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Effect of handedness on learning speed of children living with physical disability.

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ABSTRACT

This study investigated the effect of handedness on speed of learning among children living with physical disability. Specifically, the focus of the study was on those with hearing impairment. Cross- sectional design was adopted and purposive sampling technique was used to obtain participants (N = 15). Fourteen of the participants were identified as right-handers and 1 was a left-hander using Edinburgh Handedness Inventory. Ten minutes was used to teach them the intended stimulus and 60 seconds was allotted for individual responses. Speed (time) was measured in seconds. Data was analysed using t-test and analysis of variance. Results showed that right handers committed did not commit more errors than left-handed persons. On accuracy, the left hander did not perform better. Handedness had a significant effect on speed of learning, $F(1,14) = = 5.58$, $p<0.05$. The left hander had a faster speed of learning than the right-handed participants. Discussion and conclusions were made based on the findings obtained and suggestions for further studies were made especially as there were fewer participants in this study.

Introduction

Learning is a process that has no end. Human beings, right from conception to death, are in the process of acquiring one form of knowledge or the other in order to survive. Learning ranged from formal to informal process. It can be termed informal when the condition of knowledge acquisition stem from home, friends, colleagues, relations, the internet etc. Formal learning on the other hand, is the type of learning that people obtain information or acquire skills from schools, or in a formal gathering. This paper based on the formal type of learning. According to Chance (2008), learning is a change in behaviour due to experience. The definition is simple enough but bears careful consideration. The word change is preferred over acquisition because learning does not always involve acquiring something, but it does always involve some sort of change. People's behaviour changes from being bad to good because of learning. Any process that does not lead to change in behaviour and that change is not durable, cannot be termed as learning.

Humans are created with different abilities. Some can learn or adapt to learning system fast while some, learn very slow. What brings about speed in learning depend on the biological brain makeup of individual persons and environmental touches. Speed in learning is the collection of methods of learning which attempt to attain higher rates of learning without unacceptable reduction of comprehension or retention. It is closely related to speed of reading but encompasses other methods of learning such as observation, listening, conversation, questioning and reflection. Children with disabilities are obviously the most disadvantaged set of population when it comes to speed of learning on their educational or academic performance.

Onwubolu (2017) observed in a kindergarten class and in the junior primary class that most pupils experienced difficulties in reading, writing, speaking and doing arithmetic but with time they gradually overcome these difficulties. These difficulties become learning disabilities when some pupil's difficulties in speaking, reading, writing and spelling require special intervention for learning in these areas of difficulties. For these reasons the children are often discriminated upon in education, since experts in special education have to adopt regular school curriculum for their instructional need. These children need serious, active, and stage by stage techniques in learning. Meyem in Ozegya (2008) identified that the greater

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difficulty a learner has in acquiring skills, the greater the attention is needed to determine the instructional arrangement. Obani (2015) noted that disability is a silent killer in education because it is hidden and seemly innocuous, but yet frustrates achievement at the optimal levels as it affects the key school subjects and skills for achievement in other areas. These children apart from having one category of disability, may likely have additional disabilities which makes it even more difficult to attend to their instructional arrangement. This study examines the effects of handedness on speed of learning among children living with hearing impairment.

Handedness is an attribute of humans defined by their unequal distribution of fine motor skills between the left and right hands (Onion, 2005). An individual who is more dexterous with the right is called right-handed and one who is more dexterous with left is called left-handed. A minority of people are equally skilled with both hands and are termed ambidextrous motor skills (Santrock, 2008). Physiologically, being left or right-handed has to do with how the right and left sides of the brain relate to one another. Evidences (e.g., Coren, & Halpern, 2008; person & Allebeck, 2009; Raymond & Pontier, 2010) support the idea that there are clear differences between the way left-handed and the right-handed people think, learn and solve problems. One school of thought show that during prenatal development, embryos exhibit handedness via single arm movements between nine to ten weeks of gestation (Hepper, McCartney, & Shannon 1998). Some may have described handedness due to possibilities of hemispherical asymmetry of cortical association areas controlling the cognitive motor skilled movements (Haaland & Harington, 1996). Right handers use analysis as their learning style (process of breaking the problem into pieces and examine each piece in turn) to solve problem while their left-handed counterpart use synthesis as a style of learning (process of connecting the dots to understand the big picture) to solve problems (Christmann, 2004). The following hypotheses will be tested in this study:

1. Right handers will commit more errors and have less accurate responses compared to left-handed persons.
2. Handedness will influence speed of learning.

Method

Participants in this study were 15 children with hearing impairment. They were recruited from Abdul Zanga UBE Primary School in Keffi, Nasarawa state, Nigeria. Their age ranged from 8-14 years with a mean age of 9.53 years (*SD* = 1.68 years). The group comprised 6 males and 9 females from Primary 1, 3 and 6. A teacher who understands sign language assisted the researchers in the study. The participants were first given the Handedness Scale (Oldfield, 1971) to complete. Based on the scores on Handedness Scale, 14 of the participants were right- handers while one participant was a left-hander. Afterwards, they were taught the stimulus material for the study in 10 minutes. The instrument used was a 10 flash cards of colors. Subjected to standardization and experts' rate the face and content validity of the test was 77-90% while the Cronbach α coefficient was .91. The task of the participants was to identify 7 colors out of the 10 that they were taught. Sixty seconds was given to each participant to respond to the stimulus items. The researchers took record of the number of errors committed, number of accurate response and time (speed) was recorded in seconds. T-test was used to measure differences in responses while univariate analysis was adopted to check for effect of handedness on learning speed.

Results

The first hypothesis which stated that right handers will commit more errors, have less accurate and slow learning compared to left-handed persons. Was measured using multiple t-test.

The second hypothesis which stated that handedness will have an effect on speed of learning was measured using univariate analysis of variance. Handedness had a significant effect on speed of learning, $F(1,14) = = 5.58$, $p<0.05$. The left hander had a faster speed of learning than the right-handed participants.

Table 1: T-test table showing the differences in learning between left and right handers

	Handedness	*N*	Mean	*SD*	*SE*	*t*	*DF*	sig
Errors	Right	14	1.92	1.26	.33	1.46	13	.16
	Left	1	.00	.	.			
Accuracy	Right	14	4.07	1.26	.33	-1.46	13	.16
	Left	1	6.00	.	.			

Table 1 showed that the right handers committed did not commit more errors than left-handed persons. On accuracy, the left hander did not perform better.

Table 2: ANOVA results showing the tests of between subject effects

Source	Type III Sum of Squares	*DF*	Mean Square	*F*	Sig.
Handedness	17.71	1	17.71	5.58	.03
Error	41.21	13	3.17		
Total	611.00	15			
Corrected Total	58.93	14			

Discussion

The first aim of the study was to measure the differences in error committed and level of accuracy in responding to the presented stimulus between left and right handers. Result showed that there was no significant difference in error committed and level of accuracy in responding to the presented stimulus. None of the groups had the ability to learn fast and learn well. This finding contradicts past studies (e.g., Coren, & Halpern, 2008; person & Allebeck, 2009; Raymond & Pontier, 2010) on handedness. Most of the studies reported that the left handers are special in their ways and this could be trace down to their brian make up and their processing styles.

The second aim of the study was to examine the influence of handedness on learning speed among the persons with hearing impairment. Result showed that handedness had a significant effect on speed of learning. The left, right and ambidextrous persons have their different ways of processing information. Some process fast and some slow. Christmann (2004) maintained that left handers **use** synthesis to solve problems while right handers use analysis to process information. Synthesis is seen as the process of fusing a large amount of information into a single integrated body of knowledge while analysis is an examination of elements or structure of something. Based on the different methods of processing, one will conclude that the left handers will have an edge reason is because, their style gives them opportunity to connect information fast and make meaning out of it.

Teachers need to identify and understand the peculiarities with handedness and the disability to help students perform according to their speed in learning rather than discriminating on the basis of their disabilities. Education administrators and policy makers have to be inclusive in their policies to cater for these differences in handedness for effective performance in the classroom and no child irrespective of his perceived disability or conditions be forced to use either right or left instead motivate them.

Limitation of the study and suggestions for further studies

A few challenges were encountered during the study. The handedness scale was not robust enough to identify mixed handers and among the sampled participants only one is a left hander. Participants were also few, and generalisations cannot be made based on the findings of this study. Causal explanations is also precluded from the findings of the study. We recommend the inclusion of large number of participants in subsequent studies and the adoption of longitudinal design.

Conclusion

Handedness is an important factor in a learning system that needs adequate attention. Being a left- or right-handed person is not a disease but a special gift that comes with different abilities. Education administrators should enlighten tutors and parents on it and ensure that they acquire the skills to handle such preferences in classes and at homes. It was observed that sometimes, a left-handed child is forced to write or do things with right hand. Every hand preference should be appreciated and encouraged because it comes with special abilities.

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