SUSTAINABLE UNINTERRUPTED LEARNING – AN APPROACH TO BLENDED LEARNING

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ABSTRACT

Education is an all-encompassing lifetime process that is fundamental to every nation's development. The world witnessed a major shift toward education and the different ways and modes of delivery of instruction to learners during the COVID-19 pandemic. Many approaches to the teaching-learning process came into existence during this time. Different ways of remote teaching-learning processes were explored. Post-pandemic it has become essential to be ready by adding and exploring some ways of teaching-learning processes which is uninterruptable and sustainable in the long run. Blended Learning can ace the race most effectively. The recent advances in technology and its user-friendliness are an added advantage. A Blended Learning approach incorporates technology with a normal face-to-face teaching pedagogy. The Blended Learning approach helps in overcoming the idea of learning once and from one place and by one instructor. It replaces this idea and helps the process of learning to be continuous, repeated, sustainable, and joyful. Blended learning allows the learner to customize his learning experience as it facilitates the advantages of control over time and space. The students of the upper primary level are at the cusp of enjoying autonomous learning. They start taking the onus of their work and success. This makes it an appropriate time to introduce Blended Learning. A flipped learning approach was employed in the present study. The subject of science being both experimental and theoretical also caters to multiple intelligence theory. The present study focuses on checking the efficacy of the intervention (with the help of e-books) by analyzing the achievement test scores of the control group and the experimental group. Blended learning was found to be an effective

and sustainable option that can ensure uninterrupted study with a well-balanced approach in the long run.

Introduction:

Education plays a pivotal role in the development of any society. Man, an integral part of any society, is the sole proprietor whose actions make the utmost difference. Being an intelligent being, man explored his surroundings through ages, learning new things, most of which were put into application for betterment and ease of life. This nature of man has helped in the continuous development of the society that he lives in. The education received by man with the help of exploration, observation and application has also helped societies to evolve for greater sustainability.

With the changing paradigms of society, education, its pedagogies, modes of delivery, etc. needed new perspectives from time to time. From gurukuls to modern-day tech-savvy students, education has evolved in myriad ways. Technology plays the most important role in creating ease of life in the modern age. Additionally, technology helps to create a sustainable environment. Yet, the recent pandemic hit us hard and the education system was in a fix. Eventually, technology helped the instructors and the learners to wade through the tough time by continuing the process of the teaching-learning by very many different ways of remote teaching-learning.

A correct way of teaching which can encompass the varied ways of learning can only bring a desirable result. A learner's group can never be a cohesive one. With varied ways of learning the process of teaching would need to evolve and cater to the requirements of the learners. It is very important that learning in all its aspects should be a joyful and inquisitive process. Only then learning can truly take place. A joyful learner will eventually think and devise many different ways in which the

knowledge can be applied and used for generating more knowledge and learning. Modern-day problems like pollution, extreme weather changes, large-scale carbon footprints, and epidemic or pandemic-like situations, have brought forth the Sustainable Development Goals 4 to the forefront again. As a global community, we are already lagging in fulfilling the SDG4 by 2030. The COVID-19 pandemic has exacerbated the situation with the global closure of educational institutes. Singh and Niharika (2023) reported that nationwide closures of schools and universities in 192 nations because of the COVID-19 pandemic have destroyed the education of 90% of the world's learner population.

The following graph shows the staggering impact on global education due to the worldwide closure of schools.

Figure 1

COVID-19's Staggering Impact on Global Education

(McCarthy, 2020)

[Source: https://www.statista.com/chart/21224/learners-impacted-by-national-school- closures/]
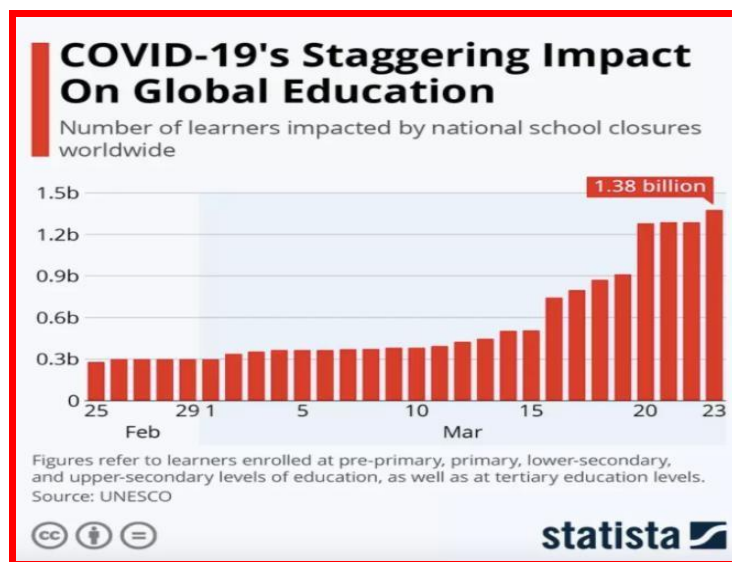
Nevertheless, to fulfill the Seven Outcome targets of SDG4, effective learning environments as the first means of implementation is invaluable. It has been found that even though schools have reopened, the digital transformation of education continues to accelerate. (*Digital Learning Futures*, 2023) An important role has been foreseen by researchers and educationists alike for Blended Learning. The pandemic has taught us ways and means to take control of the crisis and hone the ropes of uninterrupted education in similar situations if the need ever arises. Blended Learning has shown promise in the past. During the pandemic situation too, it was eventually a mode of BL which was employed by the educators far and wide. The most affected group of students were the school-going students who were at the cusp of autonomous learning yet not independent enough to take the onus on

themselves completely. The age group of 10–12-year-olds was a part of the study in which Bl was explored in the teaching of science in a regular school setup, post-pandemic.

BLENDED LEARNING

Blended learning is an innovative yet ever-evolving approach to the teaching-learning process which essentially combines an online and offline (brick and motor) mode for the exchange of knowledge. The term blended learning is generally applied to the practice of using both online and in-person learning experiences for a learner. Blend as the word means a mix of a substance with another so that they combine to make a product of desired quality. Along the same lines, Blended learning is a way of teaching where the learning takes place due to a blend of different techniques, an online component is a must in this.

Figure 2

Blended Learning
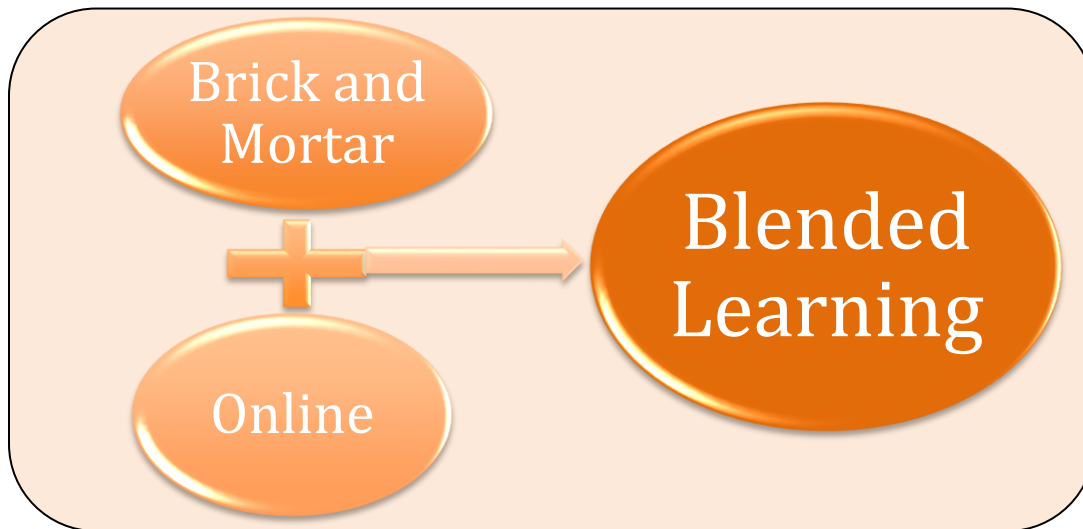
Over the past two decades, digital modes of teaching have become more and more popular and have been used widely in public schools. Much effort has been taken to bring all government and government-aided schools under the umbrella of technology. Rapid technological advances which have seen an uprise in the recent past have brought forth many options and opportunities for exploring the online teaching mode.

NEP 2020 also recommends the use of blended modes of learning. Sharma (2021) in the ICT India Working Paper mentions the role and importance of BL which can unload the teacher of regular tasking and concentrate on the effective handling of learning losses in the time saved due to the implementation of technology. Lalima and Dangwal (2017) suggest that the implementation of digital technology can create an absolute advantage in the learning process for young learners.

With a well-developed mindset for teaching in online mode, educators are now better equipped. The fall-backs of traditional teaching mode have garnered greater acceptance giving rise to a realization that a well-balanced approach of online and offline modes of delivery of instruction can eventually reap greater benefits for the educators and learners alike. As two modes are

combined the learning experiences are a blend of both wherein, the strengths of each can be used for an adequately rich learning experience.

To ensure that the Blended Learning method is an effective way of learning, two important components should be kept in consideration as shown in Table 1.

Table 1

Important Components of the Blended Learning Approach

Personalized Learning	Proficiency-based Learning
➤ Individual Aptitude	➤ Skill development
➤ Timely Accessibility	➤ Freedom of time and space
➤ Various modes	➤ Beyond Classroom

Blended learning, not only employs technology as one of the components but also follows the constructivist theory approach. In a constructivist theory approach the role of the instructor/educator is to guide and provide materials to the learners from which the learners can construct knowledge. Learners are the active participants in this approach. Higher-order thinking skills like analysis, synthesis, and evaluation receive a conducive environment to develop.

Technology can encompass various modes of learning within itself using games, videos, lectures, interactive media, emojis, stickers, and social media to name a few. Considering the traditional mode of learning i.e. face-to-face teaching methodology stays intact, blended learning, essentially caters to Gardner's theory of multiple intelligence.

Technology when put to thoughtful use can cater to various ways of learning/intelligence like mathematical, kinesthetics, musical, spatial, linguistic, natural, interpersonal, and intrapersonal. This helps the educator to broaden their horizon with increased flexibility in the teaching-learning process. This would eventually be effective in nurturing the person

and hence society in general. This will help in garnering a wider global environment of teaching- learning and developing important skills.

The four major models of Blended Learning are shown in Figure 4

Figure 3

Models of Blended Learning
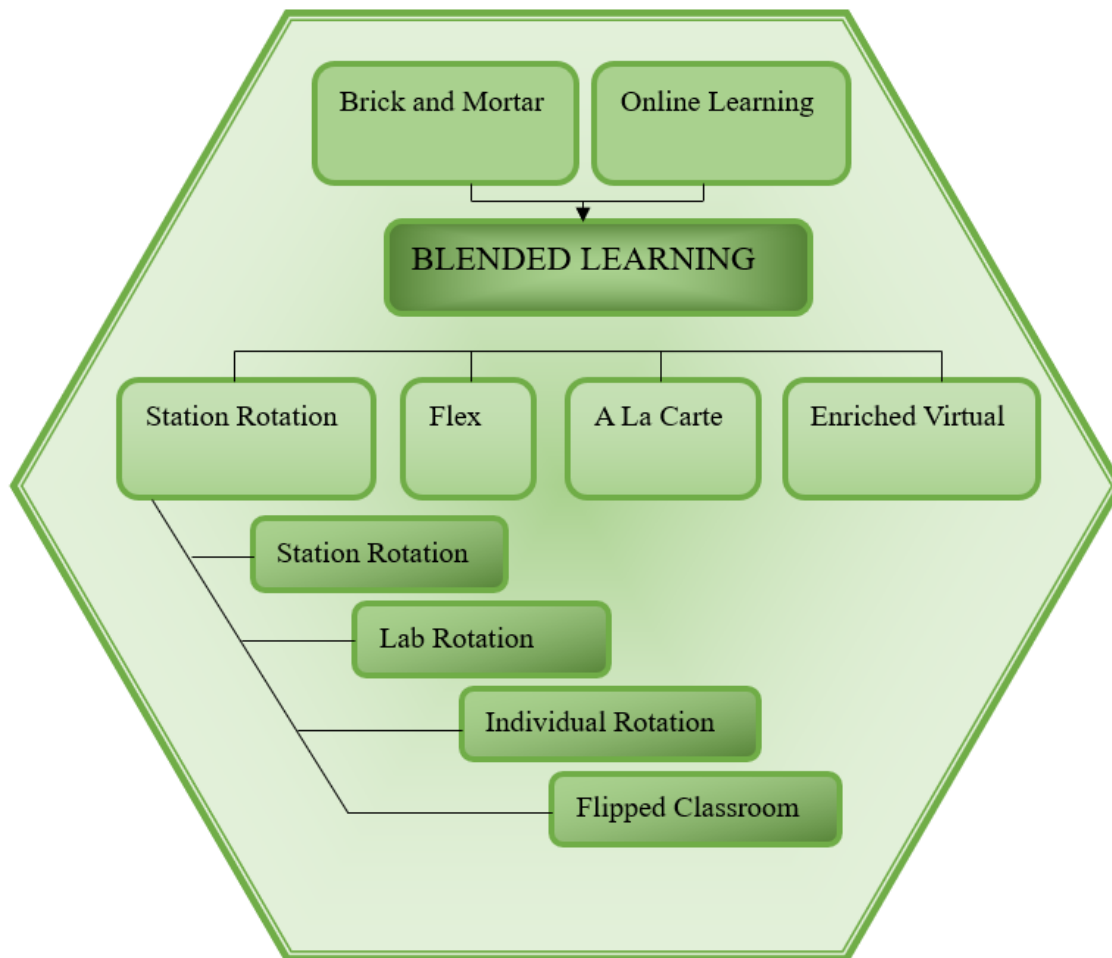
RATIONALE OF THE STUDY

The Blended Learning approach helps in overcoming the idea of learning once and from one place and by one instructor. It replaces this idea and helps the process of learning to be continuous, repeated, sustainable, and joyful. Blended learning allows the learner to customize his learning experience as it facilitates the advantages of control over time and space.

Education experts have worked to implement technology-driven teaching strategies that meet the diverse needs of students all across the world at a rapid pace in the last ten years. The pace has increased manifold during the pandemic and post-pandemic days. The traditional classroom-only method is being redesigned to include online instruction. Blended learning, which combines traditional in-person teaching and learning with an additional online module, has shown some advantages in the past. It starts with an efficient and goal-oriented method of instruction delivery. The constructivist learning theory, which is grounded in observation and is a scientific investigation of human learning, is closely related to blended learning.

"Educators and students have just participated in a sweeping and sudden shift in the use of technology to learn. The result — is a broadening recognition that a blended learning approach can provide the opportunities and flexibility necessary for the future of education. Before the coronavirus pandemic, blended learning was a choice. Now, it's a necessity." (Steelcase,2020)

A sustainable approach to education and the teaching-learning process is of utmost importance. This is needed as a preparation for any future crisis as well as to fulfill the learning gaps created during the pandemic. Students aged 10-12 years are at the cusp of finding autonomous ways of living in all aspects of life, including education. CBSE recognizes students of this age group as students who should be provided with many opportunities for engagement with the subject of science and develop the skills of observation, tabulation, data interpretation, etc. This also happens to be a stage when memories start taking a concrete shape for the

future to come. As this is the foundation stage for personality development as well as concept formation, research for this age group will be most interesting which can pave the way for sustainability in the long run.

OBJECTIVES OF THE STUDY

1. To study the effectiveness of Blended Learning at the upper primary stage by test scores.

2. To study the sustainability of Blended Learning through the students' reactions.

DESIGN OF THE STUDY

This study was an Experimental Research. The study aimed to understand the sustainability of teaching Science through Blended Learning by comparing the achievement scores and analyzing the students' reactions. This was a [post-test-only](#) design study in which the experimental group was given the intervention in the form of e-books along with a regular face-to-face classroom teaching method, and the control group was taught in a face-to-face classroom-only teaching method.

SAMPLE OF THE STUDY

Students of the age group 10-12 years are part of the study. For this purpose, students of grade VI of two Delhi-based Air Force schools were selected randomly for the academic session 2022-23. One group was treated as an Experimental group, while another was treated as the Control group under the study.

Table 2

Sample of the Study

Experimental Group	146 students
Control Group	162 students
Total students under the study	**308 students**

Methodology: A flipped learning approach of the Rotation Model of Blended Learning was used in the study. Students were facilitated with the e- books before the start of

the lesson by the subject teacher in the classroom for the academic session 2022-2023.

The study was divided into six phases.

Phase 1

Based on the identified teaching points by the subject teachers of the schools, e-books were developed.

Phase 2

The developed strategy was implemented in the group of students of the experimental Group.

Phase 3

Achievement test was administered to both the experimental group and the control group.

Phase 4

Reactions of the students were collected from the experimental group.
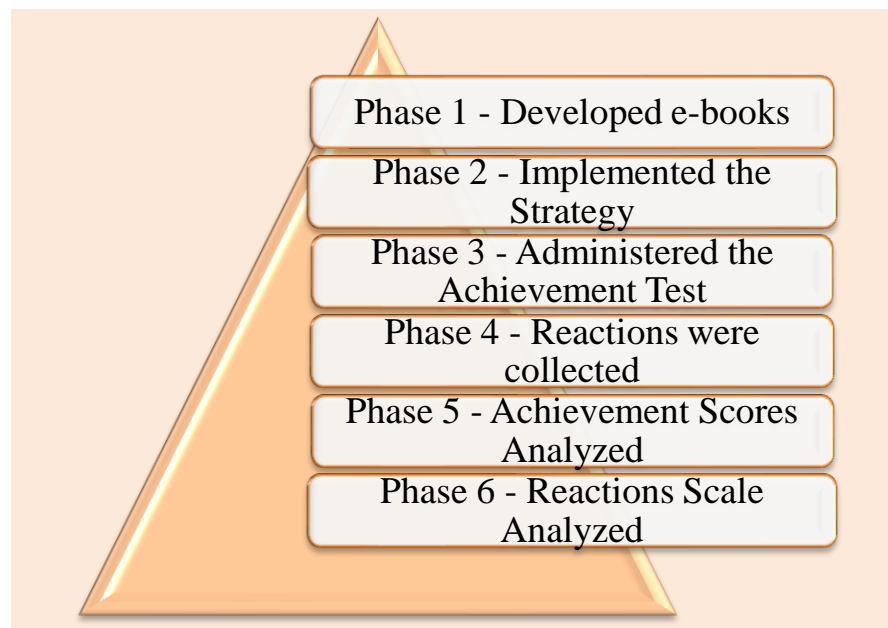
Phase 5

Achievement test scores were compared to assess the effectiveness of the intervention

Phase 6

Reactions were analyzed to understand the sustainability of the Blended Learning approach.

Figure 4

Phase-wise Plan

- Phase 1 - Developed e-books
- Phase 2 - Implemented the Strategy
- Phase 3 - Administered the Achievement Test
- Phase 4 - Reactions were collected
- Phase 5 - Achievement Scores Analyzed
- Phase 6 - Reactions Scale Analyzed

DATA COLLECTION

The achievement test consisted of 50 questions in Multiple Choice Format based on the teaching points identified by the subject teachers. The test was taken in paper-pen test mode. The marks scored by the experimental group and the control group were compared based on the mean achievement score of the two groups.

DATA ANALYSIS

To analyze the effectiveness of the intervention and hence the blended learning approach, data received as achievement test scores were analyzed with the help of a t-test, a statistical test for comparing the mean of the two groups.

To analyze the acceptance of the BL approach by the students, and hence the sustainability of the intervention, another set of data was received as feedback with the help of the reactions of the students. T -Test, a statistical test was done to compare the mean of the two groups. The 146 students who received the blended learning intervention (M= 35.39, SD=5.99)

compared to the 162 participants in the control group (M= 32.34, SD=6.89), demonstrated significantly better scores, t (306) =4.1246, $p < 0.0001$.

The data received as reactions from the students with the help of Google Forms were analyzed. It was found that more than 90% of the students

- Enjoyed learning from the e-books

- A blend of classroom learning and self-paced learning by self-paced e-books helped them to enhance their skills in the subject of science.

- Blended Learning helped them retain concepts better

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tudying from both modes made the learning process interesting.

FINDINGS OF THE STUDY

➤ There is a significant difference between the mean achievement scores of the experimental group and the control group.

➤ The teaching of science was found to be more effective by the blended learning

method than traditional classroom teaching alone in terms of achievement scores.

➢ The students' reactions indicated a positive response to the blended learning approach which indicates sustainability in the long run.

Conclusion

The present study found that the integration of an online mode of learning alongside a regular classroom approach for the students enhanced their interest in the subject of science. The study also revealed that blended learning helps to clarify the concepts in a better way as it gives the student the independence to explore in their own time and space. It helps the students to understand the concepts better as it is self-paced too. It was revealed from the reactions of the students that blended learning was an effective way of learning in the subject of science. For the sustainability of any teaching-learning method, it should be engaging and interesting to the students. As this approach was found to be effective, engaging, and interesting from the analysis

of various data, it can be deduced that blended learning is a sustainable learning method as students can uninterruptedly continue their learning process using blended learning.

SUGGESTIONS

➢ A potential solution to improve the teaching and learning process is the implementation of a blended learning model. This model can be tested for other subjects at the same level to evaluate its effectiveness and sustainability.

➢ The adoption of a blended learning paradigm is one possible way to enhance the process of teaching and learning. This model's sustainability and efficacy can be assessed by testing it on other students at the same level.

➢ In case of future school closures, a modified version of blended learning can be used where face-to-face offline mode is replaced by face-to-face online mode to ensure the continuity of the teaching-learning process. This modified version can also be studied to check its effectiveness and sustainability.

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