

Innovative Mindset Matters: Technological Interventions in Pre-Primary Classroom

Savita Kaushal¹, Harpreet Sehmbi²

¹savitakaushal2017@gmail.com, ²harpreetsehmbi1318@gmail.com,
Jamia Millia Islamia (India)

ABSTRACT

The 2030 Agenda for Sustainable Development, adopted by all United Nations Member States in 2015 has proposed Quality Education as one of the Sustainable Development Goals. In the Post-COVID era, the major apprehension was to add values to learners' lives with connection and continuity. A matter of concern was that though the physical distancing did matter, social and emotional correctness was even more critical. One positive development was that the number of the technology users and technology usage in the context of India had increased exponentially. The ownership and the use of touchscreen technologies such as smartphones and tablets are rapidly increasing and the technology users are now much younger in age. Children have become tech-savvy at early ages. The rapid expansion of technology has made the new generation more dependent and proficient in making the use of computers, mobile devices and other digital technologies. Nevertheless, in the context of early childhood settings, there are some influences that may differentiate the technology use behaviors of preschool children, which are generally constructed at home or school environment. This paper deals with how the preschools in the COVID-19 pandemic situation have taken hold of the foundational education of children with the innovative ideas and integrating technology into their pedagogy. The ICT applications in teaching-learning processes in preschool were also studied by the researchers. The pedagogical interventions offered by them were analyzed and the practices of technology integrating teaching learning at preschools were observed. In addition to this, the information through a questionnaire and structured interviews was also obtained from the teachers. The paper has explained the innovative technological interventions incorporated such as virtual shows and tours, smart books, speaking pens, touch and feel books etc. for stimulating the young minds. Further to this, it seeks to define the possible influences, effects and praxis of technology use in early childhood settings, and also intends to explore the current mindset of teachers about technology use in the field of early childhood education.

KEYWORDS: Preschool, sustainable development goals, early childhood education, educational technology, COVID-19 pandemic

1. Introduction

To walk on the path towards achieving sustainable development, there is a need for intellectual transformation of how we all think and act together. To create a more sustainable world and to engage with sustainability-related issues as described in SDGs, individuals must become sustainability change-makers. The basic factors that

empower an individual to contribute to sustainable development include intellect, knowledge, skills, values, and attitudes. Education is, therefore, the most crucial for the achievement of sustainable development.

The education system has been the most dynamic in the world. It is rapidly changing in the developing nations such as India as per the need of the society and for the nation to be capable enough of bringing their citizens on par with the people of other developed nations. From the historical perspective, we see that the education system in India has changed tremendously over a period of time. In ancient India, the students were taught various subjects about cultured and disciplined life in residential schooling. The concept of residential school (Gurukul) was followed where the school was actually a home of the teacher, i.e., Guru and students reside at the teacher's home until they complete their education. This Indian education system was transformed through various phases and now the formal schooling system has evolved into a form that was never followed in India. Now when the COVID-19 pandemic brings about a new change in the formal schooling system which was earlier in face-to-face mode. Due to COVID-19 pandemic, the whole world has been disrupted and locked up. The education also began to move from face-to-face classes to online classes for students of every level. This change has practically reversed the scenario of the education system from 'studying at teacher's home' into 'teaching at the students' home' through technology. The phase was most challenging yet the most modern and was the need of time that a developing nation like India could adapt.

Considering the fourth goal of the Sustainable Development Goals in India, the National Education Policy (2020) proposed the revision and revamping of all aspects of the education structure, including its regulation and governance, to create a new education system that is aligned with its aspirational goals of 21st century, including quality education of sustainable development goal SDG-4 (National Education Policy, 2020). National Education Policy (2020), mainly focused on three aspects at the pre-primary level of the education system: language, literacy and numeracy. These three aspects will be focused on the development of children in a joyful manner using indigenous toys, physical and tech-based activities.

The National Education Policy 2020 (Press Information Bureau, 2020) envisages a five-year foundational stage of education, i.e., three years of Early Childhood Education and the first two years of primary school. To put it simply, the foundational stage of education is now supposed to extend to children from age three to eight years. In the foundational stage of the New Education Structure, the vision for Early Childhood Education is the holistic development of the child.

The highest priority of the New Education Policy (2020) (Press Information Bureau, 2020) is to achieve universal foundational literacy and numeracy in primary schools by 2025. The rest of this policy will become relevant for the children only if this most basic learning requirement (i.e., reading, writing, and arithmetic at the foundational level) is first achieved.

A national repository (Rana & Co, 2020) of high-quality resources on foundational literacy and numeracy is made accessible on the digital platform named *Digital*

Infrastructure for Knowledge Sharing (DIKSHA). Technological interventions were implemented to serve as aids to teachers and to help bridge any language barriers that may exist between teachers and students.

Before the COVID-19 pandemic, Indian educators had no existing online schooling system for preschools. The government of India provided guidelines for digital education through online classes for all levels of schooling starting from preschool up to Class 12 (Pragyata, 2020). The recommendations pertaining to preschools stated that there should be an interaction with the parents for around 30 minutes, guiding them on how to use the e-content using available gadgets at home. In India, several initiatives were undertaken by the National Council of Educational Research and Training (NCERT) in the area of school education towards digitalization, such as DIKSHA (Digital Infrastructure for Knowledge Sharing), which provides a web portal for e-content for Classes 1–12; Swayam Prabha TV channel which telecasts educational content for Classes 1–12; and radio broadcasting for children living in remote areas with no access to digital gadgets, especially for Classes 1–5.

In India, Integrated Child Development Services (ICDS) offers non-formal education for children aged 3 to 6. Nowadays, 36 million children are enrolled in ICDS, which is under the Ministry of Women and Child Development (ICDS Scheme Status Report, 2015) - the most extensive Child Development Programme, which not only provides preschool education but also caters to the nutritional needs of children. However, today, a large part of preschool services is still private.

There was an uncertain risk looming over the preschool education sector in India. The COVID-19 pandemic forced the teachers to think out of the box in terms of pedagogy by means of digital and online resources, through their laptops and smartphones. These resources facilitated the learning of the little ones at home, the first few days of the online preschool sessions were the start of a life-determining journey for many teachers and also the parents as it was a new way to reach out to the learners and the parents were also facilitating their children from home. The technology has helped to overcome the incapability of attaining the education during COVID-19 pandemic by combining the efforts of all stakeholders, i.e., the child, the teacher, and the parent, towards achieving the common goal of acquiring and enriching the knowledge of the students; to make them connected through the mode of technology to gain knowledge which somewhat was paused for a very considerable duration due to COVID-19 pandemic. The situation was found to be more challenging for the pre-primary students as compared to the Elementary, Secondary and Higher Education students. At the same time, it has brought about various positive developments in the students of young age. Students have become technologically literate at early ages. In other words, children are accessing a variety of technologies and the internet at much younger age. The rapid expansion of technology has made the new generation proficient in the use of computers, mobile devices and other digital technologies. Nevertheless, in the context of early childhood settings, there are some influences that may differentiate the technology use behaviors of preschool children which are generally constructed at home or school environment.

This paper deals with how the preschools during the times of COVID-19 Pandemic situation have taken hold of the foundational education of children with the innovative ideas and integrated technology into their pedagogy. The pedagogical interventions they adopted by them were studied and the practices of technology integrated teaching-learning at preschools were observed. The paper explains the innovative technological interventions incorporated such as virtual shows and tours, smart books, speaking pens, touch and feel books etc., for stimulating the young minds. Further to this, it seeks to define the possible influences, effects and praxis of technology use in early childhood settings, and also intends to explore the current mindset of teachers. In other words, it studies the perceptions of teachers about technology use in the field of early childhood education.

2. Literature review

Many studies have explored the use of technology to teach preschool students at home and at preschool, and have found it as a more relevant teaching tool in this time of modern era. A few of the research studies may be stated as follows:

Otterborn and Schönborn (2019), in their study "Surveying preschool teachers' use of digital tablets: general and technology education", analyzed the preschool educators through an online survey consisting of 20 closed and 6 open items that probed the use of digital tablets. It was concluded in the study that there was a high degree of engagement with digital tablets in preschools, with activities directed toward various subject-related, social and generic skills. The use of tablets in teaching in preschool was marked as providing opportunities for learning tasks and digital adaptability. It was also found that the lack of digital skills to use the tablet in teaching was the major limitation.

Polwman (2012), in his study "Supporting young children's learning with technology at home and in preschool", aimed at comparing the ways in which children's learning takes place in two different settings, i.e., at home and preschool, with the help of technology. It was observed that the children who were having a more diverse variety of technologies at home, were observed to be more benefitted by observing the use of technology at home and family practices.

The study by Hu, Chiu, Leung, and Yelland (2021) entitled "Technology integration for young children during COVID-19: Towards future online teaching" was conducted on 1035 educators from 169 preschools through an online survey regarding the technology integration for young children during COVID-19. The study concluded that the teachers used mainly video conferencing sessions to teach students. They also used digital resources such as videos, photos or materials that they shared with the parents to involve the children in the activities at home. Most teachers set parent-child activities and worksheets to supplement online teaching.

Yildirim (2012), in the study "Preschool Education in Turkey during the COVID-19 pandemic: A Phenomenological Study", conducted a qualitative study on 25 preschool teachers and 30 parents, selected using a purposive sampling method. The data was collected using a semi-structured interview form and video recordings

of participants performing educational activities. Most teachers stated that the COVID-19 pandemic has adversely affected the preschool education, resulting in higher parental engagement in their child's education and an improvement in student-parent interaction. It was stated in the study that although the parents were primarily responsible for providing education to their children at home. Considering the fact that the parents may not be qualified accordingly or may not have enough time to devote to their child's education, authorities may provide some alternatives such as educational TV channels, Web-based preschool, games based-activities, etc.

The review of related literature also indicates that in India, traditional teaching practices are still not changed in many remote and underprivileged places. Going to a preschool itself is considered a luxury for many children. Classrooms with minimum facilities and premises with basic hygiene are challenges faced by the preschool stakeholders. Under these circumstances, affording a technology friendly learning environment seems impractical. Infrastructural facilities like E-boards, smart classes and digital teaching equipment provided by preschools are a long-lost dream for such children who are living in such areas.

The high-budget private preschools and branded private preschools, on the other hand, are now emerging into better than the best institutions with the rise of techno-friendly learning platforms coming into existence. Smartboards have been replaced by learning apps that are extremely user-friendly and they give in-depth knowledge about a subject via various perspectives and also without the rigidity of timings. Many of the preschools in Delhi have explored and adopted such techno-friendly learning platform apps.

However, the technology integrated curriculum is designed keeping in consideration age appropriateness to monitor that the technology is not overpowering the simplicity and easiness of learning. To ensure that children are not excessively engaged in gadgets and gizmos, they provide a handful of options by providing the various activity worksheets at their convenience. The major step to ensure the socialization of children with the peer groups and teachers is providing offline (face-to-face) classes on alternate days. In this way, they are not just limited to "Only tech-based learning" or "Only Traditional way of learning-offline". The hybrid method is blended in such a way that brings out the maximum development of the child. These measures ensure that the child's emotional, physical, and social well-being will be taken care of, at every point in time. The technology-integrated online classes also provide an opportunity for a productive interaction between child, parents, and teacher for a seamless learning experience. The age-appropriate technology-integrated learning at the foundational stage develops an affinity for technology among kids.

In India, specifically some of the private preschools have been using various types of technologies to engage children in learning through fun-way methods even while staying at home during COVID-19 and also with the least help of their parents that may lead to their holistic development. Technology inputs have helped children become self-reliant in using the gadgets such as speaking pens and smart books.

a. Speaking pen

The Speaking Pen is a digital pen that children can use to learn how to pronounce English alphabets and words in a fun and entertaining way. The sensor at the tip of the pen reads the hidden code in the images to recite the pre-recorded information. Similarly, using the re-recordable stick pens, you can also record new audios to add to the Smart Book. A parent can engage his/her child with the voice they love and know – Mother/ teachers' voice, even when they are not around.

b. Smart book

Each Smart Book is full of interactive and colorful content which catches the attention of the young ones. Using the Smart Pen, the pages of each Smart Book can be brought to life. The Smart Book covers a range of topics from alphabet phonic sounds to all the popular nursery rhymes, both in English and Hindi, each interactive in a unique way.

c. Virtual shows and tours

In virtual tours, the children have virtual educational experiences of tours with the use of multimedia such as images, video, sound, animation, etc. The virtual tours give the opportunities to students to explore various places such as Railway Museum, Post Office, Fire stations, etc. without actually visiting the place for real. It saves time and money in order to organize such tours without any hassle.

d. Video class

Video classes are the classes that take place online through the medium of internet on a mobile or a laptop. The teachers through live interactive sessions teach the kids being at their home.

3. Methodology

The data for the study was gathered from observations of the preschools. Questionnaire was used to collect information from teachers. The data from teachers was gathered through a web-based survey, and the questionnaire designed using Google form was developed by the researchers and was reviewed with the help of three online education professionals. The survey's questions were improved in accordance with the advice provided by the experts' evaluation. In the questionnaire there were questions about the duration for which they had taught by online mode during the pandemic, the preschool's involvement in promoting online instruction, and the difficulties these teachers encountered. The data was further supplemented by the structured interview with one-fourth of the preschool teachers who had responded to the Google form. The information about teachers' perception on the use of various technological interventions in pedagogy at preprimary level was solicited. Data was collected from a sample of 80 teachers, in which there were 20 teachers from each of these schools:

- 4 Government pre-primary schools,
- 4 Small Budget private pre-primary schools,

- 4 Big budget private pre-primary schools, and
- 4 Branded private pre-primary schools

Preschools were selected from the south west district of Delhi. It was not possible to ascertain the exact population of the preschools as the private school comes under an unregulated sector. So, the information regarding their number is not available in any records. The recently implemented National Education Policy, 2020, has stated that the pre-primary education has to be considered as the part of mainstream education which will now require the Government of India to have a mechanism to bring all pre-primary schools in its purview and norms. The sample preschools and teachers were chosen on the basis of convenience sampling as only those preschools that permitted collection of data during pandemic were taken in the sample. Sample of teachers was chosen by purposive sampling as the teacher's population was inaccessible via face-to-face survey because of the COVID-19 pandemic. The study only focused on the pre-primary teachers who had taught online lessons throughout the pandemic.

3.1. Objectives

How do pre-primary teachers use tech-based innovative interventions made for teaching in pre-primary classrooms?

What are the benefits perceived by teachers regarding the use of technology in teaching-learning from the perspective of parents and the child?

What is the perception of the challenges felt by the teachers in integrating technology in classrooms keeping in view pre-primary school diversity?

3.2. Operational definition of the terms

Government preschools are those preschools that are established and owned by the Government of India such as anganwadi, [established under](#) the Integrated Child Development Services Scheme under the aegis of the Ministry of Women and Child Development and shall also include anganwadi and similar establishments imparting pre-primary education mainly to economically deprived children. They charge a minimum fee of about Rs. 78/- per month (including admission fee, term fee, and monthly fee).

Small-budget private preschools are those privately owned schools that charge up to about Rs. 800/- per month as a fee and normally children from low-income or lower middle-class families join these schools. Big-budget private preschools are those privately owned schools that charge about Rs. 800-3500/- per month as a fee and normally children from middle-income families or higher middle-class families join these schools. Branded private preschools are those schools that specifically plan their own adopted researched curriculum, pedagogical strategies, teaching-learning material. This carefully researched curriculum is uniformly followed in all of their franchise preschools across different states. The fee charged by them is generally in the higher range starting from Rs.3500/- per month.

4. Findings and discussions

The platform for holding the classes varied in private preschools. Some of the private pre-schools (25%) had various ranges of activities to involve children at home. The activities were meant for attainment of learning, fun-filled and self-engaging. The aqua-doodle activity was primarily a drawing activity that also caters to the development of motor skills. The child paints the invisible painting with water pens on the pre-colored sheets. Within some time, the water dries and the color gradually starts disappearing from the sheet. It can be reused unlimited times. Another activity was magnetic shapes which kids use to learn shapes and also make different objects like robots, animals, flowers, etc. with the help of these magnetic shapes.

Some of the big-budget preschools were providing interactive activity kits, worksheets, smart books, speaking pens that allow and enable children to learn language vocabulary at their own pace. Smart books and speaking pens were an innovative way of using technology related to developing language skills and leading to the accomplishment of achieving quality education.

They also have an alternate idea of providing the hands-on experience of visiting and exploring various places such as post offices, museums or monuments without having to schedule travel or spend a minute. In fact, the virtual trips are free of cost too. The preschools basically used STEM activities with key development indicators such as science and technology, language, literacy, communication and mathematics. Sample daily routines, puppet shows, webinars, and other such live events are also included.

It was observed that the few private preschools belonging to all the categories (30%) were also providing an optional opportunity for children to attend preschool in physical mode once or twice a week to strengthen their socialization skills with their peers and teachers, according to observations. The observations also pointed out another fact that the private preschools were making more provisions in terms of technological tools employed for classroom learning. Perhaps their intent was to gain some kind of acceptance among the mindset of the parents and community that the online classes were worth the tuition fees charged by these schools. The majority (80%) of the government schools mainly relied on the online classes which were supplemented by classes on Google platform as the class size was not more than 100 and there were no restrictions of duration.

The perceptions of the teachers could be categorized into two categories. These categories were 1) those who were optimistic and 2) those who had pessimistic opinions and could foresee some challenges regarding the use of the technology.

4.1. Perceptions of the teachers towards use of technology in teaching-learning process

Parameters related to perceptions of teachers were classified into two broad categories, i.e., those which were optimistic in terms of benefits and those who were pessimistic in terms of certain challenges faced in teaching by using the technology.

The teachers held some optimistic views as well, and considered technology as more effective (68%), believing that the new learning tools are superior to the conventional method of using books and charts, visual experiences such as virtual tours help students retain information for longer (68%), that they give students opportunities to imagine and create (40%), that they allow for self-paced learning (24%), and that they can be customized to meet the needs of specific students (18%). The materials used and the associated activities were long-lasting and reusable (51%). Only a tiny percentage (21%) appreciated the fact that it had prepared them for the obvious future, and the teachers were encouraged and given more power to interact with the students in online mode.

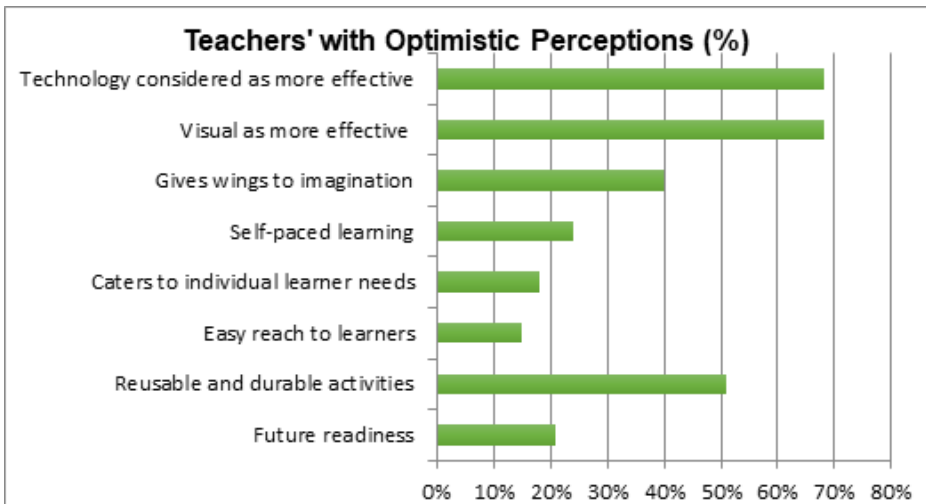


Figure 1. Teachers' with Optimistic Perceptions (%)

Examining the challenges towards integration of technology was also the objective of the study and the results show that teachers believed digital learning tools were not always helpful for early childhood education. Many fundamental ideas cannot be taught digitally, necessary teaching and learning materials are not always available in homes and so the home environment serves as a barrier and teaching and evaluating progress in certain conceptual areas is challenging (83%). Teachers felt that they lacked the professional preparation for teaching in an online environment (22%) and that parents lacked the skills, capacity, and resources to conduct teaching and learning activities for the early childhood age group (69%) as well as the knowledge, time, and resources to do so. The COVID-19 Pandemic caused an abrupt switch from traditional to online education systems, which some teachers agree made teaching and learning difficult for students because their home environments were not conducive to online teaching and learning (72%), and students could not afford to do expenditures on technology-friendly learning environments (43%). Technical difficulties were another challenge the teachers faced when taking virtual classes, with a whopping number of them (69%) mentioning it. If used for longer than the recommended amount of time, using a tablet, phone, or laptop for study or for fun might cause addiction (58%). A positive teacher-student

relationship has taken a backseat in virtual classrooms. Certainly, things are getting easier, but socialization has suffered as a result (46%). Additionally, the small-budget preschool teachers claimed that they felt the situation was challenging because they were unable to make significant investments in technology infrastructure (25%). A key issue for some (23%) of the teachers was keeping order in a virtual classroom. At least 17% of the comments allude to the difficulty of finishing a virtual course of study. So, the teachers did perceive in some ways that there was inequitable access to preschool education during the school closures.

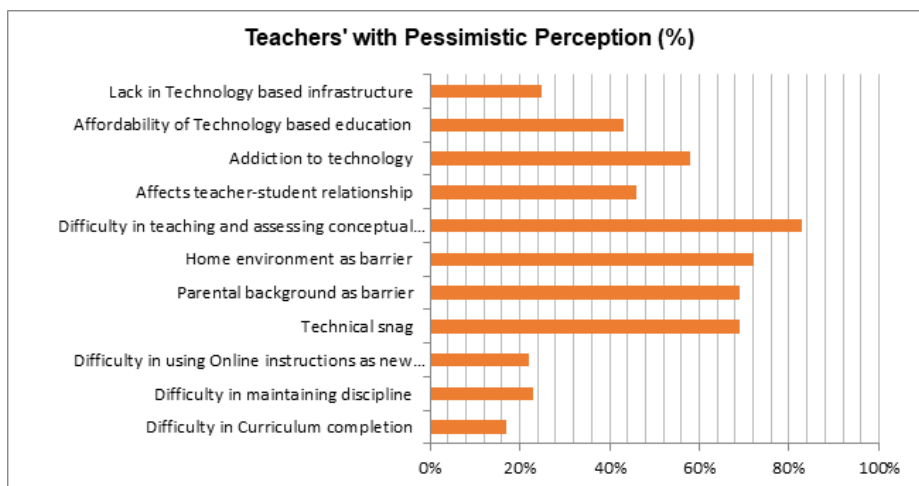


Figure 2. Teachers' with Pessimistic Perception (%)

5. Conclusion

Digital learning has been necessary during the COVID-19 pandemic times as children have not been able to attend preschool. It is also true that neither teachers nor children and their parents were prepared for this challenge. The unprecedented manner in which online education was imposed on both teachers and students has opened up a number of questions for teachers. The present study sheds light on the challenges and benefits perceived by the preschool teachers in relation to various social and cultural factors. The success of online education depends on teachers' perception of online education as a suitable pedagogy for preschool students along with the other elements involved in teaching learning such as parents' role, availability of smartphone, access to internet and various learning apps.

The response to the COVID-19 Pandemic has demonstrated how technology can help transform the education process for betterment. This also prepared school systems to face such pandemics in the future more efficiently and without prolonged disruption, as well as move towards building a strong public education system in the country. Educational technology has a huge scope and can help each child reach their full potential. For the public and private schools, there are both opportunities and obstacles. The government should ensure fair and sufficient access to online platforms. Future plans for the Indian educational system must prioritize measures that close the digital divide and bring the nation closer to reaching the Sustainable

Development Goals. The findings suggest that governments should take the initiative to provide digital technology tools and the internet at lesser cost so that every teacher and child can afford it. In other words, there has to be a policy provision in terms of addressing the inequities. In order to facilitate technology, it is suggested to enable learning a good amount of time and resources are to be invested in capacity development of preschool teachers in the first instance and training in the workshop mode for parents as well.

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