To Understand the Student Behavior based on Technological adoption

[1]Dr.Priyadarshini Ranjan, [2]Sadiya Begum, [2]P. Aakanksha, [2]K. Lasya, [2]J. Karthik.
[1]*Associate professor KLEF, KLHBS, KL University, Hyderabad.*
[2]*Students, KLEF, KLHBS, KL University, Hyderabad Campus Y22 Batch.*

Abstract: **This paper investigates the accelerated transitions of the Education system since Covid-19. This study explores the factors influencing student acceptance and effective use of technology in learning environments. The paper highlights the behavior of students on diverse technological adaptation. A questionnaire was prepared with relevant questions using Google Forms and circulated among the students. The scaling technique used in the questions was the Likert scale (1 to 5). Non-random sampling was used under which convenience sampling was done to reach the sample size of 60 respondents (All the respondents were students). The Nature of the data is quantitative data. Targeted age group-19 to 23 years. Data Analysis was done using Microsoft Excel, recorded data is displayed in the form of pie charts and bar charts for clear understanding. In the end, necessary findings and suggestions are noted followed by a conclusion and references.**

*Keywords***: Technology, Education, Covid-19, Artificial Intelligence, ChatGPT, Online learning, Behavior**

INTRODUCTION

Quality Education is a fundamental right of every individual as it plays a prominent role in life. After the COVID-19 pandemic, the education system experienced a severe downfall due to the closure of educational institutions. As there was lockdown worldwide, the authorities devised a strategy called Online learning with the help of technology. As educational institutions shifted to online learning during lockdowns, the reliance on digital tools and platforms increased, highlighting both the potential and challenges of tech-driven education. This rapid transformation has reshaped how we approach teaching and learning, pushing institutions to rethink the traditional models.

The pandemic accelerated the adoption of digital tools in education. From virtual classrooms (Zoom, Google Meet) to Learning Management Systems (LMS) like Canva and Moodle, technology has become a core part of education. Artificial Intelligence is being used to personalize learning experiences, track student progress, and even grade assignments. EdTech Innovations like interactive simulations, educational apps, and digital collaboration tools are now central to learning.

Initially, introducing the technological advancements to the teachers and students consumed limited time for the adaptation of the process. Gradually, they adapted to the change with great effort and now they are very well-versed experts in it. Many of the students grabbed the opportunity and learned various skills to gain extra knowledge with the help of advanced technology.

Post-COVID, the future of education seems more flexible and personalized approach where technology plays a central role in enhancing access, engagement, and effectiveness of learning. From artificial intelligence and virtual classrooms to gamified learning and digital assessments, integrating Technology is not just a temporary measure but a cornerstone of education's future.

LITERATURE REVIEW

There are several articles, and journals that speak about the impact of COVID-19 on education The technological revolution.

The paper says, that technological advancement has made education easy and approachable. Online learning, open learning, web-based learning, computer-mediated learning, blended learning, and m-learning, offer an opportunity to learn from anywhere, anytime, and with any means of Online Teaching. An opportunity for teachers to explore innovative methods of teaching with the help of technology and online tools like: digital libraries, search engines, and social media. Online Learning-An Opportunity for Students: It is observed that student retention increased from 25-60% more content through online teaching in comparison to offline teaching where students understand by 8-10% (Jain, 2020).

Several scholars (Darby, 2020; Zhao, 2020; Tucker, 2020) stated that the post-COVID-19 curriculum needs to help students develop new competencies for the new age enable them to thrive in the age of smart machines, and help them embrace globalization. Accordingly, the new education must instill entrepreneurial & creative skills (Matere, 2022).

AI and Chat GPT usage has drastically increased after COVID-19. As Artificial Intelligence becomes increasingly embedded in the professional realm following a university education, preparing students with the requisite skills to thrive AI-dominated future is essential. To this end, AI applications, such as ChatGPT in educational settings are a significant approach for students as well as teachers. By offering students a hands-on experience with these tools, we can foster their understanding & application meaningfully while outlining their limitations and keeping pace with technological advances. (Grassini, 2023).

Teaching productivity may be improved by using advanced technological aids, which facilitate better planning, easy and practical learning, quick assessment, better resources, new skills, etc. (Abid Haleem, 2022).

Another point is the facility to communicate effectively across platforms and use online tracking and assessment tools to monitor student progress. Finally, online collaboration skills must be evidenced with teachers and students in a virtual environment. (Montoya Cantoral, 2023).

The integration of mobile technology within higher education inherently involves social dynamics. Specifically, the adaption of technology by students is influenced by various organizational factors. The organization's continuous commitment to supporting faculty members also impacts their coping activities, ultimately influencing their overall adoption and utilization of technology. (Samantha Samaneh Kkavand, 2024).

Having considered the problems of adaptation of students to the conditions of the coronavirus pandemic, it should be noted that most of the students lack direct communication with their peers and the created groups help. The student's professional and personal development depends on how successful the adaptation process will be. The student must adapt well in the beginning of usage of technology to get the productivity result (Shulga, et al.).

The students and teachers may wish to adapt communication platforms such as email, discussion forums, and chat applications for information. Polls, whiteboard requirements, video computing platforms to enable conferencing engagements, and audio broadcasts to collaborate across geographic divides, which will promote teamwork collaborations across multimedia learning environments. Students use multimedia to support learning across a range of educational platforms, including pedagogical agents that act as intelligent virtual tutors, it offers immersive learning experiences and communication video technologies that offer a wide range of opportunities for the students (Ugochukwu Okwudili Matthew).

Every educational institution has made an effort to help students study more effectively. Their main goal was to address the student issues and using technology helps students be more involved, and it has been shown to have a positive effect on student behavior like online engagement, which is why teachers need to adopt the technology as well (Jing Zhao, 2022).

Technological innovations enable classroom solutions for schools and educators, but often without regard to student data privacy. Children are particularly vulnerable as an early source of data when they interact online and are surveilled by record-keeping practices (Kristen L. Walker. Kiya Bodendorf).

The article explores the impact of the digital revolution on education in India during the pandemic, focusing on the challenges faced by students and teachers. It examines how the shift to digital learning addressed infrastructure issues but struggled with changing teacher's attitudes and skills toward technology, while India made progress in bridging the digital divide, barriers like inadequate teacher training and digital preparedness remain significant (Shivi Grover, 2022)

This article focuses on the shift to online learning, curriculum adjustments, and the psychological effects on students and educators, particularly in higher education. Research highlights the rapid transition to virtual education technologies. (Daniela Maria Cretu, 2023)

The transition, driven by urgent necessity, revealed gaps in digital access and educational inequalities. Critics argue that the rush to adopt educational technology often prioritized efficiency over

meaningful learning, leading to concerns about data privacy, surveillance, and the commercialization of education. The pandemic also reignited debates about the "broken" nature of education, with some advocating for a deeper, systemic rethinking of educational practices, rather than relying solely on technological solutions. Ultimately, the crises emphasized the need for thoughtful, equitable integration in education. (Marko Teras, 2020)

OBJECTIVE

*To examine the role of technology in shaping the future of education post-impact COVID-19.

*To investigate student development of digital skills.

*Student adaptation to technology and challenges they faced.

RESEARCH METHODOLOGY

Research Design

Type of Study:

A descriptive type of study has been followed.

Quantitative approach:

Circulation and collection of Quantitative data.

Population

The main target to get the necessary information on this topic of study was students. Hence enough responses were collected from the students to know their points of view.

Sample size

A Questionnaire was formulated for 60 students out of 60, 60 responses have been recorded.

Sampling methods

Non-Random Sampling:

It is a sampling method in which individuals are selected based on subjective criteria rather than random selection. Therefore, as this study typically involves students, A questionnaire was formulated for students only.

Convenience Sampling:

Based on the convenience of the researcher the methods are followed.

Data Collection Methods

The study uses both sources of data collection i.e. Primary data and Secondary data.

Primary Data: Survey/Questionnaires

Data was collected through the Survey. The survey was conducted using the Google form. In the form of a Questionnaire, a Google form was circulated among the students. The Questionnaire consisted of 20 questions, the formulated questions were related to technological adaptions and it was formulated along with the usage of scaling techniques. A 1 to 5-pointer Likert scale has been used.

Secondary Data:

The data was obtained from credible sources such as journals, articles, reports, theses, and many more online sources. Published statistics from various sources were analyzed to ensure a reliable basis for the study. Google Scholar has been used to gather effective information.

Data Analysis tool

Microsoft Excel

Limitations

This study has certain limitations that should be considered when interpreting the findings:

Small Sample size:

The sample size of 60 responses is relatively small, small sample sizes make it difficult to generalize the findings. However, in our case, the respondents are from various educational settings, and as they are different educational settings the responses were diversified.

Contextual Variability:

Differences in institutions teaching methods, and access to technology could influence the results.

Psychological factors:

The study does not deeply explore the psychological challenges, such as digital fatigue or anxiety, that may have influenced technological adaptation.

Social factors:

Social factors, such as peer influence or family support, were not extensively analyzed in the research.

Comparative limitations:
The study may not account for differences in adaptation levels among various age groups or academic disciplines.

DATA ANALYSIS AND FINDINGS

This research study explores student behavior based on technological adaptation after COVID-19, study analyzes the age of the students, a respective study of courses, usage of technology, tools used for teaching and learning, tools for taking notes, widely used platforms for learning, engagement in online learning activities, outcomes, the effect of technology, challenges faced by students, improvement in critical skills, role of technology in education, supportive teachers, the ability of collaboration, hybrid learning.

Primarily, the Targeted age group is 19 to 25 years because the targeted age group has gone through online learning due to lockdown.

There are diversified courses in the curriculum, students opt based on their area of interest.
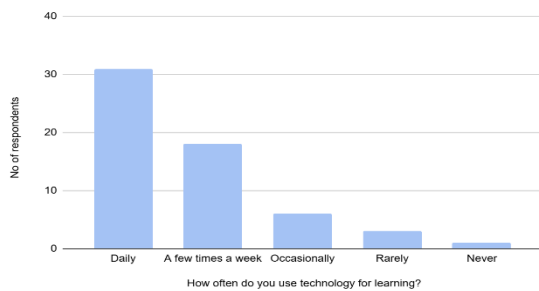

Graph A
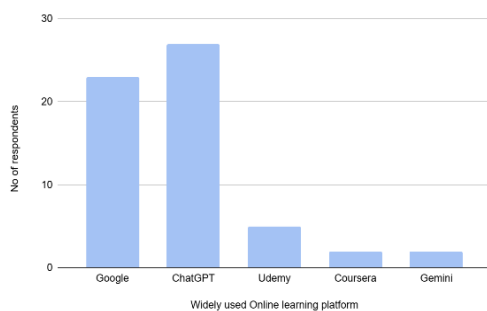
Graph B

4. *Pie chart B* displays the engagement of students in online learning activities. Many students opted engaged option due to the increase in trend and flexibility in learning, from anywhere and everywhere students can access the internet.

5. *Graph C* displays the most helpful online learning resources. Among video tutorials, interactive quizzes, virtual classroom discussions, and online textbooks or reading material students found video tutorials as most helpful online learning resources due to their accessibility, visuals, and doubt clarification.

6. *Pie chart C* conveys the effect of technology on the quality of learning. Many students voted for

1. *Graph A* shows that students use technology daily for learning. As Technology has become a fundamental tool for learning because it offers numerous advantages that make education more accessible, engaging, and efficient.

2. *Pie chart A* conveys tools used for teaching by lecturers to engage students more in learning and understanding the concepts. Mostly, lecturers use presentation slides for teaching purposes.

3. *Graph B* displays widely learning online platforms after COVID-19, Google and Chat GPT are widely used online platforms
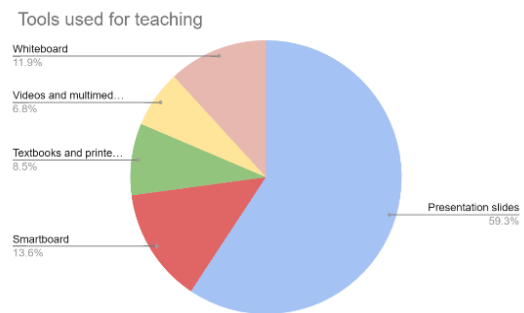

Pie Chart A

by the students to cover up syllabus, and doubts and to enhance their skills. Chat GPT is an Artificial intelligence platform that clears and answers all doubts and questions.
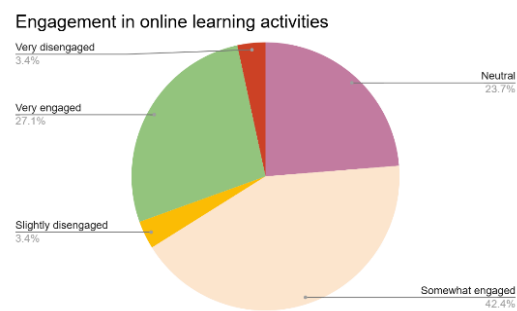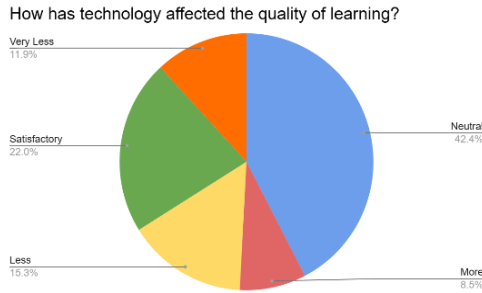

Pie Chart B

neutral and satisfactory which means 42.4% of students found that technology doesn't affect the quality of learning whereas 22% of students said technology affected them in a positive way to adapt to the new learning methodologies.
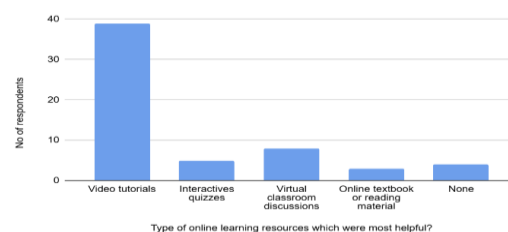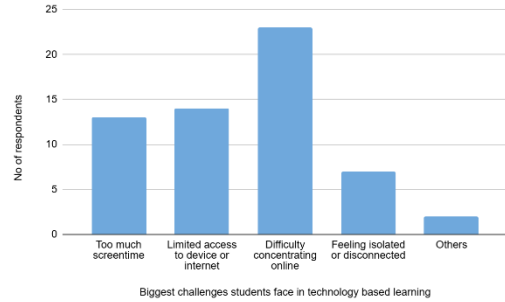

Graph C

7. *Graph D* displays the biggest challenges faced by the students in technology learning. Most of the students faced difficulty in concentration. As most of the work is done through online methodologies many students tend to divert their minds towards social media which causes difficulty in concentration in online learning. As we all know while using social media individuals tend to forget the time and important works


Pie chart

C Graph D

8. *Graph E* shows student's improvement in critical learning skills. Critical learning skills are essential for personal and professional growth, as they enable individuals to think independently, solve problems effectively, and adapt to new challenges. Students clearly opted that they have seen improvement in their critical skills.

9. *Graph F* conveys the role of technology in education

found that the teachers are supportive towards them to enhance technology learning without any conflicts and problems.

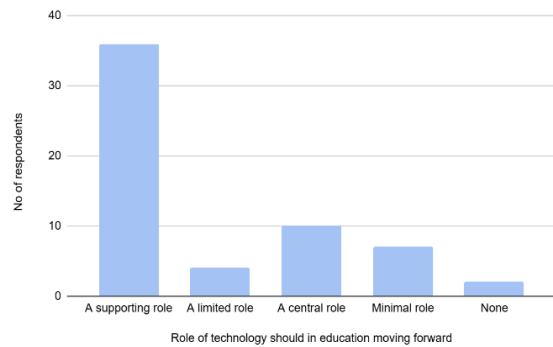11. *Graph G* displays the effect of technology in collaborating with classmates. Many students

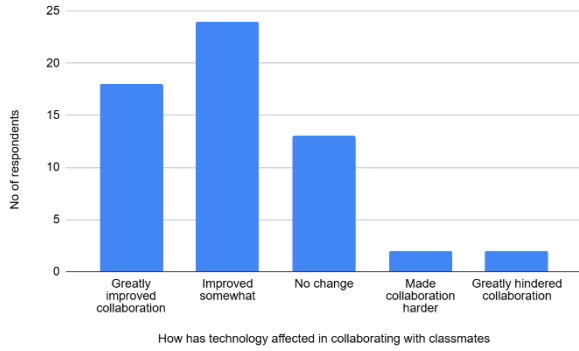Confronts that due to technology the team collaboration with classmates
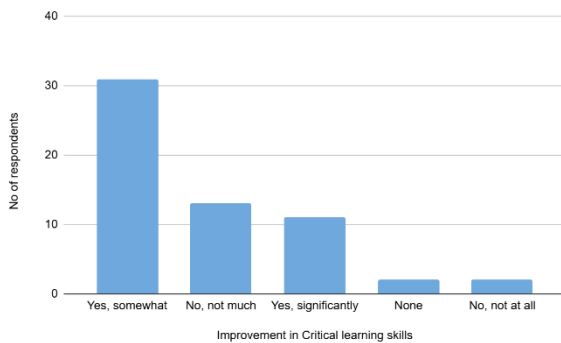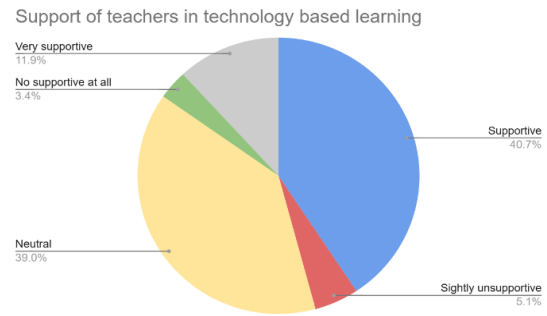

Graph E

Graph F

Technology plays an increasingly transformative role in education as it continues to evolve, teaching, learning, and accessing knowledge. Many of the students say that technology plays a supportive role in helping the students learn new skills and enhance greater productivity.

10. *Pie chart D* displays the support of teachers to students in technology learning. 40.7% of students

has increased, this increases student area of network and enhances problem-solving skills, better use of technology, decision-making skills, interpersonal skills, and intrapersonal skills. During COVID-19 many students lost their interest in studying and collaborating, after covid due to many technological advancements' students developed an interest in collaborating with classmates.
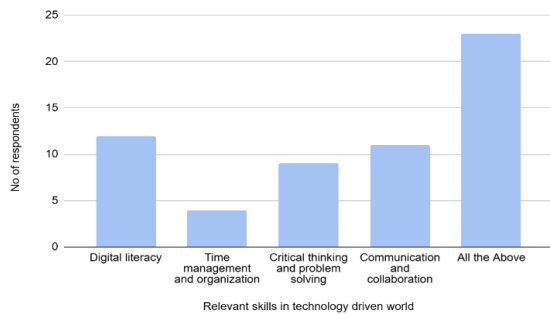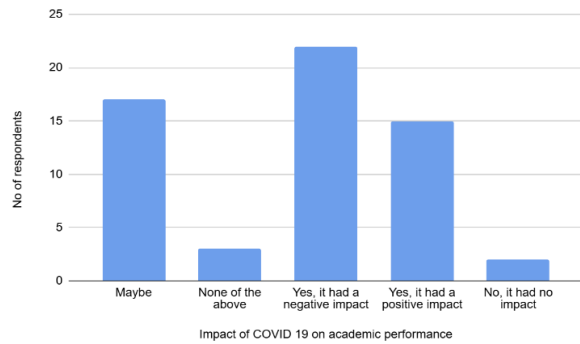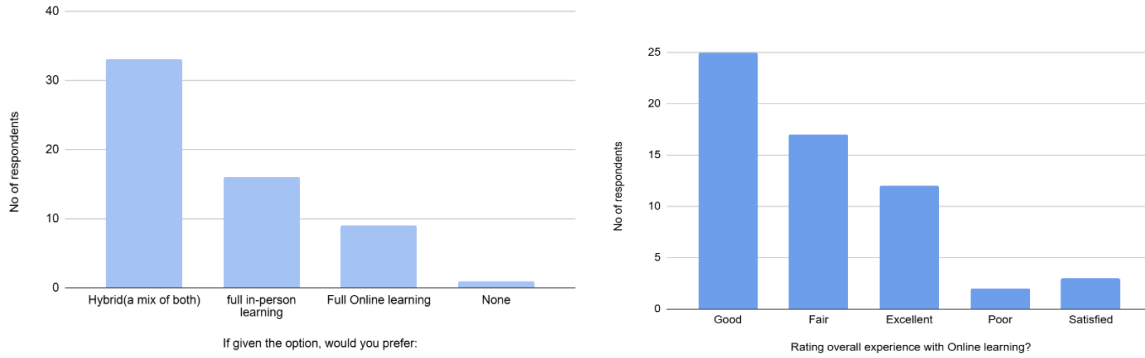
Graph G

Pie chart D

Graph H

Graph I

12. *Graph H* displays the relevant skills students need in today's technology-driven world. Digital literacy, time management, organization, critical thinking, problem solving, communication, and collaboration, are the above relevant skills students stated that every skill is needed in today's technology-driven world. These skills help the students to excel in academics. As technology continues to evolve rapidly, having the right skills ensures that individuals can adapt, thrive, and contribute effectively.

13. *Graph I* displays the impact of COVID-19 on students' academic performance. This clearly states that students are not clear about their answer, some students opted for Yes, it had a negative impact, yes it had a positive impact and confused students opted maybe, this may be due to unclear understanding of students. It depends on the student's thought processes, if they think positively then they will see positive change, if they think negatively then they will see negative change. Another reason for this negative impact is the use of excess social media. Social media diverts the student's mind from studying and learning.

14. *Graph J* displays the student's mode of learning and attending of lectures. Most of the students opted for a hybrid mode of learning i.e. in-person classroom instruction and online learning. This model leverages the benefits of both traditional and digital methods to create a flexible and engaging learning experience. Its benefits are flexible scheduling, technology integration, personalized learning, enhanced engagement, accessibility, cost-effectiveness, and skill development. Due to the immense benefits of online learning, many students opted for hybrid learning.

15. *Graph K* displays the overall rating experience with online learning. Several students gave a very good rating for online learning. Although it varies widely depending on factors such as the platform used, the quality of instruction, the learner's preferences, and access to technology. Evaluation of online learning based on its strengths and challenges: Strengths of online learning: flexibility, accessibility, cost-effectiveness, diverse resources, skill development, and global networking.Challenges of online learning: lack of interaction, technical barriers, engagement, motivation, and quality variation.

Graph J & K

SUGGESTIONS

After COVID-19 the world has been dependent on technology. Adapting to newly invented technologies has become crucial to cope with competitors, younger generation should get the proper training to enhance productivity. This can be done by enhancing digital literacy among students i.e. conducting regular workshops or training sessions to improve students' familiarity with digital tools and platforms. Integrating digital literacy as part of the curriculum to prepare students for a technology-driven learning environment.

Educational platforms should be accessible and adaptable to student needs. Every student should get the opportunity to learn about various technological platforms. Promoting student engagement through interactive content i.e. using gamification techniques, such as quizzes, badges, and leaderboards to increase student motivation. Implementing diversified learning styles.

Providing financial aid to ensure students from low-income backgrounds and rural areas have access to devices and internet connectivity. Encouraging the use of blended learning models to balance traditional and digital methods. Introducing various collaborative tools to increase the area of the network.

Regularly collecting feedback from students and teachers to improve technological tools and teaching methods. Adapting platforms and content based on evolving student needs and technological advancements.

Educating students about digital etiquette, online safety, and the responsible use of technology.

CONCLUSION

This research aimed to analyze student behavior based on technological adaption in education after COVID-19. The study found that students with higher digital literacy demonstrated better engagement and performance in technology-driven learning environments. Integrating adaptive learning technologies can cater to diverse student needs, fostering an inclusive learning environment.

The Data analysis and findings state the student opinion on technological adaptation, this study revealed that student adaptation to technology is influenced by their digital literacy, accessibility to resources, and motivation levels. While technology enhances flexibility and engagement, challenges such as lack of training, and cost-effectiveness remain critical barriers. Institutions must also prioritize training programs to enhance digital skills and engagement strategies.

Challenges such as unequal access to digital tools and low engagement in online settings persist. Addressing these challenges requires training programs, and the development of engaging, user-friendly platforms.

This study was limited to a specific demographic, the sample size was geographically restricted, potentially limiting the generalizability of the findings, which may not fully represent a diverse student population, social and psychological factors, contextual variability, and comparative limitations. Additionally, reliance on self-reported data could introduce bias.

Future research could focus on large demographics, and longitudinal studies to track changes in student behavior over time. Additionally, exploring the role of emerging technologies like AI and AR in shaping learning experiences could provide deeper insights to students as well as teachers.

Understanding student behavior in response to technological adaptation is essential for creating inclusive, effective, and innovative learning

environments. By addressing the challenges and leveraging the opportunities, we can ensure that technology fulfills its potential as a transformative force in education.

This study also reinforces the idea that technology, when thoughtfully integrated, can revolutionize education by making it more accessible, engaging, and personalized. However, achieving this potential requires a collective effort to address challenges and ensure that no student is left behind in the digital age.

BIBLIOGRAPHY

[1] Abid Haleem, M. J. (2022). Understanding the role of digital technologies in education: A review. Sustainable Operations and Computers, 3, 275-285.

[2] Daniela Maria Cretu, Y.-S. H. (2023, March 13). The Impact of COVID-19 on Educational Research: A Bibliometric Analysis. Sustainability 2023, 6(15). doi:https://doi.org/10.3390/su15065219

[3] Grassini, S. (2023). Shaping the Future of Education: Exploring the Potential and Consequences of AI and ChatGPT in Educational Settings. 13(7).

[4] Jain, P. G. (2020). Emerging trends of education during & post COVID-19: A New challenge. Solid State Technology, 63(1s).

[5] Jing Zhao, M. A.-E.-Y. (2022, July 07). The Impact of Technology Adaptation on Academic Engagement: A Moderating Role of Perceived Argumentation Strength and School Support. ORIGINAL RESEARCH article, 13.

[6] Kristen L.Walker. Kiya Bodendorf, T. K. (n.d.). Compulsory technology adoption and adaptation in education: A looming student privacy problem. Journal of Consumer Affairs, 57(1), 445-478. Retrieved December 28, 2022

[7] Marko Teras, J. S. (2020, July 13). Post Covid 19 Educational Technology 'Solutionism': a Seller's Market. 2, 863-878.

[8] Matere, J. O. (2022). Post COVID-19 education strategies: Envisaging learning in a post-COVID-19 pandemic world. 3(2).

[9] Montoya Cantoral, E. D. (2023). Didactic digital skills and virtual education in times of COVID-19. 1(8).

[10] Samantha Samaneh Kkavand, A. T. (2024, October 22). Exploring user adaptation behaviors toward mobile technology: a higher education perspective. Information Technology & People.

[11] Shivi Grover, L. M. (2022, December). Exploring the Digital Revolution in Education in India during the COVID-19 Pandemic. International Journal of Social Quality, 2(12), 51-71. doi:10.3167/IJSQ.2022.120204

[12] Shulga, T. I., Juan, Y., Krokhina, J. A., V., S. S., Ryazanova, E. L., & Baranova, E. A. (n.d.). Digital Technologies' Impacts on Student Social Adaptation during Coronavirus Pandemic. World Journal on Educational Technology: Current Issues, v13 n4 p740-748 2021(v13 n4 p740-748), 9. Retrieved 2021

[13] Ugochukwu Okwudili Matthew, A. S. (n.d.). Educational Technology Adaptation & Implication for Media Technology Adoption in the Period of COVID-19. Journal of Trends in Computer Science and Smart Technology, 4(4), 226-245. Retrieved November 02, 2022