Health Regulations, which are meant 'to help the international section and authority prevent and answer to acute public health risks that have the future to cross borders and threaten people worldwide',¹⁸ are not fully execute by many countries due to limited economic wealth and political will, and have been violated in reaction to the COVID-19 outbreak.¹⁹ What is more surprise is that many high- income countries like France have failed to fully implement the International Health management, particularly in their overseas dependency In addition, other disease control mechanisms, like the WHO Global Influenza observation and feedback System remain invade reproduce and underfunded, with too few WHO laboratories and a market-based model where a global public good (pooled influenza understanding) is turned into a private good (pharmaceutical profit), with historical partiality in terms of public health.²⁰ Moreover, many countries, like China, are impulse not to raise the infestation alarm too soon due to fears of diminished direct foreign backing (like with severe acute respiratory syndrome, H7N9 and now COVID-19) and fears that the government will be recognize as weakly.

These order of disability at the international level are aggravate by a incapacitate WHO, whose budget has been radically reduced and ring-fenced. For example, the WHO used to receive areas of its financing from assessed donation levied on organ. However, a change to a zero real growth policy for its regular accounts in the

1980s has meant it now only receives a quarter of its budget from member donation. As a result, the WHO is dependent on extra-budgetary ring-fenced 'pet project' sponsor from contributor to fill an progressively shrinking budget.²² As the money flows to other multi- lateral health capability, the WHO's command dissipates, with countless organizations like the Institute for Health Metrics and Evaluation, the Bill and Melinda Gates Foundation and Medicines Sans Frontiers able to order greater epistemic authority,²³ financial influence²⁴ and response effectiveness.²⁵ However, this growth of initiatives creates a surroundings of policy fragmentation, which significantly enervate coordinated global public fitness.

One real outcome of dissolution of global health governance is an incompetent division of labor, where hundreds of performer such as the WHO, Global Fund, President's extremity Plan For AIDS Relief, United Nations Programs on HIV and AIDS, commission For International Development, World Bank, the Gates Foundation and the Clinton Foundation(to name only a many) produce resembling programmers or perpendicular health silos that have neither generated overall system strengthening in high burden countries nor allowed for effective global health policy.^{27 28} This creates two failures. First, contrary to sector-wide approaches, ²⁹ perpendicular ' precious- design 'global enterprise frequently fail to promote sustainable long- term original health system strengthening, which is the stylish preventative defense for complaint control(of all types, not just contagious conditions). Second, the global position is sorrowfully unrehearsed for pandemics, since global policy has remained

archconservative, symptom-grounded and dependent on vaccine discoveries without full appreciation of other upstream determinants of complaint and access to those vaccines.

Given the state of global health governance and inadequate investments in health system strengthening — as well as the failure, by numerous actors, to borrow a ‘systems approach’ to problem resolution¹⁴ — the spread and peril of COVID-19 isn’t surprising. What’s needed, we argue, is to shift global health policymaking from a specific reactionary paradigm to a systemic, holistic and preventative paradigm. There’s no mistrustfulness that this approach will bear serious coffers, governance reform and political will. Nonetheless, the global profitable costs of COVID-19 have formerly reached into at least a trillion bones.³⁰ therefore, serious sweats to ameliorate global and original health systems would be a small bit of this cost, with a tried and true cost-saving gospel that ‘an ounce of forestallment is worth a pound of cure.

Beyond the Pasteurian paradigm: A holistic view of health-

The emergency responses to COVID-19 so far are grounded on the so-called ‘Pasteurian paradigm’, which states that each complaint is due to one pathogen; therefore, for each complaint there’s one cure, targeting the responsible pathogen. In this case, laboratories are contending to find the cure or the vaccine against COVID-19 — a vaccine which will come too late for the current epidemic, and will have limited efficacy if the contagion mutates in the coming months or times. Yet it’s easy to see how the further pathogens there might be in the future (which there will be) the less this paradigm makes sense.

Also, the Pasteurian paradigm has assessed its favored exploration system — videlicet, randomized control trials that try to insulate one variable from all possible variables — as the gold standard of wisdom, relegating other approaches as near charlatanism.

Still, there’s a multitude of substantiation indicating that beyond a single pathogen, the development of a complaint, as well as its outgrowth, is vastly affected by the physical and social parameters in which it operates, and that this is vastly affected by social, political, environmental and individual factors. This seems widely known by the public as far as chronic non-communicable Conditions are concerned, but is also the case for contagious conditions, especially for arising infections, in which the pathogenic part of social inequalities is recognised.³³ also, the traditional borders between communicable and non-communicable conditions are being blurred by substantiation of ‘biosocial contagion’.³⁴ In this light, the globalized world is now facing a ‘syndemic’ — that is, a community of pandemics that ‘co-occur in time and place, interact with each other to produce complex sequelae, and share common underpinning societal motorists’.³⁵ COVID-19 is no exception, since its mortality rate varies significantly according to age, coitus and comorbidities.³⁶

As a volition, we argue that it would be more effective, effective and indifferent to borrow a holistic approach to health. How to attack the silent killers and how to prepare populations — including the most vulnerable³⁷ — against unborn pandemics should be on the top of public and global health policy and exploration docket.

This should reflect both a security approach (fighting characteristic issues) and a health development approach (diving upstream causes and determinants). In doing so, the objects shouldn't be simply be the response mode, but a more combined trouble to limit environ- internal factors, cover biodiversity, 38 reduce social health injuries, strengthen original health systems for preventative health, help populations reduce their individual threat factors and compound their natural impunity — specially through colorful ' healthy behaviors ' and diets that are proven to strengthen the general vulnerable system.39 – 46 Like what lately took place in the field of evaluation of complex systems and programs, 47 a ' realist ' revolution of medical exploration is presumably demanded to help support this.

From global solution to local adaptations-

It's eventually important that the performing programs aren't copy- pasted from other countries, but acclimated to each environment, and backed by strong original health systems. By description, preventative health programs must be acclimated to original particularity, including original surroundings, and health systems must be strengthened at the original position so as to be suitable to respond to a population's requirements and prospects. This is also the case for the response to COVID- 19. Contagions and pandemics have always was, and will always live, and should be anticipated.48 49 Coronaviruses are a well- known family of contagions, and indeed if this bone is particularly aggressive, its genome has been fleetly linked. The difference with this epidemic which is causing the semi collapse of health systems is that it has revealed a profound lack of public

forestallment and preparedness. In response to the epidemic, the most hit countries so far have faced a lack of outfit and critical care beds. In the UK and France, as just two examples, decades of austerity programs and a preoccupation with assessing health installations grounded on specialized effectiveness (i.e., minimizing inputs and adding labors) have vastly dropped the capacity of health systems to respond to over- average frequentation.50

The COVID- 19 emergency responses of numerous countries have revealed important inconsistencies. In numerous European countries, the authorities have espoused a one- size- fits- all policy and assessed the same measures far and wide. Further worryingly, some governments ---especially in Africa haven't performed their own acclimated threat assessment before dupe- pasting strategies from abroad.51. This is problematic, since it makes little sense to use a prophetic model developed from a country where the median age is 47 and restate it to a country with a median age of 18, without conforming the parameters. In addition, current programs fail to regard for indigenous or transborder contextual parameters, where either more strict or relaxed measures could be more suitable depending on geographical determinants. The universal lockdown of a whole country may not be necessary when there are only one or two epidemic outbreaks separated by hundreds of long hauls, especially if constraint is quick and determined. What we suggest, in order to be effective, is that programs should fit each environment and be adaptive at the territorial or ecosystem position, versus being unreflectively and slightly bounded by public authorities. This is the stylish way to not

put measures that are too coercive, which may face legal constraints and may be counterproductive, eroding public trust and cooperation.^{52 53}

In the post-COVID-19 recovery phase, we hope the assignments learnt from original, public and global responses to this epidemic will foster support, by policymakers and by the public, for acclimatized policy responses that support stronger and further intertwined original health systems.

CONCLUSION

In summary, the current extremity calls for a paradigm shift in public and global health programs. We'll not be prepared for the coming epidemic unless we take bold way. First, global health programs shouldn't be designed on a response mode to case-by-case pitfalls, but should borrow a systems approach that can support a holistic picture of global complaint burdens, pitfalls and health conditions, as well as better consider the system-wide goods of espoused measures. Second, fighting current fragmentation in global health governance will bear a substantial shift in global health policymaking from a reactionary paradigm to a systemic and preventative paradigm, with meaningful commitments to mortal health security. Third, there's a need to shift our focus from short-term restorative programs grounded on the Pasteurian paradigm, to long-term preventive and promotional programs grounded on a holistic view of people's health, which specially implies limiting environmental factors, reducing social health injuries, helping populations reduce their individual threat factors and accelerating their natural impunity.

Incipiently, similar holistic, preventative programs must be acclimated to original surrounds and enforced through strong original health systems suitable to have the 'bumper' capacity to respond to extremities

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Article

Solar energy in Iran

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ABSTRACT

Among renewable energy sources, Iran has a high solar energy potential. The amount of solar radiation in Iran is estimated to be between 1800 and 2200 kilowatt hours per square meter per year, which is higher than the world average; also, Iran has an average of more than 280 sunny days per year, which is very significant. Considering the recent advances in solar energy technologies, the widespread use of solar energy in Iran is promising. Therefore, many domestic and foreign investors are interested in investing in the development of solar energy. If we dedicate an area equal to 100x100 square kilometers of Iran's land to the construction of a photovoltaic solar power plant, the electricity produced by it will be equivalent to the entire electricity production of the country. The increase in energy demand in Iran has caused many concerns such as energy poverty and environmental pollution. Solar energy is the best answer to energy poverty and can provide great opportunities to reduce greenhouse gas emissions and air pollution.[1] Solar photovoltaic PV can be a suitable technology for renewable electricity source in Iran, especially in remote rural areas where grid development is not financially or technically feasible. In this article, according to Iran's high solar energy potential, the benefits of using solar energy and also the need of the solar industry to reduce the resources related to greenhouse gas emissions, the environmental effects of fossil fuels and renewable energies have been examined.

Keywords: Solar energy, fossil fuels, electric energy, Energy sources

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INTRODUCTION

Iran is among the best countries in the world in terms of solar energy potential. Considering the geographical position of Iran and the dispersion of villages in the country, the use of solar energy is one of the most important factors that should be considered.

Using solar energy is one of the best ways of electrification and energy production compared to other models of energy transmission to villages and remote areas in the country in terms of cost, transportation, maintenance and similar factors.

According to international standards, if the average solar radiation energy per day is higher than 3.5 kilowatt hours per square meter (3500 watts/hour), the use of solar energy models such as solar collectors or photovoltaic systems is very economical and affordable.

In many parts of Iran, the radiant energy of the sun is much higher than this international average, and in some places it has been measured even higher than 7 to 8 kilowatt hours per square meter, but on average, the solar radiant energy on the surface of Iran is about 4.5 kilowatt hours. per square meter.

So far, according to the geographical location of Iran, a large number of solar water heaters and several solar baths have been installed and launched in different parts of the country, including Khorasan province, Sistan and Baluchistan province, Yazd province, and Kerman province. [2]

Renewable energy source solar cells:

The solar cell is the main component of the solar panel. Sometimes they are called photovoltaic cells or PV cells. These cells produce electricity by absorbing sunlight. The name PV is derived from the process of converting light (photons) into electricity (voltage), which is also called the PV effect.

Solar cells are made of semiconductor materials, the most common type of which is crystalline silicon.

The second generation of solar cells are thin film cells that are made of amorphous silicon or non-silicon materials such as cadmium telluride.

In addition to silicon, the third generation of solar cells are made from a variety of new materials, including solar composites, using conventional printing technologies, solar paints, and conductive plastics.

Ancient Iranians used solar energy to reduce the consumption of wood in heating their homes in winter. They built the buildings in such a way that in the winter the sunlight shines into the living rooms, but in the hot summer days the space of the room is in the shade. Examples of such designs can be seen in most other cultures of the world. In the years between the two world wars in Europe and the United States of America, various plans were proposed and tested in the field of solar houses. Since then, there has been no special development in this field. It has been several years that architects have seriously started building solar houses, and following the development and advancement of this technology, they have also achieved useful results. For example, in the United States in 1980, around 10,000 to 20,000 solar houses were built alone. In such houses, they try to use the sun's energy for lighting - provision of sanitary hot water - cooling and heating of the building, and by using useful building materials, the loss of heat and energy is avoided.

Solar water pump:

A solar water pump can provide water to places that do not have access to electricity. Usually, these places rely on animal or human power and diesel engines for water supply. Solar water pumps can replace today's pump systems and thus have both socio-economic and other benefits. The water provided by the solar water pump can be used for irrigation, livestock water supply and drinking water.[2] A solar water pump system is actually an electric pump system that

produces electricity with several panels. Usually, a solar pump system includes a number of solar panels that provide power to an electric motor, and the motor in turn powers the surface pump. Water is usually pumped from the surface of the ground or rivers to a storage source.

Solar Water Heater:

The solar water heater takes its energy from the sun and heats the water with that energy. Today, with the advancement of technology, in order to save fuel consumption, one of the best types of water heaters can be a solar water heater and its use. These types of water heaters have a high-pressure tank that makes them withstand city water. The tanks of this type of water heaters are directly connected to the city water and the consumer can use high pressure hot water.

The connection of hot water to the water pipes of the building is unhindered, and the hot water outlet can be connected to hot water consumption, engine room preheater, or package preheater. The types of solar water heaters are very affordable from an economic point of view.

Solar dryer

Drying food to preserve it has been customary since ancient times, and early humans considered drying to be an art. Drying means taking part of the water in food and other products, which increases the shelf life of the product and prevents the growth of bacteria. In solar dryers, solar energy is used directly or indirectly to dry the materials, and the air flows naturally or forcibly, which accelerates the drying process of the product. Solar dryers are designed and manufactured in different sizes and designs for different products and uses.

Prominent solar power plants in Iran:

Iran is one of the countries with high potential in the field of solar energy, despite having 280 sunny days out of the total 365 days of the year in more than two-thirds of its area and an average radiation of 4.5 to 5.5

kilowatt hours per square meter per day. According to studies conducted by the German Aerospace Center (DLR), it is possible to install more than 60,000 megawatts of solar thermal power plants in an area of more than 2,000 square kilometers. [3]

According to the report of the Ministry of Energy, a summary of the activities carried out in the solar field is as follows: Previously, in 2010, Yazd Solar Combined Cycle Power Plant was known as the eighth largest solar power plant in the world. It was the first time that a power plant used the combination of solar energy and natural gas in the world. This power plant was built with the knowledge of Iranian experts and its total capacity reached 308 megawatts at the time of operation and under ISO conditions.

Importance of the topic:

The consumption of non-renewable resources such as oil, gas and coal are increasing sharply, but finally the time comes when we have to look for a renewable energy source such as solar, wind or geothermal energy. Although many countries have started using solar energy extensively, they have a long way to go before they can meet all their daily energy needs with this source. The most important benefit of solar energy is that it does not produce any pollution and is one of the cleanest sources of energy. Solar energy is a renewable source of energy, requires little maintenance and is easy to use. [2]

With the growing threat of climate change from excessive carbon emissions many countries are looking for clean energy alternatives to their traditional fossil fuels. Among all energy alternatives, solar energy has been the most expensive.

However, considering the pros and cons and the 80% drop in the price of solar panels in the last five years, solar energy has a bright future. Among the benefits of this energy, the following can be mentioned. energy due to its high potential and long-term benefits:

- Solar energy is a completely free and abundant source of energy
- Solar energy, which consists of a lot of light and heat, can be harnessed with modern technologies such as photovoltaics, artificial photosynthesis, solar architecture, etc.
- Solar technology is divided into active and passive parts. Photovoltaic panels and solar thermal collectors, which harness solar energy, are examples of active solar technology.
- Water heating systems use solar energy to heat water, so that in some parts of the world, 60 to 70% of the hot water consumed is produced by the heat of the sun.
- Electricity production is one of the most exciting applications of solar energy. In this method, the large rays of the sun are converted into smaller rays using lenses and mirrors. [3]
- Solar chemical process as a source of chemical energy replaces fossil fuels and can make solar energy storable and portable. Photosynthesis can produce different types of fuels, so hydrogen production technology is an important part of scientific research. Solar energy has no pollution or harmful effects on the environment and is completely acceptable from an environmental point of view.
- Solar energy is one of the most consumed renewable energy sources and renewable energy technology is used to convert solar energy into electricity.
- Different countries that carry out space missions use solar energy to fuel the ship.
- Solar energy is a completely reliable source.
- With the progress of scientific research, solar energy will become cheaper and more efficient in the future. It can be said that solar energy is the most important source of renewable

energy due to its high potential and long-term benefits.

Disadvantages of solar panels:

- The initial costs of setting up solar equipment are expensive and private investors need financial facilities to buy and install solar cells.
- Solar energy is an intermittent source. Access to sunlight is possible at a certain time during the day and night. It is also difficult to predict the daily weather. Therefore, solar energy is not considered as the main and primary source for the production of required electricity.
- Solar energy storage systems such as batteries help to make the electricity flow uniform and stable. But these technologies are very expensive.
- Although solar energy is definitely pollution-free, there are some problems. Some materials used in the process of making solar cells, such as nitrogen trifluoride and sulfur hexafluoride, emit greenhouse gases. The transfer and installation of solar cells can also indirectly cause pollution.
- Some special solar cells require materials that are expensive and rare in nature. This is true for thin-film solar cells based on cadmium telluride (CDTE) or copper indium gallium selenide (CIGS).

DISCUSSION AND CONCLUSION

Estimates show that the countries of the world consider solar energy as one of the main sources of energy in the future, and based on this, they have already carried out extensive planning and activities to expand the use of this energy in various uses. [4]

Studies in the field of solar energy in Iran started about 35 years ago and almost simultaneously in

Shiraz and Sharif Universities of Technology. Among the important projects of interest in these centers are the 10 Mega Wat solar power plant project in Shiraz University and the design and development and construction of photovoltaic cells in the aforementioned center. Projects in the field of solar energy are currently underway in the country by the New Energy

Organization of Iran

Fortunately, in recent years, with the installation of wind turbines and the launch of solar power plants, the use of this the type of energies has been improved. The World Bank has announced that it will not participate in non-renewable power plant projects Most of the European countries, by defining a basket of energy according to their climate, have the agenda of providing 111% of the required electricity. [3] from renewable sources until 2025 and eliminating dependence on fossil fuels on the other hand, considering the 21% share of thermal power plants in Iran, it is necessary to have a codified and strategic plan for the use of new energies according to the current conditions and the existing potential power, in order to reach the appropriate share of energy supply.

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