e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:07/Issue:03/March-2025 Impact Factor- 8.187 www.irjmets.com

THE USE AND ROLE OF INFORMATION TECHNOLOGY DURING COVID-19: A PARADIGM SHIFT IN TEACHING, LEARNING, AND LEARNER WELL-BEING

Dr. Sudeep Saraswat*1

*1Associate Professor, Computer Science And Engineering Department, Modern Institute Of Technology, Dhalwala, Rishikesh, Uttarakahnd, India.

Email Id: Sudeepsaraswat22@gmail.com

ABSTRACT

The COVID-19 pandemic dramatically accelerated the adoption and integration of Information Technology (IT) across various sectors, most notably in education. This paper examines the crucial role IT played in facilitating teaching and learning during this unprecedented period, analyzing the paradigm shift it engendered. Furthermore, it explores the dual impact of IT on learners' physical and mental well-being, considering both the benefits and challenges associated with increased technology use. Finally, the paper discusses the long-term implications of this technological integration and proposes strategies for maximizing the positive impact of IT in the future of education. E- Learning is the learning utilizing electronic technologies to access educational curriculum outside of traditional classroom. There are various tools used in this technology which makes it very handy, resourceful, sufficient and helpful to students in order to gain knowledge with their teachers, faculties. This article provides role, importance and effects of these tools in this pandemic time of COVID-19.

Keywords: ICT Tools, Video And Audio Conferencing Tools, Digital Divide.

I. INTRODUCTION

The COVID-19 pandemic forced a rapid and widespread shift to online learning, placing IT at the forefront of educational delivery. This paper explores how IT became indispensable in maintaining educational continuity, examining the specific technologies employed and their impact on teaching and learning practices. It further investigates the complex relationship between IT use and learner well-being, considering the potential benefits, such as increased accessibility and flexibility, alongside the challenges, including digital fatigue and social isolation.

II. THE ROLE OF IT IN TRANSFORMING TEACHING AND LEARNING

IT played a multifaceted role in facilitating the transition to remote learning, enabling:

- **Virtual Learning Environments (VLEs):** Platforms like Moodle, Canvas, and Google Classroom became central hubs for course management, content delivery, assignment submission, and communication.
- **Video Conferencing Tools:** Zoom, Google Meet, and Microsoft Teams enabled real-time interaction between teachers and students, replicating, to some extent, the classroom experience.
- **Digital Content and Resources:** Online libraries, educational websites, and interactive learning platforms provided access to a wealth of digital resources, supplementing traditional textbooks and materials.
- **Collaborative Tools:** Shared documents, online whiteboards, and project management software facilitated collaborative learning and group work in virtual environments.
- **Assessment and Evaluation Tools:** Online quizzes, automated grading systems, and digital portfolios enabled teachers to assess student learning remotely.

III. IMPACT OF IT ON LEARNER WELL-BEING

While IT proved essential for maintaining educational continuity, its increased use also presented challenges to learner well-being:

- **Physical Health Impacts:** Prolonged screen time contributed to eye strain, headaches, sleep disturbances, and musculoskeletal issues. Sedentary lifestyles associated with increased technology use also posed health risks.

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:07/Issue:03/March-2025 Impact Factor- 8.187 www.irjmets.com

- **Mental Health Implications:** Social isolation, lack of face-to-face interaction, and the blurring of boundaries between school and home life contributed to increased stress, anxiety, and feelings of loneliness among learners. Cyber-bullying and online harassment also became a concern.
- **Digital Divide and Equity:** Unequal access to technology, reliable internet connectivity, and adequate learning spaces exacerbated existing inequalities, creating a digital divide that disadvantaged students from low-income families and marginalized communities.
- **Information Overload and Distraction:** The constant influx of information and notifications from various online platforms posed challenges to learners' focus and concentration, leading to information overload and digital distraction.

IV. MITIGATING THE NEGATIVE IMPACTS AND MAXIMIZING THE BENEFITS

To ensure that IT serves as a positive force in education, it is crucial to address the challenges to learner well-being:

- **Promoting Digital Wellness:** Educating learners about digital wellness practices, including responsible screen time management, ergonomic awareness, and online safety, is essential.
- **Encouraging Physical Activity and Breaks:** Integrating physical activity into daily routines, encouraging regular breaks from screen time, and promoting outdoor activities can mitigate the physical health risks associated with increased technology use.
- **Fostering Social Connection and Support:** Creating opportunities for online social interaction, facilitating virtual study groups, and providing access to mental health resources can help combat social isolation and promote a sense of community.
- **Bridging the Digital Divide:** Investing in infrastructure, providing access to devices and internet connectivity, and offering technical support to students and families are crucial for ensuring equitable access to online education.
- **Developing Digital Literacy Skills:** Equipping learners with the skills to critically evaluate online information, manage their digital footprint, and navigate the digital world safely and responsibly is essential.
- **Teacher Training and Professional Development:** Providing teachers with the training and support they need to effectively integrate technology into their teaching practices, manage virtual classrooms, and support student well-being is crucial.

In view of the Covid-19 outbreak all across the world, everyone was taking all precautionary and preventive measures to combat this pandemic. We followed the norms of social distancing and keeping ourselves in the confines of our homes or offices.

All schools, colleges, Universities and workplaces had been shut down to contain the spread of this virus. It was expected that the shutdown would impact the learning process to a great extent. But it is actually not the case. All credit goes to the Technology. Now we are in Technology Era where learning and teaching issues can be handled by various Apps, ICT, e -learning platforms and video conferencing tools etc.

Students and academicians can make maximum usage of lockdown period to enroll into various webinars and numerous courses which are available online like Swayam, Coursera and many more. Students can access the detailed notes, content and free books through various online platforms like ugcmoocs.inflibnet.ac.in, epgp.inflibnet.ac.in, swayamprabha.gov.in, youtube.com, etc.

It was also a wonderful opportunity for every academician and researcher to create their own OERs (Open Educational Recourses) which not only serves the purpose of students for education but also serves as a catalyst in enhancing professional self-image. Digital initiatives helped every academician to see themselves as not only teachers but creators of knowledge.

During this pandemic time various tools like Zoom, Google Meet, Google classroom, Skype have emerged as the resource provider for students, teachers and professionals as well. Before the time of Covid -19 these tools were not in use in field of education and learning but after spread of Corona and barriers of social distancing in India, the usage of these tools has increased extremely large.

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:07/Issue:03/March-2025 Impact Factor- 8.187 www.irjmets.com

Corona virus outbreak has bought the world to a standstill. Manufacturing units have been shut down, flights have been cancelled and all public places have been closed temporarily. At a time when countries placed on a lockdown, employees and students alike were turning to video conferencing and video calling apps for connecting with their colleagues and for getting on with their curriculum as schools remain closed.

Now, the recent turn of events has made Google Classroom the most popular education app on the Play Store. Google Classroom is a free education app that allows teachers to connect with their students. It enables paperless assignment workflow, which in turn allows teachers to create, review and mark assignments quickly in one place. It also allows teachers to send announcements and start class discussions instantly. Additionally, it enables students to share resources with one another and provide answers to questions on the stream. It provides free services for schools, non profits and anyone having Google account. It makes it easy for learner and instructors to connect inside or outside the school. It is easy to setup and use which saves the time. It enhances the communication between teachers and students by providing the instant discussion sessions. The teachers can mark the regular attendance and give assignments to check the progress of students.

According to a report by AppBrain (via Android Police), Google Classroom wasn't one of the most popular education apps on the Play Store until early March 2020 since its launching on January 2015 . However, lockdown imposed in nations across the globe in wake of the corona virus outbreak has led to a sudden surge in the usage of the app Google Classroom has now registered over 50 million downloads on the Google Play Store. It is also the number one app free education app on Android. Additionally, Classroom is now one of the top five apps in the US. Furthermore, the report further states that the app is one of the most installed apps in several countries across the globe including Canada, Finland, Indonesia, Italy, Mexico and Poland. The worldwide growth rate of Google classroom can be viewed as below in following figure(i):

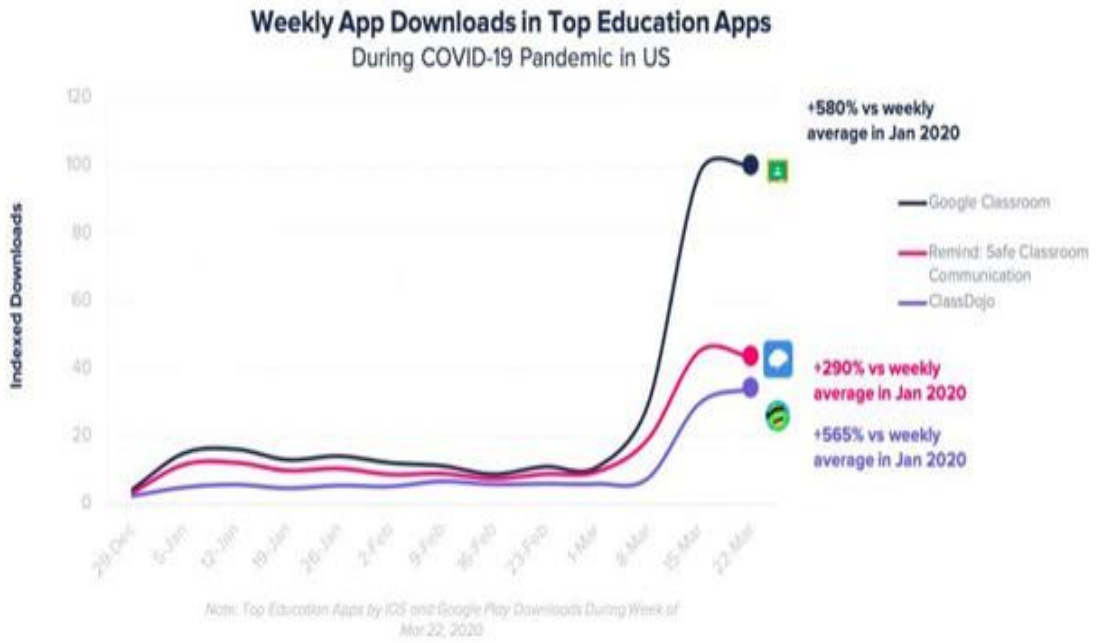

Figure 1: The top education apps downloaded during the week of March 22, 2020, from the Apple App Store and Google Play

Corona virus has impacted business like never before. And while most businesses have managed to hold on, they have had to send their employees on the work-from-home mode unless strictly necessary. And in that situation, the only way to communicate for group meetings is through video conferencing. Zoom has seen a huge increase in downloads in India since quarantines and lockdowns were imposed to control the spread of the Covid-19 pandemic in the country. The app is not only being used by millions for work but also social gatherings, yoga classes, book clubs, and entertainment concerts. The jump in Global downloads of Zoom app, is shown in figure (ii):

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:07/Issue:03/March-2025 Impact Factor- 8.187 www.irjmets.com

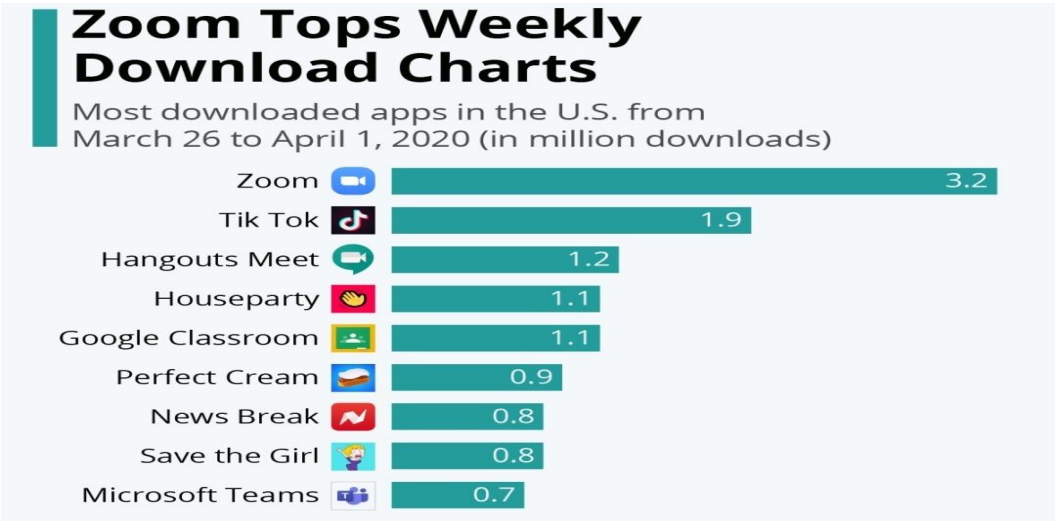

Figure 2: Zoom App download chart

According to Priori Data, Zoom has surged by more than 100 percent in March, with the latter proving particularly popular among people meeting up virtually while being confined to their homes. The video conferencing app was downloaded nearly 27 million times this month, up from just 2.1 million times in January.

While Zoom is definitely the rising star among video chat apps, Skype remains far ahead in terms of active users. According to Priori Data, the Microsoft-owned service had 59 million daily active users on its iOS and Android apps in March, compared to just 4.3 million for Zoom. It needs to be noted though, that many people also use Skype for other ways of communication, while Zoom has specialized on video conferences, so it may not be a fair comparison to make.

In last few days, Zoom surged to become the No. 1 app in India on Google Playstore as the 9-year-old platform has emerged as the go-to service for official meetings, E learning and informal gatherings. According to Apptopia, which monitors app downloads, the daily downloads for Zoom have increased from around 1,70,000 in the middle of February to nearly 2.5 million in late March. Rivals Tencent Conference, WeChat Work, Microsoft Teams and Slack have also seen a manifold increase in downloads since the onset of coronavirus globally. Gaining fast popularity, this free video conferencing app provides a pared-down service for group video calls. The basic plan lets a user conduct a 40-minute call with features like screen sharing, breakout rooms and local recording. The best part of Zoom is that the user interface is quite user friendly and so is the sign up process. The overall downloads of video conferencing apps during COVID-19 can be viewed as follows in figure(iii):

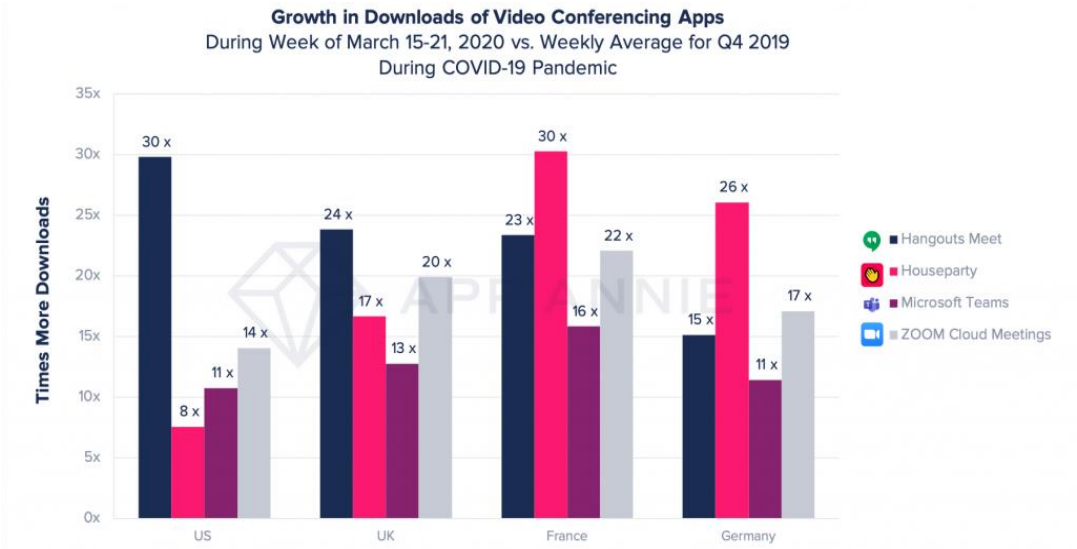

Figure 3: Overall downloads of video Conferencing apps during COVID-19

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:07/Issue:03/March-2025 Impact Factor- 8.187 www.irjmets.com

Google Meet, launched on March 2017, is the Google's video conferencing tool. It is one of the most widely used apps. The app integrates itself with the search giant's email service Gmail and can accommodate up to 250 people at a time with high quality video meeting. It is easy to use and handle. The host needs to share a video link and invited guests can join with one click .It allows the sharing of screen as well.

Skype, another very popular app, launched on October 2010, is used for both personal and professional purposes. It allows group chat of 25 professionals, friends and academicians to communicate with SMS, voice and video messages, video calls etc. using phones, tablets, PCs.

V. THE FUTURE OF EDUCATION WITH IT

The COVID-19 pandemic has accelerated the integration of IT into education, and this trend is likely to continue. The future of education will likely involve a blended learning approach, combining the best aspects of online and in-person instruction. IT will play a key role in personalizing learning, providing access to a wider range of resources, and fostering collaboration and communication.

VI. CONCLUSION

IT has played a critical role in enabling educational continuity during the COVID-19 pandemic. However, it is essential to acknowledge the challenges associated with increased technology use and implement strategies to mitigate negative impacts on learner well-being. By prioritizing digital wellness, bridging the digital divide, and fostering innovation in pedagogy, we can harness the power of IT to create a more equitable, engaging, and effective educational system for all learners.

VII. FURTHER RESEARCH

This paper provides a starting point for further research into the long-term impact of IT on education during Covid19 time. Future studies could explore the effectiveness of different blended learning models, the impact of prolonged screen time on cognitive development, and the development of best practices for supporting student mental health in online learning environments. Additionally, research is needed to understand the long-term impact of the digital divide and to develop strategies for ensuring equitable access to quality education for all learners.

VIII. REFERENCES

[1] Alford, C., Martinkova, Z., Tiplady, B., Reece, R., & Verster, J. C. (2020). The effects of alcohol hangover on mood performance assessed at home. Journal of Clinical Medicine, 9(4), 1068.
DOI: https://doi.org/10.3390/jcm9041068

[2] Anwyl-Irvine, A. L., Massonnié, J., Flitton, A., Kirkham, N., & Evershed, J. K. (2020). Gorilla in our midst: An online behavioral experiment builder. Behavior Research Methods, 52(1), 388–407.
DOI: https://doi.org/10.3758/s13428-019-01237-x

[3] Baglioni, C., Spiegelhelder, K., Lombardo, C., & Riemann, D. (2010). Sleep and emotions: A focus on insomnia. Sleep Medicine Review, 14(4), 227–238. DOI: https://doi.org/10.1016/j.smrv.2009.10.007

[4] Bai, Y., Lin, C.-C., Lin, C.-Y., Chen, J.-Y., Chue, C.-M., & Chou, P. (2004). Survey of stress reactions among health care workers involved with the SARS outbreak. Psychiatric Services, 55(9), 1055–1057.
DOI: https://doi.org/10.1176/appi.ps.55.9.1055

[5] Bechara, A., Damasio A. R., Damasio, H., & Anderson, S. W. (1994). Insensitivity to future consequences following damage to human prefrontal cortex. Cognition, 50(1–3), 7–15.
DOI: https://doi.org/10.1016/0010-0277(94)90018-3

[6] Bherer, L. (2015). Cognitive plasticity in older adults: Effects of cognitive training and physical exercise. Annals of the New York Academy of Science, 1337(1), 1–6. DOI: https://doi.org/10.1111/nyas.12682

[7] Bridges, D., Pitiot, A., MacAskill, M. R., & Peirce, J. W. (2020). The timing mega-study: comparing a range of experiment generators, both lab-based and online. PeerJ, 8, e9414.
DOI: https://doi.org/10.7717/peerj.9414

[8] Brooks, S. K., Webster, R. K., Smith, L. E., Woodland, L., Wessely, S., Greenberg, N., et al. (2020). The psychological impact of quarantine and how to reduce it: rapid review of the evidence. The Lancet, 395(10227), 912–920. DOI: https://doi.org/10.1016/S0140-6736(20)30460-8

[9] Cacioppo, J. T., & Hawkley, L. C. (2009). Perceived social isolation and cognition. Trends in Cognitive Sciences, 13, 447–454. DOI: https://doi.org/10.1016/j.tics.2009.06.005

[10] Chatterjee, D., Gavas, R. D., Chakravarty, K., Sinha, A., & Lahiri, U. (2019). Evaluating age-related variations of gaze behavior for a novel digitized-digit symbol substitution test. Journal of Eye Movement Research, 12(1), 5. DOI: https://doi.org/10.16910/jemr.12.1.5

[11] Chen, Y., & Feeley, T. H. (2014). Social support, social strain, loneliness, and well-being among older adults: an analysis of the Health and Retirement Study. Journal of Social and Personal Relationships, 31, 141–161. DOI: https://doi.org/10.1177/0265407513488728

[12] Grove, J. R., & Prapavessis, H. (1992). Preliminary evidence for the reliability and validity of an abbreviated Profile of Mood States. International Journal of Sport Psychology, 23(2), 93–109.

[13] Hawryluck, L., Gold, W. L., Robinson, S., Pogorski, S., Galea, S., & Styra, R. (2004). SARA control and psychological effects of quarantine, Toronto, Canada. Emerging Infectious Diseases, 10(7), 1206–1212. DOI: https://doi.org/10.3201/eid1007.030703

[14] Howland, J., Rohsenow, D. J., Greece, J. A., Littlefield, C. A., Almeida, A., Heeren, T., et al. (2010). The effects of binge drinking on college students' next-day academic test-taking performance and mood state. Addiction, 105, 655–665. DOI: https://doi.org/10.1111/j.1360-0443.2009.02880.x

[15] Ingram, J., Hand, C. J., Hijikata, Y., & Maciejewski, G. (2022). Exploring the effects of COVID-19 restrictions on wellbeing across different styles of lockdown. Health Psychology Open.
DOI: https://doi.org/10.1177/20551029221099800

[16] www.google.com

[17] Ingram, J., Hand, C. J., & Maciejewski, G. (2021). Social isolation during COVID-19 lockdown impairs cognitive function. Applied Cognitive Psychology, 35(4), 935–947.
DOI: https://doi.org/10.1002/acp.3821

[18] Ingram, J., Maciejewski, G., & Hand, C. J. (2020). Changes in diet, sleep, and physical activity are associated with differences in negative mood during COVID-19 lockdown. Frontiers in Psychology, 11, 588604. DOI: https://doi.org/10.3389/fpsyg.2020.588604

[19] Jacka, F. N., Pasco, J. A., Mykletun, Williams, L. J., Hodge, A. M., O'Reilly, S. L., et al. (2010). Association of Western and traditional diets with depression and anxiety in women. American Journal of Psychiatry, 167, 305–311. DOI: https://doi.org/10.1176/appi.ajp.2009.09060881

[20] Kanas, N., & Manzey, D. (2008). Space Psychology and Psychiatry (2nd ed.). Microcosm Press & Springer. DOI: https://doi.org/10.1007/978-1-4020-6770-9

[21] Karbach, J., & Verhaeghen, P. (2014). Making working memory work: a meta-analysis of executive-control and working memory training in older adults. Psychological Science, 25(11), 2027–2037. DOI: https://doi.org/10.1177/0956797614548725