

Adaptation of Technology Driven Methods of Teaching-Learning Practices under the Purview of Pandemic and Assessing its Implications on the Education System as a Whole

Abhishikta Bhattacharjee (abhishikta.bhattacharjee@iemcal.com), ORCID: 0000-0003-0242-4475

Assistant Professor, Institute of Engineering and Management, Kolkata, India

Shiplu Das (sld.cs@brainwareuniversity.ac.in), ORCID: 0000-0003-0692-9825

Assistant Professor, Brainware University, Kolkata, India



Copyright: © 2022 by the authors. Licensee [The RCSAS \(ISSN: 2583-1380\)](http://www.thercsas.com). This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution Non-Commercial 4.0 International License. (<https://creativecommons.org/licenses/by-nc/4.0/>). **Crossref/DOI:** <https://doi.org/10.55454/rcsas.2.7.2022.001>

Abstract: *The onset of COVID 19 virus at early 2020 shook the world from within. The shock was equally felt by the education sector as well. The eternal system of classroom teaching came to a halt. Education sector had to shift to online teaching-learning process in order to keep the pace of education intact. The newly introduced online education system took a great toll on the minds of the students as well because they had to adapt to this paradigm shift. The new normal mode of education paved the way for Ed Tech world which emerged as a savior for this hard time. Most of the education institutes started giving training to academic professionals and students on how to use online tools in order to facilitate online education system. Every academic institute started using various online applications like Zoom, Google Meet, Microsoft Team, CISCO Webex, GoTo Webinar abundantly. These applications and their usage were very new to both the teachers and the students. As a result, both the teachers and the students had to adapt to and negotiate with newer ways of teaching and learning. Schools, colleges and universities tried their best to subscribe these apps and accommodate as many students as possible. Therefore, the study is aimed at finding out and analyzes the challenges and obstacles that have hindered the overall education system and how the teachers and students have mitigated the newly invented educational model. How the paradigm shift in education system due to prolonged online education has impacted students with lower IQ; how far they have adapted and absorbed the online content. It has become a prerogative for researchers to find out how effective online teaching has been across students from various socio-economic strata of society and with varied IQ levels.*

Keywords: EdTech Adaptation, New Digital Modes, Online Education, Pandemic-COVID 19

Introduction

On the eve of the New Year, 2020, the entire world entered a phase of living which nobody envisioned. This year brought a difficulty which jeopardized the rhythm of life all over the world. The entire humanity had to imbibe certain rules and regulations which they have to follow as long as possible. The COVID 19 virus pervaded the entire world and paralyzed humanity for eternity. We had to adapt to various new normal modes of living like wearing masks whenever stepping out of our homes, maintaining physical distance which actually distanced us socially, washing or sanitizing ourselves in regular intervals, so on and so forth. Since early 2020, other developing countries and India tried its hand on either short or prolonged lockdown to combat the steep infection curve. But this lockdown has affected the poor and the lower middle class heavily. In developing countries, people belonging to lower middle class, micro and small business enterprises and daily wagers put extraordinary effort to get their children enrolled in schools. This prolonged lockdown impacted the overall economy of various countries. The lockdown impacted trade, tourism, export-import and other business activities which resulted in recession and loss of jobs. It created a kind of dilemma among people living in the lower economic strata of society to choose whether to spend for their kid's schools or procure them food. The developing countries that thrive on educational financing from international resources faced a huge challenge in order to keep the growth and improvement of our education system.

When every bit of our existing socio-economic system, medical bodies, political and national policies was undergoing a sea change in the face of this pandemic, the education sector witnessed the most remarkable change; this change was not spontaneous but the age-old pedagogical models which we became completely accustomed to, just fell apart. Teachers and instructors were compelled to adapt themselves to technologies and other ICTs in order to keep the teaching-learning process ongoing. There is no doubt that this paradigm shift was really challenging and had various shortcomings, but one cannot overlook the benefits and opportunities.

Many countries switched their education system to online mode; as per a report of UNESCO, almost 1.9 students from 190 countries had to adapt to this online system forcefully. As Jaime Saavedra, World Bank Global Director for Education said, “Effective action today to mitigate large and mounting learning losses, recover, and rebuild stronger is needed more urgently than ever to accelerate the acquisition of foundational skills and, increasingly, 21st-century skills for every child.” The sudden lock down in various countries and the enforcement of social distancing norm left no window open but to adopt online teaching. Teachers had to shake off all their drawbacks regarding technological advancement in order to reach the highest number of children possible. Sustaining attention of students throughout the class was the biggest challenge. In order to combat this challenge, teachers combined ICT tools with other resources like mobile, broadcast groups, online classrooms and printed teaching-learning materials for the students who did not have the access to the above mentioned tools.

As the entire education system all over the world had to shift to online mode of education in a jiffy, they had to implement various digital modes in order to enforce education both in primary and higher education. The teachers had to embrace various innovative models through online platforms in order to felicitate online teaching-learning process. In order to reach the highest number of children possible, teachers from various countries and regions used various remote learning approaches. They combined ICT tools with other resources like radio, television, mobile and printed teaching-learning materials for the students who did not have the access to the above mentioned tools. Surprisingly enough, most of the educational institutes including schools and kindergarten prompted to adopt various online platforms like WhatsApp, Zoom, Google Meet, Google Classroom, WebEx, Microsoft Team, Goto Webinar, so on and so forth. The chalk and talk method of teaching transformed into PowerPoint Presentations, Animations, Online Videos, Virtual laboratories and the innovations are still continuing. Many institutes bought subscriptions of the abovementioned applications in order to ensure better user experience and enhanced cyber security.

While many researchers and practitioners have found out multiple loopholes in the Online Education system, we cannot deny the fact that the absolute reliance on technology has paved the way for expanding the horizons of learning facilities.

Methodology

The research work has tried to analyze the problems associated with online teaching and has also tried to find out possible resolutions. The countless ways through which both teachers and students have mitigated the debacles of this newly introduced system of education have also been discussed in detail. For this article, a real-life survey among more than 430 participants has been used as methodology. The respondents are students belonging to primary, upper primary, higher secondary, undergraduate and postgraduate levels, teachers from primary to post graduation level and parents who also undergo the online teaching-learning process every day. The survey is based on certain parameters which can be seen as either advantages or disadvantages of online education. In some parameters, the responses of students have been positive towards online teaching and to some, mixed feedback has been noticed. It has become very crucial to understand whether the new innovative pedagogical models, digitalization of content, are at all working for the learners of all level or not. All the claims made in the paper are properly validated by the data found through the survey.

Literature Review

Digital transformation in the education sector has implied the involvement of sustainable management, in order to adapt to the changes imposed by new technologies.[1] As researchers spring into actions on finding short-term and long-term solutions to the threat posed on humanity by the virus, there is a need for instructional technologists most especially researchers in distance education to also take advantage of the sudden increase in participants of online learning as opportunities for research advancement in order to provide novel innovations to meet latest challenges of online learning.[2] Use this as an opportunity to shift further along the continuum from teacher/subject-matter centred to student/activity-centred educational methods. Find ways of shifting your attention from (your) coverage of prescribed ‘content’ so that you can focus sharply on what your students are actually doing.[3] Effective technology integration for pedagogy around specific subject matter requires developing sensitivity to the dynamic, transactional relationship between these components of knowledge situated in unique contexts. Individual teachers, grade-level, school-specific factors, demographics, culture, and other factors ensure that every situation is unique, and no

single combination of content, technology, and pedagogy will apply for every teacher, every course, or every view of teaching.[4] The pandemic ushers in a “new” normal, in which digitization enforces ways of working and learning. It forces education further into technologization, a development already well underway, fueled by commercialism and the reigning market ideology. [5]

Adapting to the Inevitable Changes in Educational Model

Digital transformation is not a phenomenon that is introduced only for the Pandemic situation; it has been used in higher education institutions for the last few years. The shift towards digitalization of education in higher education institutions was already an issue of much concern since it relies heavily on the abilities to apply ICT in the e-classrooms. Thus, universities all over the world were coping with the process of enabling the campuses with proper infrastructure to run the digital tools properly and prepare potential professional to be able to handle challenges posed at them during the class hours and provide instant solutions. While the entire education system of developing countries were grappling with this new upheaval in the teaching-learning process in higher education, the pandemic came and transformed Online Education from being a choice to compulsion, not only for higher education but for school kids as well.

Online teaching-learning system has been both synchronous and asynchronous since its inception. In the synchronous learning model, the students attend live classes and a lot of organic interactions go on between the educators and the learners. Since the environment in this mode is completely spontaneous, instant and genuine feedback can also be solicited. On the contrary, asynchronous learning environments are not as structured as the former. In this model learning content does not include live lectures or classes; rather it is available on different learning systems and forums. Therefore, instant and spontaneous feedback system is not part of this learning environment. While students enrolled in urban institutes can access the synchronous model through teaching on web platforms like Zoom, Google Meet, Microsoft Teams etc, students residing in remote areas cannot access these advantages due to lack of resources. Most of the institutes especially the government aided ones could not succumb to the synchronous model since it would create discrimination among students. In villages and sub-urban areas, in heterogeneous group of students, asynchronous mode of online teaching like sending notes, assignments periodically has been used.

Challenges being posed to the Unprecedented Changes in Educational Model

If we are dealing with the technological and quality of education related challenges associated with the sudden shift to Online Education, we should focus on the financial, psychological and resource based challenges and barriers associated with it. Here we are not talking about Online Education as a system but the matter of research is Online Education during pandemic which certainly emphasizes on certain aspects like:

- i. Technological barriers are taking a great toll on the lives of students who cannot afford online education: some groups of students do not have personal laptops and they have to rely completely on mobiles. Accessing mobiles for both personal purpose, social purpose, entertainment purpose and educational purpose at once is making their lives a little messy. Instead of understanding things online, they are drifting here and there. Some others have internet issues for various reasons: their inability to afford recharge packages with 2GB or 3GB data per day is becoming the greatest impediment in the online journey of education. It happens with both the instructor and the students.
- ii. Most of the students are suffering from anxiety due to this pandemic. They are highly worried regarding their family members' health which is deteriorating their academic performance.
- iii. Many students with lower IQ level who rely heavily on chalk and talk method of teaching and classroom environment might lag behind others as they fail to catch up the pace of online teaching
- iv. The financial discrepancies created a kind of inequality among students in relation to their social position. Students are getting conscious regarding their economic background which is creating hesitation among them and they are no longer willing to open up fully.
- v. The prolonged confinement at home, inaccessibility to socialization with friends, having no scope for playing and hanging out with them are creating psychological blocks in the young learners' mind and they are getting frustrated with this daily course of online teaching-learning system

- vi. The online system has also blurred the demarcation between public space and private space, earlier schools and colleges have been their public space which they enjoyed to the fullest, now the same home or the same room is both their public and private space. This blurring of these two spaces is creating hesitation and lack of interest in the students' learning process; they need to display their personal world to the outside world which is not that comfortable for everyone. The experience is same for the teachers as well.
- vii. There are many instructors who are not that adept with technology and online teaching-learning is completely dependent on technological devices and the internet. The overnight decision of shifting to online mode could not provide proper training to the instructors; while teachers in metro cities could cope up with the first pace due to the availability of resources, teachers from remote areas are still struggling to come to terms with this technological renaissance.

Negotiating with the Problems and Finding out Probable Resolutions

It is often said that 'Something is better than nothing'. If we look closely at the alternative education system which is prevalent all over world, we can say that in spite of having dealt with all its shortcomings, online education was the only hope when education system was going to collapse completely. We may have doubt regarding its effectiveness, but we cannot ignore the fact that it at least kept the education system ongoing in this moment of crisis. While there are lots of problems associated with online teaching, we can curve out certain ways to fix that as well.

- i. Prerecorded videos can be provided to students who suffer from internet issues or cannot keep up with the fast pace of online classes. If they have the prerecorded video with them, they can watch the video anytime they want, they can pause, rewind, fast forward the video in order to learn better.
- ii. The instructors should apply assignment based learning methods even in online mode, using highlighter, laser pens while teaching through PowerPoint presentation keeps the students attentive enough. Interesting videos from various social media forum, motivational talks of personalities who have achieved big in life overcoming all their struggles can keep the students energized and active throughout the session.
- iii. Online programs should be designed in such a way that they involve creativity, interaction, relevance and student-centered approach. Online course content should also be modeled in the most dynamic and interactive way possible.
- iv. The entire learning process should be full of cooperation and empathy towards the students as their future is uncertain due to this pandemic, teachers must keep them motivated to the best extent possible.
- v. Social media forums and groups can be created in order to circulate course content, videos, notes, e-books and better communication among students themselves can also be solicited. Personal attention should be given to students who are facing some problem in the online classes.
- vi. Instructors should always look for feedback from the students in order to improvise their teaching method and cater to the needs of a heterogeneous student group.
- vii. Institutions must focus on challenges related to pedagogical issues and emphasise more on collaborative learning, case-studies, and project-based learning through online mode so that learners can hone their research skills as well.

Response towards Education System: A Survey Report

Having dealt with all the above speculations regarding the perks and limitations of Online Education, it can be stated that the people who are grossly engaged in this very process are the best one to reciprocate their views on it. Therefore, relying on real-life survey responses suits the most when there is a debate still going on regarding the effectiveness of online education.

How Engaging Online Classes have been: In various institutes, online learning is going on through the synchronous model; on the other hand, many institutes are following the asynchronous one. If we closely follow the response of students through online mode since the time it started as the sole medium of

communication, we may find out that response to online education has been very diverse all over the world and especially in India in the last one and half years. When it started around last week of March, 2020, the average attendance for the online classes was around 95%-96% over a period of 5 or 6 months. Most of the college students possess a mobile phone, some others also have either a PC or a laptop which they used as the most accessible and feasible platform for attending online classes. But several case studies conducted among various institutes in India have come out with the result that a considerable number of students preferred using laptops over mobiles as mobile phones create a lot of distractions while using it for online classes. As the internet remains active all through, they feel the urge to access social media, check WhatsApp messages, play their favorite games, and so on and so forth. It leads to loss of internet data which actually hampers their attentiveness during the class.

Therefore, keeping students engaged during the class hours have been the greatest challenge faced by the teachers and instructors as well. Most of the applications and softwares used for online teaching system are woven with various tools. Teachers have been using the white board option or pen tabs for teaching application based subjects. It was not very easy on the teachers' part; but the situation demanded an alternative for the physical chalk and talk method. Apart from these, teachers have been using power point presentations with transitions and effects to grab the attention of the students throughout. Applications like Google form, Polls in various virtual platforms, Google Classroom for providing notes and assignments, implementing audio-visual aids in order to cater to their listening and speaking ability, making quizzes to make the teaching-learning session engaging-all these have been widely used for making the online classes interactive. While conducting the survey on the parameter of how engaging the online classes have been, the following result has been found:

5

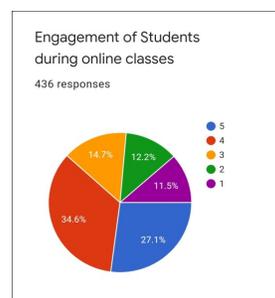


Figure1: Engagement of Students during online classes

If we closely look at the responses found through the survey, we can find that more than 60% of the respondents have voted in favor of engagement in online classes. On a marking scale of 1 to 5, these people have marked either 4 out of 5 or 5 out of 5. However, we cannot overlook the fact that around 40% respondents have given moderate to low marking on this parameter. Therefore, the findings throw light on the fact that the entire system needs a number of revisions and reconsiderations in order to make the process all the more effective.

Concerning the Privacy of Teachers and Students in Online mode: With the advent of the online education system, uncountable numbers of softwares and applications came into the knowledge of the masses which were completely unknown to the world of education before. Most of the softwares like Google Meet, Zoom, Microsoft Team etc, are quite user-friendly but sometimes they create a lot of difficulties like taking update without the permission of the user, downloading errors, issues with different Operating Systems and RAM variety, problems with audio and video, etc. On top of all these, any online system is susceptible to getting hacked or corrupted. So the privacy of both the students and the teachers might be at stake. The cyber threat towards invasion of privacy to both the teachers and students has rendered a skeptical take towards the system as a whole.

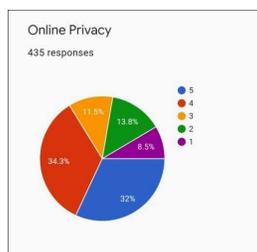


Figure2: Online Privacy for both teachers and students

From the above, we can find that the response of 64% respondents have been positive towards the issue of user's privacy in online education system. Rest of the respondents is doubtful in this matter.

If we consider the real-life situation of online teaching-learning process that has been going on in India, in most of the cases, students' videos remain off in order to save data for other classes; teachers get to see only the display pictures without having any facial expression or body posture. This practice, on one hand has been beneficiary for maintaining the security of the teachers and students online, on the other hand it has created a vacuum in the teaching-learning process on a whole. The absence of facial expression and body postures is certainly causing a barrier to the effectiveness of online education. Moreover, subscribed versions of apps like Google Meet, Zoom, GoTo Webinar, Microsoft Teams are greatly modeled to ensure top notch security for their users.

Scope of Hands on Learning Experience: There are certain subjects associated with science and engineering which demand laboratory works and hands on training; getting laboratory experiences for streams like Mechanical, Electrical or Civil Engineering online was a real challenge. Students need proper training in these domains. It is a matter of contest that whether students are failing to reach their full potential unless they practice what they learn. But online virtual labs, simulation softwares have been widely used to breach the gap of physical experience of lab and the virtual experience as well.

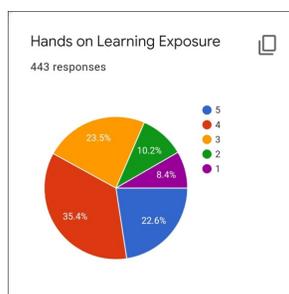


Figure 3: Hands on Learning Experience

If we closely look at the result found in the survey, we can very well see that around 55% of the respondents think that online mode of education has been capable of providing hands on learning experience but rest of the respondents are skeptical regarding the opportunity of experimentation being provided online. We cannot overlook the importance of machine oriented laboratory experience which is completely absent in the online mode.

Scope of having Flexibility with Time and Location: While learning online, students have the leisure to sit at their home and pursue studies not only in the institutes where they are enrolled but also from other institutes. Majority of students have undertaken courses under SWAYAM or NPTEL portal or have enrolled in lucrative training program offered by Coursera, Udemy or EdX. Earlier they had to invest a lot of time in coming to college and going back to their homes, which somewhat exhausted them. Even at home, they felt a little tired while studying further. Online Education has relieved them from this daily struggle of travelling; many students used to travel for 3-4hours per day which resulted in lack of attention in class and fatigue. Distance education which was earlier taken up by students who could not pursue regular education in colleges due to some financial constraints and their remote location; now they can pursue education in regular mode without any hindrance. Many people who wanted to pursue internship courses, workshops, seminars out of the state but could not do so due to time constraints, they can now invest their spare time in these extracurricular activities to build up their technical, social and leadership skills. There are many

students who have to do freelance jobs or give tuitions to younger students in order to help out their parents in bearing the expenses of their education, now they can do it more diligently.

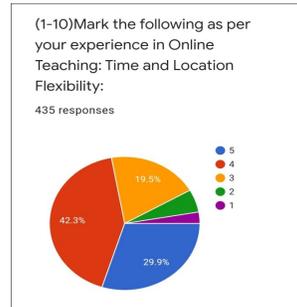


Figure 4: Flexibility of Time and Location

The response towards this parameter of online education has been quite positive. More than 70% respondents agree with the fact that online education renders more flexibility with respect time and overcome barrier associated with location.

The flexibility of time and location also allows you to spare some time for your hobbies and explore new things in life. Through various social media and online portals, we have seen how people have dug out their long lost passions during this at home period. Their engagement into exploring other things like music, painting, dancing, cooking, reading, so on and so forth has served as a cure. This flexibility of access to the essential parts of life helps everyone get released from the mundane routine of getting up at morning, going to college, attending classes, coming back, so on and so forth. It allows someone to stop, halt, observe and absorb certain things.

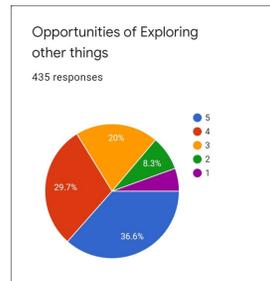


Figure 5: Exploring other things

The period of online education has helped a lot in breaching the gap between parents and their teenage kids. A gap which gets created due to lack of face-to-face interaction and mismatch of opinion and due to lack of quality time to spend together. This certain period of learning from home and the compulsion to stay at home have helped a lot to reevaluate the relationships within a family. It has also created a nice balance between work life and personal life among students; they can now spend quality time with their parents and friends as well. The survey result also shows similar kind of response:

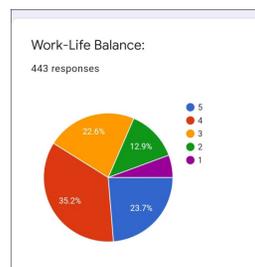


Figure 6: Maintaining Work-Life Balance

However, the kind of bond students share in the physical mode of class and within the school, college premises is not the same on online platforms. The haptic mode of communication is completely absent in the online mode. Some may argue that in the digital era, networking with peers is not a big issue; it can be

established through the use of technologies like social media groups, video callings and through partnership or opposition in online games.

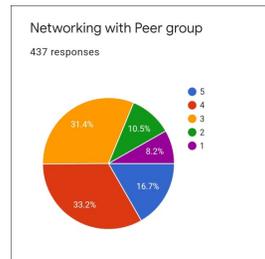


Figure 7: Networking with Peer Group

The finding of the survey gives a clear picture of this argument; where 50% of the respondents have marked the parameter with high score, 50% have expressed doubt regarding this issue.

Building Organizational Skills and Improving Time Management: In Online Education, teachers use various Online Platforms which not only improves their organizational skills but also helps students to keep an eye on the time allotted for each segment of their day. Students can use various virtual time tracker apps or softwares used for making To-Do list. This practice helps them in learning organizational skill and time management skill as well. Being a part of online platforms like Zoom, Goto Meeting, Google Meet will enable them learn how to behave in the digital world which is very much different and way more formal than offline classrooms. In offline classrooms, more than one student can talk to the teacher without creating any disturbance. But in online mode it becomes very chaotic. Therefore, learning how to handle a heterogeneous group of people online, the overall codes followed in Online Mode help the students a lot to understand the decorum of corporate world since as professionals, they have to deal clients from various corners of the world virtually keeping a balance with the diverse time zones. Most of the corporate meetings these days are conducted online; they do not have any fixed time, clients can ask the corporate employees to be online at any arbitrary time and they need to join the meeting and handle presentations, discussions and crack deals over virtual platform. Thus having a prolonged online teaching-learning session is actually working as a trial period for students willing to join the corporate arena.

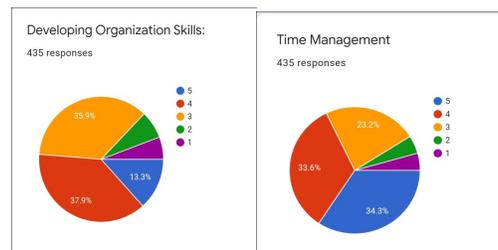


Figure 8: Developing Organizational Skills and Time Management

The Advent of Innovative New Age Teaching Model: TPACK: In the online education system, the main changes that academia all over the world had to imbibe is introducing an evolutionary and personalized curriculum which will be mainly student centred, pedagogy which will be mostly practical rather than theoretical. The instructional model must be a blend of synchronous and asynchronous modes of learning. The global pandemic has served as a huge opportunity to break through the outdated teacher-centric pedagogical models. In most of the institutes and schools the TPACK model was introduced. TPACK stands for Technological Pedagogical Content Knowledge Framework. This framework focuses on PK that is Pedagogical Knowledge, CK that is Content Knowledge and TK that is Technical Knowledge.

The TPACK model can be seen as a summation of three intersecting subsets namely PCK which establishes a relationship between the content and the way of delivering it (pedagogy), TPK which describes the relationship or communication between technological tools (ICT) and the pedagogical experiments and third TCK which describes the amalgamation of content and its technical representation. This model was invented by Mishra and Koehler, researchers from Michigan State University in 2006 but it took 14 years to get proper acknowledgement. While teachers and instructors from various regions and countries are using this

framework in both secondary and higher education, they must keep in mind that this framework demands alteration of pedagogical approaches with changing content and changing social context.

It has to be kept in mind that with the globalization and digitization of education, the content or the substance of education needs to be very much personalized. Students of the same class belong to various socio-economic strata, their cultural and ethnic codes; financial and geo-political backgrounds are also different. Here comes the role of personalized curriculum. This “new normal” curriculum is said to be more horizontal and less hierarchical. Developmental and experiential learning have to be implemented in place of textbooks and notes. In this context, the role of educational policy makers, educationists, scholars become all the more important so that changes can be enforced from the government’s end.

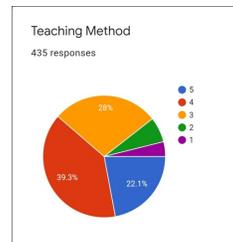


Figure 9: Use of New Age Teaching Models

The survey also shows a similar kind of result, where more than 63% of respondents have appreciated the new teaching methods employed in online education.

While dealing with the methodology of teaching, we have mentioned the importance of CK or Content Knowledge. Therefore, evaluating the changes to be implemented on the content itself becomes pivotal here. It has to be kept in mind that with the globalization and digitization of education, the content or the substance of education needs to be very much personalized. Each student has their specific needs; earlier the heterogeneity of classrooms was ignored as it was looked upon as an entity. Now each home is a separate classroom, therefore, it’s high time that we address the differences of reception quality. Students of the same class belongs to various socio-economic strata, their cultural and ethnic codes are also different. Some students have the leisure of having high-end laptops, high speed internet and a room of their own; on the other hand, some students have only one smart phone for the entire family, the entire family lives in one single room. Therefore, the curriculum which would be feasible to follow for the former learner will not be the same for the latter. Here comes the role of personalized curriculum.

With the closure of schools and colleges, conventional examinations are also replaced with online examinations; but this examination system is implemented only to keep the educational system alive but everyone knows that the credibility or validity of these examinations are not as much as the previous examination system. Therefore, developmental and experiential learning have to be implemented in place of textbooks and notes. In this context, the role of educational policy makers, educationists, scholars become all the more important so that changes can be enforced from the government’s end. The curriculum used during the pandemic and in the post-pandemic world should aim at developing students as global citizens; make them aware of the environmental issues and their social responsibilities. Instructors and teachers must ensure that the content that they are delivering is career oriented and dedicated to developing their professional skills. The bookish knowledge cannot serve as the only tool today; digital competence is very important in order to excel in life. Therefore, the content has to be designed as per individualistic competency of each student.

Realization of Inclusive Education: Online Education has truly made education inclusive and dynamic. The limitation of space, time, distance has been completely met up. In colleges and universities, classrooms of 150 and more have seen pathetic situation of microphones, pupil sitting behind first five benches were never able to see what is going on in the blackboard. Students living far from the institutions have spent their entire day only in the to-and-fro journey between their homes and colleges. Now the classrooms have become really global; it does not matter whether you are sitting at Ooty or Uganda, whether you are a group of 5 or 500, internet and online platform can bridge all the gaps. The subscription of Google Meet, Zoom or WebEx accommodates 300-1000 people at the same time without any issue. You can aim even bigger group of audience through YouTube or Face book Live.

Through inclusive education we can also aim at including differently-abled children; it has been an agenda of the central government for quite some time but has not been realized fully. Through online teaching mode, we can include students who have loco-motor disabilities. They do not have to move anywhere, but can learn sitting at their comfort zone itself. Visually impaired children can learn through listening to the lecture and it would be great if they get a Braille version of the lecture as lesson or module. Apps like Google Meet and YouTube have the facility of showing almost accurate subtitles, people having hearing difficulties can learn through that technique as well. This digital renaissance in education sector worldwide has paved the way for innumerable pedagogical innovations and researches which will be beneficial for next generation students and the later generations as well.

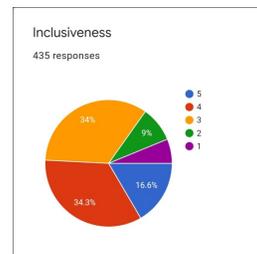


Figure 10: Inclusiveness in Online Education

The above pie chart shows that students from schools, colleges and universities, their teachers and parents agree with the point that online teaching offers a polished version of Inclusive Education.

Limitations of the Research

Although this research and survey put forward a varied response of students, teachers and parents regarding the newly introduced online education system, we cannot do away with the limitations that the survey has. The group of people among whom the survey has been conducted mostly resides in urban or semi urban areas. Most of the respondents belong to economically stable financial backgrounds. Therefore, we cannot generalize the outcome as a universal response. The response from rural and remote areas of our country could have shown some different result on various parameters. Besides, we cannot completely eradicate the psychological impacts of this prolonged online education. The constant threat of invasion of privacy through online platforms creates a trauma in the learners' mind. Besides, students who are failing to adapt the pace of this paradigm shift in education system due to financial constraints and lack of resources are developing a sense of discrimination against them. That is why most of the private educational organizations have been capable of implementing online education successfully but the same is not true for government organizations, since a majority of students belong to the lower strata of society in the latter one. Various Engineering streams like Mechanical Engineering, Architecture, and Civil Engineering cannot be taught effectively through online mode since these courses demand hands on experimentations. Thus lack of virtual laboratories for these disciplines is a limitation of online learning which must be addressed.

Future Scopes of Online Education

The research is aimed at upholding the fact that in spite of being labeled as a third world country, the online education system has been going on quite smoothly in India which was beyond everyone's imagination when it first started on a large scale. We are currently witnessing an evolution in the digital market which has boomed the EdTech sector largely. With Ed-tech big shots like Byju's, Vedantu, Awign Enterprises, WhiteHatJr., Classplus, Unacademy, India is reaching really high in building Online Education a potent alternative model of education. On the institutional level, The SWAYAM portal, introduced by the central government also has the same agenda of bringing access, equity and quality in education. We can make a truly digital India only through spreading digital literacy among its populace.

Conclusion

The entire world is stagnant at present, locked within the present, the only way to move forward is to adapt to the changes brought up with the new normal mode of living. Thus online education is no longer an option of education but has become the only mode of education. The question is not about our choice but about the necessity of the time. Change is inevitable and the only way of surviving the change is adapting to it.

Resistance towards change will not be beneficial for educational bodies across the world. Their existence depends vastly on their pace to adapt to the rapid changes, their ability to maintain the quality of education as well. Large number of population has been financially affected by this pandemic. This may result in lesser admission in higher education since most of the graduate courses are quite expensive. Therefore, all the educational institutes must keep this fact in mind that they are getting judged by the policies they are implementing in order to keep the education system working in their colleges and schools. While it cannot be stated that the effectiveness of face-to-face class or offline classes can be replaced completely by online mode of education, but a balanced combined model must be developed which can be implemented in the post-pandemic world. Online Education is here to stay; the pandemic has prompted an academic evolution through the introduction of online education. In order to become a part of this evolution, innovative curriculum and pedagogical modifications must be introduced since a blend of offline and online education is the obvious future now. We have to start preparing ourselves for embracing the inevitability of this near future and excel in it as well. We are witnessing a debate over the effectiveness of online education in a third world country like India, but we cannot overlook the fact that the emergency state of education during the pandemic has given rise to an evolution in the digital market which has boomed the EdTech sector largely. From writing scales in the 90's to writing pads in 2021, India has seen a paradigm shift within just two years. While the fashion of online education started in 1960 in the University of Illinois, it was 1994 when online education was launched in India through the introduction of Educomp. So for the Western countries it's 60 years of journey, but for India it's only about 25 years, and the last 2 years have helped a lot in breaching this gap of 35 years, India is not lagging behind the Western countries if not at per. we need to concentrate more on providing access of digital education to each and every student who are still deprived of its magic. Once we get hold of this challenge, this journey of online education will reach new heights and make India truly a digital India through spreading digital literacy among its populace.

References

- Abad-Segura, E., González-Zamar, M. D., Infante-Moro, J. C., & RuipérezGarcía, G. (2020). Sustainable management of digital transformation in higher education: Global research trends. *Sustainability*, 12(5), 2107. <https://doi.org/10.3390/su12052107>
- Rapanta, C., Botturi, L., Goodyear, P. et al. Online University Teaching During and After the Covid-19 Crisis: Refocusing Teacher Presence and Learning Activity. *PostdigitSciEduc* 2, 923–945 (2020). <https://doi.org/10.1007/s42438-020-00155-y>
- Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for integrating technology in teachers' knowledge. *Teachers College Record*, 108 (6), 1017–1054
- Daniel, S. J. (2020). Education and the Covid-19 pandemic. *Prospects*. <https://doi.org/10.1007/s11125-020-09464-3>.
- Williamson, B. (2013). *The future of the curriculum. School knowledge in the digital age*. Cambridge, MA: MIT Press.
- Carey, K. (2020). Is everybody ready for the big migration to online college? Actually, no. *The New York Times*. <https://www.nytimes.com>
- UNESCO. COVID-19 Education,Response. Available from: <https://en.unesco.org/covid19/educationresponse/> globalcoalition [Accessed 5th April 2020].
- Dhawan,Shivangi,Online Learning: A Panacea in the Time of COVID-19 Crisis.*Journal of Educational Technology Systems* 2020, Vol. 49(1) 5–22
- Khalif,N,Zuheir. The Unanticipated Educational Challenges of Developing Countries in Covid-19 Crisis: A Brief Report.*Interdisciplinary Journal of Virtual Learning in Medical Sciences*. June 2020, Vol. <https://www.brookings.edu/blog/education-plus-development/2020/04/13/coronavirus-and-challenging-times-for-education-in-developing-countries/>
- White, H. (2010). Our education system is not so much “broken”—as it is totally outdated! STEAM. Retrieved from <http://steam-stem.com/articles/oureducation-system-is-not-so-much-broken-as-it-is-totally-outdated/>
- Resta, P., Laferrière, T., McLaughlin, R., & Kouraogo, A. (2018). Issues and challenges related to digital equity: An overview. *Second handbook of information technology in primary and secondary education* (pp. 1–18). [https://doi.org/10.1007/978-0-387-73315-9_44Hbaci, I., Ku, H. Y., & Abdunabi, R. \(2020\). Evaluating higher education educators' computer technology competencies in Libya. *Journal of Computing in Higher Education*, 1–18. <https://doi.org/10.1007/s12528-020-09261-z>](https://doi.org/10.1007/978-0-387-73315-9_44Hbaci, I., Ku, H. Y., & Abdunabi, R. (2020). Evaluating higher education educators' computer technology competencies in Libya. Journal of Computing in Higher Education, 1–18. https://doi.org/10.1007/s12528-020-09261-z)
- Lorenz, B., Sousa, S., & Tomberg, V. (2013). Privacy awareness of students and its impact on online learning participation—A case study. In T. Ley, M. Ruohonen, M. Laanpere, & A. Tatnall (Eds.), *OST 2012. IFIP AICT* (vol. 395, pp. 189–192). Springer.
- Wright, C. R. (2003). Criteria for evaluating the quality of online courses. *Alberta distance Educ. Training Assoc.*, 16(2), 185–200.