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Exploring Digital Storytelling as a Pedagogical Tool for Emergent Literacy Skills

Noyonika Gupta*
Arushi Sharma**

Abstract

The present study aims to investigate whether a multi-modal intervention using digital storytelling and art can be used to advance emergent literacy skills (specifically Oral Vocabulary and Comprehension), and foster parental engagement in the learning processes amongst children aged 3–6 years. Towards this end, significant positive changes were noted concerning all three objectives. Certain identified features that have possibly contributed to the attainment of objectives include the use of music and jingles in digital stories, frequency of occurrence of certain words in the story, the familiarity of the context of the story, reinforcing words learned through stories by engaging in art activities, child-centric nature of the intervention and adult-child engagement. Despite the positive results, the study suffers from limitations in terms of sample size, composition, and the nature of tools being used. The study has far-reaching implications concerning using digital story-telling and artbased pedagogies in elementary schools for building emergent literacy skills, particularly in low socio-economic contexts.

INTRODUCTION

The pre-school years are a phase of life when children emerge from toddlerhood into a world of exploration. These foundational years are of utmost importance in the physical, social, emotional, and cognitive development of an individual. As far as cognitive development is concerned, Piaget describes these years as the pre-operational stage in his theory (Piaget, 1971). While logical reasoning abilities are still not developed, this stage is marked by significant advancements in

* *Associate,* Projects, Nalanda Way Foundation, Chennai, India
** *Senior Associate,* Strategic Partnerships, Nalanda Way Foundation, Chennai, India

representational activity, as reflected in language, make-believe play, drawing, understanding of symbols–real-world relations, and categorisation (Berk, 2013).

It is during this developmental phase, when advancements in linguistic and representational abilities are at the forefront, that another very important developmental task requires attention,' i.e., 'emergent literacy skills'. Emergent literacy is defined as "the reading and writing behaviours of young children before they become readers and writers in the conventional sense" (Justice, 2006, p. 3). This involves exposure to literacy-rich elements like listening to stories, exposure to printed material, scribbling, or engaging in oral wordplay such as rhyming words (Connor, Morrison, & Slominski, 2006). Exposure to such experiences during early years lays the foundation for literacy and academic development in later life (Bennett, Daniel & Martin, 2002)

Within emergent literacy skills, researchers have emphasised the importance of developing oral literacy skills during these years (Dickinson & Tabors, 2001). Given that the child develops cognitive representational abilities during this stage, it is the ideal time for working on vocabulary skills, language acquisition, and comprehension skills, as the child is developing the ability to identify meaningful relations between the words spoken and the objects in real life, thus acquiring new connections (Kleeck, 2008).

Studies have shown that several factors influence the development of emergent literacy among children (Carroll, Holliman, Weir, and Baroody, 2019; Gunn, Simmons, and Kameenui, 1995). For instance, Guo et al., (2012) in their study suggest that physical literacy environment (book materials, literacy area, and writing materials) and psychological literacy environment (instructional support) results in advancements in emergent literacy skills amongst children over a year. Similarly, parental involvement is an important variable impacting the emergent literacy skills of the child (Sénéchal, Lefevre, Thomas, & Daley, 1998). Researchers have suggested that emergent literacy skills are influenced positively by parental involvement in the child's learning trajectory through engaging in activities like storybook reading, sharing vocabulary words, providing print awareness, and discussing the components of print (Mullis, Mullis, Cornille, Ritchson, & Sullender, 2004).

Furthermore, it is well established that socio-economic factors like family income and parental education level greatly influence the kind of learning environment available to a child (Hammer & Miccio, 2006). This is particularly true in the Indian context, where there is a huge economic disparity between the different income groups. Socio-economic factors can play an important role in determining

a child's access to learning resources like quality of schooling, books, or experiences at home (like availability of private tutors). These factors influence the development of emergent literacy skills among children (Kalia & Reese, 2009).

The most commonly used approach to develop emergent literacy skills is through direct, didactic, academic, and skill-based instructions. This sort of an approach generates pressure to achieve good scores, and oftentimes leads to memorisation of content, without actual learning. Such pressures are observed more among pre-schoolers and kindergarteners hailing from low-income backgrounds (Miller & Almon, 2009). It thus becomes important to explore and experiment with more child-centric, constructivist, and play-oriented teaching pedagogies for emergent literacy skills. Such an approach allows the child to immerse in the process of learning in a manner through which they learn through experiencing rather than memorising. The use of storytelling and art to work on developing emergent literacy skills amongst children is an attempt towards achieving the same.

While story-telling is usually regarded as a relaxing and entertaining activity for children, it also can communicate narrative structures such as the context, plot structure, and characters to the child. For instance, in a meta study conducted by Mello (2001) to understand the effectiveness of storytelling as a pedagogical tool, it was found that participating in storytelling had a positive impact on the student's fluency, vocabulary acquisition, writing, and recall. She also found that story-telling served to improve self-awareness, visual imagery, and cultural knowledge.

Given the rapid advancements in technology, digital story-telling, i.e. storytelling through the medium of different media or software applications, is being widely used in educational contexts. Digital storytelling has been seen as a useful tool that encourages students to engage in discussion, participate in instruction, and support comprehension of content (Kosara & Mackinlay, 2013). It is regarded as a method through which a new theme can be introduced to the learner, building their curiosity to delve deeper into exploring the theme (Simmons, 2006). The use of multimedia elements like background music, jingles, and visual representations in digital storytelling makes it interesting and engaging for children (Robin, 2006). Additionally, the advantage of digital stories is that the instructor can play them as many times as the child wants to listen to them, reinforcing the content being taught, as repetition is an important technique as far as oral literacy is concerned (Kırkgöz, 2018).

Apart from story-telling, engaging in visual arts is another important

activity that has a positive impact on children's development of emergent literacy skills. Engaging in art-based activities like drawing and painting provides children an opportunity to make meaning of what they experience, which might be real or imagined. This ability of meaning-making through representation, symbols, and drawing inferences is an important precursor to literacy (Kress, 1997). Furthermore, multi-modal representation of learning through art, stories, and direct instructions leads to a deeper understanding of the content being taught, as there are multiple opportunities to engage with the content through different mediums (Barton & Baguley, 2014).

METHODOLOGY
Aim

The study aims to investigate whether a multi-modal intervention using digital storytelling and art can be used to advance emergent literacy skills and foster parental engagement in the learning processes amongst children aged 3-6 years enrolled at the Anganwadi centre in Mayur Vihar, New Delhi.

RESEARCH QUESTION

The following are the research questions for the study:

Does participating in a multi-modal intervention based on digital storytelling and art improve—

(a) the level of oral literacy among children in the age-group of 3–6 years?

(b) the comprehension skills among children in the age-group of 3–6 years?

(c) foster parent-child engagement in the learning processes of the child amongst parents of children in the age-group of 3–6 years?

RESEARCH DESIGN

This study followed a quasi-experimental, one group pretest-posttest with a mid-term evaluation research design. The dependent variables in the study are the levels of oral vocabulary, comprehension skills, and parent-child engagement in the learning processes. The independent variable in the study is the exposure to two months long multi-modal intervention based on digital story-telling and art.

SAMPLE

Participants (n=17) belonging to age-group 3–6 years (Mean age= 4.5 years) with nine females and eight males residing in Delhi NCR were selected using the non-probability technique of convenience sampling.

TOOLS

The following are the tools used for data collection in this study.

Content Based Questionnaire

A questionnaire containing both open-ended and closed-ended questions was administered to assess oral vocabulary and comprehension.

This questionnaire had questions based on an audio story that the field coordinators were required to play, just before administering the tool.

Monthly Checklist

The monthly checklist is a simple six-items checklist administered on the parents, to collect data to the level of parent-child engagement in the learning processes.

Semi-Structured Interview

A semi-structured interview was conducted with the parents to collect data on the level of parental engagement, their observation of the child's engagement and learning, and exposure to art.

Field Observation Notes

The field coordinators who were implementing the intervention on the field were given certain prompts that encouraged naturalistic observation for certain behaviours amongst children and parents. This includes behaviours like the child's level of interest in the intervention, child's clarity of diction, parental involvement, and co-operation. These observations from the field were documented in the form of extensive notes, which then provided insights that were used to supplement the analysis.

Study Procedure

After an extensive review of the literature, the aim of the study, the specific objective, and the nature of the intervention was designed. Thereafter, with the help of the Anganwadi workers, 17 participants enrolled at the Anganwadi centre in Mayur Vihar, New Delhi were selected for this intervention. A baseline assessment of their oral literacy skills, comprehension, and parent-child engagement in the learning processes was conducted. Following this, the participants were provided with a speaker and a secure digital memory card with 30 pre-recorded stories on various topics like our body, hygiene, common animals, plants, five senses, and emotions. A session of the intervention comprised the following steps:

(a) the theme of the story was introduced to the child;

(b) one audio story was played on the USB speaker;

(c) after the story, a conversation was initiated with the child around the theme of the story and the key takeaways; and

(d) the session was concluded with a supplementary age-appropriate activity in the workbook.

Each session was designed to last for 30 minutes. A midline assessment of the intervention was conducted after 30 days of the intervention. Lastly, an endline assessment was conducted at the end of the implementation of the intervention.

Results

The following section elaborates on the results of baseline, midline, and endline assessment obtained through the study.

Oral Vocabulary

Oral vocabulary refers to words that children can understand or use while speaking and listening. For this study, oral vocabulary has been divided into three sub categories— (i) unique words used by the child, which the child picks up from the story, (ii) own words used by the child, i.e., the child's ability to use their language to explain their perspective, and (iii) clarity in speech.

Table 1
Percentage of the Children's Performance in the Oral Vocabulary Domain During Baseline, Midline, and Endline Evaluations

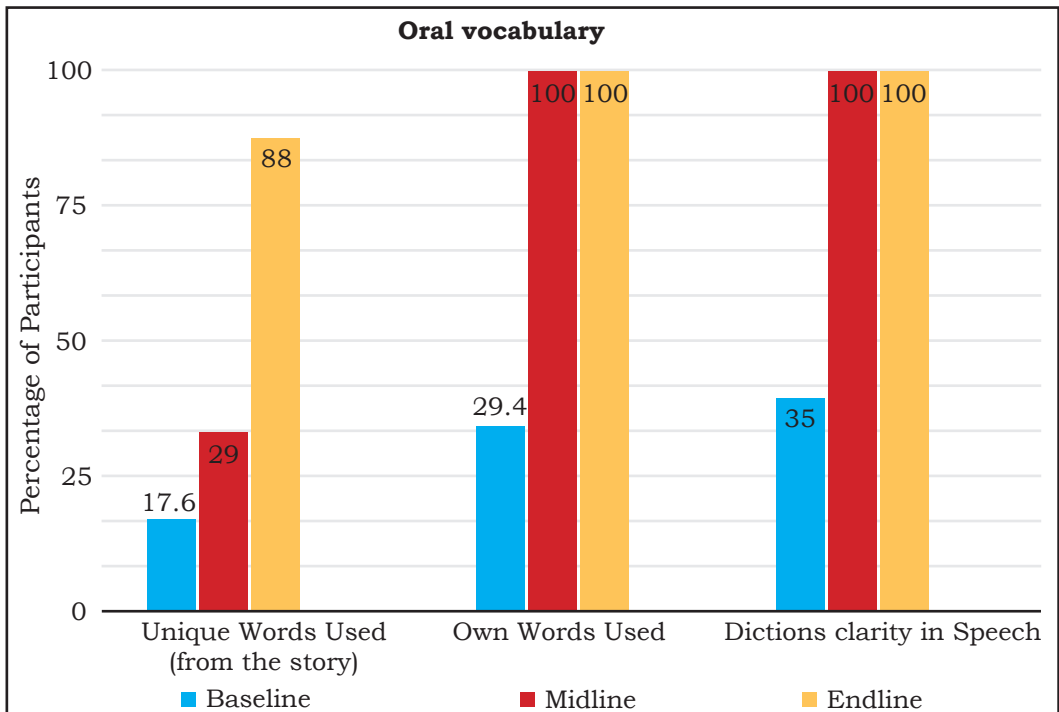| Oral Vocabulary	Baseline	Midline	Endline
Unique words used (from the story)	17.6 %	29 %	88 %
Own words used	29.4 %	100 %	100 %
Diction/Clarity in Speech	35 %	100 %	100 %

Figure 1: Graph representing the percentage of the children's performance in the oral vocabulary domain during baseline, midline, and endline evaluations

Comprehension

Comprehension involves engaging in meaningful experiences that stimulate the development and use of meaning-making strategies (McMunn and Matthews, 2009). For this study, comprehension has been divided into two sub-categories: (i) recall, i.e., ability to recall basic information from the story heard like plot, name of the protagonist, series of events, etc. (ii) forming connections, assimilation, and application, i.e., the ability to connect information learned with everyday experiences, evaluate how one would respond in place of the protagonist of the story and define the moral of the story.

Table 2
Performance on Comprehension (Level 1: Recall) During Baseline, Midline, and Endline Evalutions

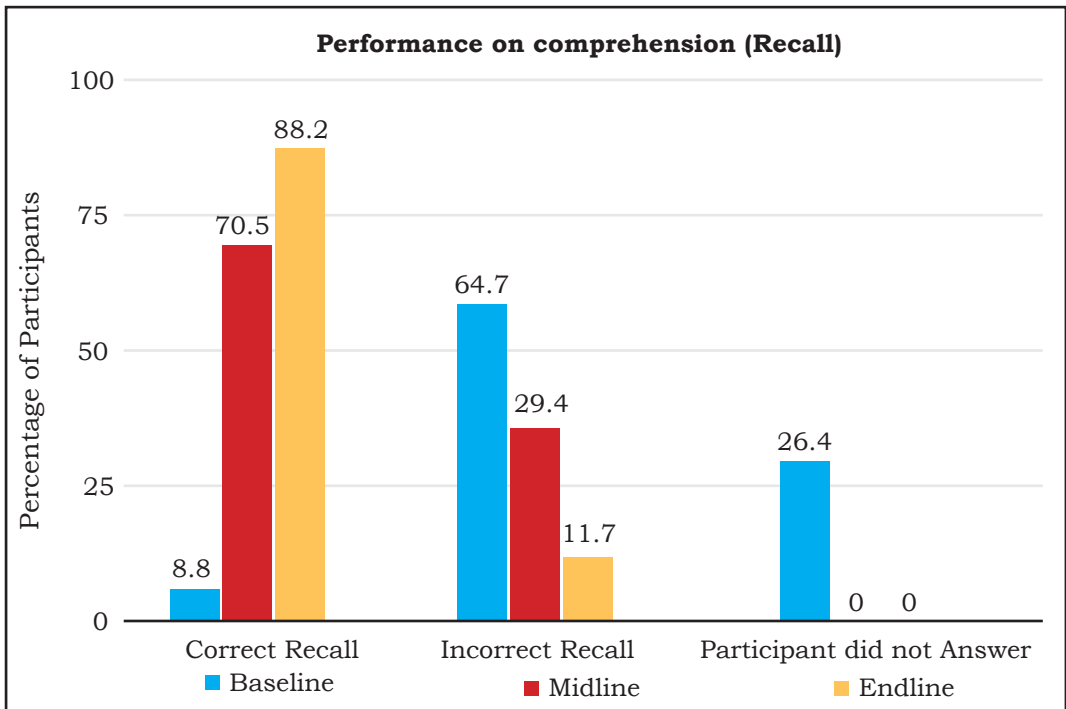| Domain	Baseline	Midline	Endline
Correct recall	8.8 %	70.5 %	88.23 %
Incorrect recall	64.7 %	29.4 %	11.7 %
Participant did not Answer	26.4 %	0 %	0 %

Figure 2: Graph representing children's performance on comprehension (recall) during baseline, midline, and endline evaluations.

Table 3
Children's Performance on Comprehension (Level 2: Forming a Connection, Assimilation and Application) During Baseline, Midline, and Endline Evaluations.

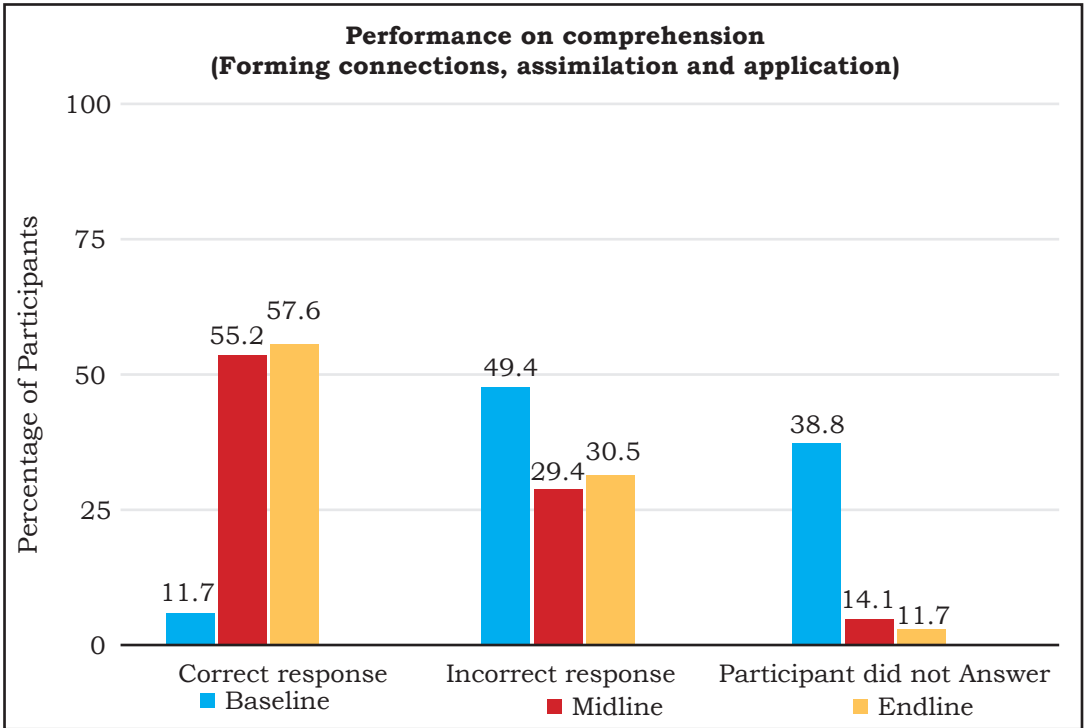| Domain	Baseline	Midline	Endline
Correct response	11.7 %	55.2 %	57.6 %
Incorrect response	49.4 %	29.4 %	30.5 %
Participant did not Answer	38.8 %	14.1 %	11.7 %

Figure 3: Graph representing children's performance on comprehension (Forming connection, assimilation, and application) during baseline, midline, and endline.

Proxy indicators—Sustained Attention, Level of Interest and Taking Initiative

Integral to comprehension are associated indicators including attention, level of interest amongst the participants and how forthcoming they were during the process of data collection. These proxy indicators were measured in this study to further provide insight into the emergent literacy skills of the participating children.

Table 4
**Indicates Percentage of Children Showing Sustained Attention, Interest
and Initiative During Baseline, Midline, and Endline**

Domain	Baseline	Midline	Endline
Sustained attention	64.7 %	94.1 %	94.1 %
Interest	76.5 %	94.1 %	94.1 %
Taking initiative	5.9 %	17.6 %	47 %

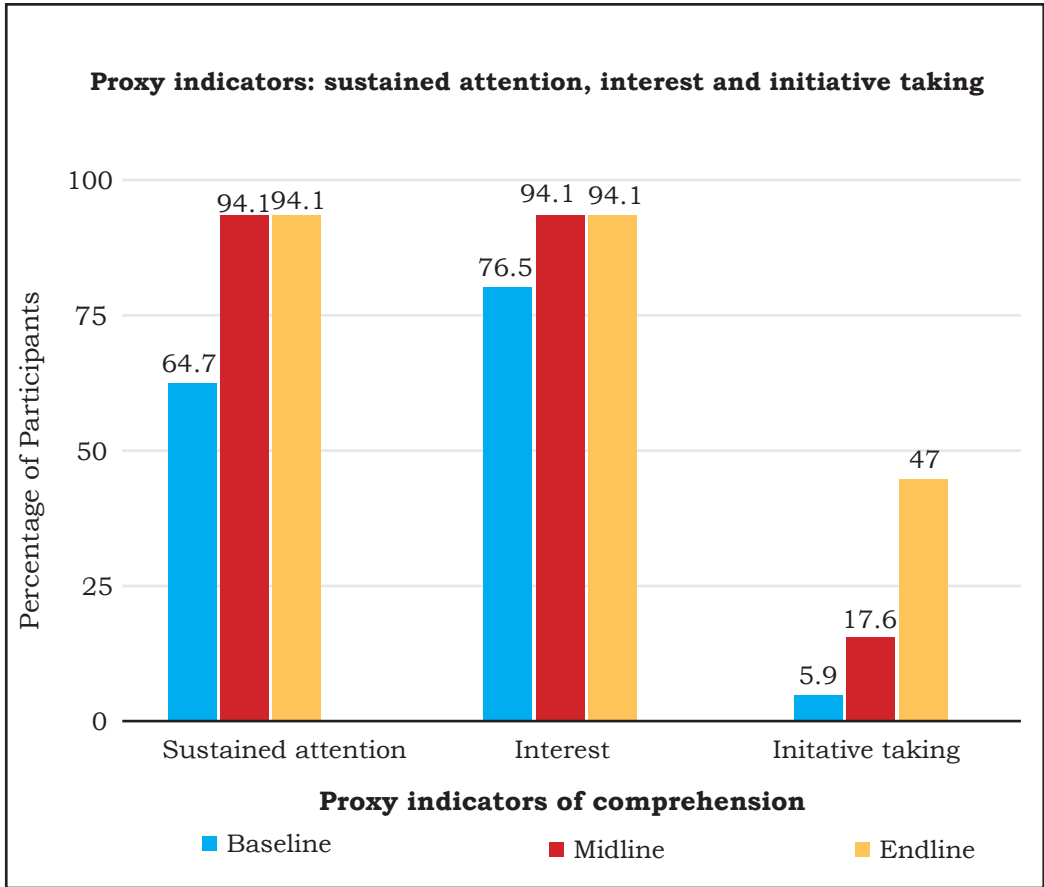**Proxy indicators: sustained attention, interest and initiative taking**

*Figure 4: Graph representing percentage of children showing sustained attention, interest
and initiative taking during baseline, midline and endline evaluations.*

Parent-Child Engagement

Table 5
Shows Percentage of Parents Engaging in Different Activities with their Children

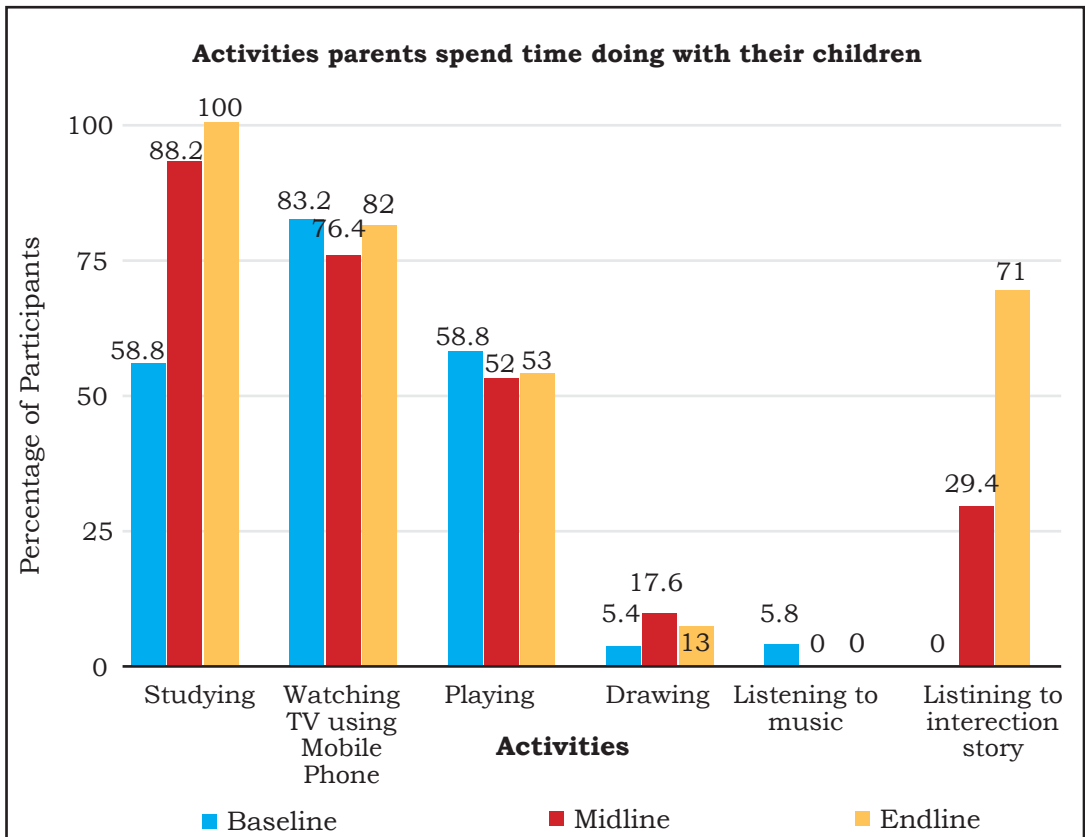| Activities that parents engage in with their child	Baseline	Midline	Endline
Studying	58.8 %	88.2 %	100 %
Watching television/using mobile phone	94.1 %	76.4 %	82 %
Playing	58.8 %	52.9 %	53 %
Drawing	5.8 %	17.6 %	17.6 %
Listening to music	5.8 %	0 %	0 %
Listening to intervention stories	0 %	29.4 %	71 %

Figure 5: Parent-child engagement during baseline, midline and endline evaluations.

DISCUSSION

The study aims to investigate whether a multi-modal intervention using digital story-telling and art can be used to advance emergent literacy skills and foster parental engagement in the learning processes amongst children aged 3–6 years enrolled at the Anganwadi centre in Mayur Vihar, New Delhi. For this purpose, an intervention was designed and implemented with a selected sample of 17 participants. Impact evaluation data in terms of baseline, midline, and endline was collected and analysed.

The intervention in terms of its modality (digital storytelling and art) and nature (child-centric) was a novel exposure for the participants in many ways. Data collected at the baseline level reveals that while a majority of the participants (70.6%) had been exposed to arts in terms of storytelling, dancing, music and drawing, the source of the exposure was mostly from television and mobile videos (58.3%). Other sources reported by the children included activities in Anganwadi centres or their homes. Thus, while the participants were exposed to art previously, the intervention was the first exposure for many of them to art in a structured manner, in the context of learning and development. Presented below are the findings of the study, concerning the identified objectives— oral vocabulary, comprehension, and parent-child engagement.

Oral Vocabulary

The results obtained suggest that there has been an overall upward trajectory as far as the oral vocabulary skills of the participants are concerned. This involved increased use of words that the children heard in the stories, improvement in using their own words while answering questions, and more clarity in a speech in the endline assessment, as compared to the baseline.

The increased use of words that the participants heard in the stories could be attributed to three specific features of the story. Firstly, the stories were designed in a manner that involved repetition of certain keywords. Repeatedly listening to these words being used in sentences in the context of a story helped the participant not only to understand how the word is pronounced, but also the meaning and usage of the word. Secondly, the stories were designed keeping in mind the cultural context and surroundings of the participants. Thus, the words learned by the participants were associated with their everyday environment, making it easy for them to understand the meaning of the same. Thirdly, the workbook used for art activities after the story-telling session involved activities related to the concepts introduced in the story. The exposure to the newly learned words, through visual representation after listening to the stories, acts as a reinforcement of the words learnt in the session.

गतिविधि 2

निर्देश:
1. उजली छाया के साथ सब्जियों का मिलान करें।
2. गतिविधि पूरी करने के बाद चित्र में सब्जियों के नाम और रंग की सूची बनाएँ।

मेरा चित्र कॉर्नर

निर्देश: यहाँ अपने चित्र से कहानी सुनाएँ तथा आप कहानी में जो चित्र नहीं बनाते हैं आधार पर चित्र बना सकते हैं।

Figure 6: An example of an activity included in the workbook, reinforcing concepts learnt through digital story-telling

These findings are in line with the identifiable features of stories that lead to enhancements in vocabulary suggested by Elley (1989) in his research. Elley suggests that children are more likely to learn new words through story-telling depending on the frequency of occurrence of the word in the story, the familiarity of the context of the story, and the frequency of occurrence of the word in pictorial representation.

Further, researchers have found that oral literacy skills are best developed through a combination of social interaction and direct instruction (Dugan, 1997; Craig, Hull, Haggart and Crowder, 2001). Discussions with the participants on the main theme of the story, after listening to the story, encouraged them to practise using the linguistic skills that they picked up from listening to the stories. This might have led to improvement in using their own words while answering questions, and also more clarity in speech.

Comprehension

Based on the results obtained, it can be concluded that there has been a general increase in the comprehension abilities of the participants, throughout the intervention. The data collected and analysed concerning comprehension has been understood keeping in mind the five-stage model of effective listening and comprehension given by DeVito (2000). It is important to note that all the stages of the model are interdependent, and the effective completion of one stage positively impacts the next.

In the context of the intervention, receiving of information is related to the intentional focus on listening to the story being played, and activities
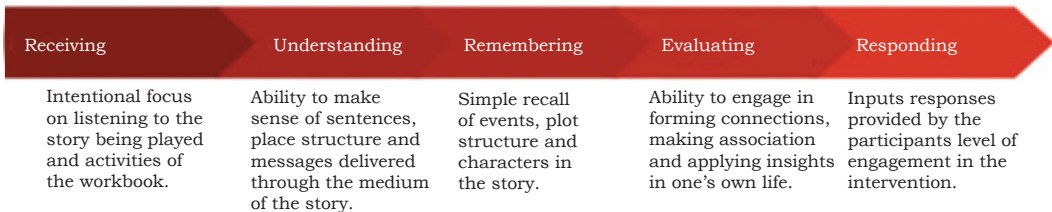
Receiving	Understanding	Remembering	Evaluating	Responding
Intentional focus on listening to the story being played and activities of the workbook.	Ability to make sense of sentences, place structure and messages delivered through the medium of the story.	Simple recall of events, plot structure and characters in the story.	Ability to engage in forming connections, making association and applying insights in one's own life.	Inputs responses provided by the participants level of engagement in the intervention.

Figure 7: Diagram representing DeVito's model (2000) about the intervention

of the workbook. Indicators for this include the percentage of participants showing sustained attention, i.e., the ability to maintain focus on relevant stimuli with repeated presentation over extended periods (Sarter, Givens & Bruno, 2001), and interest, i.e., favourable attitude and desire to attend to the story and activities. Based on the observational data collected, it is observed that there has been an increase of 45.4 per cent increase in participants showing sustained attention from baseline to midline, with the same figures being maintained at the endline (Fig. 4).

Similarly, the percentage of participants showing interest in the stories and the activities of the intervention increased by 23 per cent from baseline to midline, with the positive change being sustained till the endline (Fig.4). This advancement could be attributed to several factors such as the audio jingles and music in the digital stories (Requejo, 2016), the child-centric and engaging nature of the intervention (Van Gils, 2005), or familiarity with the context of the story, making it more relatable and thus more interesting for the child.

The second stage of effective listening and comprehension is understanding. In the context of the intervention, it refers to the ability to make sense of sentences, plot structure, and messages delivered through the medium of the story. Enhancements in oral vocabulary, as discussed above, play a major role in this step.

The third stage of the model, i.e., remembering, refers to the simple recall of events, plot structure and characters in the story. The results obtained suggest that there has

been an increase of 79.4 per cent of participants can give correct answers to questions that required recalling simple information from the story (Fig.2). This increase could be attributed to the successful completion of the above mentioned steps of receiving and understanding, as indicated by increases in sustained attention, interest and oral vocabulary.

The next stage of the model is evaluating. This can be conceived as a deeper level of comprehension as indicated by forming connections, making associations and applying insights in one's own life. Results suggest that there has been a 45.9 per cent increase in the number of participants can provide relevant responses to questions that involve them, to form connections, make associations, or apply learnings to their own lives (Fig.3). This is in line with the findings of Kosara and Mackinlay (2013), who suggest that digital story-telling is an effective mechanism for teachers to engage with their students, to promote the comprehension of the story's messages, involve them in discussions that help children make sense of their experiences and perceptions, besides fostering imagination and creativity.

The last stage of the model corresponds to responding. Two indicators, i.e., percentage of participants who do not answer during the impact evaluation and percentage of participants who show initiative, provide interesting insights

about this stage. It is noteworthy that there is a drop in the percentage of participants from baseline to endline who do not respond to the facilitator's questions for both recall-related questions (26.4% decrease) and deeper level comprehension questions (27.1% decrease). This decrease in percentage could be attributed to several direct intervention-related factors (like better comprehension, enhanced oral vocabulary, greater interest) and indirect factors (rapport with the facilitator, enhanced confidence due to familiarity with the process, etc.). Lastly, the proxy indicator of level of initiative also supplements the understanding of this stage. There is a 41.1 per cent increase in the percentage of participants who are observed to be forthcoming, and willing to take initiative in the sessions. This increase directly corresponds to higher levels of engagement in the intervention, and thus reinforces comprehension skills.

Parental Engagement in the Learning Process of the Child

Based on the results, it is observed that there is a shift in the kind of activities in which parents engage with their children. During the baseline, the maximum percentage of parents engaged in watching television and playing games on mobile phones (94.1%) with their children. However, in the midline, it was observed that a greater percentage of parents engaged in studying (88.2%), drawing (17.6%)

and listening to the intervention stories (29.4%) with their children. By the end of the intervention, 100 per cent of the parents got involved with the child's studies, and 71 per cent listened to the intervention stories (Fig. 7). Thus, it is observed that the engagement of parents throughout the intervention, changed from activities like watching television, to activities that required more involvement of the parents like studying with the child, drawing, and listening to the intervention stories.

Parental involvement has been regarded as an important variable impacting language development and emergent literacy among children (Bus, Van Ijzendoorn & Pellegrini, 1995). Regular participation of parents in activities like reading, listening to stories or other literacy related tasks have been found to have significant positive influences not only on reading achievement, language comprehension and expressive language skills (Gest, Freeman, Domitrovich & Welsh, 2004), but also on the interest levels, attentiveness and attitudes towards reading and literacy development in the classroom (Rowe, 1991).

Furthermore, research literature has indicated that parental involvement in the child's literacy development is a more powerful predictor of success, when compared to other family background variables, such as social class, family size and level of parental education (Flouri and Buchanan, 2004). Lastly, researchers have also suggested that the earlier parents become involved

in the child's literacy practices, the more profound and long-lasting effects are observed (Mullis, Mullis, Cornille, Ritchson and Sullender, 2004).

LIMITATIONS OF THE STUDY AND FUTURE DIRECTION

Notwithstanding the positive results, the present study suffers from certain limitations. The first limitation is related to the small sample size (n=17) which makes generalisability and replication of the study difficult. The second limitation is related to the nature of the tools used for data collection. The tools used were self-constructed, thus lacking validity and reliability. However, this decision was taken to make the tools simple, easy to administer and relevant to the context of the participants, thereby eliciting quality data. Additionally, the researchers had no control over the extraneous variables such as the motivation, mood or attitude of the participants that might potentially affect the results obtained.

Recommendations for future research include replicating the study with a large sample size, such that the results are generalisable. The intervention can be conducted with different populations (belonging to rural backgrounds or different socio-economic status) to evaluate the effectiveness of the intervention. Lastly, the impact of the intervention on other variables like perspective taking, social-emotional development or interpersonal skills can be explored.

Conclusion

Overall, it was concluded that the participation in a multi-modal intervention using digital story-telling and art led to significant positive changes concerning oral vocabulary, comprehension and parental engagement amongst the sample of children, aged 3–6 years. Despite the positive results, the study suffers from certain limitations in terms of sample size, composition and the nature of tools that were used. The study has far-reaching implications concerning using digital story-telling and art-based pedagogies in elementary schools for building emergent literacy skills, particularly in the context of lower socio-economic backgrounds where a rich literacy environment may not be available.

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