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# INVESTIGATING ATTITUDE OF HEARING-IMPAIRMENT STUDENTS TOWARDS LEARNING MULTIPLICATION AMONG LOWER BASIC STUDENTS IN A. A. RAJI SPECIAL SCHOOL SOKOTO, SOKOTO STATE, NIGERIA

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## Abstract

*Multiplication concept is one of the pre-requisite skills needed for better understanding and development of mathematics skills. Students' understanding, development of basic mathematical skills, and performance are affected by some factors, that include, attitude, instructional process, and materials used among others. The present research investigates the hearing-impaired students' attitude toward using the Chinese stick method in learning multiplication in Sokoto state Nigeria. One group of pre-test and post-test research design was employed, a sample of 344 was purposively selected. An attitude questionnaire for the use of the Chinese stick method of Multiplication was adapted and used for data collection after being subjected for the expert validation and also a reliability index of 0.87 using Cronbach alpha was obtained. The results obtained indicate that students have a positive attitude on the overall score when they are exposed to the Chinese stick method. Mann-Whitney U-test was used to analyze the two hypotheses. The results indicate a significant difference on students' attitude scores before and after using the Chinese stick method in learning multiplication and that no significant gender difference was found between male and female students after using the method. Thus, this indicated that the use of the stick method can enhance the attitude of hearing-impairment. Based on this the stick method can be used as a tool for improving students' attitudes and performance in learning multiplication concepts*.

**Keywords**: Hearing-impairment, Attitude, Chinese stick method

## Introduction

Mathematics is a science of number and quantity that helps in developing the human mind, concerned primarily with ideas, processes, and reasoning skills to develop other areas for the benefit of humanity. Evidence from the literature indicates that the skills in mathematics are crucial towards successful economic development, tools for actualizing scientific and technological development (Mazana, Montero, & Casmir, 2019; Ngussa & Mbuti, 2017). However, the development of higher mathematical skills that help in actualizing science and technological innovations required a better understanding of the basic skills in mathematics, such as addition, multiplication, subtraction, and division.

According to Zhang, Cao, Wang, and Li (2019) development of basic mathematical skills is fundamental for a solid foundation to more advanced mathematics skills. Thus, multiplication is one of the important basic skills required for the development of students thinking skills in mathematics. Wallace and Gurganus (2005) indicate that students with low skills in mathematics are those found without proficient in basic mathematics (multiplication) skills. Robinson, Dubé, and Beatch (2016) affirmed that the development of advanced algebraic skills required a solid foundation of the basic skill in multiplication and division. Evidence bound that students with low multiplication skills are found

disadvantaged in their subsequent higher level of mathematics skill (Wallace & Gurganus, 2005).

Thus, difficulty with Mathematics was lamented by even normal ability (physically challenge could not be on exception) students in Nigeria (Wonu and Zalmon, 2017). Students with physical challenges (Hearing-impairment) experience some problems in the learning process that affect their attitude and performance. Hashim (2016) affirmed that one of the factors affecting hearing-impairment students is communication skills. Thus, could be because students with hearing-impairment learn and communicate by gesture and other means of communication except for sound verbal communication. Researches indicate if they can see and use their body parts, it is believed they will learn better when the concept is taught using an activity-based (Hashim, 2016).

Attitude is very important in the learning process because of social interaction that involves students, teachers, the environments, methods, and materials use in the learning process. Research sees attitude as a vital instrument used in the prediction of students achievement (Aiken, 1976; Verešová and Malá, 2016). And that also, attitudes are considered as a key impetus for actualizing higher or low performance in mathematics (Mazana et al., 2019). Yara, (2009), pointed out that, teachers' personalities and modes of interaction in the learning process affect students' attitudes positively or negatively. Delamater and Myers, (2010) explained that a negative or positive attitude can be formed because of the method of interaction (learning process), and reinforcement. Tsao, (2018) affirmed that instructional strategy used influences students' attitudes in learning geometry. Substantial research indicated a positive attitude can provide better achievement, for example, Pavlovicova and Zahorska (2015) affirmed that students with a positive attitude achieved 96% success to complete the task on the square when applying properties at post-test, and 86% at the pre-test. Research indicates that the teaching approach is one of the factors responsible for students to like or dislike mathematics (Yilmaz, Altun, & Olkun, 2010). Mazana et al. (2019), affirmed that instructional practice influences students to like, dislike, or enjoy mathematics.

However, negative attitude, poor performance, and low level of mathematical thinking skills continue to be a topical issue in Nigeria. Substantial research indicates some factors associated with the problem of negative attitude, including the method used, teachers' personality, and poor background of knowledge (Ogan & George, 2015 and Yara, 2009). Aliyu, (2019), indicated that lower basic students in Sokoto state demonstrated a negative attitude toward learning multiplication when the conventional approach was used. Thus, physically challenge students could not be an exception as they are receiving similar instructional strategies. Therefore, attitude is very important when it comes to teaching and learning processes because teachers with a better understanding of their students' attitudes in relation to their personality could provide an appropriate selection of strategies that can help to improve positive attitude, similarly selection of appropriate method could provide a better way through which learning could be achieved. It is based on this Mill, (1960) indicates that students could be made to learn from outside because we are superior to them. But, to reach them from insight (understanding their attitude) is paramount for better learning (ibid). in other words, understanding the students' attitude towards teaching methods, learning environments, materials are very important for actualizing a positive attitude and better performance in mathematics and multiplication concepts in particular. Thus, the present research investigated the hearing-impairment students' attitude toward using the Chinese stick method in learning multiplication in

Sokoto state with view to provide the clear picture of their perception towards using Chinese stick method in learning multiplication.

## The Present Study

The study investigated the perceptions of hearing-impaired students for a better understanding of their attitude which can help towards achieving the basic understanding of multiplication skills. To achieve these below are the research objectives, and research questions.

## Objectives of the Research

The study investigated the attitude of hearing-impaired students towards using the Chinese stick (line) method of basic secondary schools in Sokoto state In specific the study aimed to:

i. Investigate if there is any difference on the attitudes of the hearing-impaired students before and after the treatment using Chinese stick method of multiplication.
ii. If there is any difference in the attitudes of male and female hearing impaired students taught multiplication using Chinese stick technique after treatment.

## Research Questions

Based on the above objectives the following research questions and hypotheses were generated as a guide.

i. Is there any difference on the attitudes of the hearing-impaired student before and after the treatment using Chinese stick method of multiplication?
ii. Is there any difference in the attitudes of male and female hearing impaired students taught multiplication using Chinese stick technique after treatment?

## Methodology

*Design*

The research design adopted for this study was one shot case design entailing pre-test and post-test. The design involved only one group. The group was tested before the treatment of the stick method. The questionnaire was first administered to assess their attitudes at the pre-test. Then after the treatment, the same instrument was administered to assess their attitudes on the use of the stick method in learning multiplication see Figure1 below.

$O_1 \longrightarrow X \longrightarrow O_2$

*Figure 1 One group pre-test, post-test*

Where, $O_1$ indicates the Pre-test, X, is the Treatment and $O_2$ indicates Post-test.

**Participants**

The participants for this research consisted of all 344 hearing impaired students at A.A. Raji special school Sokoto, where a purposive sampling technique was used; this is because not all the subject (students) has the requirement for selection. Thus, the focus of the research was on hearing-impaired students. This left the researcher to take a non-probability sampling technique.

**Ethical Consideration**

The research permission was sought from the Principal of A. A. Raji Special School to conduct the research in the school, a meeting with the head of the department was organized by the principal. Based on the discussion, and agreed time without disturbing the academic activities students were considered and other modalities for the successful conduct of the research. the purpose and nature of the research were explained verbally and in writing to the participants and that confidentiality and anonymity were guaranteed to the participants.

**Method of Data Collection**

**Assessments of Students' Attitude towards Learning Multiplication**

The data was collected by using a questionnaire adapted and modified from (Aliyu, 2019), after expert validation the reliability index of 0.87 was obtained using Cronbach alpha. The questionnaire was pre-tested to assess the overall attitudes of students taught multiplication before and after the treatment, to ascertain their attitude based on the learning multiplication using Chinese or stick technique.

**Data Analysis**

A quantitative method was used to analyse the overall attitude of students. The first research question required to establish the students' attitude towards using the Chinese stick method in learning multiplication. Therefore, descriptive statistics were used and obtained an overall attitude. Thus, the two hypotheses were analysed using Mann-Whitney U-test at 0.05 level of significance using SPSS.

**Results**

Analysis of differences on the attitudes of the hearing-impaired students before and after the treatment using the stick method of multiplication.

Table 1 below, indicates mean rank of 271.18 and 417.82 in pre and post-test scores respectively and that a p-value (0.000) indicating that p-value<0.05, therefore, the null hypothesis was rejected and concluded that there is a significant difference on the attitudes of hearing-impaired students taught multiplication using stick method before and after the treatment. The table shows that pupils' attitude is significantly higher after treatment and this difference was due to the simplicity of the Chinese stick method.

**Table 1: Mann-Whitney U-test on students' Attitude Before and After the Treatment**

| Treatment | N | Mean Rank | P-value | Decision |
|---|---|---|---|---|
| Before Treatment | 344 | 271.18 | 0.000 | $H_o$ Rejected |
| After Treatment | 344 | 417.82 | | |

*Decision Criterion: Reject $H_0$ if P≤0.05*

Analysis of difference on the attitudes of male and female hearing impaired students taught multiplication by using stick technique after treatment.

Table 2 provides the results based on the attitude scores of male and female students, the result of the analysis indicates a mean rank of 166.83 and 179.34 for male and female students respectively after treatment. a p-value is 0.241 indicating a p-value>0.05, therefore the null hypothesis was retained and conclude that there is no significant difference on the attitudes of male and female hearing-impaired students using the stick method in learning multiplication after the treatment.

**Table 2: Mann-Whitney U-test on Attitude of Male and Female After the Treatment**

| Gender | N | Mean Rank | P-value | Decision |
|---|---|---|---|---|
| Male | 188 | 166.83 | 0.241 | $H_o$ Retained |
| Female | 156 | 179.34 | | |

*Decision Criterion: Reject $H_0$ if P≤0.05*

**Discussion**

Based on the analysis of the study the result indicates the majority of the students show a positive attitude on the use of the Chinese stick method in learning multiplication.

However, the possible interpretation gains from the result obtained will be discussed, thus, the results show that students' attitude in post-test was positive and better than their attitude in pre-test which is in line with earlier findings of Yilmaz et al.,(2010) students develop positive attitude because the teacher teaches well and Ngussa and Mbuti, (2017) indicate that, use of humour as teaching strategy develop a positive attitude of students in the mathematics classroom. This indicates that students with hearing impairment consider the use of the Chinese stick method as interesting in learning multiplication. Furthermore, the negative attitude demonstrated by the students in the pre-test could be as a result of the strategy used prior to the use of the Chinese stick method which agreed with the finding of Yilmaz et al(2010) students indicates that they develop a negative attitude towards mathematics because the instruction is boring. Research studies in Nigeria indicated that conventional strategy is the dominant approach used in learning multiplication, and mathematics in general (Atebe & Schäfer, 2011; Hassan & Binji, 2016). Moreover, the result of the Mann-Whitney test obtained confirmed the result indicating that there is a significant difference between pre and post-test from the overall attitude scores. Mazana *et al*.,(2019) indicated that teachers' instructional strategies affect students' attitudes.

## Conclusions

From the foregoing results, it was concluded that hearing-impaired students' attitude was improved when they were taught multiplication using the Chinese stick method than the traditional method. Therefore, conclude that the method could serve as a very important strategy that can improve students' attitude towards learning multiplication.

## Recommendations

Based on the findings of this study the following recommendations were made:

Chinese stick should be appropriately adopted and incorporated in the curriculum of hearing-impaired students as it is an instructional technique that is a student-centered and activity-based approach in learning multiplication concepts as it minimizes fear, enhances interest and improves students' attitude.

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