

Use of concrete detachable learning tools in testing children's animal discriminatory ability

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This study examined the effect of concrete detachable learning tools on young children's discriminatory ability. The study adopted pre-test, post-test experimental design. Data were obtained from twenty-two (22) pupils, with age range between 2 and 4 years (average age = 2.95 years). There were ten male and twelve female pupils randomly selected from a private primary school in Ota, Ogun State. Two hypotheses were formulated for the study. The study found no significant difference in the performance of males and females who were taught using the concrete learning tools ($t = 0.516$, $df = 9$, $p > .05$) but a significant difference between the post-test performance of those who were taught discrimination using the concrete detachable learning tools and those using the visual tool ($t = 13.771$, $df = 10$, $p = .000$). This study shows that concrete detachable learning tools are suitable for early childhood education considering its positive effect on memory.

Key words: Learning, detachable tools, discrimination, performance.

Introduction

A critical part in the wider field of early childhood development is the area of cognitive development in children. The continuous interplay between the child's unfolding capacities and the environment in which he or she grows up is critical in supporting children's cognitive development (Fisher, 1998; Haywood, 2004; Gardner, 1993). Caregivers, teachers, and quality teaching in the overall programmes in early childhood settings, play important roles in the child's cognitive development and his or her subsequent learning. Documented evidence by Mustard (2008), revealed how in the early years of life, children learn, and that specific interventions can improve children's thinking and intelligence. As noted by Kok (2011), there is a growing consensus that achievement of basic literacy, while obviously necessary, is not a sufficient goal. Children must not only be taught to become literate; they must also be nurtured to become creative and competent thinkers.

Play facilitates learning. Studies have shown that children learn by playing and the concrete manipulative materials used in this study served as play tool for the children. Concrete manipulative materials are very effective as learning tools in teaching children different concepts (Olsen and Finn, 2011; Strom and Strom, 2005; Moore 1986). Researchers have reported that children love to engage with their physical environment and the

pieces that are present in these spaces (Nicholson 1971; Moore 1986). Research has shown that when manipulative objects are available, the children are more physically active (Olsen and Finn, 2011; Hannon and Brown, 2008). As noted by Nicholson (1971), manipulative objects consist of materials that children can pick up, throw, kick, examine, arrange, and chase.

The insights of many educators and theorists such as Piaget's cognitive development theory, Vygotsky's socio-cultural theory and Montessori's educational philosophy have influenced and enriched the teaching and learning of young children. Part of what this study sets out to achieve is the discriminatory ability of children taught using concrete objects, and in this study, concrete and detachable animals and those taught with animal charts.

According to the New Webster Dictionary (2004), to discriminate is to use good judgment in making a choice, to observe and make distinctions and to distinguish one thing from the other. Apparently, this definition is not far from that of the psychological explanation of "stimulus" discrimination studied under the levels and features of classical conditioning which explains that stimulus discrimination is the ability to ascertain the difference between one stimulus and another. In this study, discrimination occurs when more attention is paid to the features of the stimulus that differentiates it from the old

or initially identified stimulus. As noted by Piaget (1972), this process and many other aspects of cognitive development occur from a tendency for people to organize their psychological structures and adapt to their environment.

It is generally agreed that learning occurs when experience brings about a relatively permanent change in the learner's knowledge and behaviour. According to Hill (2002, in Woolfolk, 2004), the change may be deliberate or unintentional, for better or for worse, correct or incorrect and conscious or unconscious. For young children, most manipulative materials are learning toys used for the purpose of play. Gonzalez-Mena (2005) noted that these materials are varied rich medium of learning and that children gain confidence and increases their self-esteem through play.

Eugenia (1996) and High Reach Learning (2007) revealed that age of children contributes to their ability to effectively discriminate between objects and sound. It was reported that as children grow and develop, their ability to discriminate also develops. Among the concrete tools to test children's discrimination abilities are: picture cards, colours, audio-visual media (Television), photographs, memory game (children match cards that show like objects), letter/number match puzzles, woodland animal matching (the children can match the individual animal cards to their game card) and moral stories. It is important to mention that well developed discrimination ability can provide a strong foundation for success in children's teaching (HighReach Learning, 2007).

Statement of Problem

In introducing the basic features of his cognitive development theory, Piaget explained that children learn (acquire) new knowledge about events and experiences by adapting to new learning information through assimilation which is a process through which a child takes in a new experience and fits it into an existing schema. A classic example which is the basis on which this research lies is that of a child who has learnt the word 'dog' and who for a while calls all animal dogs.

This process according to Piaget is balanced by accommodation, in which the child adjusts an existing schema to fit in with the nature of the environment. The child in the example begins to perceive that goats can be distinguished from dogs and may develop schema for these two types of animals. In solving the problem of animal generalization among preschool children, this study explored the effectiveness of the use of concrete detachable learning tools in teaching children animal discrimination.

Studies have shown that concrete manipulative materials are very effective as learning tools in teaching children different concepts (Hannon and Brown, 2008). This study is aimed at developing a hands-on activity that

can be used by children to learn animal discrimination by manipulating its features (detachable), thereby teaching the children animal discrimination and also teaching them the differences in the features of animal that seem identical.

Hypotheses

1. There will be a significant difference between the performance of males and females using the concrete detachable learning tools in animal discrimination.
2. There will be a significant difference between the use of detachable manipulative learning tools and visual learning tools such as books and charts in teaching children animal discrimination

METHOD

Design

The study employed pre-test, post-test experimental design. After the pre-test, the experimental group was exposed to the experimental condition while the control group was not exposed to any intervention.

Setting and participants

The experiment was carried out in the natural learning environment of the participants using their classroom. The study involved children within the ages of 2 and 4 years who were observed to have a tendency to generalize animal identity. To do this, a pre-selection test was conducted with the presentation of eight different animals on flash cards to all the pupils in Reception one and two. The ability to identify at most three of these animals qualified the child to be part of the population. From a population of 140 pupils, 22 were systematically selected to be a part of the sample for this study. All the pupils were randomly assigned to the experimental and control groups. After the experiment, the pupils were appreciated by giving an eraser and a pencil.

Instruments

The materials for the study were designed by the researcher. These include a set of eight flashcards and wooden models of sheep, goat, camel, rat, rabbit, giraffe, chicken and duck. The animal models were used as a test for discrimination for the flashcards and as a learning tool to teach animal discrimination to the experimental group. The flashcard was named "What do you see" card, it is a pictorial representation of each of the eight animals. The wooden models were tagged "Animal Farm" learning tools. Each of the wooden models have at least one to

four of their parts being detachable. A chart showing different animals with the eight and others included was also a part of the materials used. The chart was used to teach the control group different animals as is contained in their curriculum, it was tagged the "Domestic Animal" chart.

Ethical considerations

The study received ethical approval from the head teacher and parents of concerned pupils. Participation was voluntary; teacher and parents were educated on the aim of the survey. They were assured of strict confidentiality of the responses of their children and wards.

Procedure

This section details the procedure through which the experiment was conducted and it involves the pilot study and the main study.

Pilot study

The pilot study commenced with the acquisition of data to ascertain the test-retest and alternate form reliability for the flashcards (What you see cards) and the concrete detachable learning tools (Animal Farm). Eleven participants (who were not part of the main study) were selected from the population of interest. The flashcards were administered to them and they were retested five days later.

They were equally requested to identify each concrete detachable learning tool. The alternate form (the Domestic Animal chart) of these tests was administered the day after the first administration of each. The result shows a test-retest coefficient of .72 for the flash cards and .82 for the concrete learning tools and an alternate form correlation coefficient of .89 for flashcards and .61 for the concrete learning tools.

Main study

The study was conducted within twelve (12) days. The twenty-two participants were taken through a pre-test where they were asked to identify the animal on each flashcard. Their responses were scored based on one point for correctly identified animal and no score for incorrect or no response. From the day of pre-test administration, a seven day interval was given before the administration of experimental conditions for each group. The participants were exposed to two days of teaching, during which they were using the "Animal Farm" learning

tools. The control group was taught using the "Domestic Animals" chart.

Participants in the experimental condition were exposed to already detached "Animal Farm" tools and their behaviours and interactions with the concrete models were observed unobtrusively by the researchers. After few minutes, the researcher proceeds with the teaching. Participants were required to identify the animals by their names. The aim of this section was to teach the children the names of the different animals and identifying distinctive features of those who look alike. Participants were taught the correct identity of each animal and thereafter, they were requested to identify the animals' one after the other. The group session lasted about fifty minutes.

With the aid of research assistants, participants in the control group were exposed to the control condition where they were taught to identify the animals relevant to the study as displayed on the "Domestic Animals" chart. The session lasted about forty minutes. On the final day of the study, all the participants were exposed to a post-test where they were asked to identify the animals on the flashcard. Their responses were recorded and subjected to statistical analysis.

Data analysis

The flashcard consisted of eight different picture items and participants were expected to identify each. Correct identifications were recorded with one point and every other response was rewarded with no score. Data generated from the instrument were analysed using SPSS software programme (version 17.0, Chicago, IL, USA). A significance level of 0.05 was adopted for the study. Descriptive statistics was employed to analyse the demographic variables. Hypothesis one was analysed using the independent t-test statistic while hypothesis two was subjected to the dependent t-test analysis.

RESULTS

Table 1 show that more females (54.55%) than males (45.45%) participated in the study. More than half (59.09%) of the participants are 3 years old while 5 and 4 participants were 2 and 4 years old respectively.

Table 2 reveals no significant difference between the performance of male and female participants using concrete detachable learning tools on animal discrimination ($t = 0.516$, $df = 9$, $p > .05$). Based on this result, hypothesis 1 was rejected.

Table 3 reveals there is a significant difference between the use of concrete detachable learning tools and visual tools in teaching animal discrimination ($t = 13.771$, $df = 10$, $p = .000$). Based on this result, hypothesis 1 was sustained.

Table 1. Demographic characteristics of participants.

Characteristics = 60	Frequency	Percentage
Gender		
Male	10	45.45
Female	12	54.55
Total	22	100.0
Age (mean = 2.95)		
2	5	22.73
3	13	59.09
4	4	18.18
Total	22	100.0

Table 2. T-test summary on experimental group by gender.

Variables	N	Mean	S.D	dt	t	p
Male	6	6.500	1.048	9	0.516	>0.05
Female	5	6.800	.836			

Table 3. T-test summary on post-test scores for experimental and control group.

Variables	N	Mean	S.D	dt	t	p
Experimental	11	6.63	.924	10	13.771	.000
Control	11	3.72	.904			

DISCUSSION

The first hypothesis which investigated the difference in the performance of male and female preschoolers using concrete detachable learning tools in learning animal discrimination reveal there was no significant difference in the performance of males and females in the discrimination task. Children’s successes on task are usually influenced by factors associated with the task which may include language used in instructions, the content of the information used in the experiment and the familiarity of the material (Donaldson, 1978). Thus, gender has no significant effect on children’s performance in the discriminatory task considered in this study.

In hypothesis 2, it was revealed that there is a statistical significant difference in the use of concrete detachable learning tools (experimental group) and visual tool like charts (control group) in teaching animal discrimination. From the finding, it was noted that children in the experimental group that could identify an animal correctly in the concrete detachable form was equally able to identify the animal on a flashcard.

On the other hand, children in the control group who were exposed to domestic animal chart and were able to identify an animal correctly in the domestic animal chart were not able to identify same animals correctly on a flashcard during the post-test, some did not respond or

did incorrectly. Thus, children in the control group were not able to transfer the knowledge acquired from their learning tools in identifying or distinguishing between animals during the post-test. Children in the experimental group were however able to use the knowledge acquired from their learning tools in identifying or distinguishing between animals during the post-test showing the importance of teaching children with concrete objects.

Use of concrete learning tools has been shown to be beneficial going by the result of this study. This result is in tandem with the result of a study by Puchner, Taylor, O’Donnell, and Fick (2008). In their study, they found that in three of four lessons studied, manipulative use was turned into an end in and of itself rather than a tool, and that in the fourth lesson manipulative use hindered rather than helped the student’s learning (Puchner, Taylor, O’Donnell, and Fick, 2008).

Learning using concrete materials promotes the active involvement of children in the learning process especially by providing them with different materials that suits their ages and enhances their understanding of the concepts learnt. Despite this evidence showing difference between the two groups, Kelly (2006) warned that teachers need to know when, why, and how to use manipulatives effectively in the classroom as well as opportunities to observe, first-hand, the impact of allowing learning through exploration with concrete objects.

Conclusion

Based on the result of this study, concrete detachable learning tools were found to be of great help in aiding the memory of preschoolers in learning animal discrimination. Apart from aiding learning, concrete detachable learning tools also promote play which is an important part of early childhood education. Observing most situations, parents send their two year olds to school not just because they "seem" ripe for school but because they "lack" the time to attend to their children's need during the day-time. Parents expect preschools to prepare their children for success in primary schooling (Sharpe, 2002; Wong and Lim, 2002).

They also put much pressure on young children to learn academic skills, such as reading, writing and numeracy skills, at a young age (Ebbeck andWarrier, 2008). Teachers as well as parents are more concerned with performance than actual learning. The truth is that in this part of the world, childhood is not seen as an important stage of development, not taking into cognizance that the child of today becomes the man tomorrow. Parents especially should realize that the childhood stage of development is the most important. During this stage, habits are inculcated, wanted behaviours are reinforced, self esteem and confidence are built and creativity is nurtured.

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