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Applications of Artificial Intelligence in Education

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The 4th Industrial Revolution is dominated by technologies like the Internet of Things, 3D printing, Cloud Computing, Augmented Reality, Virtual Reality, Mixed Reality, Artificial Intelligence, Edge Computing, Digital Twin, Blockchain, and Virtual Assistants few. The 2021 EDUCAUSE Horizon Report-Teaching and Learning Edition (published by EDUCAUSE) is that important report that identifies key trends and emerging technologies impacting teaching and learning every year. The 2021 Horizon Report identifies artificial intelligence, blended and hybrid course models, learning analytics, micro-credentialing, open educational resources, and quality online learning are key technologies and practices with great potential in the higher education sector.

Gartner predicts that by 2030 we would witness major transitions in the way the businesses are being transacted. Smart machines, connected devices, natural language processing and cloud technologies are already used and set to continue growing. Digital technologies have already made the world small, and it has transitioned from connected devices to connected humans. This has made it easy to analyse big data. The organisations can now use quantified self (wearable devices and sensors capturing data on different aspects of our life like biological, physical, behavioural etc.), sensor networks and advanced analytics. According to UNESCO, artificial intelligence in education is expected to be worth USD6 billion by 2024 and is a great tool to accelerate SDG #4 (quality education). Before we discuss the applications of AI in education, let us understand a bit about AI itself.

What is AI?

Artificial intelligence is the most promising among these technologies. The developments in this field go back to when Alan Turing proposed the Turing machine, which indicated that if we cannot differentiate a human response or a machine response, it is artificial intelligence. This deals with the human cognitive process and decision-making capabilities. Artificial intelligence applications are comprised of expert systems, natural language processing, speech recognition and machine vision/ computer vision. Computer vision allows a machine to interpret and understand the visual world as it sees it. We have different models: Deep Learning, Machine learning and neural networks, which constitute artificial intelligence.

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Contents

Editorial

This issue of the e-magazine carries eight articles. Two articles are on Artificial Intelligence; two are on Blended Learning, and four articles are on Hybrid Learning.

Sri P.K. Pramanik, Former DDG & Scientist "G", National Informatics Centre, MeitY, GoI introduces artificial intelligence and associated concepts and technologies like Machine Learning, Deep Learning, Augmented and Virtual Reality, Natural Language Processor, and Big Data and Internet of things; the author then examines the application of AI in education. Dr Ramesh Sharma, Head of the Global Affairs Department of Ambedkar University Delhi adds the types of intelligence like Artificial Narrow, Artificial General and Artificial Super Intelligence and critically examines the role and potential of AI in education.

Sri Arnab Kundu, Research Scholar in Bankura University, and Sita Anand, Dyutima Kesar, Anjali Sharma and Romy Kumar of Jammu University contributed two articles on Blended Learning. Sri Kundu shares his experiment on the use of innovative blended learning design and its usefulness in education. The second paper critically examines the prospects of adopting blended learning in developing countries and flags the challenges in implementing blended learning.

The remaining four articles are devoted to Hybrid Learning. The four articles deal with the concept of Hybrid Learning; models of Hybrid Learning, Roel of the Teacher, and method of implementing.

We hope you will find this issue enriching.

- Dr Mrityunjoy Kaibarta

Programming languages to learn for working on AI

There are various languages like Python, C++, Java and LISP etc., which can be learnt. These languages have powerful libraries. For example, tensor flow is used for machine learning workload and datasets. SciKit is used to train the machine learning modules. PyTorch is used for natural language processing and computer vision. In addition, R is also another powerful language that is good at crunching huge numbers. It was developed in 1995 by Ross Ihaka and Robert Gentleman.

Types of artificial intelligence

Based upon the kind of outcomes, AI can be categorised into three types:

1. Artificial Narrow Intelligence: Here, the intelligence equals or exceeds human intelligence or efficiency at a specific task.
2. Artificial General Intelligence: Here, the system is capable of applying intelligence to any problem, going beyond applying to a specific problem or task
3. Artificial Super Intelligence: here, the system is significantly intelligent than human intelligence in almost every field and can deal with general wisdom, social skills or scientific creativity.

Applications in education

AI applications are being increasingly used in education in chatbots, engagement platforms, self-directed learning, automated assessment systems and sentiment analysis, etc. Let us have a look at some of the real case applications.

- Conversation Technology: We have seen conversation or voice assistants, like Alexa, Siri, Cortana etc. Recently Google has demonstrated LaMDA (Language Model for Dialogue Applications) as a conversation platform that is quite powerful in understanding the power of search queries.
- Personalised Learning: There are many powerful apps, for example, Duolingo, which is used for learning an additional language. Such apps provide us with experiences where we can personalise learning. The machine and adaptive learning algorithms make it easy to create learning paths that are individualised. Knewton is such an application being used by teachers to teach Chemistry, Mathematics and other subjects.
- Automation of Tasks: There are many mechanical activities like attendance handling, books dispatch or inventory management etc. AI can handle such tasks faster and without errors.
- AI-powered Writing Assistant: Grammarly is a famous example of such an application that finds mistakes in the text. It can suggest help in making language easy and effective in expression.
- Location-based Technologies: With the help of IoT and sensors, we can locate our students and then dispatch the necessary help in the form of content or books or other materials wherever they are located.
- Smart Infrastructure: with the help of IoT and sensors, we can efficiently manage the institutional property, for example, security or lighting or air-conditioning etc.
- Image Recognition and Processing: Google Lens is a good application that allows us to process and manipulate text or images. These can be used for deep fake areas.
- Chatbots: Prof Ashok Goel's Jill Watson is a famous example of how teaching assistants can help students carry forward their studies. The University of British Columbia uses the ChatSim application where the students can talk to each other using an Avatar in virtual learning environments. The University of Illinois Chicago uses SOCRATES as a bot for interaction among the students.
- Sentiment Analysis: AI can help us make behaviour analysis in all students' classrooms, make behaviour analysis in the classroom of all students make behaviour analysis in all students' classrooms, which is not easy for a teacher in real-time. Affectiva is such an application. Mind Lab in New Zealand also uses sentiment analysis applications to study emotions.

- Student Engagement Platform: Durham University in the UK uses the Holly system, which is integrated with the university's LMS and engages students in active learning.
- Digital Learning Scorecard: the University of Iowa uses AI software to identify students struggling academically. Querium is another such application to examine the learning capabilities of students.
- Natural Language Processing: Penn State University uses NLP to process the transcripts of course sessions by the students.
- Self-Regulated Learning: United Kingdom, Germany, Australia, and the Netherlands are working on the FLoRa project for self-regulated learning.
- Internet of Behaviour (IoB): the University of Helsinki has developed an application for the study of behaviour.
- Speech Recognition: Nuance has developed software that can recognise speech and type the text, recognise speech, and type the text; this facility is good for teachers and students to create text content.

Conclusions

There is no doubt that artificial intelligence is the most promising technology, and the education sector will immensely benefit from it. By realising its potential, CBSE in India has already prescribed a curriculum from class 8 till 12 to learn about AI from their school stage itself. NITI Aayog of the Govt of India had also released India's National Strategy for Artificial Intelligence (NSAI) in June 2018with the purpose to create a vibrant AI ecosystem in India. With the power of AI, teachers can offer personalised instructions, can offer personalised instructions create quality content, and offer it to needed students as ubiquitous technology. Self-learning is one of the best advantages for students. Market predictions indicate that AI will have around 15 per cent of India's current gross value by 2035. By offering personalised education, working as a teaching assistant, enabling inclusive and accessible education, proctored online examinations, AI is the way to go forward for the Indian education system. National Education Policy2020 has emphasised the use of technology, and it is hoped that our students and teachers would reap the benefits to maximum potential.

"What makes a child gifted and talented may not always be good grades in school, but a different way of looking at the world and learning."

- Chuck Grassley

Artificial Intelligence (AI) and its Implication on Education

P K Pramanik[1]

Digital Technology is evolving faster ever since the development of commercial computers in the eighties of the last century. This attractive platform is giving birth to many technology tools used in numerous areas of our daily life. AI has become numero uno among those and started making its presence increasingly being felt in the area of education and learning also. As each student is perceived to be different concerning grasping power, the pace of learning and so forth and our curriculum is to follow a "one-size-fits-all" approach for manageability. Many students are forced to remain not fully expressed. AI is now facilitating to bring the needed flexibility in the curriculum suited to the individual needs of the learners.

Teachers who can adopt a collaborative relationship with AI are finding a robust, reactive platform in AI that can respond to individual students' needs based on performance and find a robust, reactive platform in AI that can respond to individual students' needs based on performance. Still, we are finding a robust, reactive platform in AI that can respond to individual students' needs based on performance and other behavioural parameters like emotional state and confidence level. Learning was observed to impact learning; such behavioural issues were observed to impact learning, such behavioural issues remained out of scope so far from the education system.

It shall be worthwhile to introduce such disruptive technology like AI in greater detail for greater comprehension and subsequently for its greater adoption in this area.

AI is primarily seen as the ability of a computer-controlled device to perform tasks in a human-like manner. Human-like qualities like reasoning, meaning-making, generalisation, and learning from experience are built-in into the device. Technology has evolved for many, many years and also is still evolving. There have been mind-blowing developments, so to say, as we often see, World Champions are greatly being challenged by Chess-playing or "GO" playing devices. Devices are being engineered with human-like intelligence. As humans can learn from past mistakes, so does an artificially intelligent device. The device can self-learn!! There are several vital associated technologies involve to achieve the visions of AI. Prominent ones are Machine Learning (ML) with Algorithms, Deep Learning(DL) with the neural network, Natural Language Processing(NLP), Virtual Reality(VR), to name a few. Before we delve into the use of AI can help in education, here is a brief outline of those technologies.

Machine Learning (ML)

At the most basic level, machine learning seeks to develop methods for computers to improve their performance at certain tasks based on observed data. With ML, objects, faces, speech or buyers' preferences can be identified. ML is a system in which it uses past data for predictions by employing

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suitable algorithms. Data is not just numbering anymore; it consists of texts, images, videos, frequencies, gene sequences, sensor arrays, clicks logs, etc. In other words, the data received from the users are more complex than is known by most people. However, if more data is collected and analysed, more accurate predictions can be made. Mobile devices and embedded computing systems permit large amounts of data to be gathered about individuals, and machine-learning algorithms can learn from these data to customise their services to the needs and circumstances of each individual. However, even though a hundred per cent recognition has not yet been realised, over time, the machine may come to a level where it can imitate humans.

Deep Learning (DL)

It is a subset of ML, a particular kind of ML that achieves greater power and flexibility by learning to represent the world as a nested hierarchy of concepts. DL works on very specific tasks, like classifying different types of images, similar to what Facebook does with its facial recognition, digital marketing, where the device can make predictions about what a user may prefer to purchase can make predictions about what a user may prefer to purchase, and medical imaging, to locate tumours or determine their stage. With the rapid adoption of DL, a human level of accuracy has been reached through neural networks. Both ML and DL have to be trained thoroughly with past data so that they can make intelligent decisions.

Natural Language Processing (NLP)

Natural Language Processing (NLP), also known as computational linguistics, is concerned with using computational techniques to learn, understand, and produce human language content. NLP is an area of engineering for designing and implementing computer systems for which natural language analysis is the main function. Requiring the combination of human learning and machine reasoning, the process aims to comprehend user-given verbal or written commands that require an automatic response, text translation and speech generation.

Virtual Reality (VR)/Mixed, Augmented Reality and Extended Reality (MR/AR/XR)

Virtual reality (VR) and its various variations (MR, AR, XR) are another application of AI where such computer applications simulate the three-dimensional real world, and the users' experience becomes immersive in the 3D world with interaction with virtual objects and involvement in exploring the virtual environment. The associated cost has come with technological progress, and VR has become more viable and promises new learning models and styles for students.

Big Data/Internet of things (IoT)

With the increasing use of smarter mobile devices, web applications, we all leave behind individual information footprints, resulting in an abundance of data in the cloud space, allowing human and societal behaviour to be objectively quantified and, therefore, easily tracked, modelled and, to a certain extent, predicted. Keeping the ethical issue aside, these data can also be leveraged to enhance education and learning outcomes.

Implementation of AI in the educational arena

Teachers are a vital, essential part of a successful education system. Even online courses are heavily dependent on the quality and experience of the teacher. But AI is becoming a valuable tool for teachers in several ways. Teachers rely on AI to get insights on when to make adjustments to lesson plans, which students need individualised attention, and to complete administrative tasks faster. Using very effective language translation tools powered by machine learning techniques, teachers can teach in global classrooms. AI actively translates materials in a suitable language in real-time. The facility addresses many educational challenges students face like illness, geographical location, or physical danger in some regions of the world that are associated with going to school. Apart from helping in the teaching space, AI is also helping teachers

tackle the growing burden of administrative work. Teachers need to spend valuable working time grading papers and tests, preparing lesson plans and completing administrative work outside of the classroom. Machines are becoming increasingly sophisticated at evaluating written answers in tests to determine if they accurately addressed the questions asked and are helping to empower teachers to build more configurable lesson plans in less time. These same tools can evaluate the results of those tests and lessons to find gaps in student performance. If students consistently miss a question by a more significant than average percentage of the class, the system can recommend changes to the curriculum and how the lesson is taught.

New tools are being developed that can read emotions based on a child's voice and alert the teacher if the student is happy or frustrated and struggling. This technology provides direct insight into the emotional state of a large classroom of children. That alone can help them to respond timely and accurately when there is a concern.

There are dozens of potential applications that free up time for teachers, ensure students receive the intervention support they need and allow students to learn independently in a way that is conducive to how they think.

AI technologies are driving towards much sought personalised learning, and several products are being used. Two such important ones are:

1) Intelligent tutoring system (ITS),
2) Intelligent Personal Assistants (IPA)

Intelligent Personal Assistants (IPAs):

Smarter Voice recognition system, voice analysis, and language processing technology are used to build Intelligent Personal Assistants (IPAs). These developments tailored for learning have brought much fun to the life of students. This form of speech-based interaction allows students to feel like they are communicating with a real teacher. Artificial Intelligence and Speech Recognition technologies are becoming richer, IPA has become increasingly popular.

Intelligent Tutoring Systems (ITS):

Technology-driven intelligent tutoring systems (ITS) provide a way for computing systems to teach learners by giving them immediate and personalised feedback autonomously. ITS systems have been envisioned as aids for learners inside and outside classrooms, primarily as supplemental learning aids. In classrooms, ITS systems act as scalable augmentation aids to traditional multi-student settings for automating many tasks in the teaching and learning process. This, in turn, helps teachers focus their effort on critical tasks that humans are inherently good at (ranging from interventions with empathy to nurturing creativity), which machines cannot necessarily emulate effectively. Recent advances in AI are driving stronger human-machine collaboration in the learning process, especially making aspects of Intelligent Tutoring scale up to larger masses of students. ITS can be used in collaboration with teacher and student for various personalised learning and assessment activities and observes various performance and behavioural signals from the student that provides insights to the teacher. The teacher, in turn, can use the insights specific to each student or, in aggregate, as a class to customise interventions and provide informed motivation and remediation to the student for continued involvement in the learning process.

In conclusion, it is being observed that AI has come of an age where it has started giving results to enhancing educational equity and quality for the greater benefit of the greater society.

ETMA's Upcoming Conference

International Online Conference on Hybrid, Blended & eLearning (IOCHBE)

3rd - 5th December 2021

A massive body of research has created robust evidence of how technology integrated education positively impacts learners' interest, deep engagement and performance (learning outcomes). So far. The potential benefit of technology integration has been kept on the unlit burner until the covid-pandemic has come to the forefront.

Students, parents, teachers, schools leaders and educational policymakers experienced the benefit of technology integration in school and higher education worldwide.

The world community is counting the days for the end of the pandemic. The perceptive educators believe that students, teachers and parents have experienced the benefit of technology-integrated education. The world of education may not return to the same old classrooms. Education will be reconstructed with technology integrated hybrid, blended and e-learning in classrooms. This Conference aspires to create a new model of education.

CALL FOR PRESENTATIONS

Students, parents, teachers, school leaders and educational policymakers are invited to participate and making presentations in the form of research, meta-research, reflective papers, case studies, videos, podcasts, mobile apps at the International Online Conference on Hybrid, Blended and E-learning (IOCHBE) being organised by The Educational Technology and Management Academy (ETMA) from 3-5 December 2021.

Scope of Conference

The Conference will deliberate upon re-engineering and reconstructing education with technology integrated hybrid, blended and e-learning in classrooms with flexible walls and institutions without boundaries.

Presentation of papers is not necessary for your participation.

Focus

School, higher, and professional education - Technical, management, medical and agricultural education

Mode of Presentation

Papers, video, podcast, case studies, mobile apps, mind maps, simulations, and games etc

Presentation Guidelines

- Paper and Case Study: Word length 4,000 words; Reference APA style: Format: Word file, 12 points, Times New Roman font; Tables, Figures and Boxes with source.
- Videos and Podcasts not more than 7 minutes.

Important Dates for Submission of Proposals for Presentation

16th August 2021: Submission of abstracts of the proposal

25th August 2021: Communication of acceptance/ Revision/Otherwise

30th September 2021: Submission of full paper// presentation

15th October 2021: Communication of acceptance and/or Review comments

30th October 2021: Submission of revised Final presentation

Registration Dates

- **15th July to 30th August 2021**
  Rs.1000.00 or equivalent USD 15
- **1st September to 15th October 2021**
  Rs 1250.00 or equivalent USD17
- **15th October to 30th November 2021**
  Rs 1500.00 or equivalent USD 20
- **1st December to 3rd December 2021**
  Rs 2000.00 or equivalent USD27

For more details, please click

https://sites.google.com/aud.ac.in/etma-iochbe-2021/themes

Would you please write to us at

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Reviewing a Blended Learning Design for Elementary Schools

Mr Arnab Kundu

If we teach today's students as we taught yesterday's, we rob them of tomorrow - John Dewey

Why this Review

The meaning implied in the above quotation is the change in pedagogy according to time's demand. Prof. Marmar Mukhopadhyay in the Editorial of ETMA (2021, May) has beaconed this change saying that learning at one's own pace with self-constructed pedagogy is the attributes of future learning. COVID has pushed us to a new normal with an immutable hegemony of e-learning. It also exposes contextual limitations of e-learning at the same time being too separated from the participants' reality making it tough for multitudes of underprepared elementary students. Here blending could be the best viable option, allowing learners greater freedom and autonomy, imbibing the best from both methods-traditional and online. Designed blended pedagogic practices need to be reviewed and circulated among the practitioners to give them tinges of every latest nuance. This article presents a brief review of a blended learning study designed by Kundu, Bej, & Rice (2020) having claimed that the design has the efficiency of enhancing students' classroom engagement.

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How Blending Happened

Despite having proven potential, the authors admitted blended learning implementation is always a difficult task, especially in a government elementary school with poor technological penetration. The selected Design-Based Research (DBR) was conducted between April 26 to June 26 in 2019 in an Indian elementary school among forty students of the fourth-grade class having a Station Rotation blended learning model for a chosen math and literacy content. Considering the immature context, the authors said the DBR method was deliberately used and the strongest advocacy for this is researchers here acted as agents of change by working hand-in-hand with the teachers in the real situation, pioneered a change in the traditional classroom practice by setting an example. In these rotation models, children moved in small groups among centres. Some centres had teachers, some were offline group activities, and some were online computer activities. Each day, there were eight activity choices (four math / four literacy). The children could choose the activities that they wanted until the activity had five children at the centre. When the next rotation came, the children chose again. A student, who missed an activity in one rotation because it was full, could go to another and then return to the desired activity in the next round. The researchers did not want children to use computer time to do rote or drill activities, but teachers liked the idea of having children practice certain skills through repetitive practice. As a compromise, one of the computer literacy activities consisted of programmed word

recognition, and one computer math activity consisted of drilling math facts. The rest of the computer-based activities included activities such as story writing, audio-supported reading, drawing, computer-assisted math problem generation, and computer-animated modeling for solving math problems.

The teachers also insisted children must attend a teacher-led group during the rotation time. Non-computer activities outside of the teacher-led groups consisted mostly of guided reading and math problem-solving. Sometimes, children played games or used flashcards. Additional structural routines in the classroom consisted of using chimes to signal movement between activities, descriptions of what children were to do at each activity before the blended session began, and clean-up time in the end. The first-week data collection occurred before blended learning routines were introduced to the children. The next eight weeks reflected student engagement after introducing and implementing blended learning in the classroom. Quantitative data was collected through continuous observation by the two researchers and recording where and which children were actively engaged, passively engaged, disengaged, and disruptive. At first, researchers were an important resource for keeping the computers operating. Over time, children became quite adept at diagnosing and addressing technical issues, and so did the teachers.

Demonstrating Findings

The investigation was centred around two research questions-

i. Does blended learning enhance students' engagement at the elementary level?

ii. How did teachers perceive the implementation of blended learning?

The questions were very pertinent since students' classroom engagement is considered 'the holy grail of learning, but it has been a big issue among most Indian schools, as reported in ASERs (2017, 2018). Pearson India Education Services (2016) found only 55% of average students' engagement in Indian elementary schools. The outcome of this blended design revealed that blending has a positive effect on student engagement in an elementary classroom, and this outcome was found gender-neutral. As children made choices and teachers determined which activities were engaging and which were not, the number of actively engaged children increased. Children met the 55% engagement threshold documented by *Pearson India Education Services* (2016) in the third week (two weeks after implementation) and surpassed it in the fourth week. Teachers' perception of this innovative technology implantation has been beautifully expressed when one of them said, *"blended model in a classroom is an interesting process."* As much as teachers appreciated the experience and as much as they gained confidence, they felt at ease with the process that the implementation became enjoyable to them. The feelings of inadequacy regarding computer use were often at the forefront of the blended learning design. But by the end, the teachers were proud of themselves for implementing blended learning without extensive preparation and in schools with poor infrastructure.

Assessing the Effectiveness

This brief review finds that the overall time spent in a blended learning environment positively affected children's classroom engagement irrespective of their gender. Notably, these effects emerged within nine weeks. This time frame is a very important discovery. Besides, boys and girls were found to have adjusted well to the blended classroom, which is also an important discovery since there are persistent educational disparities between boys and girls in India. All these imply having positive changes towards quality learning through blended pedagogy even in schools with low technological infrastructure and underprepared but willing teachers provided teachers getting the necessary encouragements. The researchers optimistically concluded that if a school does not have optimal resources still can have engaged in blended learning through building effective partnerships cloud help them in all circumstances to have some success.

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Blended Learning: Challenges and Suggestions

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Abstract:

The Covid19 pandemic has impacted the education sector across the world by severely affecting nearly 1.6 billion learners around the globe. This pandemic has disturbed the educational system across countries and has forced us to see the inadequacies in this sector. Blended learning is an educational practice of combining digital learning tools with more traditional classroom face to face teaching. Blended learning provides opportunities for learners to learn online as well as offline. For this learning to be successful, the elements of a blended course need to be tailored to the learning format, whether be it in-person or online. But it is not easy to implement this shift in the learning process as there are numerous challenges at the grassroots for its effective implementation. Therefore this paper highlights the challenges faced by the teachers and students in blended learning and suggests measures to go ahead with blended learning. It is a conceptual paper based on the reviews of various research articles, magazines, journals, dissertations, and newspaper related articles on blended learning.

Keywords:

Covid19-pandemic, blended learning, digital tools, **challenges and suggestions**

"The value in blended learning comes from the ability to create student centred lessons that give students opportunities to practice skills they need to develop at their own pace."

- Cheryl Costello in Education Week Teacher

Covid19 pandemic has impacted the education sector across borders by severely affecting nearly 1.6 billion learners around the globe. The pandemic has compelled one to see the inadequacies in this sector, with a slow change in academic institutions, lecture-based teaching and learning methods, outdated classrooms and the challenges of ICT in education. Parallel to this, it has also created an opportunity to make various amendments in the system in the light of policies, technology in education, a transaction in the classroom and tightening the loose ends. COVID-19 truly did the impossible. It forced the educational institutions and the educators to test out 'ONLINE' as an option in imparting education. Multifarious models of online learning were tested, evaluated and approaches that seemed most effective were zeroed in upon.

Blended learning is one such approach. Just like some people watch a cricket match from the comfort of their homes and others from the stadium, in blended learning also, some students attend class from home virtually, while others join the class in person. Blended learning comes with its fair share of perks and includes elements like online exercises, pre-recorded video instruction; to support face-to-face classroom sessions. For this learning to be successful, the elements of a blended course need to be tailored to the learning format, whether be it in-person or online.

Blended learning models use technology/ online learning strategies to supplement the face-to-face learning that makes up the core of the class for all students. Blended learning and hybrid learning are used interchangeably. Blended learning combines digital tools and resources in face to face activates designed to give the best possible learning experience. The term blended learning suggests careful and deliberate integration of online and in-person activities. Learning tools can be used before, during or after an in-person session and support a variety of pedagogic purposes. The blended component, for example, might aim to extend the time students spend on a task, develop their information, literacy skills, stimulate their interest before a class, or enable them to work at their own pace afterwards.

The Digital era and Globalisation have led to new trends in education. Technology is the driving force of the fourth industrial revolution in which artificial intelligence, supercomputer, and digital automation are at their momentum. International competitiveness and global challenges demand a highly innovative and competent learning environment (Pandey, 2019).

The emergence of new technology has changed our perception of the world. The interventions of digital technology in teaching and learning have transformed the ambience in the classroom. New information and communication technologies (ICTs) provide educators and learners with an innovative learning environment to stimulate and enhance the teaching and learning process.

With the growth of ICT infrastructure, devices and tools, like reliable internet connectivity, mobile phones, laptops, have made online delivery of high-quality learning material possible, anywhere, anytime, at any location, in any language. Online education offers unrestricted access to quality education.

The progression in digital methods for education was imminent even before the unpredictable onset of COVID-19. However, this pandemic consequently redesigned the scenario of education rapidly and

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made us realise the importance and need for technology in education. Students and teachers faced diverse challenges in these difficult times of Covid 19, giving rise to methods that could help avoid social interaction and, at the same time, ensure the continuation of quality education.

Due to the increasing desire for multimodal, flexible education models at American universities over the past 30 years, hybrid / blended classes have arisen as a way of combining face-to-face interaction and online tools (Caulfield, 2011).

Blended learning is not a new concept in the field of higher education. It has been used in various universities of the USA, UK, Canada, France, Italy in the form of e-learning, collaborative learning, problem-based learning, active learning, resource learning, situated learning, narrative learning. Blended learning is an educational approach where more than one delivery mode is used with the objective of optimising the learning process.

Blended learning/hybrid learning is becoming popular as it is proving to be an effective approach for accommodating an increasingly diverse student population whilst adding value to the learning environment through the incorporation of online teaching resources. Blended learning in the higher education system shows how the blended approach embraces the traditional values of face to face teaching and integrates best practices of online learning. This pedagogical approach is a mix of face-to-face, online activities and the integration of synchronous and asynchronous learning tools.

Research studies have proven that this approach enhances the effectiveness and efficacy of teaching and learning in higher education across disciplines. It provides teachers and learners with an innovative learning environment to stimulate and enhance the teaching-learning process.

Vaughan (2007), in his study, shows that the blended learning model provides students with greater time flexibility and improved learning outcomes. His study shows that faculty suggests that blended courses create enhanced opportunities for teacher-student interaction, increased student engagement in learning and opportunities for continuous development. Another study by Lopez -Perez, Perez -Lopez and Rodriguez-Ariza (2011) shows that the use of blended learning has a positive effect in reducing dropout rates and in improving exam marks. Moreover, it shows that the joint effect of the blended learning activities has a positive influence on the students' final marks.

Cubillos, (2007). Gascoigne & Parnell (2013), In their study on hybrid course instruction and material, give feedback on student learning style which demonstrated that the majority of students who participated in the hybrid learning course are active/sensing/sequential/visual learners. Most of them preferred visual presentations to verbal explanations.

Blended learning could be the solution for providing education in the context of 21st century India. The massive use of open educational resources, MOOCs, social media and meeting apps like Google meet during the COVID- 19 lockdowns has opened up the minds of the people (Bordoloi, Das& Das, 2021).

There has been greater participation of teachers and students in online learning due to the Covid19 pandemic. This has given rise to opportunities and getting familiar with digital learning platforms, becoming digitally literate, organising webinars, and understanding the power of digital devices for imparting online education.

Features and Benefits of Blended Learning

In India, University Grants Commission has recently introduced a concept note on the blended mode of teaching and learning. The National Education Policy (2020) has given a rare glimpse into what can be achieved through the transformation of education.

Blended learning is a relatively new phenomenon in India, which is becoming a new normal educational approach and is here to stay. Blended

learning gives better opportunities for experiential learning. It makes teaching and learning student-centric, developing quality teaching materials and involving modern multimedia tools. Blended learning improves learning outcomes through alternative and enriched pedagogical approaches. Electronic lectures, unlike face-to-face teaching, can be accessed by learners constantly, which helps in better understanding of concepts. The teacher becomes the facilitator, advisor /mentor rather than the knowledge provider by developing content-rich interactive lessons and using ICT, transforming the learning environment. Blended Learning provides making learning resources and experiences repeatable, reliable and reproducible. This model is potentially a powerful training method whereby the students can learn and boost their skills better. Blended learning courses help the learners take ownership of their knowledge and expand their expertise.

What's interesting is that blended learning is also referred to as 'personalised learning' since these learning methods are custom-built to meet the professional needs of each student. Often, the instructional methods, learning objectives, assessment types, tests, instructional approaches and teaching modules may differ based on each student's needs. Such a training model helps the learners assess and evaluate themselves better. Students get the flexibility to attend online classes and also be a part of classroom-based learning for in-person interaction with the trainers. The online classes help students save time too.

Students can collaborate and communicate with each other using online tools. Students become responsible and attentive during online learning, as they have to meet their own deadlines for the timely completion of various assignments online. This generates confidence and autonomy in the students.

Effective blended learning programmes are focused on the learning experience and outcomes before considering the technology. As with physically presented learning, blended and online programmes have clear aims, objectives and assessment points. Effective blended learning emphasises active participation over consumption of "content".

The higher education landscape has changed and will continue to change, meaning existing models of blended learning/hybrid learning may not be appropriate or practical. Universities will need to reflect not just on how blended learning can be used to deliver modules but how existing blended learning curriculum models will need to be adjusted to fit this new future. Many universities have sought to develop their own blended /hybrid learning courses as another option for students and instructors who prefer to replace some portion of traditional face-to-face meeting time with online instruction.

Technology is what we are living with day in and day out; therefore, teachers have to acquire their expertise on digital tools/ web-based tools, subject matter and digital skills.

Challenges in Blended Mode of Learning

The digital divide is starkly visible among students of various regions, religions, incomes, gender, caste and creed. Some of the challenges faced in the blended mode of learning are:-

- Poor internet connectivity-the geographical terrain of India, with a large percentage of colleges and universities being located in rural areas where internet connectivity is a major issue.
- Lack of proper infrastructural facilities- lack of proper buildings, classrooms, digital infrastructure such as internet/high-speed internet facilities, expensive technology-digital devices, computers, laptops, phones, etc., causes hurdles in this approach of the teaching-learning process in rural areas.
- A well-planned blended learning programme -which effectively integrates content, a range of techniques and resources for online

and face to face learning will take time to implement and become the new normal.

- Lack of physical infrastructure- lack of trained teachers and students, with regard to expertise/skills on the usage of digital tools and techniques, subject expertise and pedagogy of online learning.
- Lack of government attention, support and funds- without the support of the government and funding for new models, the innovative educational approach will not grow.
- Developing instructional modules- empower teachers to make quality e-learning material, designing content and establishing techniques onto new platforms.
- Time management–no proper timetable for study and submission of assignments and online exams by learners.
- Learners lack contact and face to face interaction with peer groups and teachers.
- Lack of control over students during online learning – teachers cannot control the students from indiscipline in a blended mode of learning.
- New innovative approach in education should reach all-The blended learning approach also comes at the cost of excluding the socio-economically marginalised learner from getting higher education.

Some Suggestions

- For proper implementation of blended learning in education, proper infrastructure and facilities like– computers, laptops, high-speed internet etc., should be provided.
- To overcome these challenges, specific skills would be required for both learners, staff and teachers, a well-planned, blended learning programme that effectively integrates a range of techniques and resources for online and offline learning.
- Provide targeted training and support to teachers for online instruction. Support the teachers and students with new innovative technological advancements so that they are comfortable handling the digital sources.
- Simply moving content online is not sufficient; translating the content, altering design and delivery and establishing techniques onto new platforms is required. An enriched pedagogical approach should be adopted to keep the students involved and engrossed.
- When deploying blended learning/ hybrid learning, the course and programme are responsive to changes keeping in mind the landscape and environment.
- Course design for blended learning should be age-appropriate so that students understand.

Conclusion

Blended learning helps learners to learn at their own pace and also inculcates the spirit of collaboration enabling participants to work together and engage in discussion. It also promotes students to have autonomy in learning. A cost-effective learning process in a time-bound manner is the need of the hour, and blended learning stands out as the flag bearer of the digital India initiative in higher education.

Blended learning can prove to be a powerful tool and a strategy if learning experiences are well designed. Withstanding the issues and drawbacks related to blended learning, it has humungous potential to impact Indian higher education in a positive way by forming the underpinning of a transformational model that irrevocably holds expectations for students, faculty and administration. It's all about the RIGHT BLEND based on the learner's requirements, their level of understanding, and competencies at stake. Blended learning has changed the way learning is perceived and delivered, and this is just the beginning.

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International Online Conference on Hybrid, Blended and e-Learning

3rd – 5th December 2021

ETMA now takes the initiative to explore this post-pandemic future of learning and education in an International Online Conference on Hybrid, Blended and E-learning (IOCHBE) scheduled for 3rd, 4th& 5th December 2021. The Conference will be addressed by globally reputed scholars from India and abroad.

Invitation:

Join a community of Experts, Leaders and Professionals at the International Online Conference on Hybrid, Blended and E-learning. Your colleagues and your social media friends are cordially invited to connect virtually to interact, expand and share your learning and expertise with the community of scholars at this Conference.

Presentations

In the celebration of shaping a new model of the future learning process, we invite you to share in your research, meta-research, reflective papers, case studies, videos, podcasts, mobile apps to enrich the deliberations. Only with your collaboration, participation and scholarly contribution we can move ahead to achieve the goal.

- Would you mind sending a brief proposal on your presentation – papers, video, podcast, case study, etc. latest by the 15th August 2021
- The status of your proposal shall be intimated to you by 30th August 2021
- Full paper video, podcasts, etc., to be submitted latest by 30th September 2021 at.
- Communication of Review comments - acceptance/ revision/non-acceptance by 15th October 2021
- Submission of Final presentation after revision by 30th October 2021

Length of case study or paper not to exceed 4000 words (File Format: Word; without Size: 12; Font Style: Times New Roman; Tables, Figures and Boxes acceptable with source)

Videos and Podcasts not more than 7 minutes.

The Conference deliberations would facilitate developing a new model of education that would be exciting, engaging, and facilitating excellence.

The Conference deliberations will include school, higher, and professional education - Technical, management, medical and agricultural education.

To explore the world of the futuristic education, ETMA with immense pleasure welcome you to the International Online Conference on Hybrid, Blended and E-learning system on 3rd to 5th December 2021.

There are many reasons to join, but here are just a few. The plan is designed by the ETMA, in collaboration and consultation with experts, to explore this post-pandemic future of learning and education. It addresses the most significant questions in the potential benefit of technology integration in schools, colleges and universities. Our prestigious panel of speakers will guide the discussion for maximum engagement, offering you a unique opportunity to learn from your peers from all around the world. It also offers you a brilliant chance to share your knowledge with thousands of members around the globe. We move a step ahead to reconstruct education with technology integrated hybrid, blended, and e-learning classrooms with flexible walls and institutions

without boundaries.

Reputed scholars from

1. British Columbia University, Canada
2. Athabasca University, Canada
3. Commonwealth of Learning (Vancouver)
4. Stockholm University, Sweden and other international and Indian institutions will present their papers and disquisitions during the Conference.

For more and details, please visit:

https://sites.google.com/aud.ac.in/etma-iochbe-2021/home

Saturday Academic Conclaves

ETMA organises a One-hour Academic Conclave every Saturday. Scholars share their readings, new learning, research proposals and findings. This Weekly online Academic Meet is attended by a large number of participants from India and a few other countries like Singapore, Sweden, Singapore and others

You are welcome to join this forum to share your learning, research. Young research scholars can consult senior professors on their research projects.

Following are the last four Saturdays Academic Conclaves

S. No.	Date	Topic	Speakers
1.	03/07/21	Managing Mind During Pandemic Lockdown	1. Sri Y N Kausal, Director, Enablers India, Alumni IIM Ahmadabad 2. Prof Satish Kalra, Visiting Professor/Guest Faculty at various management schools like Great Lake Institute of Management (GLIM) Gurgaon, MDI Gurgaon, TISS Mumbai and former Professor IIM Lucknow.
2.	10/07/21	Neurodiversity	1. Ms Manobina Chakraborty, An inclusive education consultant and the founder of 'I for inclusion', Gujarat, India. **Chairperson** Prof. Sudesh Mukhopadhyay, Former Chairperson of The Rehabilitation Council of India, Head of the Dept. of Inclusive Education in NIEPA and Director of the SCERT Delhi.
3.	17/07/21	Life in IITs	1. Sri Atanu Mondal, doctoral student IIT Kharagpur and ETMA scholar. 2. Sri Soumya Saha, industry executive, IIT Mumbai Alumni. ETMA scholar. 3. Sri Sanjay Dalmia, Educational Entrepreneur and founder of Ticklinks; IIT Delhi and IIM Ahmadabad alumni. 4. Sri Tileswarnath Tiwari, former Chief Public Affairs Officer, ACC Ltd and alumni IIT Kharagpur. **Chairperson** Prof VS Raju, Former Director IIT Delhi and Member of ETMA Council.
4.	24/07/21	Health Management during Pandemics	1. Dr Rajesh Acharya, MCH, MBBS, MS, Senior Consultant (Neurosurgery), Sir Gangaram Hospital, New Delhi 2. Dr Paritosh Gupta, MBBS, MS, DNB, Head, General & Minimally Invasive Surgery, Artemis Hospital, Gurugram 3. Dr Prabhatam Maheswari, MD, DNB, MRCPCH (London), Chief-Neonatal & Paediatric Critical Care, Artemis Hospital, Gurugram

Transformative hybrid learning in higher education: A futuristic approach

Ms. Raspreet Kour[1]
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Mr. Mulkh Raj[1]
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Hybrid learning is a new concept in teaching-learning settings in which learning takes place as per the needs and requirements of the students. These requirements can be individual, social, emotional, etc. With the advent of the hybrid learning approach, learning is not restricted to only four walls of the classroom or an educational institution. It gives exposure to the students in many ways, as it takes care of individualised learning as well as social learning both at the same time. Halverson, Graham, Spring and Drysdale (2012) defined hybrid learning as 'a diverse and expanding area of design and inquiry that combines face-to-face and online modalities".

Qi and Tian (2011) defined that there are four properties of hybrid learning:

i) a mix of collective learning and individual learning
ii) a mix of synchronous and asynchronous learning
iii) a mix of self-paced and group-paced learning
iv) a mix of formal and non-formal learning in terms of lifelong learning incorporation and/or setting of learning

This term has come into existence at the time of need when the world is fighting with pandemic Covid-19, due to which educational institutions are now imparting education through a hybrid learning mode. Students can now access education both online and offline mode. According to Goel (2021), "The education system in India has undergone a major haul over the last one year in terms of how it operates. Due to unfortunate circumstances of the pandemic, more than 35 crore students and 1.08 crore teachers across 15 lakh schools, 1,028 universities, 41,901 colleges and 10,726 standalone institutes in our country were unable to attend classes during the lockdown." In order to deal with this, our education system has transformed from traditional to blended to hybrid learning. UNESCO, in collaboration with McKinsey and Company, has prepared Covid-19 response- hybrid learning "Hybrid learning as a key element in ensuring continued learning- Version 2 as of December 2020". It is a detailed toolkit of UNESCO for dealing with future learning-related problems in situations like pandemics, epidemics, etc.

Hybrid learning is thus a combination of:

It is not only suitable in times of epidemics, pandemics or natural calamities, but it is beneficial for students of diverse needs who cannot attend a formal system of education because of one

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reason or the other. For instance, it is beneficial for diverse need students, which include special need children, autistic children, ADHD children, children facing cognitive disabilities, students coming from backward areas, terrorist prone areas, natural disaster-prone areas, acid attack victims, girl students, students belonging to SEDGs (as written in NEP, 2020), rehabilitating and re-enrolling dropouts, etc. It provides learning opportunities to students that are based on synchronous-asynchronous technology.

This term is often used synonymously with blended learning, flipped classroom, digital learning, online learning or e-learning. But, in reality, hybrid learning is technically a different term. It is one step ahead of blended learning. Hybrid learning is a customised kind of learning which is structured according to the individual needs and interests, self-paced and flexible.

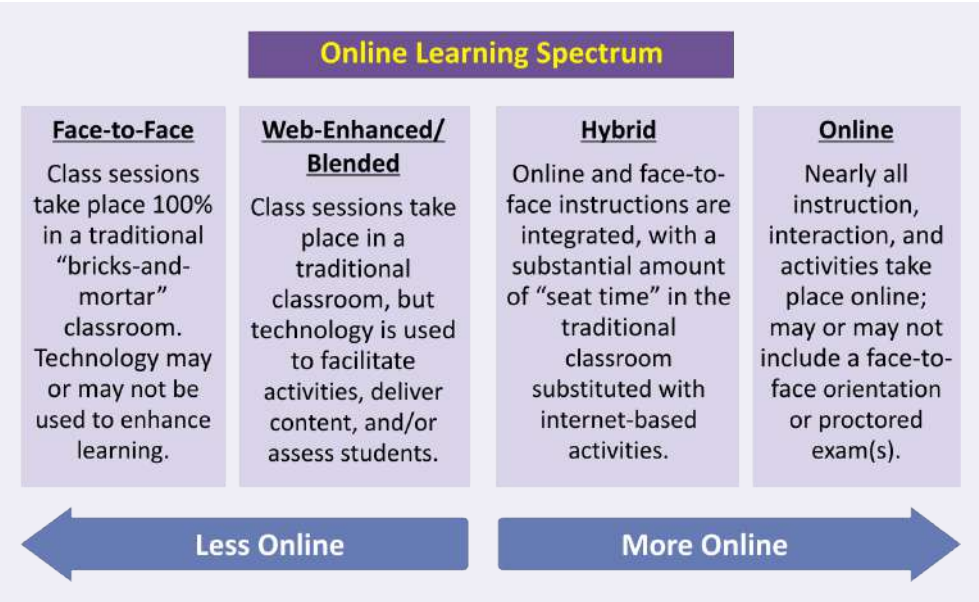
Hybrid Learning and Blended Learning:

While exploring hybrid learning, all what we collectively concluded is both terms can be used interchangeably. But, with each passing day, it was realised that both are different in the sense that blended learning combines in-person teaching with asynchronous learning methods, where students work on online exercises and watch instructional videos during their own time and hybrid learning is a teaching method where teachers instruct in-person and remote students at the same time. In hybrid learning models, asynchronous teaching methods can be used to supplement synchronous, face to face instruction. Many people might use the words "hybrid" and "blended" interchangeably, but in fact, they mean different things. That difference is based primarily on the proportion of face-to-face and online sessions and/or instructional material in a given course. That said, hybrid and blended are but two terms in what we might think of as a larger "online learning spectrum".

Evolution of Hybrid Learning Models

In an article published online by Copy leaks in 2021, the evolution of hybrid learning models is explained in the following manner:

1. **The Differentiated Model:**
   In it, every student appears from home or is in class but engages synchronously in the same lessons. At home, students use video conferencing technology. However, both in-person and virtual students interact with each other.
2. **The Multi-Task Model:**
   Here, teachers divide students from both groups into cohorts, and teachers use a separate track. They can work on the same assignment, but no interaction between them takes place.
3. **The Virtual Accommodation Model:**
   Here, a small group of at-home students participates in face-to-face interaction. They use video conferencing software to assess learning.



(Source- https://www.codlearningtec.org.)

4. **The Split A/B Model:**
   Here, the at-home and in-person students are interchanged on alternate days. When virtual students learn by videos and podcasts, the real-time students are engaged in assignments, participate in classroom debates, enjoy games, and get academic help from teachers.
5. **The Independent Project Model:**
   4-5 students work independently on their projects personalised when in-person students continue working on their assignments in the face-to-face learning environment.

Benefits of Hybrid Learning

In this digital era, hybrid learning is one of the constructivist learning strategies to make students learn in a barrier-free environment and has the following benefits, as given by Brown (2021):

1. Convenience
2. Affordability
3. Accountability
4. Flexibility
5. Face Time
6. Differentiation
7. Effectiveness
8. Expanded Access
9. Self-pacing
10. Personalisation
11. Engagement
12. Deeper Learning

Hybrid Learning and Higher Education

Higher education students belong to a generation that is comfortable in using technology and who likes to read, write and share their ideas on virtual platforms and are independent learners. They know how to think rationally, make informed decisions and are vigilant about their cognitive processes. For students of higher education levels, hybrid learning is a blessing. Different experts and researchers have studied it differently:

According to Spector (2008), "Hybrid learning is relatively new in the field of higher education, although, the approach has already been applied in various Open Universities, most prominently in UK & USA in the form of e-learning."

Masson et al. (2008) concluded that the hybrid learning model enables the creation of simple yet effective artefacts for teaching and learning that are understandable across the various stakeholders in Higher Education. These simple aids prompt interrogation and a deeper reflection and consideration of processes, interactions, roles and expectations involved in teaching and learning. They can also be the catalyst for identifying opportunities, resources and technologies for transforming and improving practice, e.g., formalisation of learning design practise, revision/ modifications to enhance current practice and provision of artefacts to promote discussions among course teams and with students.

Young et al. (2016), in their research paper, concluded that online and hybrid models of instruction offer colleges and universities flexible, cost-effective, and academically rich alternatives to traditional instructional models that are becoming more rigid with each new technological advancement. Still, programs, departments, and schools that consider change simply for the financial benefits neglect the most valuable and obligatory role of the institution: instructional fidelity. Academic ramifications for such a transition in instructional delivery must be well thought out, and careful consideration must be given to the intentional development of program-specific courses that meet the professional and academic needs of the student while continuing to address weaknesses in the social aspect of schooling that is critical to the integrity of the collaborative learning community.

Gleason & Greenhow (2017), in their article, concluded that, as colleges and universities continue to find ways to increase their enrolments, such as offering expanded and alternative pathways to education for all students, especially non-traditional or under-represented students, hybrid or blended learning programs are a promising solution. This first-of-its-kind study of robot-mediated blended learning suggests that RMC can offer several advantages over traditionally used videoconferencing systems for fostering social presence and embodiment in doctoral education. Additional design studies are needed to examine

the interaction of hybrid pedagogy and robot technology over a longer period than a one-semester course, with additional groups of students (e.g., undergraduates), and connected to student learning outcomes.

Hybrid Learning: A transformative Futuristic Approach

Keeping into consideration the importance of hybrid learning, Kahn, Blended Learning Coordinator, Center for Teaching and Learning and Ecampus, Oregon State University, opined that "this form of learning will continue to grow and likely at an accelerated rate."

Also, it is evident that hybrid learning is the future of the teaching-learning process as it will transform the whole education system from rote learning to constructivist learning and from generating dependent learners to independent and self-regulated learners. It has the quality of:

i. Improved flexibility
ii. Mentoring
iii. Enhanced peer learning
iv. Experiential learning in an online setting
v. E-proctoring tools
vi. Learning through collaboration

Teaching and learning at times of complexity and uncertainty is a challenging task for all teachers and students across the globe. Hybrid learning is the solution for all these problems wherein students can be engaged in learning through the right kind of tools regardless of the location and physical presence in the classrooms.

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Hybrid Model of Learning: A Flexible Combination of In-person and Remote Environment

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Introduction

In a developing nation like India, the implementation of successful remote learning in school education in the context of a pandemic is extremely troublesome and as well controversial. After a year of experience and experiments with various modes of remote learning, it was not possible to keep children from falling behind academically (Morgan, 2020). Most schools lack the academic capacity to accommodate full-fledged remote learning systems, and they also lack supports from higher authorities, which will certainly add to learning losses during the pandemic. In contrast, parents with a poor and even middle socioeconomic standing were unable to give their children the essential technology and high-speed internet access during this crisis. Because a virtual approach alone could not guarantee equal access to education, many countries banned teachers from offering remote learning to school students (Mezzacappa and Wolfman-Arent, 2020). At the same time, content, pedagogy, relationships, the balance of workloads for both teachers and learners, and the nature of the learning climate are all key concerns in such situations (Zhang et al., 2020). So, in turn, virtual instruction and requiring students to work remotely do not ensure social justice and equity in education, and that ultimately became a debate. So, it is urgent to search for an alternative model which is executable in such an emergency.

Hybrid Learning- An Alternative Approach

Although it is uncertain when and how the children will come back to school and how health and safety measures will be taken in the learning campus, it is urgent that schools will need to gradually transform from full-time remote learning back into the classroom. As being vulnerable for infection instead of full-strength classroom small group of students may be accommodated for in-person instruction maintain safety protocol. Considering both aspects, hybrid learning may be an alternative in such a transitional situation. Hybrid learning can be defined as a learning approach that combines both in-person classroom instruction and remote learning into one cohesive experience that ensures learning continuity. It is more relevant during partial school re-openings during pandemics (UNESCO, 2020). In a hybrid learning environment, the on-campus learning experience with a substantial amount of "seat-time" in the classroom is integrated with pre-scheduled online instructional synchronous and or asynchronous activities. The duality is unique

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here in which the online instructional activities are crafted in such a manner that can substitute to in-person material and is meant to add flexibility to the learning experience (Jayakumar, 2020).

Although people mostly used both the terms Bended learning and Hybrid learning interchangeably, these two strategies are exclusive and different from each other. The difference is based primarily on the proportion and design of instructional experience in a given course in order to utilise its two instructional formats. Hybrid refers to learning instruction that is well balanced and potentially equivalent between its in-person and remote learning experience simultaneously, whereas blended mostly deals with a traditional in-person course that also incorporates a few online class sessions and/or providing online asynchronous discussion. Hence-in-here, the hybrid environment is towards more "online learning spectrum" (College of DuPage, undated) in comparison to the blended learning in terms of pedagogical design, interaction, and experience; though there is nothing to estimate how much amount of those elements will deviate from each other in existing two learning mode.

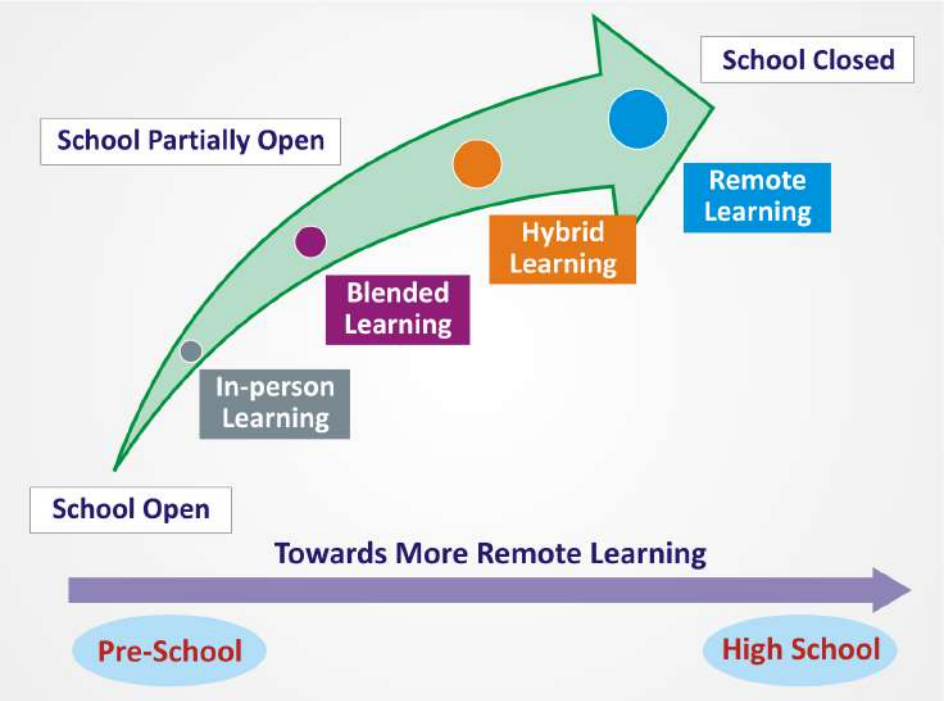

Figure1: The Degree of Hybridisation of In-person Learning and Remote Learning

There should be liberty at the teacher to enjoy flexibility in hybrid design to determine the weightage of online activities and relevant pace of interaction considering the variation of age and diverse capacity of the school. In a continuum of two extremes having face to face in one end and remote engagement on the other, from pre-school children to secondary, the degree of remote engagement may be gradually enhanced.

Models of Hybrid Learning

Several formats of hybrid learning have been documented since the beginning of the twenty-first century. With each successive technology innovation, the hybrid model of teaching-learning becomes more authentic in terms of student participation and outcome. Through in-depth analysis of literature, we could able to categories all such different formats into three basic models of hybrid learning.

Traditional model

This model is a first-generation hybrid learning model, and it is the forerunner of other hybrid learning models in this context. In the classroom, teachers provide learning instruction and learning activities like lecture notes, PowerPoint presentations, pre-recorded video, and links to view or download resources are available in an asynchronous online form as a supplement to the in-person material (Ho & Burniske, 2005). Some of its forms and functions quite adhere to blended learning. This model is less expensive and more accessible to learners of all types. However, the main drawback of this paradigm is that it is too superficial for pedagogical intervention, especially

when working remotely.

Mixed model

This is an extension of the traditional hybrid model in which students participate in a mix of learning activities at school and at home. Teachers interact and assess their students' understanding of the topic during in-person activities and then provide additional instruction, practise, and feedback on new material online. When they're working remotely, they use asynchronous and synchronous content to perform tasks independently. Synchronisation can be accomplished through interactive virtual video conferencing platforms such as Google Meet, Zoom, WebEx, and others (Wichadee, 2015), as well as online examinations and live chat rooms (Lin, 2008). The mixed model is quite popular since it is less expensive than the synchronous model or full-fledged remote instruction because neither the school nor the students require high-end technology support.

Synchronous Model

One such concept involved separating students into two groups, with one giving in-person classroom instruction and the other providing simultaneous live instruction through video conferencing (McKinsey & Company, 2020). During the pandemic, some Danish and Chinese schools used the asynchronous paradigm. One benefit of this strategy is that it is simple, as teachers will only need minimum retraining and will be able to keep to their present lesson plans, reducing their workload. However, it might be difficult for remote students to follow a lesson that is also being taught to a large group of in-person students, and it can be difficult for teachers to accommodate dual pedagogy in a single template.

Whatever model is chosen by the school authority, it is a very crucial academic decision to map out that how the students will be grouped for in-person class and for remote teaching. Which students will be prioritised for in-personal learning and which students will be selected for engagement in remote learning. There is a need for a guiding framework.

Rubrics for Segmentation of Students for In-person and Remote Learning

With safety concerns in mind during the COVID-19 epidemic, student segmentation is crucial, and it is also required for implementing a particular teaching model. In terms of student segmentation, however, using the hybrid approach is challenging. Students might be separated based on their aptitude and learning needs, and it is also necessary to establish how infrequently they should return to school. The table below depicts an optimal distribution plan for learners throughout the continuum of in-person and remote interaction.

Frequency (Back to School)	Status of the Student	
★★★★★	Vulnerably Students at risk remotely	★
★★★★	Student require nutrition and child care programme	★★
★★★	General students	★★★
★★	Parents worried about safety measures	★★★★
★	Students with health risk by their own and/or family members	★★★★★

Table 1: Frequency to adopt the mode of learning for hybrid model through student segmentation (Based on McKinsey & Company, 2020).

Strategies for Creating Hybrid Environment

Creating a successful hybrid course requires a lot more insight than simply taking half of your existing class sessions and converting them into online activities. The nature of negotiation with learning content in peer-group can be expanded in such a hybrid format, while learners may have pre-exposure with content and later on reflect further in an in-person class.

Creating an effective hybrid-learning strategy

involves an iterative approach with four steps: understand and envision, decide and design, enable and execute, and monitor and adjust (UNESCO, 2020).

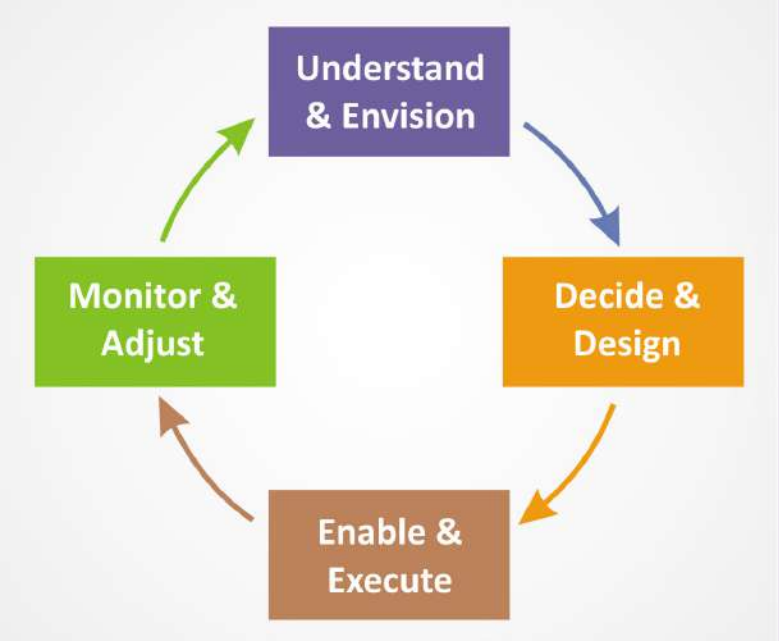

Figure 2: Strategies for the execution of hybrid learning.

"Understand and envision" is the stage where it needs to decide about the parameters on which the hybrid-learning strategies would be framed. The academic leaders can finalise the guiding principles for the hybrid-learning strategy according to the scope of application and students' pacing. The system's existing status need to be assessed, including student and family needs and preferences, the usefulness of remote-learning choices, and the teacher's capacity to provide in-person learning and logistic assistance.

"Decide and design matters", once the strategic parameters have been established, the next stage is to allocate scarce capacity by grade, i.e., how much in-person learning can be offered to each grade level based on its effects on individuals. Should full-time in-person learning be prioritised for specific ages (e.g. early elementary stage) while hybrid learning is provided for other grades? How much in-person learning should we provide to vulnerable students at-risk, is also influenced by specific demographics within grades?

"Enable and execute" follows careful prioritisation of student groups; in this stage, in-classroom time for each group must be prioritised based on the nature of the content and learning activities. It's critical to choose which subjects should be studied in person and which should be studied remotely, as well as which aspects of the teaching and learning process should be designated for in-person study. After systems have decided on a hybrid-learning model, the next step is to choose the best shift system for in-person learning (stretched hours, days, and weeks)

Because it's vital to reflect in order to achieve perfection, the following step is to "monitor and adjust." The Hybrid-learning model is an experiment by nature. Based on changing conditions, student engagement and learning outcomes, and feedback from students, parents, and instructors, systems will need to analyse and change their approach.

Teacher's Role

New teaching approaches are required as a result of the increase of remote and hybrid learning. The strategy necessitates a combination of in-person and virtual learning instruction; it enables teachers to prepare for the dual format of the curriculum. Furthermore, the process allows children to access less time in the classroom overall. In this context, the hybrid teaching-learning systems may incorporate improvised team-teaching and co-teaching approaches. For instance, such as having some teachers provide in-person contact while others provide remote instruction for the same class of students in order to build meaningful relationships with students, differentiate instruction, provide evidence-based interventions, and, to put it another way, meet students where they are. (Spasić et al., 2015; Mahoney, 2021). In any system, creating new roles could be advantageous. Hybrid learning may necessitate the hiring of additional classroom aides to manage students who are unable to be in the same classroom as their teachers

owing to physical distance. For remote education, "learning navigators" may be required to assist students, teachers, and families in effectively using technology (McKinsey & Company, 2020).

SWOT Analysis of Hybrid Model

The hybrid model has been evolving for the past two decades, and in the context of compulsory school closure, it is taking on a new shape. The finest potential hybridisation of in-person and remote learning should not be rigid and fixed; rather, the flexibility of such experimentation is its strength. The SWOT analysis has been done here for the academic leaders of the school to use as a ready reference while making their decision on hybridisation of learning format.

Table 2: The SWOT analysis for integrating Hybrid Model of learning in school.

Strength	Weakness
• Taste of on-campus & online learning	• Re-design a new campus structure
• Increased flexibility	• Against of 'one-size-fits-all approach
• Personalised learning	• Equipped with additional infrastructure
• Richer concept exploration and large scale discussion	• Demand more mentoring and supervision
• Immediate feedback	
Opportunity	**Threats**
• Back to school campaign in post-pandemic	• Probability to form a gap between course design & student learning style
• Maintaining health and safety issues	• Feeling of identity crisis when immigrating towards remote teaching
• Reducing digital divides	• Workloads
• Opportunities of access to combine more than one mode of learning	• Participation may become optional in remote discussions for a disadvantaged group.
• A deeper sense of community interaction	
• Innovation and application of effective pedagogy	

Concluding Remark

In the time of any kind of social disaster, in reviewing the present state of safety measures, the school must choose the option that will be most beneficial to them. With changing circumstances, the academic leadership of schools may switch from one format to another format of hybridisation. However, they must reconstruct the student and instructor allocation for in-person learning, as well as the pedagogy and students' involvement and interaction for both modes. During stressful times, heart and passion may be more important than the content needing to be covered. While building a resilient system of education, the hybrid model is one of such endeavours, which demands continuous reflection, innovation and experimentation.

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Hybrid Learning in Educational System: A Ray of Hope during Covid-19 Pandemic

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Abstract

The education system in India has changed dramatically over the last year in terms of how it operates. The Covid-19 pandemic has created a lot of challenges in the Indian educational system. Due to the cumbersome circumstances of the pandemic, it became impossible for more than 35 crore students and 1.08 crore teachers across 15 lakh schools, 1.028 universities, 41,901 colleges and 10,726 standalone institutes in our country to attend classes during the lockdown, leading to an abundance of learning loss. In order to address this challenge, the traditional classroom teaching methods had to be reinvented, by encouraging educators to start making use of technology in various innovative ways to make learning, a lot more interactive, effective and productive as well. In 2021, many were looking forward to the long and much-awaited return to the physical classroom, i.e., back to school. However, the pandemic has changed the education landscape in India drastically, thereby necessitating the educational system to accelerate the adoption of e-learning or Hybrid Learning. Universities are now evaluating how they can effectively integrate technology to create classrooms of the future, and educational institutions are under tremendous pressure to establish excellent standards for hybrid learning—with educators teaching students in both the classroom and at home. One of the most important factors while implementing the hybrid learning approach is to ensure that the quality of the learning experience is the same as in-class training. The strategies and the technologies that universities and schools implement to make e-learning more immersive and constructive to the teacher and student community what it is more important than ever.

Keywords

Hybrid learning, Educational System, Pandemic

"We need to bring learning to people instead of people to learning."

- Elliot Masie

Introduction

Hybrid learning means to learn in a face to face class interaction and online mode. Hybrid learning creates a flexible environment for every learner to learn at his/her own pace and also provide opportunities to explore ourselves through online mode. The objective of hybrid learning is to teach the students by using different techniques and make the teaching-learning process more effective

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so that the needs of the students should be fulfilled and the goal of the educator can be achieved. These techniques are used in teaching to reduce the problem faced by the students in traditional classrooms.

Halverson, Graham, Spring and Drysdale (2012) defined hybrid learning as a manifold that connects face to face classroom instruction and online learning. Qi and Tian (2011) claimed hybrid learning has four attributes (1) collective learning and individual learning (2) synchronous learning and asynchronous learning (3) self-learning and team learning (4) formal, non-formal and distance learning. Hybrid learning is collective learning that works parallel to learning with different methods, strategies and programs for the transmission of the instruction.

Many pieces of research have been conducted to know the effects of online learning on students' performance. Vinod Kumar Sharma (2017) studied the attitudes of students towards geography achievement through hybrid learning. Sukhmani (2018) studied the effect of blended learning on student's achievement at the secondary level. Pravat Kumar Jena (2020) studied the impact of Covid 19 on higher education in India and stated that online learning creates opportunities for learners to learn at any level of education.

UGC and MHRD have launched many virtual platforms with online depositories, e-books and other online teaching/learning materials. A combination of the traditional technologies (radio, TV, landline phones) with mobile/web technologies to a single platform with all depositories would enhance better accessibility and flexibility to education. All these services provide proper access to learners, especially disadvantaged groups. Virtual learning is the most trendy means to provide education at the time of Covid 19.

Need of Hybrid Learning During Pandemic

Covid 19 is a new virus that has spread throughout the world. Many areas are affected by this virus-like social, economic, political, educational etc. In the education sector, face to face interaction method is carried out in all schools. Social distancing disturbs traditional educational practices. During covid 19 face to face, activities are turned into online activities that break the chain of coronavirus. When hybrid learning is used as a tool in the teaching and learning process, learning should be learner-centred, more innovative and flexible. In this process, the learner can learn anywhere and interact with teachers and other learners. Online teaching is flexible where the learner can learn at his/her own pace. In the present scenario, hybrid learning has stepped into the digital world. Hybrid learning provides various opportunities to explore students in the different fields during Covid 19. It helps the students to become self-instructor and auto learners. It helps the teachers as well as students to upgrade their skills in various fields. Hybrid learning increases the ability of the students to concentrate, thinking and imagination power. During Covid 19, it is used in all areas of education, i.e. formal, non-formal and distance education. It is important that teacher should be properly trained and has proper knowledge how to evaluate students' performance with hybrid learning. It reduces the burden of the teacher during a pandemic and learns various new things related to education.

Hybrid learning used various types of tools to make the teaching-learning process more effective, like video conferencing, audio conferencing, computer conferencing, web conferencing etc. During the pandemic, students spend maximum time in online learning and increase intrinsic motivation also.

Hybrid Learning Benefits

For Student:

- Ability to track learning
- Ability to learn at his/her own pace
- Encourages ownership of learning
- Increased engagement
- Greater flexibility in scheduling

Faculty Benefits:

- Potential time savings through less in-person learning.

- Higher-quality interactions with students via email, discussion forums or online chat.
- Ability to appeal to varying learning styles.
- More purposeful face-to-face instruction that emphasizes deeper learning.
- Increased collaboration among students.

Administrator Benefits:

- Potential cost savings if using less brick-and-mortar classroom space.
- Better student data to write measurable learning outcomes, track real-time progress and apply early student intervention.
- Opportunities to upskill faculty.
- Ability to expand course offerings to more students.

Preparation of Classroom for Hybrid Teaching During Pandemic

"Every accomplishment starts with the decision to try."

Some schools are planning to reopen for hybrid teaching in the coming weeks; it becomes a thought-provoking question for the administrators, teachers, and parents like how to implement this hybrid teaching-learning process (a combined form of in-person and online learning) into the school. Here are a few tips for educators on how to prepare their classrooms for hybrid teaching.

- Communication with Parents & Guardians: Before the initiation of classes, send a physical letter and talk via phone call with the families of the students regarding the hybrid learning instructions. Class expectations and also a contact list for questions.
- Create a safe and effective learning environment for everyone: The schools must take the responsibility to protect the health and provide safety to their students, as the physical well-being of the students is the main priority of the educational system.
- Classroom disposition for Social Distancing: Make sure to keep the in-person learning safe, this can be possible by turning all desks to face one direction and spacing classroom seating 6 feet apart, and following all social distancing classroom tips.
- Make a roster for recurring video calls: Plan regular class video calls and parent-teacher conference calls in advance using apps such as Zoom.
- Encourage social distancing through portable classrooms--if in-person learning space is too small for social distancing in your classrooms, you may need to add portable classrooms to safely accommodate your class size. Portable classrooms can be quickly delivered to your campus when and where you need them.

"Know your students and let them know you; support wayfinding; don't be afraid to slow down together, laugh together and talk about what is challenging together."

Hybrid Learning: A Hope in Educational Sector During Covid-19

As we all know, the COVID-19 pandemic has been a crucial time for each one of us. The most important sector that suffers a lot due to this pandemic is EDUCATION. So, in order to continue the studies of students, the traditional classroom approach has shifted to a hybrid learning approach, which is the need of the hour and proved to be very beneficial.

- Hybrid learning played an important role in saving the learning loss caused by Covid-19. It helped the students to continue their studies from their respective places.
- The life of the students is the utmost priority of any educational institution. So here, Hybrid learning seems to be the only way to save or protect the students from this deadly pandemic.
- Hybrid learning acts as the only means to engage the students in pandemic time by engaging them in various activities. Also, the teachers prepare interesting lessons; that makes the interaction more lively and human.
- As the motto of education is, "No one should be left behind"…Hybrid learning is the exact solution to this, as it provides opportunities to all. Every student can approach this model as it is self-paced.

- Due to the Covid-19 pandemic, suddenly, we all have to get ourselves locked in our homes, which was not normal for each one of us. Students isolate themselves from their peers, teachers and neighbour friends, which may lead to many disorders like anxiety, depression, etc. Here, the question arises, What about the mental health of students? Hybrid learning is the only answer to this question, as it saves students from such disorders and provides them with a way to make connections, interact with their teachers and peers, share their problems with them and get the problems solved collaboratively.
- Hybrid learning provides the freedom to students to study from anywhere, with just a computer or smartphone, thus, saving most of their time.

Conclusion

Hybrid Learning allows a flexible approach to the learning process performed collaboratively by the student, the teacher, and the participating experts or institution. Based on the four constructs identified, the key feature of hybrid learning is that it can be adjusted according to the needs of the learner, the course, and the other significant indicators, such as pace, time, and space. Unlike the traditional learning approach, hybrid learning could offer an array of opportunities for time and space-constrained individuals. Hybrid learning has also been found conceptually effective and applicable in different forms of collaborative learning approaches in cross-disciplines, institutional bridging, and non-formal settings. Unfortunately, despite the benefits offered by hybrid learning, the approach has been found to be less adopted by providers due to drawbacks in terms of applicability, integration, and social effects to learners and cost restrictions.

However, hybrid learning is more than just tossing half of your syllabus into a virtual classroom. Instead, it's a comprehensive approach to combining the best parts of face-to-face and online learning to create the ideal learning experience.

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Hybrid Learning: A new platform to reform educational system during COVID- 19

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Abstract

COVID-19 pandemic has been a challenging time for all of us. The education system around the globe has also suffered and is shifted to the hybrid learning system as the only best option of resuming studies. One of the great benefits of the technological boom that has happened across all the sectors within the last half-century is the development of digital learning and training solutions for every phase of life. Not only are today's education initiatives better able to harness technologies to customise content and create more engaging learning experiences for students. However, during the current pandemic, traditional classroom learning could not be resumed, and a hybrid learning system, that is, a blending of classroom and online learning, is introduced to carry out studies. It is thus the need of time to highlight the significance of hybrid learning systems and explore the various challenges faced by teachers and students in this regard. The aim of this paper is to discuss hybrid learning and how it could be a solution to reform the educational system during the pandemic.

Keywords

Hybrid learning, COVID-19, reforms, educational system

Introduction

World Health Organization (WHO) officially declared COVID-19 as a pandemic on 11 March 2020 after assessing the global outbreak around the clock for months. The pandemic has caused educational disruption across the globe, as nationwide closures forced institutions to temporarily close their doors (Bouchrika, 2020). While countries are at different points in their COVID-19 infection rates, worldwide, there are currently more than 1.2 billion children in 186 countries affected by school closures due to the pandemic (LI & Lalani, 2020). However, during the current pandemic, traditional classroom learning could not be resumed, and a hybrid learning

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system, that is, a blending of classroom and online learning, is introduced to carry out studies while maintaining the standard operating procedures (SOPs).

Concept of Hybrid Learning

Hybrid learning is a way of combining traditional classroom experiences, experiential learning objectives and digital course delivery that emphasises using the best option for each learning objective. Hybrid learning refers to the blending and mixing of the learning environment (Doering 2006). A hybrid learning environment gives students the privilege to understand and explore real-world issues through authentic learning experiences facilitated in an online learning environment (Ellis, 2001). The goal of hybrid learning is to provide the most efficient and effective instruction experience by combining delivery modalities (Kumar, 2012).

Hybrid learning is where students learn through a mix of in-person and online activities. Students are encouraged to learn from one another in-class instruction sessions, whereas the multimedia shared online enhances and reinforces discussion in class. Hybrid learning is most effective when it occurs before, during and after class. Hybrid learning refers to web-based learning activities that are used to complement in-person instruction. Students spend less time seated in a classroom listening to lectures and are instead encouraged to explore online and learn from their peers. This approach combines face-to-face classroom instruction with online activities. This approach reduces the amount of seating time in a traditional face to face course and more of the course delivery online. During classroom instruction time, students can be engaged in authentic, collaborative learning experiences. The online components can include multimedia-enhanced content and channels for ongoing discussion. Hybrid instruction allows the students to get benefits from both traditional and online classes.

The concept of hybrid learning refers to the combination of an online learning environment by gaining the flexibility of distance or outside of classroom learning and face to face classroom instruction (Hentea, Shea and Pennington, 2003). Hybrid learning also affords learners the opportunity to meet with course instructors and their peers face to face to discuss, debate, question, and acquire instruction. Courses that are taught online obviously do not provide for these physical experiences. Hybrid learning combines the benefits of both distance and face-to-face learning. Teachers play the role of facilitators by assisting the students whenever necessary and the role of instructors by providing complimentary lessons in line with the online courses of the students.

Concept of COVID-19

Coronavirus disease (COVID-19) is an infectious disease caused by a newly discovered coronavirus, which causes mild to moderate respiratory illness, which may turn out to be fatal in no time. This virus spread primarily through droplets of saliva or nasal discharge when an infected person cough or sneeze. On 31 December 2019, WHO was informed of cases of pneumonia of unknown cause in Wuhan City, China. A novel coronavirus was identified as the cause by Chinese authorities on 7 January 2020 and was temporarily named “2019-nCov”. The World Health Organization declared a Public Health Emergency of International Concern regarding COVID19 on 30 January 2020 and later declared a pandemic on 11 March 2020. As of 11 June 2021, more than 184 million cases have been confirmed, with more than 3.84 million confirmed deaths attributed to COVID-19, making it one of the deadliest pandemics in history (WHO, 2021).

The COVID -19 pandemic has affected the educational system worldwide, leading to the near-total closure of schools, Early Childhood Care and Education services, universities and colleges. Most governments decided to temporarily close educational institutions in an attempt to reduce the spread of COVID 19. The COVID-19 pandemic created a lot of challenges in the Indian Education system. At such a time, understanding these challenges is the key to solving them for better crisis management in education. Another set of lockdown seems imminent, with no idea when the situation will be back under control. Due to this, E-learning has been on the rise and is being added as the future of education. Online pedagogy

has done a great job of supplementing offline education at different levels in this crisis, although it may not serve as its replacement wholly. Online learning has become a critical lifeline for education. Hybrid learning can enable teachers and students to access specialised materials beyond the textbooks from many experts across the country and internationally. It can bridge time and space gaps during this phase of crisis when the education system is lagging behind.

Hybrid Learning to Reform Educational System during COVID-19

As we all know that COVID- 19 has brought new challenges to the entire world in every field, whether it is business, industries, institutions and individuals themselves. One of the most affected segments includes the "education system", which in turn affected the students as well as teachers. In India, the education system has undergone a drastic change over the last year in terms of how it operates. Due to the unfortunate circumstances of this COVID- 19 pandemic, approximately 35 crore students and one crore teachers across the country were unable to attend and take classes during the lockdown. To address this challenge, there was a need to re-imagine the traditional methods of teaching, and for this, educators started using technology in an innovative way to make teaching-learning more interactive, attractive and effective (Goel, 2021). The Covid-19 pandemic has caused the largest disturbance of the educational system in human history. Schools were closed in every part of the world as a precautionary measure. This forced teachers to shift towards online sources of learning overnight. The outbreak has significantly developed the necessity of switching over to user-friendly online learning devices and applying that in this crucial time of lockdown and restricted movements. The annual calendar of each institution huge block the uncertainty related to the pandemic; online education has been accepted as new normal. Online education podiums are the need of the hour for developing a sense of continuity in the educational system. With the realisation that we will not be able to return to the normal system of education, apps like Google Meet, zoom which has not been heard by most of us, become part of our routine within the shortest possible time. Artificial Intelligence, big data, 4G and 5G, and cloud-based platforms have been used in the service of education. (Rekhi, 2020)

Many were looking forward to returning to the physical classroom during lockdown. However, the pandemic has disrupted the education system in the country, thereby accelerating the adoption of e-learning. In 2021 all universities, colleges, schools and all educational institutes are under pressure to establish excellent standards for hybrid learning---with educators teaching students in both the classroom and at home. If we think of education in rural India, hybrid learning is not only providing flexibility to teachers and students, but it is also helping to change the way we think of education and is removing many of the barriers that were traditionally existing. One of the most important factors while implementing hybrid learning is to ensure that the quality of learning should be the same as in a physical classroom. Prior importance should be given to the strategies and technologies that universities, colleges and schools are implementing to make e-learning/hybrid learning more constructive and effective to the teachers as well as to the students. Besides this, many teachers and students are facing difficulties due to poor audio and video quality, and this, in turn, is having a negative impact on students ability to learn. The online mode of education provides many advantages like location independence, flexible hours, travel free, time-saving and convenience for both the teacher and taught.

The educational institutions have faced many problems and difficulties due to COVID-19 because they were way behind in adopting technology as they have focused more on classroom teaching and had never seriously thought of having online education. However, due to the incredible dedication and determination, educators were quick to adapt to the new ways and means of providing education to their students. Instructors and educators have had to upskill themselves almost overnight to adjust to the new modes of teaching, ensuring that learning should remain accessible to students even in the current circumstances.

The most significant part of the hybrid learning model is how does it impact students as online classes are not new, parents and students are already familiar with it. A hybrid learning system promotes blended learning, in which the learner experienced traditional classroom activities along with online learning (https://yourstory.com/2021/03/hybrid-education-system-new-form/amp). In other words, we can say that it combines remote and in-person classroom learning. It develops independent learning by which students gets chance to present their ideas, understanding and to explore their personal interest.

Since the beginning of this pandemic, the school system is moved these three main models between these three models predominately:

1. **Schools open – in-person model:** Prior to COVID-19, schools had a full in-person model where teachers and students interacted full-time with each other. Most schools used traditional variants (i.e., textbook, blackboard teaching), while some had a blended variant (i.e., employed EdTech solutions). It is possible for schools to return to this model after the risk of the virus becomes controlled.
2. **Schools closed – remote model:** schools closed to minimise the spread of the virus and shifted to a fully remote model where all learning and teacher-student interactions are taking place remotely. It will probably continue in areas with a high risk of transmission.
3. **Schools partially open– hybrid model:** Following the immediate response and the peak of the virus, schools started opening partially so students could return in person for a partial school day or for a few days a week.

   In the hybrid learning model, selection of the students for in-person teaching and remote teaching is another major challenge before the schools:

   For In-person Teaching:

   - Students at risk of being away from school (Special children, children whose parents unable to support them, second language, at-risk home and at risk of dropping out etc.)
   - Lack of Access to remote learning.
   - Students without care.
   - Students who are in the last grade of their education system.

   For remote learning:

   - Students whose parents are not comfortable sending their ward to school.
   - Students at high risk of infection. (UNESCO, 2020)

Six types of hybrid models

1. **In-person:** -Students go through the entire learning value chain in person
2. **Homework model (instruction at school, practice at home):** Teachers transmit new concepts to a group of students in person, who then complete exercises and assignments remotely.
3. **Flipped classroom (instruction at home, practice at school):**

   Students learn about new concepts remotely and then complete their exercises and assignments and review them in person with the teacher.
4. **Synchronous live (with one group in person and one remote simultaneously):**

   Teachers have a full normal class with a group of students in person while another group follows remotely through video conferencing (VC).
5. **Asynchronous hybrid (mix of learning activities at school and at home):**

   Hybrid of flipped classroom and homework model in which the remote element is asynchronous. Teachers provide instruction, practice and feedback at school, then provide an asynchronous platform for students to do the same at home, which is then reviewed again in the classroom.
6. **Remote:**

   Students go through the entire learning value chain remotely. (UNESCO, 2020)

S. No.	Models	Merit	Demerits
1	In-person	Traditional learning methods students are most familiar with. Facilitates teacher interaction and peer collaboration.	Due to physical distancing measures, there is a limited capacity to offer to students. Higher risk of spreading the virus from longer physical interactions.
2	Homework model	Teachers can focus on what is happening in the classroom. Remote and in-person learning are integrated. Students can ask questions during the instruction phase and benefit from other students' questions.	Students and parents cannot review instruction (as it happened live) which can make it difficult to complete exercises. School is only used for instruction and has no social function. Teachers do not know how students did in their practices and, as a result, cannot adapt to teaching
3	Flipped classroom	Teachers can observe if the instruction has been understood and offer additional instruction as needed. Students and parents can view and review instruction at home at their own pace. Possible to focus in-person time to do practical activities with groups of students	Requires support from the parents for initial instruction. Students can forget the previous day instruction by the time they need to complete the respective exercises
4	Synchronous live	Class does not have to be split. Teachers work synchronously with all students and do not split time.	The teacher cannot see the students at home or students see each other. Students cannot review instruction. Difficult for remote students to follow
5	Asynchronous hybrid	The teacher accompanies students through all core learning activities. Students can complement all in-person learning with self-paced learning remotely. Coherent learning experience	High investment from the teacher and availability of remote resources are required for students to be able to continue learning remotely. Requires support from parents for remote learning activities in order to be effective
6	Remote	Highest safety from the virus. Enables deployment of certain specialised software	Not effective for specific ages and subjects. Can require demanding requirements for advanced solutions. Students do not benefit from socialisation and interaction at school

The Challenges of Hybrid Learning

There are, however, many challenges of hybrid learning. Some of them are-

- Some students without reliable internet access and/or technology struggle to participate in digital learning; this gap is seen across countries and between income brackets within countries.
- Procrastination can become magnified when online work adds up.
- Online Temptations can distract students.
- Online communication can be misunderstood and cause angry/hurt feelings among classmates because you do not have the benefit of seeing or hearing the author -eye contact, body language, voice intonations all give clues about humour or sarcasm.
- Some students can never remember that they have hybrid assignments.
- If students are not careful or strong readers, they may miss a crucial element of online, hybrid assignments.
- Many teachers have a fear of technology and often see a move to hybrid or online learning as a move to replace them as teachers.
- Difficulties in sharing files and learning materials
- The emergence of technical issues.
- Retaining teacher authenticity
- Creating an effective self-paced learning environment
- Building student authentic mastery

Conclusion

To conclude, we can say that it would be impossible to predict when this pandemic of COVID-19 is going to end. But what we make out of it is entirely in our hands. Change is desirable and inevitable. This change, in fact, has been forced upon us due to the onset of covid-19. Whether we use this opportunity as an advantage or let it go is entirely in our hands (Manhas, 2020). In other words, there is a great need for a paradigm shift in our thinking about teaching and learning to create a conducive environment for learning with technology. The capacity of teachers is the major key for that, but we must also change our mentality about teaching and learning as well. (https://www.universityworldnews.com/post.php?story=2020052 8134934520)

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