

Efficacy of Play-Way Technique in Promoting Numeracy Skills in Preschool Children with Hearing Impairment

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ABSTRACT

Background: The major occupation of children is playing. More often than not they are found forced into a rigorous system of education due to demands of the contemporary world. **Objective:** In this context, the current study was undertaken to investigate the effectiveness of play-way technique in teaching numbers 1 to 10 in preschool children with hearing impairment. **Sample:** Eight children with hearing loss of 60dB and above, in the age group 3 to 4 years, and having been inducted into formal early childhood special education for more than a term of 6 month were selected for the study. These children were undergoing training in special early childhood educational centre for children with communication disorders. **Design:** Random sampling was used with pre and post tests experimental design. **Tool:** At the end of a fortnight of training, the participant-Children were tested for their skills for recall and comprehension like identifying a number called out, naming a number displayed, and matching numerals with appropriate number names and dots. **Results:** As the sample size was small lacking normality, the performance scores were subjected to non-parametric comparison employing Mann-Whitney test. The results revealed that play-way exercises were resulted in better learning with a statistically significant mean rank difference of 3.5 among the 8 participants ($z=2.309$; $p=0.21$). **Conclusion:** Play-way technique is the natural and most appropriate way for instruction of young children, especially those with special needs

Keywords: Hearing impairment, number skills, play-way, preschool children

Introduction

Play is the lifeline of children. It is not a casual means for spending their time but a vital tool for promoting their all round development. Realising this fact several early reformers in the field of education like Froebel (1837) advocated for play as a medium of teaching-learning for young children. This notion continues to be held aloft even by current practitioners and researchers in the field of education (Siegler & Ramani; 2008). There are several scientific reasons behind such overwhelming support for play-way method of teaching especially for young children and those with special needs like hearing impairment.

To begin with arousing the curiosity of the learners is said to be the first and foremost step in the process of effective learning. Play being a field of natural interest of children it can easily arouse the prerequisite inquisitiveness necessary for learning. The next major factor contributing for effective learning is an alert mind.

Irrespective of the type of play, all play activities are found to excite children, which in turn tend to heighten the alertness of their mind thus enabling better absorption and comprehension of things happening in the process of play. When play-way activities are incorporated in play, the better grasping, understanding and retention of the learning task are naturally conveyed to it. Last, but definitely not the least is the effect of play in relaxing children and helping them overcome the adverse influence of fear and anxiety encountered when they have to exhibit their learning for the purpose of evaluation. And undoubtedly play effectively turns the evaluation component inconspicuous, thus enabling children to perform naturally to their optimal levels (Kochhar, 1985).

All these positive effects hold good for children with special needs like hearing impairment; and they are helpful in easing the learning process which is made

difficult due to certain impediments occurring due to the presence of the disability. With this premise, the investigators of the reported research were curious how play-way activity could be helpful in the evaluation of young learners with hearing impairment and the field of learning that they chose to experiment.

Objectives

The current study was undertaken to investigate the comparative effectiveness of play-way exercises against traditional paper-pencil exercises in establishing learning of numbers 1 to 10 in preschool children with hearing impairment. The component objectives focused on studying the efficacy of play-way exercises in enhancing the skills for:

- Comprehension Skills for –
 - o Identifying numerals 1 to 10
 - o Identifying number names 1 to 10
 - o Matching numerals 1 to 10 with their written names
- Recall Skills for –
 - o Counting & identifying dots of specified number
 - o Matching numbers with corresponding number of dots
 - o Matching number names with corresponding number of dots

Method

Sample:

For the purpose of experiment, the study included eight young learners with hearing impairment in the age range of 3 to 4 years. The participant children included 4 boys and 4 girls. All the children were having hearing loss of 60 dB or above and had been exposed to formal preschool training for a period of more than 6 months (i.e., one academic term), with Kannada a south Indian language as the medium of instruction from special Early Childhood Educational Centre for children with communication disorder.

Design:

Random sampling was used with pre and post tests experimental design.

Tools:

For the purpose of the experiment, special play-way materials had been self-developed by the researchers for the two distinct play-way activities designed for the purpose of teaching numbers one to ten.

Procedure

The children had been formally introduced to numbers one to ten in class, following which the group was randomly assigned to two experimental groups of four children each. This was followed by supplementary training through two play-way techniques akin to card game and bowling pins in one of the experimental group, while the other group continued with traditional paper-pencil exercises.

Activity involved with a card game where play cards with dots and numerals corresponding to the 10 numbers were printed and cut out. These cards were printed with numbers and their names facing both the directions and dots in the middle so that they could be read from either direction as in traditional cards. Eight sets of these cards were made. These cards were shuffled and distributed among the children. As in the traditional card game of *rummy*, children had to take turns to drop one card each at a time. Whichever player drops a card with the same number (identified by the numerals and number of dots) will win all the cards that have been accumulated until then. At the end when any one player has extinguishing his/her cards, the player left with the most number of cards will be considered the winner.

The second game was fashioned after the game of bowling pins, where an existing toy set of ten pins made of plastic was made use of. Numerals of numbers one to ten were stuck to the balls, while to the pins both number names and number of dots were stuck separately. Children had to randomly pick up ball and aim at a pin with matching number of dots or number names according to the number found on the ball.

Following pre-test of baseline abilities in number skills children were randomly assigned to two experimental groups, one exposed to fortification exercises in the traditional paper-pencil format and another using play-way technique. By deriving information from their clinical reports of psychological, listening, speech and

language development it was also ensured that the participant-children in both the groups had comparable levels in cognitive and communication skills; thus resulting in stratified random sampling of the participants.

The study was carried out in five distinct steps the first step involved adaptation and/or development of play materials for training and testing which were validated by experts, the second phase involved formal instruction in numbers 1 to 10 to eight children with hearing impairment undergoing special early childhood education; the third step involved pre-test in the number skills followed by random constitution of two experimental groups from among the eight subjects; the fourth step involved carrying out fortification exercises for children of the one experimental group through play-way technique and for children of the other experimental group through traditional paper-pencil exercises for a duration of one fortnight; and the final fifth step involved conducting post-test in the number skills which was parallel to the pre-test.

The pre and post-tests were conducted on individual basis. As the sample size was small, it could not be distributed on normative probability curve, non-parametric measure of Mann-Whitney U test was employed to compare the performances of the two experimental groups. The difference between the post and pre-test performances had been computed to arrive at the gain scores so that baseline differences among the two groups could be nullified. The gain scores of the children were worked out separately for recall tasks involving numerals or number names and related association, as well as comprehension tasks involving association of value of numbers or number names to appropriate number of dots. The overall gain in performances was also analysed. All analyses were carried out after converting the raw scores into percentage scores for ease of comparison.

Results

As described herein above, the gain scores of the two experimental groups were compared. To begin with the overall improvement in number skills was compared by computing the average gain in performances.

Table 1(a):
Comparison of overall gain performance with
Mann-Whitney U test

(a) Ranks

Training Options	N	Mean Rank	Sum of Ranks
Play-Way technique	4	6.50	26
Paper-Pencil	4	2.50	10
Total	8		

(b) Test statistics

	Overall Gain
Mann-Whitney U	0.000
Wilcoxon W	10.000
Z	2.309
Asymp. Sig. (2-tailed)	0.021
Exact Sig. [2*(1-tailed Sig.)]	0.029 ^a
Exact Sig. [2*(1-tailed Sig.)]	0.029 ^a
a. Not corrected for ties.	

Mean gain scores of the two experimental groups evinces a mean difference of 29.5% in favour of the play-way technique thus underlining its efficacy in promoting learning in young preschool children with communication disorders like hearing impairment.

The data was further subjected to non-parametric statistical measure of Mann-Whitney U test the results of which have been presented in table 1 (a) & (b) that displays the mean rank of the two groups along with z-score and statistical significance of the difference among them.

Test statistics

Table 2 (a): Comparison of recall ability with
Mann-Whitney U test

(a) Ranks

Training Options	N	Mean Rank	Sum of Ranks
Play-Way technique	4	6.13	24.50
Paper-Pencil	4	2.88	11.50
Total	8		

(b) Test statistics

Gain in Recall Skills	
Mann-Whitney U	1.500
Wilcoxon W	11.500
Z	1.888
Asymp. Sig. (2-tailed)	0.059
Exact Sig. [2*(1-tailed Sig.)]	0.057 ^a
a. Not corrected for ties.	

Substantial difference gained by play-way exercises over paper-pencil exercises, in the form of a mean rank advantage of four in a total of eight participants, and that too with the significant advantage ($p < 0.05$) proves beyond doubt its efficacy in stabilizing learning of numerals in preschool children with hearing impairment. Further detailed analyses were carried out to determine the relative influence of the two methods in improving recall as well as comprehension skills related to learning of numbers 1 to 10. First the improvement in the ability to recall numerals and number names was compared between the two groups. The results indicate that radiant advantage displayed by play way method over paper-pencil method grows a shade brighter in the enhancing skills for recalling numerals and number names as is evident in the mean advantage of 31%.

However statistical comparison of the performances elicit more definite results that have been displayed in table 2 (a) & (b) where the mean difference in rank has actually gone down to 3.42 and is without statistical significance.

Table 3 (a):

Comparison of comprehension ability with Mann-Whitney U test

(a) Ranks

Training Options	N	Mean Rank	Sum of Ranks
Play -Way technique	4	6.25	25.00
Paper -Pencil	4	2.75	11.00
Total	8		

(b) Test statistics

Gain in Comprehension Skills	
Mann-Whitney U	1.000
Wilcoxon W	11.000
Z	2.021
Asymp. Sig. (2-tailed)	0.043
Exact Sig. [2*(1-tailed Sig.)]	0.057 ^a
a. Not corrected for ties.	

Consequent effort was made to compare the gain made in meaningful learning of numbers and their value between the two experimental groups. The results elicit a mean difference of 28% in favour of play-way technique. Even though the mean arithmetic difference in the gain scores is lower for comprehension than recall ability. Outcome of statistical analysis employing the non-parametrical measure of Mann-Whitney U Test reveals that the difference in mean rank is 3.5 with suggestion of statistical significance which was better compared to the advantage in recall ability.

Discussion

Pedagogists have highlighted the multifarious effect of play-way teaching for typically developing children like – arousal of curiosity to learn; alertness for better absorption and comprehension; sustenance of interest in the (covered) teaching-learning activity; effective retention of learnt information for longer; enhancement of ability to apply learnt skills in practice; and ultimately display of learning outcomes optimally without conscious fear of assessment procedures. There have been specific evidences (Asha, 2009) that have highlighted the role of traditional games and play activities in enhancing acquisition of (pre)academic skills in young children with hearing impairment, thus adding strength to the findings of this reported research.

Conclusion

In spite of brevity, the findings of the investigation reiterate the irrefutable fact that play-way technique is the natural and most appropriate medium for young children, especially those with special needs. More

intensive research to experiment teaching-learning through a wide range of play-way activities across different areas of preschool curriculum and over longer durations may provide more concrete evidence to make early childhood education, especially for children with diverse kinds of special needs a joyful and meaningful experience.

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