Transforming Education with a Blended Learning Model to Overcome the Digital Divide

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Abstract

The global impact of the COVID-19 has been devastating in all the sectors throughout the world. During this period, huge number of students faced numerous obstacles to continue the education in an effective manner. For the educationists, it is the matter of great concern to maintain quality and accessible education in this period of crisis as well as after the crisis. COVID-19 has prompted experts to reconsider the most relevant pedagogies for dealing with global health challenges. Several educationalists and researchers propose blended learning as a practical and best-fit alternative for academic institutions. There is dire need to blend and integrate technology and traditional methods of teaching in the times to come. The importance of traditional textbook-based classroom learning cannot be overstated. However, in order to meet the demands of the new normal or post pandemic, the integration of blended learning approach into education and its widespread use is the only viable solution.

This paper attempts to track the potentials of implementing blended learning classrooms in India following the corona virus outbreak, as well as to identify related problems and make possible recommendations. The study is carried out in six Universities of North India. A semi structured questionnaire was administered in Google form covering the perceptions of the teachers (40) and students (60) regarding the usage of technological devices and blended services. The study concluded that a blended classroom is the new emerging need of the Indian classrooms to bridge the gap of digital divide and other connectivity issues. The study attempts to make some recommendations in light of National Education Policy 2020 of India to aid educators in understanding the challenges of implementing blended mode of learning in Indian classrooms and proposes an emerging blended learning model -based on collaborative model of teaching.

Keywords: *Blended Learning, Technology, Transformation, Access and Inclusivity, Collaboration.*

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One of the most significant casualties of the current COVID-19 pandemic has been education. According to the UNICEF-International Telecommunication Union report (2020), this was the largest widespread disruption in schooling in modern history, affecting 1.6 billion children worldwide. To confront the situation, policymakers all around the world have called for a shift to remote learning. However, because many people do not have access to the Internet, this has created an unbalanced landscape. According to a report by UNICEF (2021), the shift to online learning during the pandemic has exacerbated issues of inequality and widened the digital divide in India. It should be addressed by the policy makers and the educationists on priority.

In April 2020, the Ministry of Human Resource Development (now renamed as the Ministry of Education) in India circulated a new Alternative Academic Calendar (AAC) which emphasized the continuation of online education throughout the country. The closure affected the learning community across India due to lack of access to mobile connectivity and other necessary gadgets. Though a lot of content was disseminated by the teachers but there is limited evidence regarding the following:

(i) Were the teachers prepared for the pedagogical shift?

(ii) How much content was accessible to the learners?

(iii) How many students were engaged?

(iv) What was the level of participation of the learners?

REVIEW OF LITERATURE

With the advancement of the technology and its application in the field of education like distance education, open schooling, digital education, lifelong learning etc. becomes a hope for the learners to access quality education and learning resources as well. In order to harness the potential of ICT in addressing educational inequalities and bringing inclusivity, firstly we need to revamp our approach to overcome digital divide in terms of its access and resource reach. ICT in education benefits all sorts of learners by removing some of the access hurdles they face. So, the blended learning involving the technological incorporation is an approach which uses and integrated online learning with traditional mode. Graham et al. (2013) suggested that blended mode of education can supplement the traditional mode of education. Blended services also allow the distance or open school learners to receive the study material (by mail, email, or other options made available by the Internet). This educational act might apply new tactics

and learning processes that are individualized to the student, fostering self-management and self-teaching (Aladwan, Al-Shboul, & Awamrah, 2018). Online technologies are seen as excellent means for gaining access to students. This improved connectivity can efficiently, effectively, and affordably connect students from anywhere at any time with learning centers (Van Dam, 2001).

Blended learning, at its most basic, is the intelligent blending of in-person and online learning activities in the classroom (Garrison & Kanuka, 2004). The flipped classroom is a technique that utilizes technology in order to remodel the learning experiences and increases the effectiveness of traditional face-to-face teaching. Blended learning is the integration of traditional face to face and e-learning teaching paradigm (Wong et al. 2014). Blended learning entails the combination of different methods of delivery, styles of learning and types of teaching (Kaur 2013). Graham et al. (2013) projected that blended learning will become the new course delivery model that employs different media resources to strengthen the interaction among students. It provides motivating and meaningful learning through different synchronous and asynchronous teaching strategies such as forums, social networking, live chats, webinars, blog, etc. that provides more opportunities for reflection and feedback from students.

Blended Learning furthermore was divided into the 'third generation' of distance education systems (Phipps and Merisotis, 1999), where the first generation referred to correspondence education using a one-way instructional method including mail, radio and television. The second generation meant distance education aided with single technology such as multimedia projector device whereas the third generation refers to the blended learning, characterized by combining face-to-face learning with various computer technologies to learn and instruct.

In a study on blended learning, Feng Su and Namrata Rao (2020) stated that for the cognitive and conative development of the students, the teachers need to know the pros and cons of online instruction, thereby, understanding the importance of blending traditional and online technologies. They recommend a few essential considerations for a successful blended learning design. The study also discusses the formation of a learning web community of learners and educators to enhance peer tutoring. Chawdhary (2020) suggested that the creation of flipped and virtual learning environment can also enhance the learning by short quizzes and new evaluation methodologies. There is need to inculcate the sense of responsibility towards setting an effective model of sustainable education in the future. A study on blended learning was undertaken by Hockly (2018)

in which she proposes that teaching has to be a two-way process whether it is online or blended of online and offline. The key element to be taken care is the quality and effectiveness of the teaching learning process. She also suggested that the institutions need to ensure the requisite infrastructure for moving towards the blended mode to make education sustainable in any situation.

RATIONALE OF THE STUDY

New circumstances and new realities require new initiatives. The recent rise in epidemics and pandemics necessitates that we are ready with alternative modes of quality education whenever and wherever traditional and in-person modes are not possible. But there are numerous challenges while dealing with certain types of subjects/courses, such as performing arts and science practical in online education space. Thus, unless online education is blended with experiential and activity- based learning, it will tend to become a screen- based education with limited focus on the social, affective and psychomotor domains of learning. Therefore, while promoting digital learning and education, the importance of face-to face in-person teaching is fully recognized. Accordingly, different effective models of blended learning will be identified for appropriate replication of different subjects.

With the advancement in technology, there is an emergence of a number of tools and resources where the instructional designer now has a plethora of choices that can be used singularly or can be integrated to create a blended mode. SimLab+, Virtual labs, Robotics, Free/Libre and Open-Source Software for Education (FOSSEE) etc. can act as an effective technology. Virtual labs provide 24 by 7 remote-access to the experiments at low cost and provide better access, repeatability, reliability, safety and security. FOSSEE project of Ministry of Education under National Mission on Education through Information and Communication Technology (NMEICT) and e-Yantra promote the usage of educational tools in academia and research. Advent of many tools proctored through Artificial intelligence have been witnessed during the pandemic time and this AI technology helps to grab attention level of students, their ways of learning, speed of learning etc. Learning resources such as video lectures, podcasts, recordings and articles are provided to the learners in order to lead discussions and facilitate engagement for active learning spaces.

Most popular resources presently used are electronic portfolios, online discussions, live discussions, Google classroom, Zoom, Microsoft teams, Skype, Moodle, etc.

Blended mode of education includes: group discussion and exchange of ideas, virtual classroom, accessing e-library, virtual laboratories, viewing expert lectures on you-tube, online learning through videos and audios, accessing and maintaining educational blogs. Most apex educational institutions across India are currently providing enormous opportunities for the capacity building of the educators at all the stages of education through refresher courses and bridge courses. Apart from this, many workshops and webinars are also being organized and initiated to keep the teachers updated. All teachers, regardless of their location, language, age, or qualifications, were able to participate in the programmes like special lectures, webinars, faculty development initiatives and much more.

Recent ICT initiatives of Ministry of Education and UGC will be helpful in implementing BL and also in ensuring the availability of e-learning resources that are Open Educational Resources- OER, NPTEL, SWAYAM PRABHA, e-content courseware in UG subjects, CEC-UGC you-tube channels, spoken tutorial, National Digital Library (NDL), Shodhganga, Vidwan, Massive Online Open Courses (MOOCs), Study Web of Active Learning for Young Aspiring Minds (SWAYAM) etc. All these together with Digital Infrastructure for Knowledge Sharing (DIKSHA) i.e. One-Nation-One Digital Platform project of Ministry of Education shall ensure the availability of online learning resources. Millions of people now have access to educational opportunities nowadays. The number of students enrolled in Massive Open Online Courses (MOOCs) provided in India is an example to back up this claim. Furthermore, in recent years, a focus on open educational resources (OER) has given an ample of opportunities to save time and money and has resulted in outcome-based learning. (Fischer et al., 2015).

On the other hand, the University Grants Commission (UGC), India's higher education regulatory agency, has established guidelines for basic teaching requirements. Some of these provisions include 180 days of teaching per year, 30 hours of teaching per week, 75 percent attendance in theory and practical classes, and specific credit value for courses offered over 15 weeks in a semester, excluding admission, examination, and time for other co-curricular activities. But during COVID-19, these regulations were unquestionably broken. As a result, the UGC formed a committee to look at academic schedule difficulties in light of the pandemic. The committee has presented its findings, and it is expected that the UGC regulations will be changed to accommodate the unusual position that we are in.

Some universities, according to the report, lack the technological infrastructure required for online teaching and assessments. When we address concerns of fairness and inclusion, recommending a one-size-fits-all strategy and expecting every teacher to teach online is incongruent. COVID-19 has created a conducive environment for technology-enabled learning in India's higher education. It is perfect time for policymakers and educators to seize this opportunity to change Indian higher education and build a resilient system that promotes equity, excellence, and expansion. The current crisis has given us many lessons and future of education in Indian Education is learning in blended mode.

From the above discussion, it is clear that the need of the hour is to adopt and adapt to the alternative methods to keep our education system efficient, effective and ready for all kinds of disasters in future. It is imperative to integrate the new technological advancements in the Indian classrooms. The review of related literature supports the idea of blended learning as the probable solution in the coming times. The findings of the present study will assist the teachers and learner in understanding the use of blended learning in Indian classrooms after COVID pandemic or in new normal situation. Only face-to-face or online classes would be less successful than blended learning instructions. It would provide adequate time to the students to work for part-time earnings while continuing their studies. In terms of communication and information technology, they would be effective. To succeed, they must be more presentable, autonomous, self-regulated, and independent.

Suggestive framework for Blended Learning Pedagogy

Ministry of Education under the guidelines of NEP 2020 has provided the broad framework for BL environment in Higher Education Institutes in India.

Online Mode: involving both synchronous and asynchronous activities mentioned as-

(i) Accessing e-resources in the form of Open Educational Resources (such as text, graphics, simulations, gaming, interactive multimedia)

(ii) Digital libraries, virtual labs, museums

(iii) Studying Massive Open Online Course (MOOCs)/ Synchronous Massive Online Classes (SMOCs) etc.by the learners as per guidelines by the instructor

(iv) Completing assignments and uploading on LMS

(v) Attending webinars/ workshops, online internships/projects as per suggested by the instructor related to the curriculum

Face to face (F2F) Mode: involving the activities to be performed in the classroom as-

(i) Physical training, apprenticeships, internships, field visits, sports, projects

(ii) Physical labs, hackathons, working in maker spaces, etc.

(iii) Participating in group activities with peers, collaborating and co-creating new knowledge

(iv) Discussions on queries related to self-learning or group learning.

IPSIT: An Indian Framework for Blended Learning

IPSIT model has been proposed for the Higher Education Institutes in India and it recommends that every higher education teacher planning offers the course in Blended Learning mode that should follow all the phases of IPSIT Model.

IPSIT stands for:

(i) Identify resources and learner-centered activities

(ii) Provide resources and announce activities on Learning Management System (LMS)

(iii) Scaffolding and support to learners

(iv) Identification of learning gaps and feedback

(v) Testing

OBJECTIVES OF THE STUDY

1. To determine the current state of blended teaching - learning methodologies as well as their prospects and problems; and
2. To figure out the challenges and lessons learnt by students and teachers during COVID 19 period.

METHODOLOGY:

The researchers have used the mixed method approach in the present study. The study is carried out in six Universities of North India viz. Central University of Jammu, University of Jammu, Central University of Himachal Pradesh, Himachal Pradesh University Shimla, Central University of Punjab and Punjab University Chandigarh.

Sample: The sample comprises of 60 post graduate students and 40 teachers selected randomly.

Tool used: A semi structured questionnaire was designed in google forms covering the perceptions of the teachers and students regarding the usage of technological

devices and blended services. Validity of the tool was ensured after being reviewed from the concerned faculty and language expert. Data has been collected from the 60 post graduate students and 40 teachers selected randomly form 6 different above-mentioned universities. Further, the analysis of the collected data is done using the simple statistical tool like percentage.

FINDING AND DISCUSSIONS:

Objective 1: To determine the current state of blended teaching - learning methodologies as well as their prospects and problems

The analysis has been done in two parts viz.

1. Responses of the Students
2. Responses of the Teachers

1.1 RESPONSES OF THE STUDENTS:

Q1. Digital devices used by students during COVID 19?

(a) Most frequently digital device used

The students were asked about the most frequently used device for teaching learning during COVID. The table I (a) and figure I (a) interprets that 95% of them were using their smart phones and only 5% were using laptops for the same. PC was not being used by any student.

Table I (a) - Digital Devices used by the Students

Item	Responses
Smart Phones	95%
Laptops	5%
PC	0

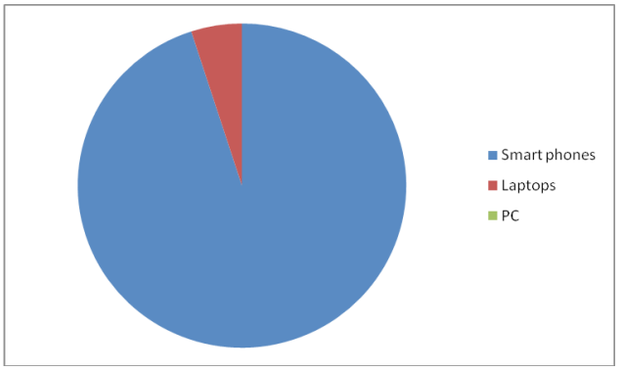


Figure I (a) - Digital Devices used by the Students

(b) Most frequently used tool for content transaction

The students were asked about the most frequently used tool for content transaction during COVID 19. The table I (b) and figure I (b) reveals that ZOOM/Google Meet/WebEx is the most widely used tool for content transaction in education, with a response rate of 98%. WhatsApp follows closely behind at 89%, serving as a platform for content transaction. Google Classroom is utilized by 80% of respondents. YouTube is popular for accessing educational videos, with a response rate of 70%. Skype, blogs, and Twitter have lower usage rates at 9%, 8%, and 8% respectively. Facebook live classes are the least frequently used at 5%. Overall, ZOOM/Google Meet/WebEx, WhatsApp, Google Classroom, and YouTube dominate as the preferred tools for content transaction in education. Mishra (2020) in his study came up with the similar findings that near about 45% of teachers and students used Zoom, Google Meet, Cisco WebEx, and Skype platforms to carry out online classes, whereas 32% of teachers were utilizing Google classroom.

Table I(b): Most frequently used tool for content transaction

Item	Responses
ZOOM /Google Meet/WebEx	98%
WhatsApp	89%
Google Classroom	80%
YouTube	70%
Skype	9%
Blogs & Twitters	8%
Face book live class	5%

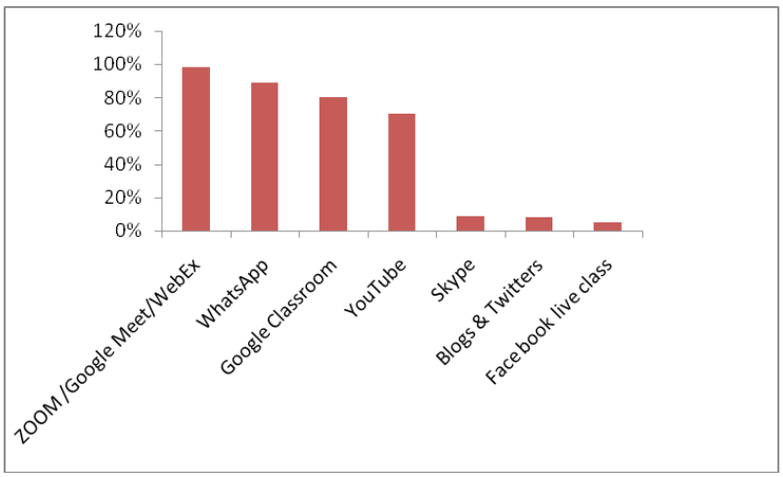


Figure I (b): Most frequently used tool for content transaction

Q2. About Blended Learning

Table II - Response of the Students about Blended Learning

Sr No	Item	Yes	No	No comment
a)	Blended learning as a preferable learning medium after Covid-19	80%	20%	0
b)	Flexibility of time and space in blended learning	78%	22%	0
c)	Liberty and independence in learning process	76%	20%	4%
d)	Acquaintance of Blended learning	70%	25%	5%
e)	Knowledge of difference between blended Vs Traditional Teaching	70%	20%	10%
f)	Provision of requisite infrastructure for blended learning	30%	60%	10%

(a) Blended learning as a preferable learning medium after Covid-19

The students were asked to share their opinion on whether blended learning will be their preferred learning medium in post COVID era. The table II and figure II (a) interpret that 80% of the sampled students were in favor of using blended learning in future, where as 20% of the remaining were not in favor of the use of blended learning in classrooms. The study conducted by Yoko H. et al. (2008), also revealed that the majority of students preferred online learning to traditional classes, and believed that combining online and face-to-face learning is beneficial for students.

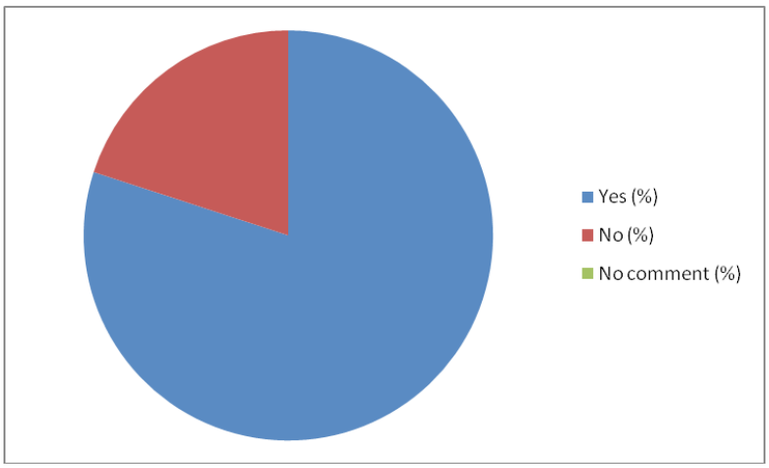


Figure II (a): Blended learning as a preferable learning medium after Covid-19

(b) Flexibility of time and space in blended learning

The students were probed to share their views if blended learning will give them more flexibility of time and space. The table II and figure II(b) interpret that 78% of the sampled students responded "yes" that blended learning gives flexibility of time and space whereas 22% negated the statement.

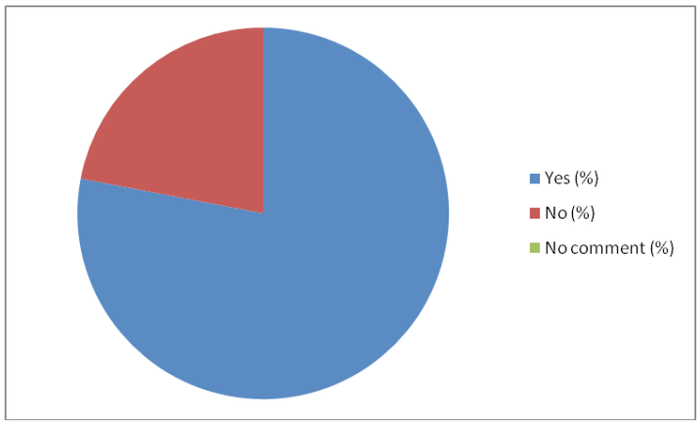


Figure II(b): Flexibility of Time and Space in Blended Learning

(c) Liberty and independence in learning process

As depicted in the table II and figure II (c), 76% students responded "yes" on the question 'do you think that incorporating blended learning will give you more independence and liberty for learning?' whereas 20% students were of the opinion that it will make them more engaged and restricted where as 4% remained neutral. Similarly, it was revealed in the study by Bhushan, (2018) that one can privilege themselves of learning independently and performing live discussions with an expert team of faculties through the online and blended modes.

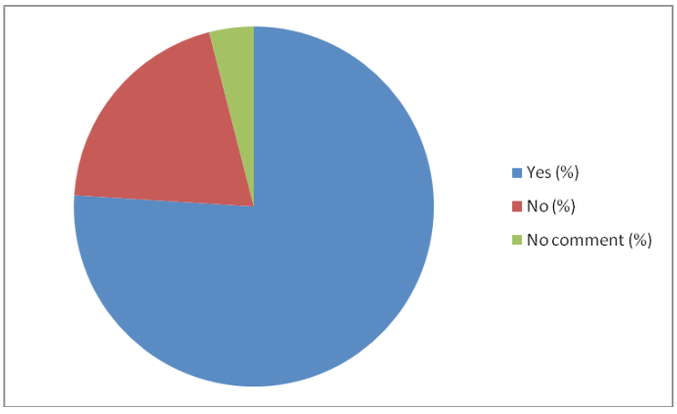


Figure II(c): Liberty and Independence in Learning Process

(d) Acquaintance of Blended learning

The question was asked whether students have any knowledge of the blended learning. The table II and figure II(d) interprets that around 70% of the respondents said yes, indicating that they have some knowledge of the subject whereas, 25% of students have no prior knowledge of the subject. The remaining 5% of pupils said nothing about it. A study undertook by Lu Dan (2021) also revealed that the students hold positive perceptions for the blended learning environment and moreover they believed that the Blended Learning Environment help them to develop critical thinking and knowledge in different aspects.

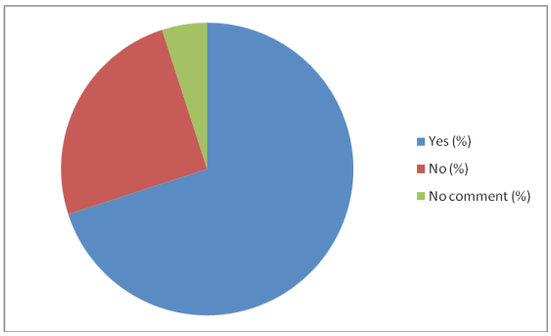


Figure II (d): Acquaintance of Blended learning

(e) Knowledge of difference between Blended Vs Traditional Teaching

The students were asked if they know that there is difference in blended and traditional learning. The table II and figure II (e) report that 70% of them responded "yes" indicating that they know that there is difference in blended and traditional learning whereas 20% of the pupils don't know about the subject. The remaining 10% students shared no opinion about the subject.

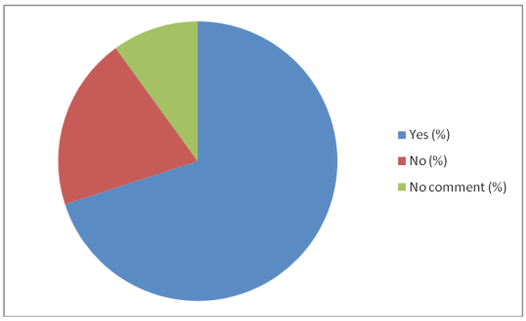


Figure II (e): Knowledge of difference between blended Vs Traditional Teaching

(f) Provision of Requisite Infrastructure for Blended Learning

The students were asked "Do we have the requisite infrastructure for incorporation of blended learning in Indian Classrooms?" The table II and figure II (f) interpret that 30% of the students responded that they have requisite infrastructure for blended learning to get started and 60% students said that Indian classrooms are lacking in proper infrastructure where as 10% remained silent on the issue.

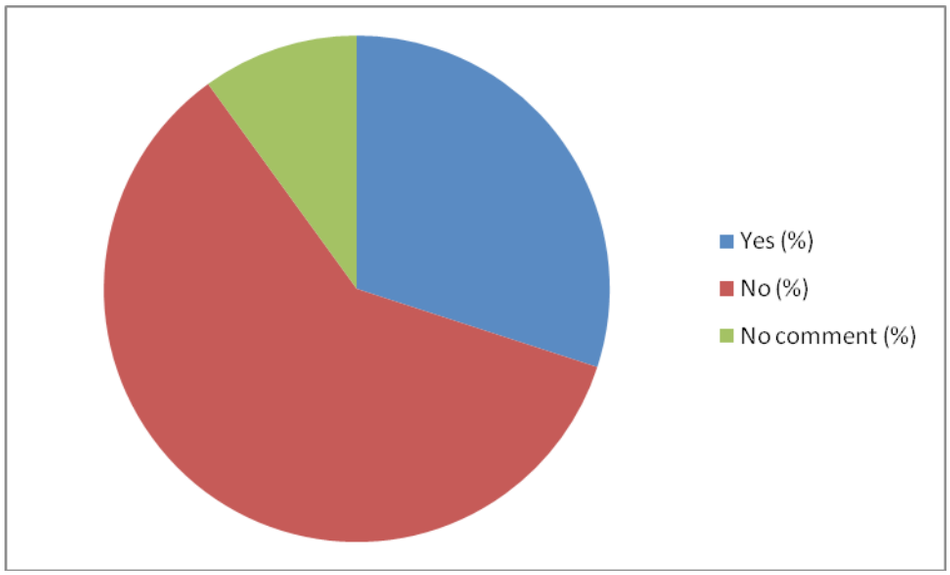


Figure II (f): Provision of Requisite Infrastructure for Blended Learning

Q3. Material Constraints in incorporating Blended Learning

The students when enquired about the constraints in incorporating blended learning responded that infrastructure and internet connectivity are the major limiting factors in the incorporation of blended learning in Indian classrooms. Electricity and poor computer-based assistance are the other factors that hinder the effectiveness of blended learning classrooms.

Table III: Material Constraints in Incorporating Blended Learning

Material Constraints	Responses
Infrastructure	58%
Internet Connectivity	45.5%
Electricity	13.75%
Poor Computer-based Assistance	7.5%

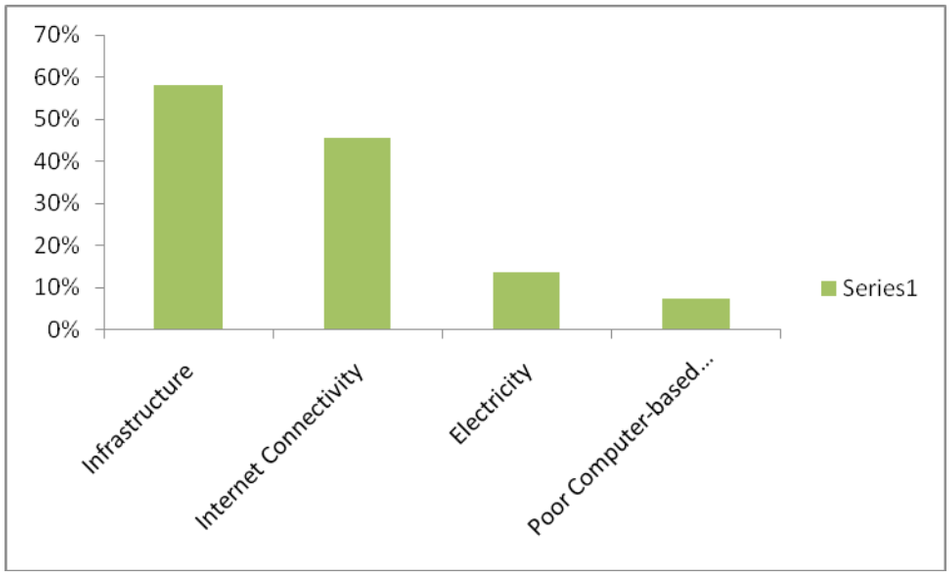


Figure III: Material Constraints in Incorporating Blended Learning

Q4. Process Constraints in incorporating Blended Learning

As depicted in the table IV and figure IV, the study revealed that teachers' reluctance towards adoption, lack of trained teachers, attitude of teachers are the major constraints in incorporating blended learning in Indian classrooms. Results are in line with the research study undertook by (Haleem et al, 2022) where they also highlighted that conventional teachers, are reluctant to use modern technology and gadgets in the classroom because of lack of proficiency and they see them as a distraction rather than an intelligent aid.

Table IV: Process Constraints in incorporating Blended Learning

Items	Responses
Fear for technology	51%
Lack of trained teachers	47.5%
Lack of skill in integrating online and Traditional learning	37%
Teachers' reluctance towards Adoption	21%
Lack of competent teachers	19%
Attitude of teachers	18.9%
Aptitude of teachers	18%

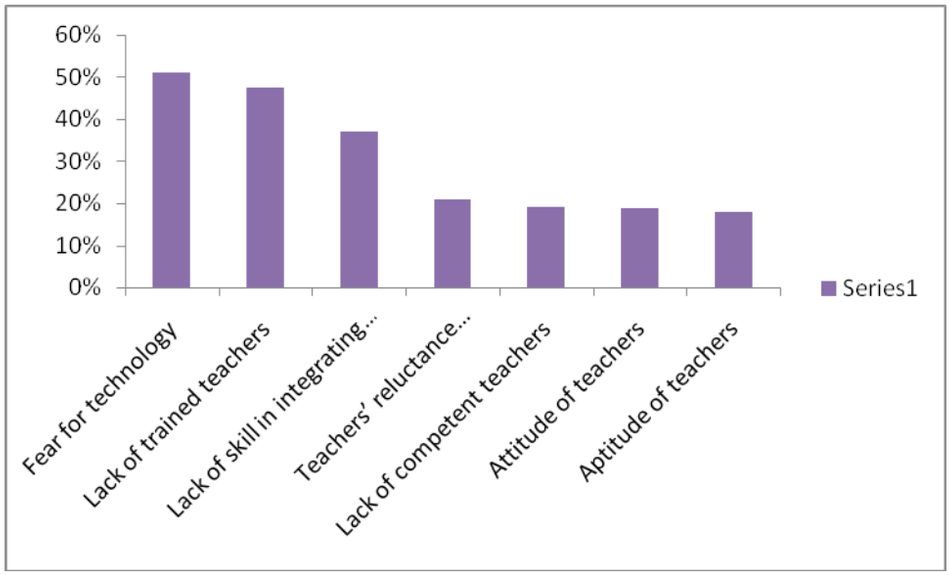


Figure IV: Process Constraints in incorporating Blended Learning

1.2 RESPONSES OF THE TEACHERS:

The teachers were asked few questions to enquire about the possibilities and challenges in incorporating blended learning in the teaching learning process. Following are the questions responses of the teachers which are presented below.

Q1. Blended learning should be incorporated in the teaching learning process after Covid-19?

When enquired about the views of teachers about incorporating blended learning in learning process, table V and figure V interprets that 82% teachers strongly recommended the use of blended learning as future strategy , whereas 13% teachers were reluctant in the use of blended learning. 5% were silent on the statement and gave no comments.

Table V – Incorporation of Blended Learning in Teaching Learning Process

Item	Responses
Yes	82%
No	13%
No Comments	5%

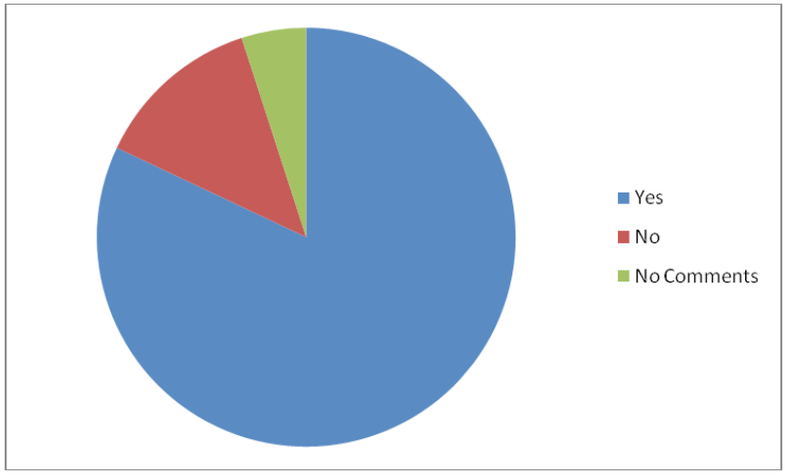


Figure V: Incorporation of Blended Learning in Teaching Learning Process

Q2. Blended learning system can help students to enhance their technological skills while also allowing them to work part-time?

As depicted in the table VI and figure VI, the study revealed that the 60% teachers were of the opinion that blended learning is the best strategy which can give students space to work part time while learning. A very few teachers (10%) negate the statement whereas 30% remained silent on the issue.

Table VI – BL can enhance technological skills for part-time jobs

Item	Responses
Yes	60%
No	10%
No Comments	30%

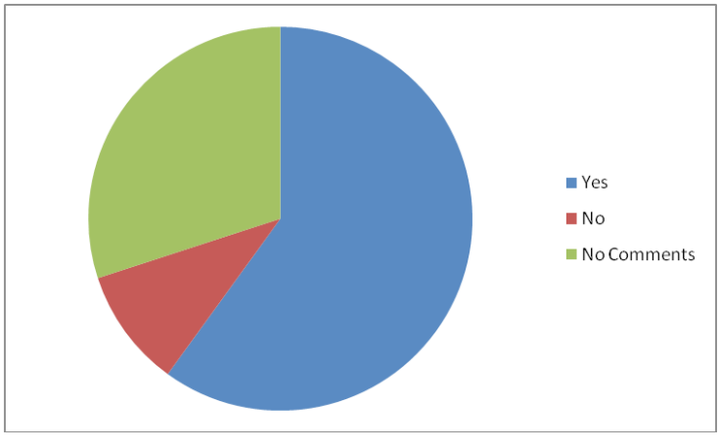


Figure VI: BL can enhance technological skills for part-time jobs

Q3. Students can be introduced to an updated and innovative education system through a blended learning programme?

As depicted in the table VII and figure VII, the study revealed that the 76% teachers think that blended learning will provide a new updated and innovative learning environment in education system. There were 10% teachers who negated the statement whereas 14% gave no comments. The findings of the study are in line with the study carried out by Dzuiban, Hartman & Moskal (2004) where blended learning was not only supposed to be effective in terms of learning outcomes, but also as an innovative way leading to satisfaction of both instructors as well as students.

Table VII– Updated and Innovative Education System

Item	Responses
Yes	76%
No	10%
No Comments	14%

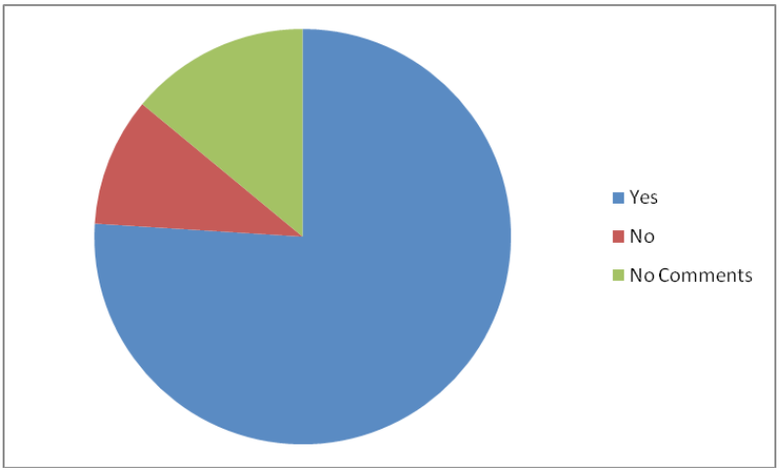


Figure VII: Updated and Innovative Education System

Q4. What are the constraints in incorporating blended learning

As depicted in the table VIII and figure VIII, the study revealed that lack of training of blended learning process is the major constraints in incorporating blended learning whereas lack of resources by the students, digital divide, poor internet connectivity, interest in adoption of blended learning in classroom and lack of infrastructural support are the other factors that hinder the effectiveness of blended learning classrooms. These findings are parallel with the findings of the study conducted by Sorbie (2015) & Khairunnisa (2022) which also showed

that the students' lack of motivation and disengagement in learning process, infrastructure and the device concern, poor internet network, along with the lack of time to integrate technology effectively are certain constraints affecting the Blended mode of Learning.

Table VIII: Constraints in Incorporating Blended Learning

Items	Responses
Lack of training of blended learning process	38%
Lack of resources by the students	36%
Digital divide	33%
Poor internet connectivity	32%
Interest in adoption of blended learning in classroom	31%
Lack of infrastructural support	23%

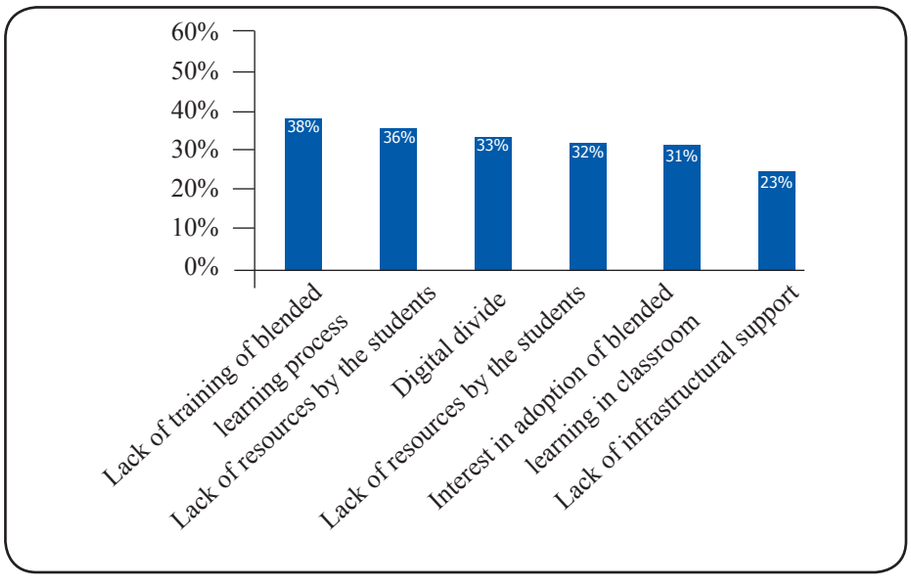


Figure VIII – Constraints in Incorporating Blended Learning

Q5. Preferred blended learning models

The multiple responses were gathered on the question of preferred blended learning models. As depicted in the table IX and figure IX, the Flipped classroom revealed to be the most preferred model for blended learning in India, whereas Blended MOOCs and blended face to face classrooms are also recommended by the teachers. The same has also been reported in the research conducted by Luna (2020) that the blended and flipped classroom promotes deep and life-long learning and is mainly considered as the most learner-centered type of learning.

Table IX: Preferred Blended Learning Model

Models	Responses
Flipped classroom	66%
Blended MOOCs	35%
Blended face to face class	25%
Blended online class	18%

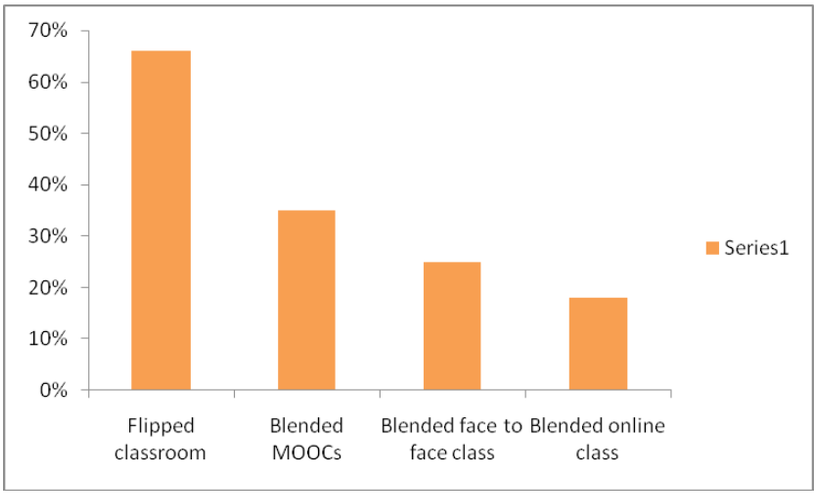
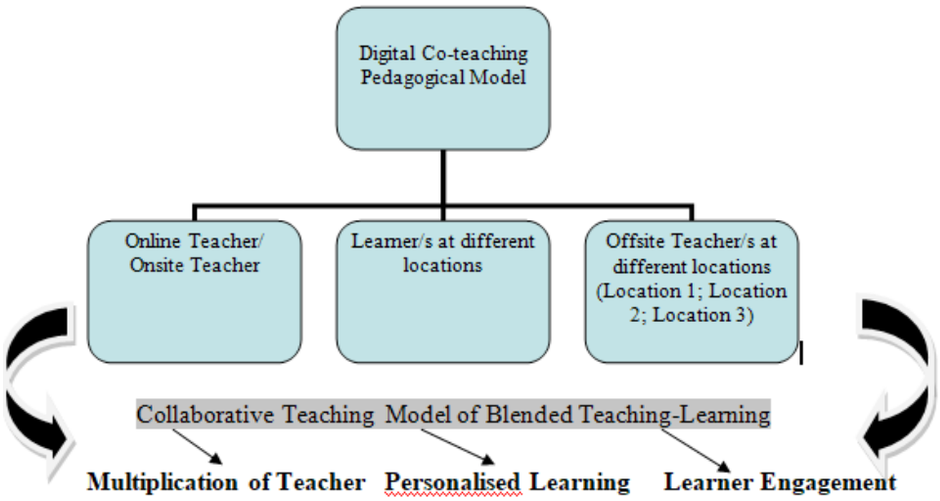


Figure IX: Preferred Blended Learning Model

Discussion:

From the above analysis and interpretation, it is evident that blended classrooms is the new emerging need of the Indian classrooms to bridge the gap of digital divide and other connectivity issues. The following model of new blended approach is proposed by the author to meet the learning demands of learner in the time of pandemic as well as a promising future solution.



The beauty of the above proposed model is that it emphasizes on the multiplication of teacher keeping in mind the various geographical locations of the learners in India. The model can be created by the educators to blend personalized instruction in traditional blended learning models.

Conclusion

There is a need to perform concurrent experimental studies to assess the advantages of combining instruction with online education in a collaborative way. A digitized collection of content has to be developed with a clear public system for user reviews on efficacy and quality. This content generation and development of course needs to add educational game - based learning, virtual reality, and augmented reality to make learning more effective. Developing technologies such as virtual reality, augmented reality, and novel gamification approaches will create a completely new educational environment, resulting in blended and adaptive learning. Student-appropriate resources, such as applications and gamification of Indian heritage and literature, will have to be developed for fun-based learning. In order to support the blended mode of learning, there is a great need of IT infrastructure (typically hardware and software requirements) involving user computing devices (personal devices, lab devices, audio-visual devices, satellite-based TV Channel, low cost IOT devices). Proper infrastructure for implementation also demands the core network to be placed at data-centre, internet link, all essential software and other support infrastructure. The author has also proposed a collaborative model of blended learning where online content delivery will be clarified in personalized manner by collaboration of the main teacher with other teachers at different locations to meet the demands of diverse group of learners.

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