# EFFECTIVENESS OF CHAINING STRATEGY IN DEVELOPING READING SKILLS AMONG DEAF PUPILS IN SELECTED PRIMARY SCHOOLS IN TANZANIA

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**A THESIS SUBMITTED IN FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY IN EDUCATION**

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## CERTIFICATION

The undersigned certify that they have read and hereby recommend for acceptance by the Open University of Tanzania, a thesis entitled: **"Effectiveness of Chaining Strategy in Developing Reading Skills among Deaf Pupils in Selected Primary Schools in Tanzania"** in fulfilment of the requirements for the degree of Doctor of Philosophy of the Open University of Tanzania.

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## COPYRIGHT

## DECLARATION

I, **Fraterinus Osward Mutatembwa**, declare that, the work presented in this thesis is original. It has never been presented to any other university or institution. Where other people's works have been used, references have been provided. It is in this regard that I declare this work as originally mine. It is hereby presented in fulfilment of the requirements for the degree of Doctor of Philosophy of the Open University of Tanzania.

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Signature

……..……..

Date

## DEDICATION

I dedicate this thesis to my beloved father, the late Osward Kamugisha Rwakabwa and my grandfather, the late Peter Rwakabwa, for their concerted efforts, determination and support in my education. May their souls rest in peace.

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## ABSTRACT

Despite chaining strategy being used in teaching deaf pupils in Tanzania, still the deaf graduate with poor reading skills. This study investigated the effectiveness of chaining strategy in developing reading skills among deaf pupils in Tanzania. It examined the impact of chaining strategy on word recognition and language comprehension, identified challenges faced by teachers, and determined ways to support the chaining strategy. The study employed mixed research approach with a convergent research design. It was conducted in four special primary schools for the deaf from Dar es Salaam, Njombe, Kagera and Tabora. It was guided by the theory of simple view of reading and VARK model. In-depth interview, observation, questionnaire and test were employed in collecting data from 20 teachers and 162 deaf pupils respectively. Data were analysed through descriptive statistics, correlation, simple linear regression and content analysis. The findings revealed that chaining strategy had a significant contribution in developing word recognition and deaf pupils' ability of generating meaning from individual words and short sentences. The study further found that the strategy had insignificant influence in developing deaf pupils' ability of generating meaning from long sentences and reading texts without encountering some challenges. The study concludes that chaining strategy contributed to the development of deaf pupils' word recognition ability but could not guarantee the development of language comprehension. It recommends that deaf pupils should be identified and exposed to sign language in early ages, and teachers for lower grade levels need to be competent in sign language.


***Keywords:*** *chaining, strategy, reading, deaf, word-recognition, comprehension*

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| | |
|---|---|
| AMUCTA | Archbishop Mihayo University College of Tabora |
| CDC | Centres for Disease Control and Prevention |
| CD-ROM | Compact Disc Read-Only Memory |
| NECTA | National Examinations Council of Tanzania |
| SPSS | Statistical Package for the Social Sciences |
| UK | United Kingdom |
| UNESCO | United Nations Educational, Scientific and Cultural Organization |
| USA | United States of America |
| URT | United Republic of Tanzania |

# CHAPTER ONE

# INTRODUCTION AND BACKGROUND TO THE STUDY

## 1.1 Introduction

This chapter presents the background to the study, statement of the problem, objectives of the study, research questions, significance, and limitations of the study as well as delimitations of the study. The chapter also highlights operational definition of key terms as used in the study, organization of the study and lastly, the chapter summary.

## 1.2 Background to the Study

Development of reading skills is a gradual process of building an individual's ability to recognize words and comprehend the written information (Indeed, 2020). This process is inevitable in laying the academic foundations of young children (Moreillan, 2007). Thus, an individual's reading ability is one of the determinants for one's academic achievements (Hulme & Snowling, 2015).

Reading skills (word recognition and language comprehension abilities) are more easily acquired during the early years of a person's life (from two to eight years) than it is in one's adult life time (CDC, 2022). This is due to the fact that, in the early years, the brain of children is capable of capturing easily different information considered to be the foundation of reading skills (Niklas et al., 2016). That is why school curricula of various countries include reading skills development to be among the skills that should be taught in the first years of education of their children. For that matter, when

a child misses these important skills s/he may end up becoming a low achiever or even end up dropping out of school (Kern & Friedman, 2008).

Reading difficulties among hearing and deaf children has been an increasing problem in both developed and developing countries in recent years. This is indicated by the United Nations Educational, Scientific and Cultural Organization (UNESCO) report of 2021 which shows that the number of children worldwide that is experiencing reading difficulties has increased from 483 million children in 2019 to 584 million in 2020 (UNESCO, 2021). Also, studies from USA, UK, Namibia, Zambia, Zimbabwe, South Africa, Kenya and Uganda report reading difficulties as one of the problems facing deaf children in these countries (Herman et al., 2017; Maina et al., 2014). Tanzania also experiences problems related to reading skills development among deaf children (Mushi, 2021). In Tanzania deaf students attend primary education for ten years; however, majority of them still graduate with poor reading skills (Hakielimu, 2011). The studies have not identified the actual causes of this detrimental issue of reading difficulties amongst deaf learners; hence raising the question on whether deaf children are taught using appropriate deaf pedagogies and strategies or not.

This being the case, the world has been making efforts to ensure that deaf children are provided with the opportunity to acquire reading skills as their hearing peers. The efforts made have influenced different scholars to develop and come up with different reading intervention strategies and techniques for deaf children. For instance, some European and American scholars developed and proposed strategies such as role play, gradual release of responsibilities, storytelling, and elaboration on text as strategies for

teaching reading among deaf pupils (Mich et al., 2013; Nikolraizi et al., 2013). Notably, Padden and Ramsey (2000) proposed chaining strategy as one among the most effective intervention measures for handling reading problems among deaf children because it can promote the development of word recognition and language comprehension abilities among the deaf.

The latter strategy has also been recommended by Haptonstall-Nykaza and Schick (2007), Puente et al. (2006), Staden (2013), Staden and Roux (2010), Stone et al. (2015), and Quinto-Pozos and Reynolds (2012) as an effective strategy that has significantly demonstrated a significant enhancement of reading and vocabulary skills among deaf leaners when appropriately used by teachers in teaching reading skills. Moreover, Gentry et al. (2004) recommends chaining the stories on CD-ROM with multiple modes of reading cues such as print, pictures, and sign language, while Francisco and Padilla (2023), and Knoors and Marschark (2014) recommend chaining of multimedia tools when teaching reading skills to deaf pupils.

Similar to the efforts seen in Europe and America, scholars from some African countries have worked on intervention measures for reading challenges among deaf children in their countries. The evidence from studies conducted recommended interactive reading activities, storytelling, visual aids, rhyming techniques, lip reading, text immersion, peer collaboration, and interactive whole-class reading as some of the strategies for teaching reading to deaf (Banda et al., 2024; Bruwer et al., 2024; Molapisi, 2024). Moreover, majority of scholars have emphasized the use of chaining strategy as an effective solution to reading problems among the deaf (Vinopol, 2018).

The use of chaining strategy was being encouraged because it boosts reading skills development among deaf children by promoting association or linking of written words with their corresponding sings and other related stimuli (Quinto-Pozos & Reynolds, 2012). Through this strategy, deaf students are able to connect a sign, printed or written word, picture or real object representing a concept and fingerspelling of that word (Holcomb, 2023; Nussbaum et al. 2012). Chaining strategy is usually used by teachers for the deaf in teaching second language through the use of the skills of the first language (Holcomb, 2023). For instance, a teacher can apply chaining in teaching reading skills to the deaf by connecting a sign, a printed or a written word, picture or real object representing a concept and then fingerspelling of that word. Likewise, the teachers can use a written story accompanied with sign language and pictures (Holcomb, 2023). Also, one can use story-signing, memory game, matching letter game, and lotto (Costa et al. (2018); Khenissi et al. (2015); Miller et al., 2021). Thus, chaining strategy helps deaf children in discovering the interconnectedness of different concepts and constructing meaning of particular concepts (Gynne, 2016).

In the same spirit, the government of Tanzania and other stakeholders have been making efforts to ensure that deaf children are provided with the opportunities that will facilitates their acquiring of reading skills. The initiatives made include equipping teachers for deaf with relevant pedagogical skills for teaching reading skills to deaf such as the use of chaining strategy (Kentalis, 2018; URT, 2021) and promoting competition among teachers involved in teaching reading skills to the deaf to enhance their capacity and motivate them (URT, 2019). The other effort includes the development of the first digital Tanzanian

Sign Language Dictionary with a large collection of 7,200 video signs and pictures along with their meaning in both Kiswahili and English (Mkama, 2023).

Regardless of the efforts, the deaf children still continue to perform poorly in reading and this lowers their transition rate from primary to secondary education (Kisanga, 2019). Worse still, few of those who succeed to join secondary education manage to complete and get a good score at that level (URT, 2018). This is proved by Mkama and Storbeck (2023) whose study revealed that, 54% of 86 secondary school deaf students in Tanzania involved in the study dropped out of school whereas 82% of those students who reached form four failed in their final examination. Likewise, another study by Mkama (2023) on literacy skills among form two deaf students in 24 secondary schools in Tanzania found that all 428 students who were involved in the study had some varying literacy challenges. Majority of the 428 students could neither read nor produce intelligible written texts in either Kiswahili or English languages.

Furthermore, the 2022 Standard Four National Examination results provide another evidence which shows that 84.8% and 90.1% of deaf pupils from two of the primary schools for deaf in Tanzania performed poorly in Kiswahili while 63.6% and 54.5% of the same students performed poorly in English respectively (NECTA, 2022a). These are language subjects whose performance depend much on the reading ability of an individual (Mylanguages, 2019). Also, the 2022 Standard Seven Examination results showed that 92.6%, 54.6% and 50% of deaf pupils from three primary schools for the deaf respectively, failed the exam in general (NECTA, 2022b). Similarly, the 2022 Ordinary Secondary Level National Examination results showed that 92% of deaf

students from the only special secondary schools for the deaf in Tanzania scored Division Zero while the remaining 8% attained Division Four (NECTA, 2022c). The overall poor performance of deaf students in Tanzania is directly linked to poor reading skills as Khan, (2021) observes that bad or undeveloped reading skills impact negatively the overall academic performance of students because it is the means of constructing meaning and acquiring new knowledge.

The above situation raised the doubt on whether deaf pupils in Tanzania were being taught reading skills by using effective strategies and techniques. Preliminary interview with 6 teachers of the target schools on 18th December 2022 indicated that chaining was the most commonly used strategy in teaching reading to the deaf in Tanzania. However, reading skills development among deaf pupils in the country was still a problem. Based this background, it would be plausible to question that, if chaining strategy was being advocated as an effective strategy for teaching reading skills to deaf students by different scholars, and was being used in teaching deaf pupils the same skill in Tanzania, why did majority of deaf pupils in the country fail to acquire the skills as expected?

While there has been limited information available on the chaining strategy in Tanzania, there have been data on alternative educational approaches such as re-teaching and collaborative teaching (Koboli, 2021; Philip & Kumbur, 2023). These methods, recommended by Tanzanian researchers, were found to be supportive in educating deaf students; however, they were not specifically used to teach reading skills. Instead, their application was more common at the secondary school level.

Therefore, this study sought to address the existing gap by investigating the effectiveness of the chaining strategy in developing reading skills among deaf pupils in Tanzanian primary schools.

## 1.3 Statement of the Problem

Though reading ability enables an individual, including deaf learners, to successfully interact with written information and that deaf learners are expected to master such skills like their hearing peers (Warren, 2021), the reading problem among deaf pupils in the country has continued to be a serious challenge. The government of Tanzania and other education stakeholders have implemented different intervention measures such as conducting training on appropriate pedagogy to teachers for deaf and emphasizing on the use of chaining strategy in teaching (Kentalis, 2018; URT, 2021). Through chaining strategy, teachers use the combination of sign language, fingerspelling, visualization materials like real objects and pictures, written words as well as learning games in imparting reading skills to deaf pupils. Despite the training activities and the use of chaining strategy which had been recommended by many scholars and was commonly being used in teaching reading skills to deaf pupils in the country, still majority of deaf learners continued experiencing serious reading problems in schools (AMUCTA, 2022). While this was puzzling, the effectiveness of chaining strategy in the context of Tanzania was not yet known; hence, inspiring the need for a research to bridge the gap in knowledge in this area. Therefore, this study sought to investigate the effectiveness of chaining strategy in developing reading skills among deaf pupils in Tanzania.

## 1.4 Research Objectives

### 1.4.1 General Objective

The overall objective of this study was to investigate the effectiveness of chaining strategy in developing reading skills among deaf pupils in Tanzania.

### 1.4.2 Specific Objectives

Specific objectives of this study were to:

i) Examine the contribution of chaining strategy in developing word recognition ability among deaf pupils in Tanzania.

ii) Determine the usefulness of chaining strategy in developing language comprehension ability among deaf pupils in Tanzania.

iii) Identify challenges facing teachers in applying chaining strategy when teaching reading skills among deaf pupils in Tanzania.

iv) Develop a model that enhances the use of chaining strategy in developing reading skills among deaf pupils in Tanzania.

## 1.5 Research Questions

The study sought to address the following research questions:

i) What is the contribution of chaining strategy in developing word recognition ability among deaf pupils in Tanzania?

ii) What are the usefulness of the chaining strategy in developing language comprehension ability among deaf pupils in Tanzania?

iii) What are the challenges facing teachers in applying chaining strategy when teaching reading skills among deaf pupils in Tanzania?

iv) Which model that can effectively enhance the use of the chaining strategy in developing reading skills among deaf pupils in Tanzania?

## 1.6 Significance of the Study

This study may help the government, through the Ministry of Education Science and Technology and other related ministries, to understand the strengths as well as the weaknesses of the chaining strategy when used in teaching reading skills among deaf children in Tanzania and be able to take relevant steps for its improvement. Also, this study may help the government, through the respective ministries, to improve the existing policies or come up with new policies related to intervention on reading challenges among deaf pupils in Tanzania. Additionally, this study may act as an eye opener to researchers and professionals who are interested in studying reading intervention strategies for deaf pupils in Tanzania and beyond. The study may lead to the formulation of a new theory or modifying the existing ones on reading skills development among deaf children. Lastly, the study may act as the body of knowledge to different people inside and outside the country interested in research on reading skills development among deaf pupils; thereby, contributing to the improvement in teaching and learning of reading skills among deaf pupils.

## 1.7 Limitations and Delimitations of the Study

### 1.7.1 Limitations of the Study

This study faced a few challenges in reaching teacher respondents. During data collection, there were seminars that were being held to introduce teachers to a new curriculum in Tanzania. This situation could have affected the sample size. However,

the researcher remained flexible and adjusted the schedule for data collection. He met some respondents in the evening or early in the morning before attending the said seminars. Those who could not meet in person were interviewed by phone. Additionally, heavy rainfall in some study areas caused roadblocks and delays. Some roads became impassable for several hours. Nevertheless, the researcher remained patient and continued with the journeys once road repairs were done.

### 1.7.2 Delimitation of the Study

This study focused on examining the effectiveness of chaining strategy in developing reading skills among deaf pupils in Tanzania. It was conducted in four special primary schools for the deaf located in Dar es Salaam, Njombe, Kagera and Tabora regions of Tanzania. The schools were chosen because they enrolled only deaf, thus the strategies and techniques that teachers used were purely for the deaf. The respondents of this study were teachers and students from the four special primary schools for the deaf in Tanzania as they had the requisite experience, skills and knowledge in teaching deaf children; hence, could provide relevant information that was required in the study.

## 1.8 Operational Definition of Key Terms

**Chaining Strategy:** Refers to the method that teachers use to intervene and impart reading skills to deaf pupils in special schools through the use of various techniques and approaches synchronously.

**Deaf Pupil:** Refers to any primary school child at the level of education from standard one to three in Tanzania who has total or partial hearing loss.

**Effectiveness**: Means the extent to which the chaining strategy enables a deaf pupil's ability to recognize words and comprehend the written information.

**Language comprehension:** Refers to the ability to decode meaning from a written sentence by understanding its different elements.

**Reading Skills:** Refers to the ability of a deaf pupil to recognize words and understand the meaning of the written materials they interact with when reading texts.

**Word recognition:** Refers to the pupil's ability to visualize a written word and understand its component letters and meaning.

### 1.9 Organisation of the Thesis

The study is organised into six chapters. The first chapter provides the background to the study, statement of the problem, main objective, specific objectives, research questions, significance of the thesis, limitations of the study and delimitation of the study and organization of the study. Chapter two contains the details from both theoretical and empirical reviews related to the chaining strategy and reading skills development among deaf pupils. The chapter also ends by summarizing the key lessons learned from the reviewed literatures and displaying out the research gap. Chapter three contains the details on research methodology which highlight different techniques and strategies employed in the study with the reasons for selection. The subsections include: research philosophy, approach, research design, study area, population of the study, sampling techniques, and sample size, data collection

methods, reliability and validity of the study and instruments, data analysis as well as logistical and ethical considerations. The fourth chapter presents the study findings while the fifth chapter presents the discussion of the findings. Chapter six provides the summary of the findings, conclusions and recommendations of the study.

# CHAPTER TWO

# LITERATURE REVIEW

## 2.1 Introduction

This chapter presents theoretical and empirical reviews of various theories and studies related to the study. It summarizes the findings from various studies that have been conducted in relation to effectiveness of chaining strategy in influencing reading skills among deaf pupils. It also establishes the knowledge gap and ends with conceptual framework for the study.

## 2.2 Theoretical Review

The study reviewed and adapted two theories which were the theory of Simple View of Reading (SVR) and Visual (V), Aural (A), Reading/Writing (R), and Kinaesthetic (K) (VARK) Model of Learning. Thus, the reviewed theories guided this study, specifically in the areas related to the necessary skills for reading skills development (word recognition and language comprehension) as well as the applicability of the chaining strategy in developing reading skills among deaf pupils in Tanzania.

### 2.2.1 The Theory of Simple View of Reading

The theory of SVR was developed by Gough and Tunmer in 1986 (Catts, 2018). The theory highlights word recognition and language comprehension as important components for effective reading ability development (Catts, 2018). The theory points out that, if either a component is weak or missing, reading ability of an individual will be limited. For instance, a child may be good at word recognition but poor at

comprehension, hence, leading to ineffective reading. It also emphasizes the use of effective reading instruction that promotes the development of reading ability easily. Although the theory has laid the foundation for imparting important skills in reading development, it does not provide adaptations that can accommodate the needs of deaf learners. This has necessitated an additional theory to supplement the SVR in guiding research on the effectiveness of chaining strategies in developing reading skills among deaf pupils in Tanzania. Therefore, in this study, the theory was used to guide objectives number one and two which focused on the development of word recognition and language comprehension ability among deaf pupils in Tanzania respectively. Similarly, it guided objective number four which focused on developing a model that could enhance the use of chaining strategy in developing reading skills among deaf pupils in Tanzania.

### 2.2.2 VARK Model of Learning

The VARK model of learning was developed by Fleming in 1987. It emphasizes the use of four distinct learning modalities: Visual, Auditory, Reading/Writing, and Kinesthetic. The model recommends that teachers should use a variety of strategies to match different learning preferences. This is important because some learners may benefit more from one style than the others (Broadbent, 2021). VARK helps teachers improve students' engagement and understanding by being exposed to diverse teaching methods.

In this study, the VARK model works together with the SVR theory. SVR theory, describes reading as a combination of decoding (word recognition) and language

comprehension. Conversely, VARK provides practical ways to teach these skills, especially to deaf pupils. For example, the visual style supports word recognition through sign-supported texts, image-word links, and fingerspelling. These techniques enables pupils to decode words without hearing. Language comprehension is also supported through visual and kinesthetic methods like role play, visual storytelling, and signed narratives.

This study used the VARK model to guide the application of the chaining strategy in achieving first, second and fourth objectives. Specifically, the model's principle of strategy diversification informed the use of chaining in teaching both word recognition and language comprehension. Additionally, the study integrated principles from both the VARK and SVR theories as a conceptual roadmap, since their combined use offered a more comprehensive explanation on how reading skills can be developed through the chaining strategy.

## 2.3 Empirical Literature Review

The review of empirical literature was guided by the key variables derived from the study objectives, as presented in the subsequent subsections.

### 2.3.1 Contribution of Chaining Strategy in Developing Word Recognition Ability among Deaf Pupils

Humphries and MacDougall (2000) have highlighted that chaining of printed or written word, then fingerspelling the word and giving the sign related to the written/finger spelled word as the most appropriate strategy that can be used to support

the development of word recognition ability among deaf pupils. Padden and Ramsey (2000) indicate the chaining strategy as a technique that enables deaf pupils to recognize different word patterns through connecting written words with fingerspelling and signs. Therefore, chaining strategy enables deaf pupils to identify and understand the letters that make up the word and the differences they cause when the specific arrangement is changed (Harris and Moreno 2004; Staden, 2013).

The first paragraph aligns with a study by Herrera-Fernández et al. (2014), which explored visual strategies that were adopted to improve literacy in 24 pre-lingual deaf children in Santiago de Chile. Using a quasi-experimental design, the study found that the chaining strategy significantly improved word identification skills. The weakness of this study is that the small sample size of 24 participants reduces generalizability. The findings of the study are consistent with those of a longitudinal study by Mayer and Moskos (1998), which involved 15 deaf pupils. Their study reported improved spelling abilities resulting from the combined use of print, sign, and speech. However, the small sample size of only 15 participants limits the generalizability of the findings. Additionally, being a longitudinal study, it may have been influenced by external factors over time that were not controlled, thus, potentially affecting the reliability of the results.

A qualitative study by Quinto-Pozos and Reynolds (2012), which involved two deaf children, examined American Sign Language discourse strategies, focusing on the effectiveness of chaining and connecting techniques. The study found that chaining strategy supported vocabulary development and print word recognition among deaf

children. However, the small sample size and the approach used limit the generalizability of the study findings. Similarly, limited details on how the teaching strategies were implemented makes it difficult to replicate the results. Moreover, the cultural and educational differences between the study settings and other countries may affect how well these findings apply to the Tanzanian context.

A quasi-experimental study by Staden and Roux (2010) with 64 participants demonstrated the effectiveness of the chaining strategy in teaching reading skills. The study focused on the use of fingerspelling coding and visual imaging techniques to improve spelling proficiency in deaf elementary children who were using sign language in South Africa. The results indicated that combining fingerspelling, visual imagery, and print language through chaining enhanced the development of literacy skills in these children. Although the study had interesting results, it lacked a well-defined control group, which weakens the ability to draw definitive conclusions from the findings. Likewise, an experimental study by Puente et al. (2006) in Chile, involving 26 deaf participants, found a significant link between orthographic skills and the use of chaining techniques like fingerspelling and visual vocabulary coding**.** Nevertheless, the study had a small sample size and did not specify how these skills were developed.

A single-subject study by Subasno et al. (2021) in Indonesia demonstrated that the multiplex teaching method (chaining strategy) was effective in helping deaf students master vocabulary. The study involved only two deaf students in assessing the effectiveness of this method. The small sample size used in this study limits the

generalizability of the results, implying that the findings may not apply to the broader population of deaf students. The findings align with those from an experimental study by Plaewfueang and Suksakulchai (2020) that was conducted in Thailand. The major goal of the study was to develop and evaluate an interactive multimedia program for teaching reading skills to deaf learners. The study reported a significant increase in vocabulary among 16 deaf children involved in the program. The challenge of this study is that it used a small sample of 16 participants, something that makes it hard to generalize the findings to a larger context. Likewise, the study by Daza-Gonzalez et al. (2022) which was conducted in Spain revealed that there was a significant contribution of chaining strategy to developing word recognition ability among deaf children. This was experimental research that was conducted among 40 deaf children to investigate the impact of chaining visual, kinaesthetic, and vibrotactile information when teaching reading skills to deaf children. Although the study used a large number of participants compared to the studies mentioned above, it did not indicate whether the strategy could yield similar results when applied in contexts outside of Spain.

The above reviewed studies used either qualitative or quantitative approaches whereby quantitative studies used either quasi-experimental or experimental design. None of the reviewed study employed mixed research approach in studying the contribution of chaining strategy in developing word recognition ability among deaf children. Thus, the reviewed studies believed that there was only on one way of understanding chaining strategy and word recognition ability among deaf children. On the other hand, none of the reviewed studies used teachers as their respondents in trying to understand the contribution of chaining strategy in developing word recognition ability among

deaf children. Therefore, these studies did not recognize teachers as key players of developing word recognition ability of deaf children through chaining strategy. Each of the reviewed study used less than 65 participants, a number that could not be reasonably adequate for generalization because generalization studies need a large number of participants.

Also, the reviewed studies have shown that deaf pupils are needed to develop sign language skills before developing word recognition ability. However, in this study, the researcher was not sure if this was being considered in Tanzania when teaching word recognition to deaf pupils. Likewise, none of the reviewed literature explained the contribution of chaining strategy in developing word recognition ability among deaf pupils in the context Tanzania. This inspired the need for having this study conducted in Tanzania.

### 2.3.2 Chaining Strategy and Development of Language Comprehension among Deaf Pupils

Chaining strategy supports the development of language comprehension among deaf pupils through increasing their opportunity to make more associations that add more linguistic meaning to the words being learned (Hermans et al., 2008). According to Howerton-Fox and Falk (2019), chaining strategy takes multiple forms as it emphasizes on the concurrent use of more than one technique or approach when teaching reading skills which in turn support language comprehension development among the deaf.

The above findings correspond with those in a study by Staden (2013) conducted in South Africa that investigated the efficacy of applying multi-sensory coding strategies (chaining) to facilitate elementary phase deaf readers' reading development. It employed experimental research design where sign language in combination with multiple visual, tactile and kinaesthetic coding strategies was used to facilitate literacy development to the experimental group of 64 deaf children. The study showed improved language comprehension abilities among the group of deaf children. While the study provided useful information, the educational environment, resources, and teacher training in South Africa may differ from other settings. This limits the applicability of the results elsewhere. In addition, the study did not explore teachers' experience or views about the strategy. The study also does not mention whether the improvements in language comprehension were sustained over time.

A single subject study conducted in Indonesia by Triarini et al. (2017) examined the impact of multimedia learning strategy in improving reading skills among the deaf. The study used a sample size of 5 deaf students to conclude that the use of multimedia strategy improved reading abilities among deaf pupils. Even though the study had a plausible conclusion about the effectiveness of the chaining strategy, the inadequate sample size used limits its reliability. The design employed restricts its applicability and statistical reliability. Besides, the study provides little information on the learners' individual backgrounds, which could influence the results.

A quantitative study by Stone et al. (2015) involving 32 deaf children from Gallaudet University and the Washington, D.C, supports the use of chaining strategy. This study

examined fingerspelling as an effective gateway to enhancing reading fluency among deaf bilinguals. Its finding revealed that the development of English reading proficiency was facilitated through chaining the fingerspelling, sign language, and written words. While the study's findings are appreciated, it is important to note that the study was conducted in a highly specialized setting. Thus, the results from this study may not accurately represent the educational environment of deaf children in other regions or countries, especially in less-resourced contexts. This limitation makes it difficult to apply the results in developing countries.

An experimental study conducted in USA by Scott et al. (2019) which studied how deaf pupils learnt reading comprehension of words, underscored the use of chaining strategy as an effective way of enhancing reading comprehension. Using a sample size of 6 deaf pupils, the study concluded that the use of chaining strategy that combined written words, fingerspelling and sign language promoted deaf pupils' comprehension ability. The major weakness of this study is its small sample size, which may not provide results that are applicable to the entire population of deaf children due to the lack of adequate representation. This makes it hard to apply the findings to other places. The study also did not look at how the strategy could work in developing countries like Tanzania.

Another study conducted in the USA by Gentry et al. (2004) using a sample size of 28 deaf children also found that the use of chaining strategy of multiple modes of reading cues, such as print, pictures, and sign language resulted in friendly and standard reading practices among the deaf. This was experimental research that conducted a

repeated-measure design for single subjects within groups. Though the study showed success in using a chaining strategy, the repeated measures design may not fully reflect individual differences, thereby limiting the reliability of the results if apply to bigger population of deaf children.

Alawad and Musyoka (2018) conducted a review study on the journal articles on the use of chaining strategy to support the vocabulary and literacy development of deaf students. The review focused on empirical, peer-reviewed articles written in English and published after 2005, amounting to a total of 11 articles. The findings showed that the use of chaining strategy supported reading development among bilingual deaf students. While the study offered a comprehensive analysis, the limited number of articles reviewed weakened the reliability of its evidence. In addition, the review excluded relevant studies in other languages and earlier works.

A study on shared reading by Berke (2013) conducted in the USA, also showed positive results on children's literacy for parents who used chaining strategy as a mediating strategy between American Sign Language and English. The study adopted experimental research design and involved 10 deaf mothers with their deaf children who were between the ages of 3–5 years. All the mothers had some college experience with eight of the deaf mothers completing graduate school, while five were trained as school teachers. Four of the deaf mothers in the study used the chaining strategy with their deaf children to bridge American Sign Language with written English and obtained positive results. The main weakness of the study is its small sample size of only 10 deaf mothers and their children. Moreover, most of the parents had high levels

of education, which may not represent the broader population of deaf parents, especially in developing countries like Tanzania. This makes it difficult to determine whether the positive results were due to the chaining strategy or the parents' educational background.

Connecting to the previous paragraphs in this subsection, an experimental study from Thailand by Plaewfueang et al. (2013) revealed that chaining bilingual, visual and an interactive multi-media (tool) contributed to the development of reading skills among deaf children. This study was conducted to deaf children aged between 10 to 13 years by combining sign language, pictures and written texts in teaching reading skills to the children. The weakness of this study is that it focused on a specific age group (10 to 13 years), which makes it difficult to generalize the findings to children in other age groups. In Tanzania, reading teaching occurs from standard one to three, with students typically beginning standard one at six or seven years old. Therefore, the results of this study might not be applicable to younger children in Tanzania or other countries with similar conditions.

Similar findings were reported by an experimental study conducted in South Korea with 62 deaf children by Yoon and Kim (2011). The study was evaluating the impact of chaining sign language video captions with online written texts. Another experimental study conducted in Sweden among 12 deaf children by Rudner et al. (2014) reported significant impact of chaining strategy in teaching reading skills among the deaf. The study involved chaining of Swedish sign language and written Swedish through literacy training program. This is in-line with an experimental study

by Cooper (2016) that studied the effect of multimedia (chaining) strategy on comprehension and cognitive load. The study was conducted in the USA with the sample size of 64 deaf students from the higher learning institutions. It revealed that chaining of picture with text had significant impact on deaf students' comprehension. Lastly, comparable observations were reported in the study by Daza-Gonzalez et al. (2022) conducted in Spain with 40 deaf children under experimental research design. This study revealed that chaining visual, kinaesthetic, and vibrotactile information contributed significantly to the development of syntactic reading abilities among the deaf.

The foregoing reviewed studies employed quantitative research approach with experimental design. Thus, the studies relied on only one approach in examining how chaining strategy could influence the development of language comprehension among deaf children. Additionally, few of the studies in this section involved teachers as respondents. For that matter, most of the studies did not consider teachers as being among the factors that could contribute much in teaching and learning of reading skills through chaining strategy. Each of the reviewed studies involved participants who were less than 65, a number that is not suitable for making generalizations. On the other hand, most of the reviewed studies did not tell if all studied deaf students were from one class level or different levels.

Furthermore, most of the studies did not present the tests that were used in testing reading ability of deaf students after the intervention. The reviewed literatures under this part have not shown if the chaining strategy could be adapted and work better in

other areas different from where the studies were conducted. Moreover, none of the reviewed literatures highlighted the usefulness of chaining strategy in developing language comprehension ability among deaf pupils in Tanzania. Therefore, this precipitated the need of having this study conducted in Tanzania.

### 2.3.3 Challenges Facing Teachers in Applying Chaining Strategy in Teaching Reading Skills to Deaf Pupils

According to Saleem-Khasawneh (2021), teachers for the deaf face challenges which include lack of sign language skills and experience of handling of the deaf as well as lack of teaching literacy skills to deaf learners. These findings are in line with those of a study conducted in Indonesia by Yusuf et al. (2023) that investigated the pedagogical problem faced by teachers in communication and language learning for deaf students in special schools. The study indicated that all teachers involved in the study had experienced difficulties in teaching language subjects to deaf students due to lack of appropriate skills. This was a research survey that involved 33 respondents who were selected purposively and the collected data were analysed descriptively and qualitatively. One of the limitations noted in the study is that it used only one type of sampling technique, which is non-random. This may bring about bias and affect the representativeness of the sample, thereby limiting the applicability of the study findings to different contexts.

According to a study by Ngobeni et al. (2020), limited sign language knowledge among teachers was a barrier to deaf pupils' literacy learning. This was a qualitative study on the effects of sign language barriers among teachers for the deaf that was

conducted in South Africa involving 7 teachers and 10 deaf students. It is true that without sign language knowledge and skills, deaf pupils may not learn effectively. However, the findings of this study have limited applicability beyond the original context due to the small sample size used. Moreover, the research approach used was based on subjective experiences and may not represent broader trends across different schools or regions.

A qualitative study by Nikolaraizi (2000) reported that communication barrier between teachers and deaf students was one of the challenges facing the teaching of literacy among deaf children. The study used a sample size of 25 teachers to explore Greek teachers' views on the role of teacher training among those involved in teaching deaf children. Its findings revealed that most of the Greek teachers had challenges in communicating with deaf children due to lack of sign language training. One limitation of this study is its exclusive focus on teachers' perspectives, without incorporating insights from deaf students or other stakeholders. As a result, the understanding of communication challenges is one-sided. Similarly, a study by Shojaei, et al (2016) conducted in Iran on the effect of early intervention on language development among children with hearing impairment, presented communication problem among deaf pupils as an effect of late identification. It underscored the fact that hearing loss from birth up to the age of 3 years had a negative effect on communication and academic abilities of the affected children. This was a quantitative study that employed a sample size of 30 deaf students.

Musyoka et al. (2016) found that limited skills in handling deaf students with additional disabilities as another challenge that faced teachers of the deaf. Their study investigated experiences of K-12 classroom teachers of deaf students with additional disabilities. This was a qualitative study that employed a phenomenological research design with a sample size of 4 teachers of the deaf in the United States. One challenge of this study is its limited sample size. Another is the dependence on self-reported data within a qualitative, phenomenological framework, which may introduce bias or reduce objectivity. Therefore, the challenges faced by teachers involved in this study may be different from those of the teachers from other regions basing on their education background and experience. Similarly, Bowen and Probst (2023) showed that the presence of hearing loss may affect the identification of other disabilities. Thus, this, compelled teachers to address only challenges related to hearing loss.

Correspondingly, a qualitative study by Zrigat and Al-smadi (2012) was conducted to find out challenges of educating students who are deaf and hard-of-hearing in Jordan. A sample size of 30 teachers of the deaf and 4 heads of schools were interviewed. Respondents indicated lack of remedial and educational programs, inadequate number of teachers, unequipped schools, and a lack of instructional and assessment tools as being among the challenges they faced when teaching the deaf in Jordan. However, the study does not specify the type of teachers involved. For instance, it is unclear whether they were specialized teachers for the deaf or regular teachers. In the same way, there is no information about their level of educational qualifications. The training details of the participants are also missing. This information could have added credibility to their perspectives.

Findings in the above paragraph aligns with a study by Muiti (2010) that was carried out in Kenya on the hindrances to effective learning of pupils with hearing impairment. It reported that lack of facilities to be used in applying chaining strategy was a significant challenge facing the teaching of deaf children. The study involved one special primary school and 22 units and employed descriptive survey design. Nevertheless, employing a descriptive survey design restricts the ability to establish cause-and-effect relationships.

Other challenges facing teachers in educating deaf pupils were presented by Khomera et al. (2020). The study was conducted in Malawi by involving a total of 45 respondents and employed qualitative approach. Its results indicated shortage of hearing aids, communication barrier, negative attitudes, inadequate funding, and shortage of teachers as being among the challenges affecting the education of deaf children in Malawi. Another qualitative study from Malawi conducted by Malonje (2021) revealed that teachers for the deaf lacked understanding of deaf children's educational needs. The constraint of the two studies is that they exclusively relied on a qualitative approach. This reliance causes them to lack the statistical rigor necessary to quantify the magnitude of the identified challenges. Equally, the focus of these studies was limited to Malawi, which poses challenges for generalizing the results to Tanzania without conducting a similar study. This limitation arises from the fact that the two countries differ in various aspects concerning deaf education.

From the above reviewed literatures, it is not clear if teachers who lacked pedagogical or sign language skills and experience of teaching literacy to deaf were either

specialized teachers for deaf or just regular teachers. Also, it is not clear if teachers of the deaf in Tanzania experienced such similar challenges. Thus, there are several issues that have not been addressed by the reviewed literatures under this section. This showed that there was a need of having this study conducted in Tanzania.

### 2.3.4 Enhancement of Chaining Strategy in Developing Reading Skills among Deaf Pupils

To ensure effective use of chaining strategy in the teaching and learning processes of reading skills among deaf pupils, teachers need to understand clearly their classes and combine various appropriate techniques when teaching the deaf so as to meet the unique learning need(s) of each learner in the class due to their diverse learning styles (Dzulkifli, 2021). Furthermore, teachers need to diversify their teaching techniques and styles to attract students to learn the intended skills (Koutsoubou, 2004, as cited in Patrick & Awari, 2017).

The above views are in-line with the study conducted in the USA by Cannon et al. (2010) on vocabulary instruction through books read in American Sign Language for English-Language learners with hearing loss. This study used expository books with vocabularies in a multiple-baseline design (chaining) across three sets of five vocabulary words. Likewise, the study used experimental design with four participants aged 10 to 12 years with severe to profound hearing loss. The study found that chaining strategy was more effective in developing reading skills among the deaf when accompanied with pre-teaching of the target vocabulary words and the use of multimedia tools. However, the weakness of this study is that it used only four

children, a sample which is too small to make reliable conclusions. Also, the study was done with children aged 10 to 12 years. This makes it hard to use the results in Tanzania, because in Tanzania, reading is mostly taught to children aged 5 to 9 years. By the time a child is 10 to 12 years old in Tanzania, if they still can't read well, they are usually seen as having a learning problem. Also, the study worked well in the USA, where schools have better resources and systems than in developing countries like Tanzania.

Similarly, a study by Staden (2013) conducted in South Africa investigated the efficacy of applying multi-sensory coding strategies and reading scaffolding to facilitate elementary phase deaf readers' reading development. This was an experimental study that involved 64 deaf children who had severe to profound bilateral hearing loss and aged from 6 to 11 years. The findings revealed that when chaining strategy (sign language in combination with multiple visual and tactile aids) was applied together with reading scaffolding techniques and kinaesthetic coding strategies, it improved literacy and vocabulary development of deaf children. While the results of the study are appreciated, it used an experimental design that did not take teachers' views into account, which led to biased conclusions. The study also did not combine different approaches or research designs, which could have made the study findings more reliable.

These views are in-line with the VARK model of learning that lays emphasis on the diversification of the strategies by including visual, auditory, reading/writing and kinaesthetic modalities when teaching the deaf (Broadbent, 2021). In connection to

VARK model, Heick (2021) identifies Gradual Release of Responsibility Model as a strategy that can support literacy learning among deaf pupils through applying a sequence of learning activities that shift the responsibility from the teacher to the student. Although both models are said to support the use of the chaining strategy, there is limited information about their practical effectiveness in real-world classroom settings. Furthermore, the study by Heick (2021) does not address the potential challenges of applying these strategies with diverse groups of deaf students, such as those with different individual learning needs or the availability of resources.

All the reviewed studies under this section applied quantitative research approach with experimental design. Thus, the studies did not take into consideration either qualitative or mixed approaches. The reviewed studies also involved respondents of the age ranging from 6 to 12 years old; thus, they are silent on whether the same strategies could work with children with more than 12 years of age. This is due to the fact that, sometimes, deaf children delay to enrol in education. Moreover, the studies are also silent on the role of teachers when applying chaining strategies in teaching reading skills to deaf pupils. However, despite their limitations, the reviewed studies have demonstrated that the impact of chaining strategy in developing reading skill to deaf pupils was more enhanced when applied together with other models though they did not clarify on the issue of which strategy should be applied first.

Despite their limitations, the researcher agrees with the results of the reviewed studies which have demonstrated that the diversification of teaching techniques and styles was significant when teaching deaf pupils because each deaf child has his/her own learning

style. Thus, when more than one technique or style are used in teaching the same content, it is most likely to benefit the whole class. Likewise, we needed to have a model that directly integrates different necessary skills of developing reading ability among deaf pupils with the use of chaining strategy in teaching reading skills to deaf pupils in Tanzania.

## 2.4 Literature Summary and Research Gap

Sign language knowledge was important in promoting the process of learning reading skills among deaf students. Similarly, knowledge of sign language supported the use of chaining strategy in teaching reading skills to deaf pupils. Moreover, chaining strategy enabled the diversification of teaching techniques and tools that helped teachers to meet diverse learning needs of deaf students. Most of the reviewed empirical studies done on the applicability of chaining strategy in teaching reading skills to deaf students applied either quasi-experimental or experimental design with pre-test and post-test groups.

However, after reviewing a number of literatures related to this study, it was noted that all these studies advocated only one way of understanding the relation of chaining strategy to reading skills development among deaf children. This was owing to the fact that most of the reviewed studies applied only quantitative research approach while very few studies applied only qualitative research approach in understanding issues related to chaining strategy and reading skills development among deaf children. Thus, none of the reviewed studies applied mixed research approach that could give them

the chance of having different ways or angles of understanding the insights about chaining strategy and reading skills development among deaf children.

Furthermore, most of the reviewed studies did not consider involving teachers in their studies. Hence, they ignored the role of teachers in teaching reading skills to deaf pupils through the use of chaining strategy. If teachers were part of the respondents in most of the reviewed studies, most likely the studies could reveal more about chaining strategy and reading skills development among deaf children. Similarly, each of the reviewed studies used respondents less than 65, the number that could not give a true representation of the target population. Thus, the findings of these studies lost the credibility of being used in making plausible generalizations. Also, all the reviewed studies did not tell if all the deaf students involved in each study were in one class level of were from different levels.

On the other hand, despite this study reviewing a number of literatures related to chaining strategy and reading skills development among deaf pupils, still there was no enough information that could demonstrate the effectiveness of chaining strategy in developing reading skills among deaf pupils in Tanzania. This was because none of the reviewed literatures had provided the information on the extent to which chaining strategy contributed in developing word recognition skills among deaf pupils in Tanzania or the usefulness of chaining strategy in developing language comprehension skills among deaf pupils in Tanzania. Furthermore, the literatures did not present the model that could directly integrated different necessary skills of developing reading ability among deaf pupils with the use of chaining strategy in teaching reading to deaf

pupils in Tanzania. Lastly, the reviewed literatures did not show the challenges facing teachers in applying chaining strategy when teaching reading skills to deaf pupils in Tanzania.

This was the inspiration for conducting this study to investigate the effectiveness of chaining strategy in developing reading skills of deaf pupils in Tanzania through the use of mixed research approach. It also involved respondents who comprised standard one, two and three deaf pupils as well as their teachers. The sample size of this study was more than 180, a number that was quite enough for drawing generalizations of the findings.

## 2.5 Conceptual Framework

The conceptual framework for this study was based on the Theory of Simple View of Reading, and VARK Model of learning. It showed the relationship of chaining strategy that was used in teaching reading skills to deaf pupils (an independent variable) and reading skills development/ reading ability, word recognition ability as well as language comprehension ability among deaf pupils (dependent variables of this study).

Figure 2.1 illustrates the conceptual framework which shows how chaining strategy determined the development of reading ability of deaf pupils.

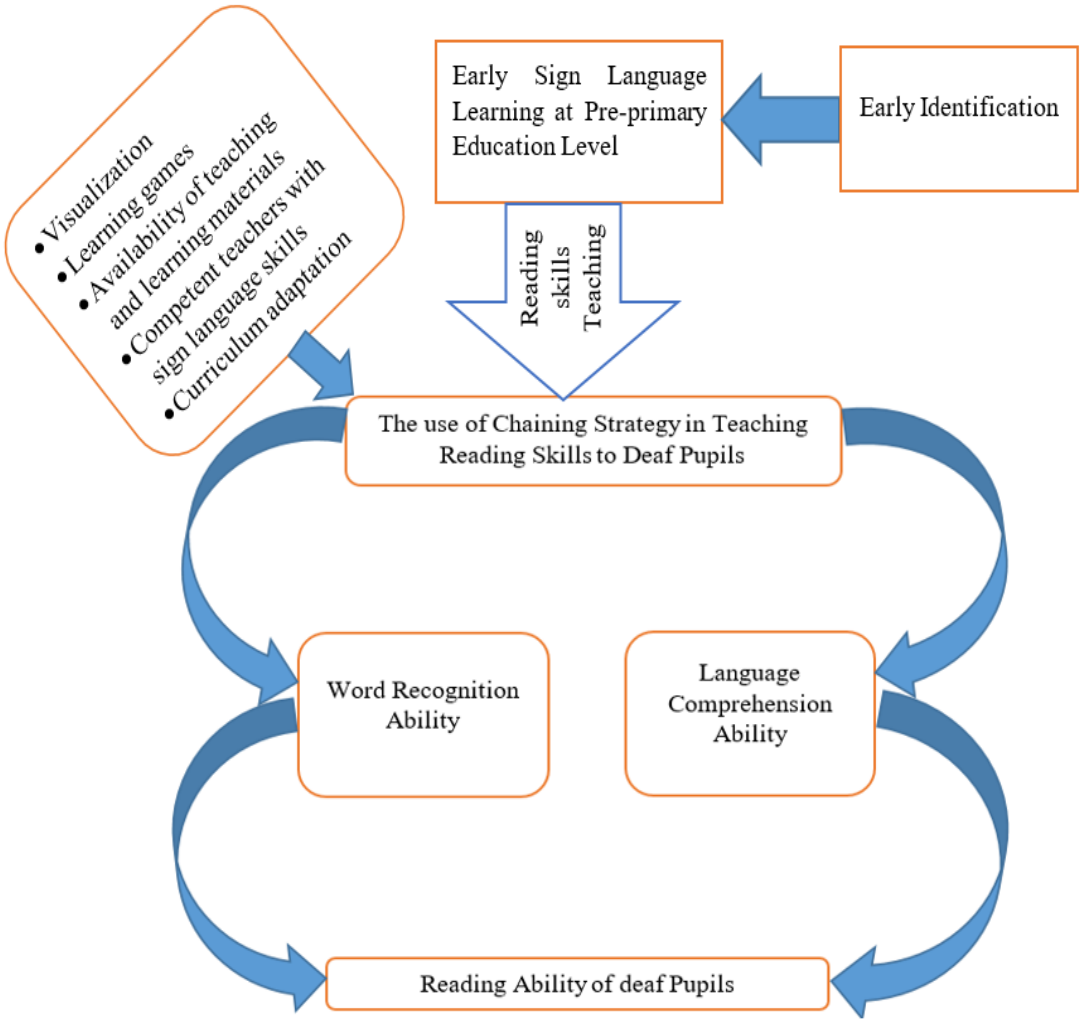


**Figure 2.1: Conceptual Framework showing the Relationship between Chaining Strategy and Reading Skills Development among Deaf Pupils**

**Source**: Findings of the current study (2023)

Figure 2.1 shows that reading skills development among deaf pupils depends on the effectiveness of chaining strategy. This is due to the fact that, if chaining strategy is effective, deaf pupils acquire two major skills (word recognition and language comprehension) which in turn result in development of good reading ability of an individual. Conversely, if the strategy is not effective, it leads to poor/no development of reading skills among the deaf pupils.

The framework shows that, for the use of chaining strategy to be effective in developing reading skill among deaf pupils, a number of strategies need to be adopted along with the use of chaining strategy in teaching deaf pupils. For instance, hearing loss and other disabilities among children need to be identified early and the identified children need to be given appropriate intervention. After the intervention, deaf pupils need to be enrolled into pre-primary education for early sign language learning. From pre-primary education, the pupils are enrolled in primary education where learning games as well as visualization need to be taken as part of the chaining strategy being used by teachers in teaching reading skills to the deaf.

Likewise, the curriculum for deaf pupils needs to be adapted so as to address diverse learning needs of the children. Responsible organs need to ensure that teaching and learning materials are available all the time. Teachers allocated to teach lower classes for deaf children need to be competent and fluent in sign language because without sign language skills it will be difficult for them to communicate with deaf pupils in class. Therefore, the framework emphasizes that when the above strategies are put into implementation together with the use of chaining strategy, they promote the development of word recognition ability and language comprehension ability among deaf children which in-turn enhance effective reading ability among deaf pupils.

# CHAPTER THREE

# RESEARCH METHODOLOGY

## 3.1 Introduction

This chapter presents the methodology for this study. It covers the research philosophy, approach, design, study area, population of the study, sampling techniques, sampling procedures, as well as sample size. It further describes the data collection methods, data analysis, logistical and ethical considerations as well as validity and reliability of the study and research instruments.

## 3.2 Research Philosophy and Research Approach

### 3.2.1 Research Philosophy

This study was guided by the pragmatism research philosophy. This is owing to the fact that pragmatism research philosophy recognizes that there are many different ways of interpreting the world and undertaking the truth. Moreover, the study adopted the pragmatism research philosophy instead of choosing only positivism or interpretivism because it effectively combines the strengths of the two. Positivism emphasizes objective measurement and observable outcomes, while interpretivism focuses on subjective experiences and the meanings individuals assign to phenomena. Through combining the principles of two philosophies, pragmatism provided a better and deeper understanding of the effectiveness of chaining strategy in developing reading skills among deaf pupils in Tanzania. As well, the philosophy helped to address the gaps identified in the reviewed literature in chapter two of this study. The

reviewed studies focused exclusively on qualitative or quantitative approaches owing to the philosophies that were adopted.

### 3.2.2 Research Approach

This study employed mixed research approach. Mixed research approach provided a better understanding of the effectiveness of chaining strategy in developing reading skills among deaf pupils in Tanzania than when it could be either with the use of qualitative or quantitative research approach alone. This is because the quantitative part of the mixed approach helped in quantifying the contribution and usefulness of chaining strategy in developing word recognition ability as well as language comprehension ability among deaf pupils in Tanzania respectively. On the other hand, the qualitative aspect of the approach helped to describe the contribution and usefulness of chaining strategy in developing word recognition ability as well as language comprehension ability among deaf pupils in Tanzania respectively. Furthermore, qualitative part helped in identifying and evaluating the challenges facing teachers in applying chaining strategy when teaching reading skills to deaf pupils in Tanzania. Finally, it helped in developing a model for enhancing the use of chaining strategy in developing reading skills among deaf pupils in Tanzania.

## 3.3 Research Design

This study used a convergent research design in which qualitative and quantitative data on the effectiveness of chaining strategy in developing reading skills among deaf pupils in Tanzania were collected simultaneously in one phase. Additionally, the design helped the researcher to confirm, cross-validate and verify findings. This study opted for convergent research over explanatory and exploratory sequential design

because under the latter two designs, there was a high possibility of data from the first phase affecting the findings of the second phase. Thus, this study underscored the fact that convergent design would eliminate the possibility of biases through conducting both quantitative and qualitative studies on the effectiveness of chaining strategy in developing reading skill among deaf pupils in Tanzania concurrently.

Therefore, through a convergent research design, the researcher simultaneously collected and analysed both quantitative and qualitative data on the effectiveness of the chaining strategy in developing reading skills among deaf learners. After the analysis, the findings were presented in a mixed format. It begun with presentation of descriptive statistics, followed by incorporating interview and observation results, then providing additional descriptive data, and concluding with quantitative results from correlation and simple linear regression analyses. This structured presentation allowed each set of findings to build upon the previous ones and enabled cross-validation across data sources, ultimately supporting well-informed conclusions aligned with the objectives of this study.

### 3.4 Study Area

The study was conducted in special primary schools for the deaf which are located in Dar es Salaam, Kagera, Njombe and Tabora regions in Tanzania. First of all, these regions were purposively selected because each region had one school that enrolled only deaf pupils and teachers from each school were trained on how to use chaining strategy in teaching reading to the deaf. Secondly, more than 49.9% of deaf pupils from each school in each region had either poor performance in general or in Kiswahili

language in either standard seven or standard four national exams in 2022, regardless of their teachers having been trained on how to teach literacy to deaf children using chaining strategy. Table 3.1shows Standard VII and IV National exams results for the selected schools in 2022.

**Table 3.1: Standard VII and IV National Exams Results in 2022**

| S/N | SCHOOL | 2022 NATIONAL RESULTS SUMMARY |
|---|---|---|
| 1 | A | 50% Failed standard seven exam in general in 2022<br>46% Failed standard four Kiswahili exam in 2022 |
| 2 | B | 92.6 Fail standard seven exam in general in 2022<br>84.8 Failed standard four Kiswahili exam in 2022 |
| 3 | C | 90.9% Failed standard four Kiswahili exam in 2022 |
| 4 | D | 54.6% Failed standard seven exam in general in 2022 |

Source: (NECTA, 2022a; 2022b)

Table 3.1 shows that three out of four primary schools for the deaf had general poor performance since more than 49.9% of the pupils failed the exams in each school. Also almost majority of the pupils from the primary schools in Table 3.1 failed Kiswahili exam in standard four in 2022.

## 3.5 Population of the Study

The target population for this study was 334 people that was drawn from four special primary schools for the deaf that had high failure rates in standard four or seven national examinations in 2022. In 2022, over 49.9% of the students in each of the four schools failed in either standard four or seven examination regardless of their teachers having been trained on how to use chaining strategy. The study targeted all standard one, two and three deaf pupils and all the teachers from the four special primary schools for the deaf. This population was selected because it was expected to give

adequate information on the effectiveness of chaining strategy in developing reading skills among deaf pupils in Tanzania. Deaf pupils from the selected four special primary schools demonstrated their reading abilities which in-turn determined the effectiveness of the chaining strategy used by their teachers. The proposed category of teachers was expected to provide their views and experiences related to the effectiveness of chaining strategy in developing reading skills to deaf pupils. Table 3.2 shows the distribution of the target population of this study.

**Table 3.2: Target Population**

| S/N | School | Teachers | Students | | | | | Total |
|---|---|---|---|---|---|---|---|---|
| | | | STD 1a | STD1 b | STD 2 | STD 3a | STD 3b | |
| 1 | School A | 21 | 10 | 14 | 19 | 8 | 11 | 83 |
| 2 | School B | 18 | 20 | 19 | 23 | 16 | 25 | 121 |
| 3 | School C | 19 | 9 | 11 | 9 | 8 | 12 | 68 |
| 4 | School D | 17 | 9 | 8 | 15 | 9 | 4 | 62 |
| **Total** | | 75 | | | | | | 334 |

Source: (Targeted schools, 2023).

Table 3.2, indicates the target population of this study which was 334 people. From the population of 334 people, 259 were pupils while 75 were teachers teaching in the selected four schools for deaf in Tanzania. The number of pupils only comprised standard one to three deaf pupils from the four primary schools.

## 3.6 Sampling Techniques and Sample Size

### 3.6.1 Sampling Techniques

This study used purposive and simple random sampling techniques. Purposive sampling technique was used in selecting the study area and teachers who taught reading subject to deaf pupils in standard one, two and three in the four special primary schools for the deaf in Tanzania for qualitative aspect. The researcher employed this

technique in the study so as to intentionally select respondents and study area with pre-determined characteristics by research objectives and who had relevant information about chaining strategy and reading skills development among deaf pupils in Tanzania. Simple random sampling technique was used in selecting standard one, two and three deaf pupils and their teachers from the selected four special primary schools for the deaf in Tanzania for quantitative research aspect. The technique was used because it gave equal chance to deaf pupils and teachers to participate in the study; hence, it eliminated any chance of bias or favour in selecting respondents. In obtaining participants through the use of simple random sampling technique which is one of the types of probability sampling techniques, the researcher used the fishbowl technique.

In obtaining student respondents through the use of simple random sampling technique, 162 papers with “Yes” labels and 97 papers with “No” labels were prepared and thrown for students to pick. Standard one, two and three deaf students (162) from selected schools who picked papers with “Yes” labels were involved in the study. Those 97 students who picked papers with “No” labels were not involved in the study. Likewise, the researcher prepared papers with names of teachers with experience of teaching lower grades in each of the four schools. Then papers were folded and put in an envelope, the researcher picked five papers from the envelope with the names of teachers in each school. Teachers whose names were picked were involved in the study.

### 3.6.2 Sample Size

The quantitative sample size of the study was calculated by using the formula suggested by Yamane in 1967. Yamane provided a simple formula to determine a sample size when the population is known. Therefore, this formula assumes a normal distribution.

This formula by Yamane is as indicated below:

$$n = \frac{N}{(1+Ne^2)}$$

Whereby:

n = sample size,

N = population size, and

e = Margin of error (MoE),

This study used margin error of 5% or 0.05.

Since the total number of target population of quantitative part of this study was 334 (75 teachers and 259 deaf students), the sample size was calculated as follows:

$$n = \frac{334}{1 + 334(0.05)^2}$$

$$n = \frac{334}{1 + 334(0.0025)}$$

$$n = 182.02$$

$$n \approx 182$$

Therefore, the quantitative sample size of this study was 182 respondents that included both teachers and students which was equivalent to 55% of the total target population. Since deaf pupils in Tanzania attended standard one and three for two years and standard two for one year, the study selected five teachers from each school as

indicated in Table 3.2. Five teachers with experience of teaching in at least one of the five streams from each of the four schools were selected to participate in the study. This made the number of teachers involved in the study to be 20. Thus, out of 182 respondents, 20 were teachers and the remaining162 were deaf students. 162 deaf students were obtained from the four primary schools by selecting 40 deaf students from three schools and 42 students from the fourth schools as it had many students.

On the other hand, out of 20 teachers selected for quantitative data collection, 12 of them were also involved in qualitative aspect of this study which was the interview. The researcher interviewed participants until when saturation of the information was reached. This was determined by repetition of information from new respondents. When this was noted, the researcher stopped from conducting interview, that is why interview involved only 12 teachers.

## 3.7 Data Collection Methods

This study used in-depth interview, observation, and test as well as questionnaire data collection methods to collect data from the selected respondents.

### 3.7.1 In-depth Interview

In-depth interview was used to collect data from teachers who had the experience of teaching reading subjects to deaf in standard one, two and three in the selected four special primary schools for deaf. Also, the in-depth interview was used to collect data from the teachers on the challenges they faced in applying chaining strategy when teaching reading skills to deaf pupils in Tanzania and on how to enhance the use of

chaining strategy. The researcher used structured questions in tapping specific information while unstructured questions were used for exploring and giving interviewees a chance to make more clarifications about the information that one provided for the structured questions. Each respondent was interviewed for around 15 to 20 minutes.

### 3.7.2 Observation

This study employed participatory observation method. With this technique, the researcher observed how teachers applied chaining strategy in teaching reading skills to deaf pupils in their respective schools. Also, the researcher observed the participation of deaf children in reading classes as well as how they demonstrated word recognition and language comprehension abilities. Moreover, the strategy enabled the searcher to collect information that contributed to the conclusion on the challenges facing teachers in applying chaining strategies when teaching reading skills to deaf pupils. Therefore, to ensure effective observation, the researcher prepared the observation schedule before going to the field for data collection that guided him in this process.

### 3.7.3 Questionnaire

Questionnaire was used to collect data on word recognition and language comprehension abilities of deaf pupils from standard one, two and three teachers from the four selected special primary schools for deaf in Tanzania. The questionnaire was designed after thorough review of various theories including the theory of simple view of reading as well as VARK model and literature on reading skills development among

deaf pupils as indicated in chapter two of this thesis. This tool was designed to gather information on one independent variable (chaining strategy) and two dependent variables (word recognition and language comprehension abilities).

The items developed to measure the variables were constructed based on the important sub-skill needed in developing major reading skills (word recognition and language comprehension). The tool comprised multiple choice question items and five Likert scale rating items. The tool was given to some peers, senior researchers and supervisors for their comments and advise. The comments were accommodated before the tool was piloted. The tool was piloted to one of the schools that was not involved in the main study but which had similar characteristics as those of the schools that participated in this study. Thus, the questionnaire was prepared before going to the field and during data collection as the respondents were thoroughly taken through the document before responding to the questions in the tools.

### 3.7.4 Test

After reviewing a sample of school exams on reading from some of the schools for the deaf, a test was prepared and piloted by the researcher. After piloting, expert audit and peer debriefing of the test was improved to accommodate suggestions that were given by experts at different levels who reviewed this tool. Then, the test was used to collect data on word recognition and language comprehension abilities of deaf pupils from standard one, two and three in special primary schools for the deaf in Tanzania. The test questions were prepared and interpreted in the language that was well-known to the respondents. Through sign language interpreters, deaf pupils were given the test papers and taken through the instructions. Then, when responding to the test through

demonstration, the researcher and sign language interpreters watched and scored the responses from the respondents on the given score sheets.

## 3.8 Reliability and Validity of the Study and Research Instruments

### 3.8.1 Validity of the Study and Research Instruments

In this study, expert audit was used to ensure validity of the study through the use of lecturers from the Department of Special Needs Education at the Archbishop Mihayo University College of Tabora (AMUCTA) and supervisors who were requested to assess the relevance of the content that were to be used in the interview guide, questionnaires and observation checklist. The feedback which was given by the experts in the field were taken into consideration by the researcher. Likewise, the researcher used peer debriefing to ensure validity of the study. This was achieved through the researcher giving chance to peers who were outside the context of the study but who had a general understanding of the nature of the study to read the entire research work and provide their comments. Their comments acted as a guide in making some improvements on the final impression of this work.

Triangulation is another strategy for ensuring validity that was used in this study. Under this technique, the researcher used four data collection methods which were the in-depth interview, observation, questionnaire and test. Furthermore, the researcher used two types of respondents which were the deaf students and their teachers from special primary schools for deaf in Tanzania. Furthermore, the researcher used more than two individuals for expert audit and peer-debriefing to ensure the exactness of the content and avoid biases. Lastly, the data collection tools were translated into the language that was well understood by the respondents and this was done by people

who were experts in both languages. Thus, the data that were collected through these instruments represented the content that the test designed to measure.

### 3.8.2 Reliability of the Study and Research Instruments

In this study, reliability was ensured through a piloting method. Prior to the actual data collection, both the questionnaire and the test for deaf students were piloted at a school for the deaf that shared similar characteristics with the study area, however, it was not included in the sampled schools for the main study. Based on the results of the pilot study and subsequent analysis, any item that failed to elicit the desired response was either revised or removed.

Once more, so as to ensure reliability of the findings, the researcher clearly presented data collection procedures as well as data analysis process and used an inquiry audit by allowing an outside person to review and examine the research process and the data analysis in order to ensure that the findings were consistent and could be repeated. Moreover, during data collection process, respondents who had challenges with understanding some items in the tools were given clarifications that cleared their doubt.

Lastly, the study employed Cronbach's alpha that helped to measure if a group of items in the questionnaire consistently measured the same characteristic through showing their level of agreement. The developed and piloted questionnaire was found to have Cronbach's alpha value of 0.817. Most of the items in the tested tool were noted to be consistent in measuring the intended variables as indicated in Table 3.3.

**Table 3.3: Reliability Results**

| S/N | Variable | Cronbach's Alpha Test | No. of Items |
|---|---|---|---|
| 1. | Chaining Strategy | .725 | 10 |
| 2. | Word Recognition | .737 | 8 |
| 3. | Language Comprehension | .726 | 12 |

The general tool as well as individual variable reliability results values were above 0.7 which is regarded as the minimum acceptable value that shows agreement and consistency between items, informing that the measurements are reliable and the items might measure the same characteristic (Garth, 2008).

### 3.9 Data Analysis

Quantitative data was analysed using both descriptive and inferential statistics analysis through the Statistical Package for Social Sciences (SPSS) software version 20.0. Therefore, the quantitative aspects of the first and second objectives of this study were analysed using descriptive statistics of frequencies and percentages, and the results were presented in simple tables.

Similarly, correlation and simple linear regression were used to analyse the data of the said two objectives. The correlation analysis was conducted to measure the strength and direction of the relationship between variables in objectives number one and two of this study. The correlation results were presented in tables. Furthermore, the simple linear regression helped to determine the effectiveness of chaining strategy in developing word recognition as well as language comprehension abilities among deaf pupils, which in turn determined their reading ability. Thus, the results from linear regression predicted the effectiveness of chaining strategy in developing reading skills among deaf pupils in Tanzania.

The qualitative aspects of all objectives of this study were analysed through thematic analysis by checking inner meanings of the data from the in-depth interview with teachers and observation. This was done by analysing individual words, sentences and paragraphs to get their meanings, whereby data with similar meanings were grouped together into themes. The qualitative data were presented in short narrations with quotations from interview and observation findings.

### 3.10 Logistical and Ethical Considerations

The researcher requested a clearance letter from the Open University of Tanzania, which granted him permission to engage with authorities in the study regions. These included the offices of the Regional Administrative Secretary in Dar es Salaam, Njombe, Kagera, and Tabora, as well as the District Executive Directors and District Education Officers from the respective regions. Subsequently, each of these authorities issued a letter authorizing the researcher to conduct studies in selected special primary schools for the deaf in Tanzania. Ethical standards were also achieved through ensuring anonymity of the respondents, by allowing responses to be submitted anonymously, and ensuring that there no identification on the data collection tools. Confidentiality of the respondents' identity and information was also highly observed as everything collected was only used for the purpose of the study. Also, the researcher ensured that all the studies and other consulted sources were duly acknowledged and accordingly referenced.

# CHAPTER FOUR

# PRESENTATION OF FINDINGS

## 4.1 Introduction

This chapter presents the findings of the study which covers four areas as stipulated in the study objectives: the contribution of chaining strategy in developing word recognition ability among deaf pupils; chaining strategy and development of language comprehension among deaf pupils; the challenges facing teachers in applying chaining strategy when teaching reading skills to deaf pupils; and, enhancement of chaining strategy in developing reading skills among deaf pupils.

## 4.2 Demographic Characteristics of the Respondents

The respondents' demographic characteristics have been analysed based on different criteria, namely, academic achievement, working experience and education. Table 4.1 under this section and their descriptions provide the details of the said demographic characteristics of teacher respondents.

**Table 4.1: Demographic Information of Respondents**

| **Teachers' Highest Academic Achievement** | **Frequency** | **Percent (%)** |
|---|---|---|
| Bachelor | 9 | 45 |
| Diploma | 10 | 50 |
| Grade A Certificate | 1 | 5 |
| **Total** | **20** | **100** |
| **Teachers' working experience** | **Frequency** | **Percent (%)** |
| Below 5 Years | 6 | 30 |
| 6 to 10 Years | 4 | 20 |
| Above 10 Years | 10 | 50 |
| **Total** | **20** | **100** |
| **Teachers' Specialization** | Frequency | Percent (%) |
| Teachers of the Deaf | 15 | 75 |
| Regular Teachers | 5 | 25 |
| Other Specializations | 0 | 0 |
| **Total** | **20** | **100** |

Source: Field data, 2023

### 4.2.1 Teachers' Highest Academic Achievement

The study sought to determine the highest academic achievements among teacher respondents. Respondents' academic achievements helped to determine the level of their pedagogical skills. The findings as shown in Table 4.1 revealed that half of the respondents had diploma in education and almost other half of the respondents had a bachelor degree in education, while only 5% of the respondents had grade A certificate of teacher education. This suggests that majority of the teachers had the requisite pedagogical skills for teaching students at secondary education level, but there might be others with both primary and secondary school pedagogical skills.

### 4.2.2 Teachers' Working Experience

The study sought to disclose the working experiences of teacher respondents. The study noted mixed levels of working experiences among the teachers under this study as presented in Table 4.1. Their different working experiences helped the researcher to collect different views, ideas, and opinions on the effectiveness of chaining strategy in developing reading ability among deaf pupils in Tanzania.

### 4.2.3 Teachers' Specialization

The study deemed it necessary to establish the respondents' specialization to determine their skills in teaching deaf pupils. The findings denoted that three quarters of the teachers specialized in teaching deaf as summarized by Table 4.1. This means that most of the teachers involved in this study had pedagogical knowledge appropriate for deaf pupils.

## 4.3 Presentation of Findings

This subsection presents findings based on the research objectives.

### 4.3.1 The Contribution of Chaining Strategy in Developing Word Recognition Ability among Deaf Pupils

The first objective sought to examine the contribution of chaining strategy in developing word recognition ability of deaf pupils in Tanzania. In responding to this objective, teachers were requested to rate the contribution of chaining strategy in developing sub-skills important for word recognition among deaf pupils. The rating was done on the questionnaire with five Likert scale items ranging from very poor to excellent. Teachers were also involved in the interview sessions where they were given chances to express their views on the contribution of chaining strategy in developing word recognition ability of their deaf pupils.

Similarly, deaf pupils were given a test that required them to demonstrate their word recognition abilities as one way of augmenting the teachers' responses under this objective. Other information was gathered through observation whereby the researcher observed some class sessions and pupils' behaviour as well as their reactions when attempting the test on word recognition.

Under this objective, different forms of data analysis were applied for triangulation purposes. Firstly, quantitative data related to this objective were analysed descriptively, followed by thematic analysis, which helped to explain more about the descriptive results. Secondly, data from observations were further analysed to add

more meaning to the descriptive and interview results. Lastly, inferential analysis helped in making conclusions about the objective under study.

As explained in the previous paragraph, the study conducted descriptive analysis to determine the contribution of chaining strategy in developing word recognition ability as presented in Table 4.2. The descriptive analysis conducted under the first objective of this study revealed that there was high contribution of chaining strategy in developing word recognition ability among deaf pupils in Tanzania. Results in Table 4.2 shows respondents' rates on the contribution of chaining strategy in developing word recognition ability of deaf pupils through various sub-skills. The sub-skills included fingerspelling, matching words with their corresponding signs, identification of specific words and identification of misspelled words.

**Table 4.2: Contribution of Chaining Strategy in Developing Word Recognition Ability**

| Statements | Very Poor | | Poor | | Fair | | Good | | Excellent | |
|---|---|---|---|---|---|---|---|---|---|---|
| | F | % | F | % | F | % | F | % | F | % |
| Fingerspelling ability | 0 | 0 | 1 | 5 | 1 | 5 | 5 | 25 | 13 | 65 |
| Matching words with their corresponding signs | 0 | 0 | 0 | 0 | 2 | 10 | 8 | 40 | 10 | 50 |
| Selecting specific word from the group of words | 0 | 0 | 0 | 0 | 4 | 20 | 8 | 40 | 8 | 40 |
| Identifying misspelled words | 2 | 10 | 5 | 25 | 7 | 35 | 6 | 30 | 0 | 0 |

**F = Frequency*

**Source**: Field data, (2023)

Findings in Table 4.2 showed that majority, 18 (90%), of the teachers pointed out that chaining strategy had a remarkable contribution in developing fingerspelling ability of deaf pupils which is one of the sub-skills that determine word recognition ability. This implies that, majority of the deaf pupils in the selected schools were good at fingerspelling because of the influence of chaining strategy in teaching and learning

processes. Furthermore, study findings indicated that many teachers were using chaining strategy in imparting fingerspelling skills to the deaf pupils.

The above descriptive results on the contribution of chaining strategy in developing deaf pupils' fingerspelling ability were further supported by responses from interview. Interviewees' responses revealed that the use of chaining strategy in teaching reading skills to deaf enhanced many pupils' competence in fingerspelling. This is exemplified by a response from one of the respondents who was quoted saying:

> *I appreciate the role of chaining strategy. It has helped me in teaching the deaf on different skills such as fingerspelling in my class. From its application, most of my deaf are good at fingerspelling and they can tell components of different words through fingerspelling. However, there are some who fingerspell with difficulties. Sometimes they misspell or even forget some letters making up the words.*

Similarly, another teacher underscored the importance of chaining strategy in developing fingerspelling of deaf pupils by saying:

> *Through the use of chaining strategy, the deaf have been capable of breaking words into their component letters through fingerspelling. Although fingerspelling is among the skills that the deaf master easily and very fast, the chaining strategy has made it the easiest skill. When you show a word to the deaf in my class and you direct them to fingerspell it, they do it fast. For that matter, I have no problem with fingerspelling skills among my deaf students.*

These interview responses showed the extent to which teachers were confident in the use of chaining strategy. The study findings also indicated that teachers believed that their pupils were competent in fingerspelling due to the use of chaining strategy in teaching process. The interpretation of this is that, teachers usually used the chaining strategy in teaching literacy skills to deaf pupils and they did not regret using the strategy.

It was observed that when deaf children were tasked to fingerspell words, they did it well and quickly at reasonable speed. In all schools that were visited for data collection and all classes that were involved in this process, students were good at fingerspelling. They did not need a lot of instructions or repetitions to understand the task. Furthermore, the study observed that teachers used chaining strategy in their classes. This was noted when teachers were teaching different vocabularies whereby they started by showing the words on cards or boards, followed by the fingerspelling of that word, then showing the sign representing that word/concept and finally showing the picture or real object of that word. This was not a two-minutes' process, rather it took four to six minutes for one vocabulary. Therefore, the demonstrated fingerspelling competency among deaf pupils in this study had been attained through the use of chaining strategy.

Moreover, study findings showed that almost all teacher respondents, 18(90%), as indicated in Table 4.2 believed that chaining strategy had notable contribution to the development of deaf pupils' competency of matching signs with their corresponding words. On the other hand, none of the teacher respondents had negative opinion about the contribution of chaining strategy in developing deaf pupils' ability to match signs with their corresponding words. This suggests that, deaf pupils from selected schools were competent in matching signs with their corresponding words as one of the strategies used for word recognition among deaf pupils.

The above descriptive findings on the contribution of chaining strategy in developing deaf pupils' competency of matching signs with their corresponding words tallied with

the interviewees' responses. From the interviews, it was reported that chaining strategy had positive impact on the deaf pupils' competence of matching words with their corresponding signs. For example, during interview with teachers, one of the respondents was quoted saying:

> *Through the use of chaining strategy, the deaf have been capable of matching the written words with their corresponding signs. I usually make sure that their class is full of well-labelled pictures as they help in enabling the pupils in making associations with corresponding signs.*

Similarly, another teacher respondent who provided the evidence on the strength of chaining strategy in developing deaf pupils' ability of matching words with their corresponding signs emphasized:

> *As I said before, majority of the deaf students in standard IB are good at matching signs with their corresponding words owing to the impact of the use chaining strategy when teaching them. For example, when you sign and tell them to select the card with the word corresponding to the given sign, almost 88% of them can do that without hesitating.*

Study findings through interview indicated that deaf pupils recognized different words and their meanings, thereby making most of the deaf to match the indicated words with their corresponding signs. It was also noted that sign language knowledge is important for deaf pupils to learn reading skills. Additionally, interviewees' responses showed that teachers depended on chaining strategy in developing deaf pupils' ability to match words with their corresponding signs.

Deaf children were observed to have no problem with the skill of matching signs with their corresponding words. Student respondents were very active when performing the test related to matching of words with pictures or signs. The classes used by deaf students were observed to have several well-labelled visualization materials. During

break time, students were asked to give signs from labelled pictures and it was very interesting as the deaf pupils demonstrated the correct matching ability. In class sessions, literacy teachers were observed applying chaining strategy by signing, fingerspelling, pointing on the picture and demonstrating or imitating different animals. Others even used their tablets to show short videos related to concepts that they were teaching. Thus, there was no doubt that teachers used chaining strategy in teaching deaf pupils and that it contributed to developing their competency in matching words with their corresponding signs.

Furthermore, as indicated in Table 4.2 results revealed that 16(80%) teachers graded the contribution of chaining strategy in developing deaf pupils' ability of identifying specific word being prominent. This predicts that, high percent of deaf students were good in recognizing the specific word from group of words as the result of applying chaining strategy. As well, study findings imply that chaining strategy influenced teachers for deaf to make their students understand components of words in such a way that they were capable of differentiating one word from the other.

In the same way, the descriptive findings were supported by responses from interview which showed that majority of deaf pupils were competent in selecting specific words from the group of words provided. This is exemplified in a response from one of the respondents who said:

> *Chaining strategy has made it easy for deaf students to differentiate certain word from groups of words written either on the board or cards. I usually show a word on one card in my hand and tell the class or individuals to select and give a similar word from the group of words*

*collected together or to cycle such a word on the written paragraph and they do it without problem.*

The responses from the interview demonstrate that the chaining strategy helps deaf students in learning words. The strategy helps students recognize words and understand how they are connected. It makes language easier to understand, gets students more involved and helps them remember and learn better. This shows how important it is to use teaching methods that fit different ways through which students learn, especially the deaf.

Through the use of observation method, the researcher observed that teachers were using learning games to assess deaf pupils' ability in identifying selected words from a group of words. For instance, in one of the sampled schools, a teacher had prepared word cards which were placed inside a box and students were told to select a word that was similar to the one written on the board from the box. Sometimes, they were given a sign and tasked to select the word being represented by the given sign.

Table 4.2 further presents varied opinions from teachers on the contribution of chaining strategy in developing deaf pupils' competency of identifying misspelled words. Study results showed that majority of the teachers indicated that chaining strategy had an average contribution in developing deaf pupils' competency of identifying misspelled words. The implication of this is that teachers might have not trained their students on the skill of identifying misspelled words. This is from the fact that, if deaf students were not given clear instructions and clarification, they might have thought that it was a new vocabulary and not a mistake.

The descriptive findings explained in the previous paragraph were also supported by responses from interview. The interview response showed that majority of deaf pupils were partially competent in identifying misspelled words. This is exemplified from a response from one of the respondents who said:

> *Noticing the misspelled words is somehow tricky and difficult to the deaf students who I am teaching. Through chaining strategy and word cards, I have been trying, now and then, to make sure that they can differentiate a word with correct spelling from that with spelling errors. Unfortunately, it is still difficult to some of them. However, there are others who demonstrate their ability to do it on that on some days, but on other days the problem occurs. I really fail to understand what happens to such students.*

The research findings highlighted by the above quote might be linked to the unique language processing experiences of the deaf pupils. The inconsistency in some students' ability to identify spelling errors suggests variability in cognitive processing or external factors affecting their performance. This inconsistency could be attributed to differences in individual learning styles, strength of memory retention, or even fluctuating levels of attention and motivation on different days. Moreover, teachers might not have effectively applied the strategy in teaching this particular skill.

Another descriptive analysis was conducted on deaf pupils' test results as presented in Table 4.3. The findings provide more evidence on the contribution of chaining strategy in developing word recognition ability among deaf pupils in Tanzania. The test intended to prove deaf pupils' word recognition abilities as one of the ways of confirming teachers' responses on the contribution of chaining strategy in developing word recognition among deaf.

**Table 4.3: Deaf Pupils' Test Results on Word Recognition Ability**

| Word recognition ability | Frequency | Percent (%) |
|---|---|---|
| Not capable | 2 | 1.2 |
| Very poor | 3 | 1.9 |
| Poor | 4 | 2.5 |
| Fair | 14 | 8.6 |
| Good | 21 | 13 |
| Very Good | 118 | 72.8 |
| **Total** | **162** | **100** |

Source: Field data (2023)

As indicated in Table 4.3, findings revealed that chaining strategy which was used in teaching deaf pupils had high impact on their word recognition ability. This is because more than three quarters (85.8%) of all pupils involved in this study were competent in the word recognition exercises.

In addition to the descriptive analysis, the study performed a correlation analysis to determine the relationship between chaining strategy and word recognition ability. The results of the correlation analysis are shown by Table 4.4. Correlation was applied so as to measure the strength and direction of the relationship between chaining strategy and word recognition ability.

**Table 4.4: Word Recognition and Chaining Strategy**

| | | Words recognition | Chaining strategy |
|---|---|---|---|
| **Word recognition** | Pearson Correlation | 1 | .879** |
| | Sig. (2-tailed) | | .000 |
| | N | 20 | 20 |
| **Chaining strategy** | Pearson Correlation | .879** | 1 |
| | Sig. (2-tailed) | .000 | |
| | N | 20 | 20 |

**. Correlation is significant at the 0.01 level (2-tailed).

As shown in Table 4.4, the bivariate correlation results revealed the existence of very strong positive relationship between chaining strategy and word recognition ability. This is indicated by the Pearson correlation (r = 0.879) and $p$ = 0.000. This implies

that the use of chaining strategy in teaching reading skills to deaf pupils promoted the development of word recognition ability among the pupils in the studied schools.

After understanding the strength and direction of the relationship between chaining strategy and word recognition ability, the study further employed simple linear regression analysis as shown in Tables 4.5 and 4.6. The simple linear regression analysis was conducted so as to clearly understand the impact of chaining strategy in developing word recognition among deaf pupils. Simple linear regression was used to prove study findings on the contribution of chaining strategy in developing deaf pupils' word recognition ability that were presented descriptively and thematically. The results from regression analysis in Table 4.5 showed that chaining strategy affected word recognition ability among deaf pupils by 77.7%. This is shown by $R^2 = 0.777$ and the Adjusted $R^2 = 0.764$.

**Table 4.5: Model Summary of Chaining Strategy and Deaf Pupils' Word Recognition Ability**

| Model | R | R Square | Adjusted R Square |
|---|---|---|---|
| 1 | .879[a] | .777 | .764 |

a. Predictors: (Constant): Contribution of Chaining strategy in developing deaf pupils' word recognition ability

Moreover, statistically, the results showed a significant relationship ($p = 0.000$) between the use of chaining strategy and the development of word recognition ability among deaf pupils as presented in Table 4.6. The relationship is said to be significant because the obtained $p$ value is within the recommended range ($\leq 0.05$). Therefore, it can be concluded that, the manifested word recognition competencies among the deaf pupils was a result of the use of chaining strategy in teaching literacy skills.

**Table 4.6: Contribution of Chaining Strategy in Developing Word Recognition Ability**

**Coefficients[a]**

| Model | | Unstandardized Coefficients | Standardized Coefficients | |
|---|---|---|---|---|
| | | **B** | **Beta** | **Sig.** |
| 1 | (Constant) | .490 | | .281 |
| | Contribution of Chaining strategy in developing deaf pupils' word recognition ability | .840 | .879 | .000 |

a. Dependent Variable: Deaf pupils' word recognition ability
b. Independent Variable: Chaining Strategy

Generally, the study findings demonstrated that the use of chaining strategy in teaching reading skills to deaf pupils had substantial contribution in developing word recognition ability among deaf pupils from the selected special primary schools in Tanzania. This is revealed in teachers' responses and results from deaf pupils' test as well as the observation process. The simple linear regression results analysed under this objective confirmed that the use of chaining strategy in teaching reading skills to deaf pupils contributed significantly to the development of word recognition abilities. This was shown by a significant relationship between the use of chaining strategy and development of word recognition ability among deaf.

### 4.3.2 Chaining Strategy and Development of Language Comprehension among Deaf Pupils

The second objective sought to determine the usefulness of chaining strategy in developing language comprehension ability among deaf pupils in Tanzania. Five Likert scale questionnaires, test and observation were used in collecting data from teacher respondents and deaf pupils respectively. Teachers were asked to rate the usefulness of chaining strategy in developing deaf pupils' language comprehension

abilities. Likewise, deaf pupils were given a test that enabled the researcher to determine their comprehension skills as a way of predicting the usefulness of chaining strategy. Comprehension ability was determined by four sub-skills that included generating meaning from individual separate words, short and long written sentences as well as a pupil's ability to read written texts without challenges. The quantitative data for this objective were analysed descriptively and through correlation as well as simple linear regression and presented in form of tables. The multiple analyses were conducted to ensure triangulation of data collected through different instruments.

The study conducted descriptive analysis to get a general picture on the usefulness of chaining strategy in developing deaf pupils' language comprehension ability as presented in Table 4.7. The study findings revealed that there was a slight usefulness of chaining strategy in developing language comprehension among deaf pupils in Tanzania. Table 4.7 presents respondents' ratings of the utility of chaining strategy in developing and enhancing deaf pupils' ability to generate meaning from individual separate words, short and long written sentences as well as reading written texts without challenges.

**Table 4.7: Respondents' ratings of the effectiveness of chaining strategy in developing deaf pupils' ability to generate meaning**

| Statements | Very Poor | | Poor | | Fair | | Good | | Excellent | |
|---|---|---|---|---|---|---|---|---|---|---|
| | F | % | F | % | F | % | F | % | F | % |
| Individual separate words | 0 | 0 | 1 | 5 | 4 | 20 | 7 | 35 | 8 | 40 |
| Short written sentences | 0 | 0 | 0 | 0 | 7 | 35 | 8 | 40 | 5 | 25 |
| Long written sentences | 0 | 0 | 2 | 10 | 16 | 80 | 2 | 10 | 0 | 0 |
| Written texts without challenges | 4 | 20 | 6 | 30 | 9 | 45 | 1 | 5 | 0 | 0 |

**F = Frequency*

**Source:** Field data (2023)

As shown in Table 4.7, three-quarters, 15 (75%), of the teachers reported that they believed that chaining strategy was significantly useful in enabling deaf students to develop ability to generate meaning from separate words. This implies that most of deaf pupils taught using this strategy had their ability to read and understand the meaning of words significantly enhanced.

The study findings from questionnaires were supported by interview responses which showed that majority of the deaf pupils were competent in understanding individual words. This is exemplified by a response from one of the teachers who said:

> *As you might have noticed, when our students are shown words they give the sign of that word without hesitation or if there is a picture or real object they point at it directly. I am 100% sure that this is the impact of chaining strategy as it helps in generating identification and connecting skills. I assure you that the strategy has helped me to enhance this skill among the students in my class.*

Similarly, another teacher expounded the aforementioned quote by elaborating further the role that chaining strategies play in developing word recognition abilities of deaf pupils by saying:

> *When deaf children enrol in primary school, we usually start teaching them sign language and fingerspelling. Once they show some level of mastering the two skills, it is when we start introducing them to different vocabularies through the use of chaining strategy. Chaining strategy is very useful in creating or generating meaning of different words to deaf students because it enables them to connect pictures of objects they have in mind with the signs and fingerspelling they have learnt in beginning of their education together with new written vocabularies under study.*

A third teacher explained how she usually applied the chaining strategy when teaching word recognition to deaf pupils, saying:

> *Majority of deaf students here (almost 98% of them) understand meaning of individual words. I mean that they are good at giving the signs corresponding to individual words because when teaching vocabularies, I usually use the strategy that bring different information concerning a certain vocabulary together (chaining strategy) and thus students get to understand the word in details as all information related to it will be exposed to them.*

Although teachers appreciated the usefulness of chaining strategy in developing deaf pupils' ability of understanding individual words, the task of teaching reading skills to deaf is not easy. This is because, when the deaf come to school, they have to learn sign language first so that it can enable them to use or apply chaining strategy. Thus, the use of chaining strategy depends on sign language competency of both the teachers and students. Also, as revealed in the preceding paragraph, the impact of chaining strategy depends on teachers' commitment in designing and applying the strategy.

In the same way, the study results in Table 4.7 indicated that more than half of teacher respondents 13(65%) were confident in the usefulness of chaining strategy in developing deaf pupils' ability in generating meaning from short written sentences. The results demonstrated that a good number of deaf pupils were doing well as far as generating meaning from short sentences was concerned. Therefore, this implies that teachers usually used chaining strategy when teaching comprehension skills to deaf pupils in the study schools.

Moreover, responses from interview complemented the above descriptive findings by showing that majority of the deaf pupils who participated in this study were competent in generating meaning from short written sentences as a result of the employment of

the chaining strategy. This is exemplified by a response from one of the teacher respondents who said:

> *I usually use chaining strategy in teaching my deaf students, but it takes time for them to acquire the ability to read sentences. At least, they try to read short sentences but when it comes to long sentences they only end up giving one to two signs of the words in the sentences. They can't tell what the entire sentence means*.

Another teacher added to the aforementioned claim, by explaining the ability of the class to read short sentences as a result of using the chaining strategy by noting:

> *More than half of my class is capable of reading and understanding short sentences. One of the strategies I am using involves signing words, fingerspelling them, showing pictures related to those words and connecting ideas to generate meaning of the written sentences (chaining strategy). The strategy is very helpful in teaching deaf students with different levels of understanding. However, the strategy is demanding and you need to be creative when using it because, sometimes, in addition to what I say, I also need to connect videos through tables so as to make my students understand and get a clear concept or mental picture of the words and sentences they are learning.*

Though the findings showed that some of the deaf pupils were capable of generating meaning from short sentences, it was still observed that there were some who were not good at understanding such sentences. The above interviewees' responses underscores that the deaf pupils' ability to generate meaning from short written sentences was the impact of the use of chaining strategy.

Study findings in Table 4.7 also indicated that more than three-quarters, 16(80%), of teacher respondents highlighted the usefulness of chaining strategy in developing deaf pupils' ability to generate meaning from long written sentences. This denotes that many of the pupils were only able to understand some parts of the long sentences but not complete ones.

The descriptive findings of the study presented in the previous paragraph were supported by responses from interviews which showed that majority of the deaf pupils were not capable of generating meaning from long written sentences. This is exemplified in a response from one of the teachers who said:

> *I usually use chaining strategy in teaching my deaf students, but it takes time for them to acquire the ability to read sentences. At least, they try to read short sentences but when it comes to long ones, they only end up giving one to two signs of the words in the sentences. They can't tell what the entire sentence means*.

Another interviewee commented on the challenges that deaf pupils faced in reading long written sentences, despite the use of the chaining strategy in teaching them:

> *Although, I apply chaining strategy but very few deaf students are able to generate meaning from long sentences, paragraphs or pages of written texts. About 3 students out of 16 students are capable of generating meaning from long sentences, paragraphs or pages of written texts.*

In trying to elaborate the responses from interviewees above, several reasons might be given out. First, many deaf learners have limited exposure to rich, spoken language input from an early age, something that delays the development of vocabulary and grammar which are key elements for understanding complex texts. Second, chaining often focuses on word or sentence-level meaning, but reading comprehension also requires the ability to infer, summarize, and connect ideas across paragraphs or entire texts. Third, deaf students lack background knowledge or world experiences that hearing peers gain through incidental learning, making it harder to make sense of extended written material.

From observation method, it was noticed that deaf pupils from the study schools were poor in reading long sentences. Most of the deaf could not read even a sentences correctly. Instead of reading and responding to what the sentences required them to do, they kept on fingerspelling word by word. This implies that deaf pupils were good in fingerspelling and understanding meaning of individual words and short sentences of two to three words, but they could not connect and get the meaning of the long sentences.

Lastly, study findings in Table 4.7 showed that half, 10(50%), of the teacher respondents in this study indicated that chaining strategy was not useful in developing deaf pupils' ability to generate meaning from written texts without encountering some challenges. This shows that there was a number of deaf pupils in this study who were able to read; however, they were not fluent in their reading.

The descriptive findings presented in preceding paragraphs on the usefulness of chaining strategy in developing deaf pupils' ability to generate meaning from written texts without facing challenges were supported by responses from interview. Findings from interview with teachers showed that some of the deaf pupils were incompetent in reading written texts. This is exemplified by a response from one of the teachers who was quoted saying:

> *Frankly speaking, very few deaf students can read without challenges. Some can read, but at some level, they face difficulties. For example, a high percentage of the students are capable of comprehending up to word level, but they struggle when it comes in reading sentences, paragraphs and long texts.*

The claim in the above quotation highlights the reading challenges faced by deaf pupils under this study. The interviewee said that, while deaf pupils could recognize and understand individual words, they often struggled with comprehension at higher levels of textual structures. One possible reason for this could be the lack of access to phonological information, which plays a key role in developing fluent reading skills. Furthermore, the situation might be due to lack of specialized teachers who could apply chaining strategy appropriately in teaching reading to the deaf.

Further descriptive analysis of the deaf pupils' test results as shown in Table 4.8 was conducted so as to corroborate findings from questionnaires and key informant interviews. Deaf pupils were given a test that intended to capture their language comprehension ability whose results were used to confirm teachers' responses on the usefulness of chaining strategy in developing deaf pupils' language comprehension ability.

**Table 4.8: Deaf Pupils' Test Results on Language Comprehension Ability**

| Language Comprehension Ability | Frequency | Percent (%) |
|---|---|---|
| Not capable | 58 | 35.8 |
| Very poor | 27 | 16.7 |
| Poor | 26 | 16 |
| Fair | 21 | 13 |
| Good | 17 | 10.5 |
| Very Good | 13 | 8 |
| **Total** | **162** | **100** |

Source: Field data (2023)

Study findings in Table 4.8 revealed that chaining strategy used in teaching deaf pupils had slight impact on their language comprehension ability. This is because more than half, 111(68.5%), of the deaf pupils involved in this study demonstrated language

comprehension abilities ranging from not being capable of comprehending to having poor comprehension ability.

Descriptive and thematic content analysis in this section were followed by correlation analysis as presented in Table 4.9. The correlation analysis was performed in order to determine the strength and direction of the relationship between chaining strategy and language comprehension among deaf pupils.

**Table 4.9: Chaining Strategy and Language Comprehension**

| | | **Language comprehension** | **Chaining strategy** |
|---|---|---|---|
| **Language comprehension** | Pearson Correlation | 1 | .283 |
| | Sig. (2-tailed) | | .414 |
| | N | 20 | 20 |
| **Chaining strategy** | Pearson Correlation | .283 | 1 |
| | Sig. (2-tailed) | .414 | |
| | N | 20 | 20 |

Table 4.9 shows a weak positive relationship between chaining strategy and language comprehension. This is shown by a Pearson correlation ($r = 0.283$) and $p = 0.414$. This implies that there was minimal relationship between chaining strategy and language comprehension.

Furthermore, simple linear regression analysis was conducted to prove statistically the study findings on the usefulness of chaining strategy in developing deaf pupils' language comprehension ability as presented in Table 4.10 and Table 4.11. The regression results showed that chaining strategy influenced deaf pupils' language comprehension by 32.2%. This is shown by $R^2 = 0.322$ with its Adjusted $R^2 = 0.285$.

**Table 4.10: Model Summary of Chaining Strategy and Deaf Pupils' Language Comprehension Ability**

| Model | R | R Square | Adjusted R Square |
|---|---|---|---|
| 1 | .495[a] | .322 | .285 |

a. Predictors: (Constant): Usefulness of Chaining strategy

Similarly, the regression results in Table 4.11 indicated insignificant relationship ($p$ = 0.191) with positive effect size (β = 0.495) between the use of chaining strategy and development of deaf pupils' language comprehension ability. The value is insignificant because the obtained $p$ value is above the recommended range (≤ 0.05).

**Table 4.11: Usefulness of Chaining Strategy in Developing Deaf Pupils' Language Comprehension Ability**

**Coefficients[a]**

| | | Unstandardized Coefficients | Standardized Coefficients | |
|---|---|---|---|---|
| **Model** | | **B** | **Beta** | **Sig.** |
| 1 | (Constant) | 1.375 | | .297 |
| | Usefulness of Chaining strategy in developing deaf pupils' language comprehension ability | .243 | .495 | .191 |

a. Dependent Variable: Deaf pupils' language comprehension ability
b. Independent Variable: Chaining strategy

In trying to understand more the findings in table 4.1, an independent analysis of the effect of chaining strategy in developing specific sub-skills for language comprehension was conducted. The results are presented in Table 4.12.

**Table 4.12: Usefulness of Chaining Strategy in Developing Deaf Pupils' Language Comprehension Sub-Skills**

**Coefficients[a]**

| Model | | Unstandardized Coefficients | Standardized Coefficients | |
|---|---|---|---|---|
| | | **B** | **Beta** | **Sig.** |
| 1 | (Constant) | .139 | | .816 |
| | understanding meaning of separate words | .905 | .835 | .000 |
| 2 | (Constant) | .873 | | .254 |
| | understanding meaning of short written sentences | .686 | .655 | .002 |
| 3 | (Constant) | 3.400 | | .070 |
| | understanding meaning of long written sentences | -.250 | .101 | .672 |
| 4 | (Constant) | 1.086 | | .048 |
| | reading written texts without challenges | -.368 | .390 | .089 |

a. Dependent Variables: Deaf pupils' ability of generating meaning from individual words, short and long written sentences as well as reading written texts without challenges
b. Independent Variable: Chaining Strategy

As presented in Table 4.12, the findings show that, independently, chaining strategy was significant in developing deaf pupils' ability of generating meaning from individual separate words ($p$ = 0.000) and generating meaning from short written sentences ($p$ = 0.002). Conversely, chaining strategy was insignificant in developing deaf pupils' ability of generating meaning from long sentences ($p$ = 0.672) and ability to read written texts without facing challenges ($p$ = 0.089) as indicated in Table 4.12. The statistical results presented in Table 4.12 imply that chaining strategy affects differently the development of the sub-skills for language comprehension with no direct combined effect to the general language comprehension ability among deaf pupils. Thus, this gives the reasons for the observed incapability of deaf students in generating meaning from long written sentences and reading written texts without experiencing challenges.

In general, the use of chaining strategy was significant in developing deaf pupils' ability of comprehending separate individual words and short sentences among deaf pupils. On the other hand, the same strategy had a slight impact on enhancing deaf pupils' ability of comprehending long written sentences and ability to read written texts without experiencing some challenges.

### 4.3.3 Challenges Facing Teachers in Applying Chaining Strategy when Teaching Reading Skills to Deaf Pupils in Tanzania

The third objective of this study intended to identify challenges facing teachers in applying chaining strategy when teaching reading skills to deaf pupils in Tanzania. Responses for this objective were obtained from in-depth interview with teacher respondents. The identified challenges are presented here under this objective in short narrative form.

The first challenge that was highlighted by teacher respondents was that the use of chaining strategy in teaching deaf pupils required much time to make deaf pupils benefit from it. Teachers said that they usually need needed more time to prepare different techniques to be chained during the actual lesson and different teaching aids to be used to make deaf pupils to understand. Thus, they spent a lot of time in preparing one lesson while they also had other duties to perform. For instance, during the interview, one of the interviewees said:

> *The use of chaining strategy in teaching reading to deaf pupils isn't an easy task because it needs much time for preparing the materials. Despite the much time being devoted to preparing what is needed, the deaf pupils understand what they are being taught at a slow pace. It takes time for them to understand what you are teaching them*.

Another respondent elaborated on the issue of spending much time in preparing materials for use with the chaining strategy, as well as the necessity of repeating concepts when applying the strategy, by stating:

> *This work is very tiresome, because the use of chaining strategy demands that a teacher prepares adequately and uses different techniques concurrently when teaching reading to deaf pupils. It does not end up there, you are forced to repeat several times similar content for some days so as for the deaf to follow and understand. Without doing that, students will not acquire the intended skills*.

Similarly, another interviewee provided further elaboration by emphasizing the idea that using the chaining strategy in teaching reading to deaf pupils consumes more time than usual:

> *I can admit that the presence of some teaching strategies like chaining strategy have somehow brought about a relief to us. Although chaining strategy needs much time for preparing pictures and designing how to apply it effectively so as to make meaningful, it contributes significantly to developing important skills easily like word recognition and meaning generation from written texts*.

Yet another interviewee highlighted the challenge of the use of chaining strategy as time-consuming activity by claiming:

> *Some deaf pupils forget easily what they are taught through chaining strategy and this forces a teacher to repeat an idea several times. Even after spending a lot of time repeating the content still there are some who fail to catch-up. It really needs teachers to be patience*.

Though one can agree with the above interviewees' comments, it is worth noting that, sometimes, there are some materials which, once they have been prepared, they can be stored and reused. It was observed that all classes visited were full of well-drawn pictures with labels and other improvised materials that could be used repeatedly in teaching and learning. Therefore, although it is true that the use of chaining strategy

need time for making preparation when applying it, sometime teachers make this as a hidden agenda. They don't like to acknowledge that sometime they don't play their role as it is required.

It was highlighted that many deaf pupils were from hearing parents and their parents did not have sign language skills. This made the deaf students fail to develop any language during their early years of compared to their hearing peers. Hence, when the deaf were enrolled to school, they come without any formal language, thus, it became difficult teaching them literacy skills. This forces teachers to start by teaching sign language skills to deaf pupils so that they can communicate with them. Also, without having sign language skills, it becomes difficult for teachers to apply chaining strategy because the strategy uses sign language skills to develop reading ability. This was clarified more by one of the interviewee who commented:

> *Many deaf pupils, if not all, are enrolled in standard one with poor or no sign language skills. This is due to the fact that most of the deaf are from hearing families and community. Therefore, it is very difficult to teach reading skills to deaf students who do not have language of communication*.

Another interviewee pinpointed the challenge of poor sign language skills among deaf pupils when they enrol in an education program by arguing:

> *When deaf pupils are enrolled in standard one, we are forced to teach them sign language skills until they are somehow competent in the language. This is when we start teaching them reading and other related skills. Most of the deaf come to school with either no sign language skills or local signs. I believe that this is one of the reasons of having some deaf pupils who are struggling to learn reading even after completing standard three. This is because they don't have much vocabulary and they don't understand well the world around them*.

Another interviewee argued that, if deaf individuals do not possess sign language skills at the time they are learning reading skills, the development of these skills will be difficult. This was revealed when the interviewee asserted:

> *Deaf children who are enrolled in standard one do not know sign language. It should be noted that one of the components of chaining strategy is sign language and we use pictures accompanied with signs to teach different concepts. If students do not know sign language, it becomes difficult for the strategy to yield the intended results. Thus, although it is not stipulated in the syllabus, we use the first months of these pupils in schools to develop their sign language skills. Consequently, this hinders us from completing up the syllabus on time*.

Sign language is important in deaf education because it is the communication bridge between teachers and students. From the interview with teachers, it was clear that most students joined school with no sign language skills; hence, compelling them to start teaching them such skills in standard one. Therefore, some of the students who failed to grasp sign language skills ended up lagging behind their peers in literacy skills development and education at large. Sometimes, there were teachers who were teaching the lower grades but were not competent in sign language. There are some teachers who were observed straggling in using sign language in communicating with their deaf students. Again, this contributed to having deaf pupils who were not competent in both sign language and reading.

During interview with teachers, it was revealed that there were some students who learnt reading skills with difficulties due to their age. Parents delayed in enrolling them in education due to either lack of knowledge about deafness and disability in general or negative attitude towards them and low expectations from them. This was revealed from one of the interviewee who said:

> *There are some deaf children who enrol into education program very late just because their families delayed to identify their hearing challenges. When they are identified they are not exposed to sign language until they come to school. Sometimes when they come to school they isolate themselves because of age differences between them and other students. With such kind of students, it becomes difficult in integrating them in class when using chaining strategy because the strategy need active students. Thus, when there are some who don't interact effectively with the class in general or with others they are usually left behind.*

Another teacher presented a scenario that demonstrated the existence of students who were older than their peers in class due to their late enrolment. This was clearly indicated when the interviewee revealed:

> *My standard one class has few students who are older than the others, for instance, one is 11 years old. Due to his age, he always feels shy in responding to questions. Also, when you group students, he ends up fighting others. Sometimes he goes to stay with standard three friends during class hours.*

The interview results revealed that challenges persisted within the Tanzanian society concerning people's awareness and understanding of disability. Some parents struggled to accept that their children were deaf, with a few even perceiving the education of deaf children as a waste of resources. These attitudes are likely to have contributed to delays in enrolling deaf pupils in educational programs.

During data collection, it was observed that there were some deaf students who seemed to be old compared to others. Therefore, the teacher should make sure that no one is left behind despite one's age during the learning process. A good teacher is the one who successfully manages to handle and teach the class with students of various characteristics. On the other side, these students may be part of those students who

were found having poor reading skills and those who completed their primary education with poor reading abilities.

The other challenge that was raised by teachers as an obstacle when applying chaining strategy in teaching deaf students was the presence of some student with multiple disabilities. These students were enrolled into deaf schools because the dominant disability that was first identified was deafness but they had other visible or hidden disabilities. This was a challenge as most of the teachers specialized in attending students with one type of disability. However, the unidentified disabilities affected the teaching and learning processes of such deaf students.

For example, one of the interviewees pointed out:

> *I specialized in teaching deaf students and knowing that this school is for the deaf, when I prepare the lesson, in my mind there are only the deaf. Surprisingly, in the last month of standard two, we noticed that there was a student who had intellectual disability. In all her education life ever since she came here, she has been struggling in learning. Unfortunately, we have been punishing her without knowing that she had the problem of intellectual disability*.

Another teacher elaborated further on how the presence of deaf students with multiple challenges affected the use of the chaining strategy in teaching. The said teacher explained:

> *Sometimes I use more efforts in teaching because in my class there is a deaf student who seems to have also visual problems. I really don't know how to make her learn effectively. When I prepare and use teaching aids during lessons, she does not see well despite making her to sit near the teacher's table.*

Another respondent expressed similar concerns about the impact of unrecognized multiple disabilities on deaf students' learning through the chaining strategy when he recommended:

> *I really advice that all deaf students should be well screened at their enrolment time so as to identify the existence of multiply disabilities. I am sure in my class there are other deaf students who have multiply disabilities because I use much time in teaching. Sometimes, I repeat and use different visual aids as well as video games from my tables but some end up gaining nothing.*

From the presented quotations, it is apparent that during data collection, some students with elements of multiple disability were found. When teachers attended those students with only techniques for teaching deaf students, the students did not benefit from the strategies like chaining. Thus, other initiatives were needed to make teachers at these schools have skills to address students with multiple disabilities. Likewise, as many said during interview session, all deaf pupils required to undergo a comprehensive screening so as to identify all learning needs they might be having before starting teaching them in standard one. If they could not be well attended, they would be likely to be among the students who have poor reading skills in schools for deaf in Tanzania. Teachers commented that, in some schools, there were scarcity of resources to be used in developing teaching aids. They said that sometimes they had to use their personal money to purchase materials. Furthermore, they highlighted that there were some head teachers who did not provide teaching materials on time despite having the budget for that. During one of the interview sessions, one interviewee said:

> *Chaining is a good strategy but it requires the use of different techniques that involve application of different teaching aids. Sometimes I use my money to by materials for preparing teaching aids.*

Another teacher elaborated further on the issue of provision of the required materials on time due to negligence by saying:

> *From what I know, each school is given a budget for purchasing some materials, but at our school the head of school does not purchase the*

> *required materials on time. So, it becomes difficulty for me to prepare what is needed to be used along with chaining strategy. When materials are prepared and posted in classes, naughty students destroy them within a few days. It becomes difficult to place another request for other materials from respective offices, thus I am forced to teach without using teaching aids.*

Teaching aids are crucial when applying chaining strategy. Applying chaining strategy without teaching aids might reduce the effectiveness of the strategy. Therefore, the comments from the above teachers demonstrated that they did not regularly use teaching aids, hence, that could be one of the reasons for the identified deaf students with poor reading skills. Although teachers noted unavailability of materials for developing teaching aids as the challenge, it was observed that almost all classes visited during this research study several had teaching aids posted on the walls.

From interview sessions, teachers presented the established system of key performance indicator as another challenge that faced them when applying chaining strategy. This is exemplified by interviewees' comments when one of them said:

> *Another challenge facing us in teaching reading skills to deaf through chaining strategy is the academic calendar with key performance indicator introduced by the ministry of education. When deaf pupils join school, we begin by teaching them sign language which they understand after several repetitions. This impedes us from completing all the content of the syllabus on time. This brings misunderstandings between teachers and the heads of schools as well as school quality assurers. There are some of us, who, in trying to avoid confusion at the work place decide to rush through the syllabus so as to accomplish it within the academic calendar. However, the consequences remain serious for the deaf pupils who end up acquiring no reading skill*.

The responses from the interviews highlighted the conflict between the rigid academic calendar with performance targets set by the Ministry of Education and the time-intensive needs of teaching reading to deaf pupils using the chaining strategy. As a

result, teachers struggled to cover the syllabus within the given timeframe, leading to pressure from school heads and education quality assurers. This ultimately harmed teaching and learning of the deaf learners, who might have failed to develop essential reading skills due to the compromises on the appropriate teaching approaches.

Generally, teachers and other relevant education organs need to focus on students' understanding rather than focusing on completing the syllabus. As the above quotation indicates, if teachers put much attention on completing the syllabus but not on acquiring the skills, many deaf students might end up lagging behind their hearing peers academically. This is because learning depends on activeness of the pupils. This gives us the real picture on what affects the impact of chaining strategy in delivering the intended skills to deaf pupils. Similarly, this might have contributed to poor reading skills among some deaf students from the primary schools involved in this study.

From the discussions under this objective, it is clear that the use of chaining strategy required much time for preparation and its application. Also, lack of sign language competency among teachers and deaf students affected the applicability of chaining strategy. Late identification of the pupils' disabilities and the existence of deaf students with multiple disabilities were some of the challenges that teachers faced when applying chaining strategy in teaching reading skills to deaf pupils. Similarly, scarcity of materials for developing teaching aids and the established system of measuring key performance indicators among teachers affected the appropriate use of chaining strategy when teaching deaf pupils. For that matter, so as to make the use of chaining strategy to be more fruitful, these challenges need to be worked upon. This is because

these challenges might have been the source for poor reading abilities among deaf students in Tanzania.

### 4.3.4 Enhancement of Chaining Strategy in Developing Reading Skills among Deaf Pupils

The study sought to determine how the use of chaining strategy could be enhanced in developing reading skills among deaf pupils in Tanzania. Various suggestions were obtained from teachers teaching in the selected primary schools for the deaf in Tanzania through in-depth interview. The collected data were analysed thematically and presented in a narrative form and supported with short quotations. The suggestions were used by the researcher to develop a model for enhancing reading skills among deaf pupils. The strategies and the model itself are well elaborated in the subsequent discussion.

Teachers believed that when deaf students are identified as early as possible and screened in details, it is possible to find out all their learning challenges. After that, it would be easy for teachers to provide appropriate intervention compared to when some challenges remained unknown. For example, one teacher explained:

> *So as to make the use of chaining strategy effect, I suggest that deaf students should be screened thoroughly. This will help us to understand the child in details in such a way that when you are designing the techniques to teaching using chaining strategy, you are aware of the learning needs of all students in the class. This will make us use different techniques together which are relevant and appropriate to all students in the class.*

Another respondent emphasized the importance of early identification in the application of the chaining strategy by asserting:

> *Early identification of deafness will make parents find appropriate enrolment for their children. Thus the child will learn sign language when still young and when enrolled into primary education teachers can apply chaining strategy which involve the use of sign language.*

Additionally, another teacher emphasized the role of screening deaf pupils before enrolling them in education programs when she said:

> *I really advice that all deaf students should be well screened at their enrolment time so as to identify the existence of multiply disabilities. I am sure that, in my class, there are other deaf students who have multiply disabilities because I use much time in teaching for the to understand me. Sometimes, I repeat and use different visual aids as well as video games from my tables but some end up gaining nothing. Therefore, when we understand the status of each student it will be easy for me and other teachers for deaf to teach them.*

Always screening is important for effective early intervention. Therefore, when students are screened, it might be of great importance to their education. Therefore, this implies that, if deaf students are screened as early as possible, it would be helpful to teachers in designing appropriate strategies such as the use of chaining strategy because screening makes them have the knowledge of strengths and weaknesses of their students.

In responding to the questions under this objective, teachers suggested that it was important for deaf pupils to enrol into pre-primary education before joining primary education. This idea was clearly elaborated by interviewees' responses as demonstrated when one of them recommended:

> *Deaf students should be enrolled in pre-school at their early years so that they can be taught Tanzanian Sign Language and be oriented to the world around them before beginning literacy classes in primary*

> *education. This will make them to be competent in the language rather than leaning sign language at the time of learning reading skills in standard one.*

Another teacher also explained more on the significance of pre-primary education among deaf pupils by asserting:

> *If pre-primary education is made compulsory to all deaf pupils before joining primary education, it will eliminate the possibility of having very old deaf students in the lower primary school classes. It will be a relief to such students because they have been facing a lot of challenges as well as neglect form others.*

Similarly, another teacher remarked that pre-primary education is an important stepping stone for literacy education among deaf pupils as demonstrated, thus:

> *When deaf pupils enrol into standard one with sign language skills having been acquired in pre-primary education, it will be simple for us to apply chaining strategy. This is from the argument that for deaf to benefit from the use of chaining, they need to be good at sign language.*

The above quotation indicates that being competent in sign language is the solution towards equipping deaf pupils with appropriate reading skills at the appropriate age. It indicates that, in pre-primary education, deaf children will develop a good foundation that will enable them to benefit from the use of chaining strategy when in primary education.

During interview with teachers, it was emphasized that one of the techniques that should be employed to enhance the use of chaining strategy in teaching deaf pupils, is making learning games part of the chaining strategy. This is because of the fact that games do not only make deaf pupils relax and enjoy their learning, but they also consolidate their leaning. This is evidenced by responses from one of the interviewees who asserted:

> *For me, I suggest that learning games should be used together with chaining strategy. This is owing to the fact that learning games help the deaf in memorizing different concepts and vocabularies. Deaf pupils remember easily when they are actively involved in their learning. Thus, games actively involve all students in class; hence, it becomes easy for them to remember the concept through remembering game events.*

Another teacher emphasized the importance of integrating learning games with a chaining strategy when teaching deaf pupils, as elaborated in the following:

> *I usually make learning games one of the techniques that I use together with the chaining strategy. Games help in consolidating the lesson as well as assessing the understanding of students. Its effectiveness depends on teachers' creativity. If teachers are creative and make good use of proper planning, the games can take different forms that will build a number of skills relating to reading.*

The above views show that when learning games are applied as part of chaining strategy, they reduce the number of deaf students with reading problems. Again, what we can learn from teachers' comments is that, not only does the use of games make chaining strategy more effective, but also requires and enhances creativity and good planning based on students' ability and learning needs.

Similarly, teachers underscored on the use of different visual materials as part of the chaining strategy. They believed that chaining strategy enhanced understanding among deaf students and enabled them to remember concepts easily. In supporting the idea, one of the interviewees said:

> *My suggestion on how to enhance the use chaining strategy is to adopt the use of visualization as part of the strategy. Visualizations help in creating mental pictures about the concepts under study, thus, enabling deaf pupils to easily remember either the lesson or concepts through remembering the visual aids used by the teachers during lessons*. It has been of great importance to my students.

Another teacher recommended the integration of audio-visual materials with the use of a chaining strategy in teaching deaf pupils. This is exemplified when the teacher said:

> *I recommend that one of the components for chaining strategy should be audio visual technique. The audio visual technique is very important to both the deaf and hard of hearing students. Therefore, when it is used along with the chaining strategy, I am sure it will be helpful because hard of hearing students will benefit from both audio and visual materials while the deaf will benefit from only visual materials.*

The respondents' quotes reveal that Audio-visual integrates both auditory and visual elements to transmit information effectively. It is true that these strategies when audio-visual is used together with chaining strategy help deaf in their learning. The synergy of auditory and visual stimuli addresses varied learning requirements of deaf learners. The interviewees proposed the need for making curriculum adaptation so as to meet the needs of deaf students. They were optimistic that, if the current curriculum was made to suit the needs of deaf students, it would be easy to apply chaining strategy and yield the desired outcomes. This was heard from one of the interviewees during interview session with teachers teaching in the selected primary schools for deaf, who argued:

> *Even if you apply chaining strategy, if the content you are teaching is not relevant to the needs of the deaf, it will not work. For instance, one of the sub-topics for standard one is that they are required to learn under reading subject is "Alama za Uandishi." It is like crushing water into a motor because the pupils are still struggling with generating meaning from short to long sentences. On the other hand, we need them to understand writing symbols (Alama za Uandishai). Therefore, I propose that the curriculum should be reviewed so as to make some adaptation to meet learning needs of deaf students.*

The researcher agrees with the interviewee's response, which indicates that a chaining strategy becomes beneficial when the content being taught is derived from a flexible

curriculum. Thus, a thoughtful review and adaptation process is essential for creating an educational framework that supports meaningful learning experiences for all students.

Interviewees were on the view that, if the materials were made available all the time, the application of chaining strategy would be easy to apply and its impact would be enhanced. Teaching materials are crucial in the application of chaining strategy; if they are not available or adequate, the effectiveness of chaining strategy might be hampered. For example, in responding to the interview questions, one of the interviewees pointed out:

> *Chaining is a good strategy but it requires the use of different techniques that involve different teaching aids. Sometimes I use my money to buy materials for preparing teaching aids. Therefore, so as the application of chaining strategy to be more appropriate, I recommend that the materials for preparing teaching aids should be made available all the time.*

Another respondent emphasized the importance of using teaching aids when applying a chaining strategy among deaf pupils, by arguing:

> *If heads of schools are educated on the importance of the teaching aids in teaching reading skills to the deaf through chaining strategy, they will make sure that necessary resources are available. Also, they will understand that there is no any teacher who misuses the materials, because chaining strategy involves preparing a lot of materials that consume resources.*

The education of deaf students presents unique challenges and opportunities, particularly in the realm of reading skills. The use of teaching aids is crucial in this context, especially when employing strategies like chaining. Chaining is a pedagogical technique that involves linking concepts together to facilitate learning. When heads of

schools are educated on the importance of these aids, they can ensure that necessary resources are available and used effectively.

Teachers are responsible for competence of all students in their classes. For that matter, teachers need to be competent in different aspects so as to be able to handle leaners with different needs. This was one of the reasons that made teachers to emphasize on equipping teachers with sign language skills to be able to teach classes of the deaf. The aforesaid views were witnessed during the researcher's conversation with interviewees when one of the respondents commented:

> *Without being competent in sign language, it will be difficult to apply chaining strategy. Therefore, teachers should teach deaf pupils at lower primary classes sign language because without this skill, no competent students will be produced.*

Emphasizing on the need to be equipped with sign language skills, one interviewee suggested that teachers working in schools that enrol deaf students to be given sign language skills. She elaborated:

> *I suggest that the government should make sure that all teachers teaching in schools for the deaf have deaf education which include learning sign language. If they employ someone who has no special needs education, that person should not be allocated to teach in lower primary levels.*

Furthermore, another respondent emphasized that regular teachers required professional development to effectively support deaf children. The respondent emphasized:

> *There are many regular teachers at our schools who are allocated to teach the deaf though they don't have sign language skills. I suggest that in-service trainings should be provided so as to equip such teachers with appropriate skills.*

The issue of regular teachers being allocated to teach deaf students despite not possessing sign language skills is a significant concern in the field of special needs education. This situation brings out a gap in teachers' preparedness and the necessity for specialized training to ensure effective communication and improved educational outcomes for deaf students.

From findings for this objective, a number of strategies were identified. It was noted that, so as to enhance the use chaining strategy, deaf students required to be screened before enrolling them into the education programs. Furthermore, it was recommended that deaf pupils should attend a compulsory pre-primary education so as to enable them learn sign language skills and be oriented to the world around them. Additionally, it was suggested that making use of different visualization techniques and learning games as part of chaining strategy when teaching reading deaf pupils would bring about the intended outcome. Other strategies for improving the use of chaining strategy among deaf that were put forward included curriculum adaptation with the intention of meeting learning needs of the deaf and making different materials for developing teaching aids that should be available all the time. Lastly, it was pinpointed that, for chaining strategy to be more fruitful, the government should ensure that teachers who teach deaf students, especially in lower primary classes, should be competent in sign language. Therefore, it is optimistic that when all these proposed strategies are put into consideration, reading problems among deaf pupils in Tanzania would be minimized or eliminated altogether.

# CHAPTER FIVE

# DISCUSSION OF FINDINGS

## 5.1 Introduction

This chapter discusses the findings of the research in relation to the study's research objectives. The discussion revolves around the contribution of chaining strategy in developing word recognition ability among deaf pupils; usefulness of the chaining strategy in developing language comprehension among deaf pupils as well as challenges facing teachers in applying chaining strategy when teaching reading skills to deaf pupils. This part also discusses the findings on enhancement of chaining strategy in developing reading skills among deaf pupils.

## 5.2 Contribution of Chaining Strategy in Developing Word Recognition Ability among Deaf Pupils

This study sought to examine the extent to which chaining strategy contributed to the development of word recognition ability among deaf pupils in Tanzania. Word recognition ability is discussed under four features namely, fingerspelling ability, ability of matching signs with their corresponding words, ability to identify specific words from the group of written words and the ability to identify misspelled words. The general finding was that the use of chaining strategy had a significant contribution to the development of word recognition ability among deaf pupils in Tanzania. This is in-line with a study by Herrera-Fernández et al. (2014) which revealed that chaining strategy was one of the strategies that promoted the improvement of word identification abilities among the participants. The study findings by Quinto-Pozos and

Reynolds (2012) indicated that the use of chaining technique among the deaf supported vocabulary development and print word recognition; thereby, providing further validation of results under this objective.

The study revealed that the use of chaining strategy in teaching reading skills to deaf pupils influenced the development of fingerspelling competency. The findings are congruent with Haptonstall-Nykaza and Schick (2007) who found that chaining strategy that used lexicalized fingerspelling, signs, and English vocabulary to teach deaf students new words enhanced deaf pupils' fingerspelling competency. Also, the above findings tally with the findings from a study by Stone et al. (2015) who discovered that the use of chaining strategy in teaching reading skills to the deaf promoted the development of fingerspelling, sign language, and orthographic decoding skills which in turn facilitated the development of reading skills. According to Puente et al. (2006), fingerspelling is one of the codes for word recognition.

The results in this study revealed that fingerspelling competency among deaf pupils was a result of the use of chaining strategy. This is due to the fact that fingerspelling is part of chaining strategy (Haptonstall-Nykaza & Schick, 2007; Puente et al. 2006; Stone et al., 2015). This denotes that the regular use of chaining strategy enhances deaf pupils' competency in some components of the strategy like fingerspelling skills. On the other hand, if a teacher has to use chaining strategy, he or she needs first to teach specific skills that are important for the applicability of the strategy.

The study further revealed that the use of chaining strategy in teaching reading skills contributed to the development of deaf pupils' competency in matching words with

their corresponding signs. The findings are in agreement with Nussbaum et al. (2012) who pointed out that one of the techniques and strategies that can help deaf children link sign and spoken or written language is the chaining strategy. This aligns with the findings by Padden and Ramsey (2000) who found that teachers used chaining strategy in helping deaf students to connect written words with their signs. Likewise, Humphries and MacDougall (2000) emphasized that the use of chaining strategy when teaching reading skills helped deaf pupils to develop the ability to associate real-world objects or pictures, signs, and finger-spelled words with written words. Subasno et al. (2021), also, had similar findings which showed that chaining-method strengthened the connection of sign language with the written words.

According to existing research, the use of chaining strategy contributes to the development of deaf pupils' competency in matching words with their corresponding signs (Humphries & MacDougall 2000; Nussbaum et al., 2012; Padden & Ramsey, 2000; Subasno et al. 2021). This is due to the fact that chaining strategy capitalizes on making associations or linking ideas from known to unknown. Chaining strategy enables deaf to understand concepts through making them associate what is being taught with what they already have about that concept. Thus, it is through this that deaf students acquire the ability of matching words with their corresponding signs.

Furthermore, the study disclosed that the use of chaining strategy in teaching deaf pupils, backed the development of deaf pupils' ability to identify specific words from a group of written words. The findings are supported by Quinto-Pozos and Reynolds (2012) who found that the use of chaining strategy supported vocabulary development

and print word recognition. Likewise, the current findings correspond with the study by Puente et al. (2006) which found that chaining strategy influenced the development of the skill to map individual vocabularies as well as orthographic skills among deaf children. The findings are also in-line with the study by Staden (2013) who concluded that the use of chaining strategy demonstrated a significant increase in vocabulary skills of deaf children during reading intervention. Haptonstall-Nykaza and Schick (2007) argue that chaining strategy that involves multiple exposure to words is efficient in helping deaf students to learn new words and understand the difference between various words.

From the above findings and support from various studies, it is clear that chaining strategy enables deaf pupils to understand and develop as many vocabularies as possible. Again, because the strategy includes fingerspelling where deaf pupils get to understand components of individual word, thus, deaf pupils are able of differentiating one word from another as they know their spelling.

The study discovered that the use of chaining strategy had slight contribution to the development of deaf pupils' ability of identifying misspelled words. This partly corresponds with Harris and Moreno (2004) who argue that chaining strategy can help the deaf in learning spelling through creating visual memory of the words, by linking the written word with its fingerspelling form, sign and how it is pronounced through lip-reading. Similarly, the study findings align with the study by Berke (2013) has highlighted that the use of chaining (sign, finger spelling and written word) can help in making deaf students understand spelling differences between two similar-looking

words. Moreover, the findings are partly supported by Staden (2013) who explains that chaining strategy enables deaf pupils to understand letters that make up the word and the differences they cause when the specific arrangement is changed. The findings are contrary to Mayer and Moskos (1998) who established that, the use of chaining strategy (print-based, speech-based, and sign-based) led to effective spelling development in deaf children as the use of visual-spatial information when recalling how to spell a word.

The findings under this objective imply that, most of the teachers for deaf pupils in the study primary schools used chaining strategy in teaching literacy skills to deaf pupils. Likewise, majority of the deaf pupils in the selected schools had developed word recognition ability as a result of being taught using chaining strategy. While chaining strategy contributed to the development of fingerspelling skills among deaf pupils, the effective application of chaining strategy also depends on the deaf pupils' fingerspelling and sign language skills. Therefore, teachers need to ensure that their students are good at fingerspelling as well as sign language before starting to apply chaining strategy in teaching reading skills to the deaf.

Moreover, this study revealed that, in applying chaining strategy, teachers needed to link ideas or techniques starting from known to unknown. That is, when developing word recognition ability among deaf, teachers should start by showing a picture or real object that students already have in their mind followed by fingerspelling, signing, written word as well as other techniques. Therefore, it is imperative that the teachers need to teach from known to unknown.

## 5.3 Chaining Strategy and Development of Language Comprehension among Deaf Pupils

This study sought to determine the usefulness of chaining strategy in developing language comprehension among deaf pupils in Tanzania. Language comprehension is discussed under four features namely, ability of understanding the meaning of separate individual words, ability to generate meaning from short written sentences, ability to generate meaning from long written sentences and ability to read written texts without encountering challenges. Generally, the findings showed that the use of chaining strategy significantly impacted the development of deaf pupils' ability to generate meaning from separate individual words as well as short written sentences.

This finding is in line with Triarini et al. (2017) whose findings showed that the use of various forms of chaining strategies improved the reading ability of deaf students. Contrary to Triarini et al. (2017), the findings under this objective showed an insignificant contribution of chaining strategy to the development of deaf pupils' ability to generate meaning from long written sentences and reading written texts without encountering challenges. This might be due to the fact that, while deaf pupils are capable of generating meaning from individual words, they lack understanding of the rules and principles of the written language. This affects them in connecting the meaning of words and ideas in sentences; thereby, failing to generate meaning from the sentences.

The findings of the study revealed that the use of chaining strategy in teaching reading skills to deaf pupils led to significant development of deaf pupils' ability to generate

meaning from separate individual words. The findings are in line with those in a study by Hermans et al. (2008) which demonstrated that chaining strategy could help deaf children to generate word meaning through making associations. Likewise, Humphries and Macdougall (2000) argue that chaining strategy facilitates understanding of the meaning of various words because it makes direct connection of the written word, sign language, fingerspelling and pictures that represent the written words.

Again, the findings are in line with Haptonstall-Nykaza and Schick (2007) who found that deaf students acquired the meaning of words easily through the use of chaining strategy. Scott et al. (2019) indicated that chaining in which teachers used written words with respective fingerspelling and a sign-to-print condition helped deaf children to understand the meaning of written words. As indicated earlier, changing strategy can help deaf pupils to learn concepts through association, it is from this angle that they get to generate meaning of different concepts. Linking of word being taught with its corresponding fingerspelling, signs and real objects make deaf students get the meaning of the particular word easily. This is because out of the three or four things that will be connected together, a child will have prior knowledge with at least one, and it is from that prior knowledge the meaning of a new concept is generated.

Moreover, the study found that the use of chaining strategy influenced the development of deaf pupils' ability of generating meaning from short written sentences of two to three words. This is supported by Alawad and Musyoka (2018) whose study showed that the use of chaining strategy supports reading development among bilingual deaf students. The findings are also in line with Francisco and Padilla (2023)

whose study showed that the deaf preferred the use of chaining strategy because it supported them to comprehend concepts better.

From the findings, it can be interpreted that deaf pupils demonstrate to have good comprehension with short sentences of two to three words because such sentences are easy to understand if one already has the meaning of individual words. Thus deaf easily connect the meaning of two to three words to understand short written sentences. Also, when chaining strategy uses visual materials like pictures, it becomes easy to construct meaning of simple sentences from pictures than it is for long sentences.

Contrary to these findings, the study revealed that the use of chaining strategy had insignificant influence on the development of deaf pupils' ability of generating meaning from long written sentences. The findings are contrary the study by Howerton-Fox and Falk (2019) which concluded that chaining strategy supported language comprehension development among the deaf. Again, the study does not align with Gentry et al. (2004) whose study findings suggest that the use of chaining strategy of multiple modes of reading cues, such as print, pictures, and sign language results in enjoyable and interesting standard reading practices among the deaf.

This shows that teaching long sentences to deaf students is very complicated, hence, if teachers use chaining strategy without innovative ideas, it will be difficult to achieve the intended goal. Long sentences have various grammatical structures that contain prepositions, conjunctions, verbs, adverbs and adjectives. Thus, if teachers do not use

chaining strategy well to make these components clear among the deaf, it will be difficult for them to generate meaning from such sentences.

Furthermore, the study revealed that the use of chaining strategy had little impact on the deaf pupils' ability to read written texts without challenge. This is contrary to Stone et al. (2015) who revealed that the development of English reading proficiency among deaf children was facilitated through chaining strategy.

The findings for this objective denote that, the chaining strategy is more effective in developing deaf pupils' ability of comprehending individual words and short written sentences than it is with long sentences. This shows that, although chaining strategy influences reading skills development, its application in Tanzanian context does not guarantee reading fluency among deaf pupils. This justifies the reality of the existence of many pupils with poor reading skills. Thus, the findings indicate the need for modifying chaining strategy to strengthen its efficacy in developing deaf pupils' competencies of comprehending long sentences and reading texts without encountering challenges.

## 5.4 Challenges Facing Teachers in Applying Chaining Strategy when Teaching Reading Skills to Deaf Pupils in Tanzania

This study identified a number of challenges facing teachers in applying chaining strategy when teaching reading skills to deaf pupils in Tanzania. These include, among others, the issue of chaining strategy requiring much time for preparation and application, lack of sign language competency among teachers and deaf students, late

disability identification and the existence of deaf students with multiple disabilities. Similarly, scarcity of materials for developing teaching aids and the established system of measuring key performance indicator among teachers were among the challenges that affected the effective use of chaining strategy in teaching deaf pupils.

The study noted that consuming much time in the preparation and application of the chaining strategy was one of the challenges that teachers faced in applying chaining strategy when teaching reading skills to deaf pupils. However, it is worth noting that chaining strategy should consume much time in preparations because the ethics in the teaching profession insist on teachers making adequate preparation before going to class to teach students. If teachers go to class without adequate preparation on how the class will be conducted, the teaching and learning processes will not be effective. Therefore, teachers need not take this as a challenge but consider it as one of the requirements in the teaching profession. On the other hand, much time for lesson preparation becomes a challenge as teachers have a lot of workload at school.

The study highlighted lack of sign language skills among deaf pupils and their teachers as another challenge that teachers faced in applying chaining strategy when teaching reading skills among deaf pupils. This is in line with Khasawneh (2021) who highlighted that a major challenge that teachers of the deaf faced included lack of sign language skills. Also, Ngobeni et al. (2020) argue that lack of sign language skills among teachers and deaf students resulted in learners' poor academic performance. This finding is also in agreement with Yusuf et al. (2023) who found that among the challenges facing language teachers of deaf include deaf students' and teachers' poor

sign language skills. Similarly, the study by Nikolaraizi (2000) reported that most of the teachers for the deaf in Greece faced difficulties in communicating with deaf children because they were not fluent in sign language and there were no in-service trainings to equip them with the skills.

Effective teaching and learning depend on media of communication to be used by the teacher. Thus, teachers need to use the media of instruction which is well-understood by both the teachers and students. The use of chaining strategy depends on sign language skills among the teachers and their students because it is through language that teachers and students communicate and exchange instructions. If teachers are not competent in sign language, they will not be able to use chinning strategy in teaching the deaf as students will not understand what is being taught. Also, if deaf students have poor sign language skills, they will not understand what the teacher is teaching.

Likewise, the study found that late disability identification was a challenge that affected teachers in applying chaining strategy when teaching reading skills to deaf pupils in Tanzania. This finding is in line with the study by Ewing and Jones (2003) who indicate that some deaf students, most of the time, are either misidentified or identified late and placed in inappropriate educational setting, hence, they end up receiving inadequate support. Furthermore, Shojaei, et al (2016) point out that late identification and intervention of hearing loss leads to poor or late language development among children which in-turn leads restricted vocabulary, grammatical problems and academic difficulties.

Late disability identification leads to a delay in learning sign language as well as being enrolled into an education program. Thus, this will force teachers to start teaching them sign language when they enrol in primary education regardless of their age. This results in the delay in acquiring reading skills or they will be low achievers depending on their age because it is believed that the early years of one's life are critical for brain development and it is within this time when it is easy to learn basic communication skills.

This study showed that the presence in class of students with unidentified multiple disabilities was another challenge facing teachers in applying chaining strategy when teaching deaf pupils in Tanzania. This is supported by Bowen and Probst (2023) who argue that the presence of hearing loss may decrease accurate identification of other disabilities; thus, making teachers to focus on only deafness but not on other disabilities which might have negative effects on communication, cognition, social development, and behaviour. Besides, Musyoka et al. (2016) further support the findings by pinpointing that most of the universities and colleges have focused on preparing teachers with skills for teaching deaf students well but fail to deal with students having multiple disabilities.

The argument of the current study just like that of Musyoka et al. (2016) and Bowen and Probst (2023) is based on the fact that, if a child has multiple disabilities, people will focus on intervening the one that is either conspicuous or is easily identified. Thus, if teachers are not well equipped on how to identify multiple disabilities, they will end up considering this group as comprising the deaf only, hence, leaving behind those

with other disabilities unknowingly. In turn, the untreated disabilities will continue being ignored, hence, becoming a barrier to the effective learning through the use of chaining.

Furthermore, the study revealed the inadequate resources for making teaching aids as one among the challenges facing teachers in applying chaining strategy when teaching deaf pupils in Tanzania. The current study concurs with that of Muiti (2010) which reported lack of facilities as one of the challenges that face teachers in applying chaining strategy. Also, the findings are supported by Zrigat and Al-smadi (2012) whose study showed that, in Jordan, teachers for the deaf and hard-of-hearing students faced various challenges that included unequipped schools, and a lack of instructional and assessment tools. The study by Dzulkifli (2021) also discovered several challenges that faced teachers for the deaf in teaching language subject whereby lack of appropriate and limited materials for developing teaching aids were among them.

Lastly, the study found that the established Key Performance Indicator (KPI) was another challenge that faced teachers in effectively applying chaining strategy when teaching deaf pupils in Tanzania. This is owing to the fact that the use of chaining strategy need preparation of a lot of teaching materials to be used and testing of the techniques before entering the class. The government, through relevant ministries established key indicators that should be attained by teachers within specified timeframes. Thus, teachers failed to comply with the established system due the nature of students and subject they were teaching. This compelled the head teachers and quality assurance officers to put teachers under pressure. Therefore, when pressurized

to adhere to the performance targets, most of the teachers decided to rush through the syllabus so as to comply with directives issued; thereby, failing to equip the deaf children with adequate reading skills.

The findings for this objective denote that the identified challenges were among the reasons why chaining strategy had insignificant usefulness in making the deaf students develop the ability to understand long written sentences or read written texts with difficulties. The findings also provided some of the reasons on why many deaf pupils graduated with poor reading skills. Form the findings, it is clear that if the identified challenges are not seriously addressed, the impact of chaining strategy will not be felt.

## 5.5 Enhancement of Chaining Strategy in Developing Reading Skills among Deaf Pupils

The study sought to establish how the use of chaining strategy could be enhanced in developing reading skills among deaf pupils in Tanzania. These includes, among others, early disability identification before enrolling to education, enrolling deaf children into pre-primary education for early sign language learning, and making learning games part of the chaining strategy. Also, other strategies include the use of different visual materials, making curriculum adaptations to fit the needs of deaf children, making teaching and learning materials available all the time and having competent primary education teachers with sign language skills.

The study findings revealed the need for having deaf children screened before being enrolled to education programs. This is in line with Shojaei, et al (2016) who argue

that early identification of hearing loss and other related disabilities followed by intensive intervention increase the chances for easy mastering of different skills such as literacy skills among the pre-lingual deaf. Early identification among deaf children is very important because it makes people to know and understand the strengths and weaknesses of the child at early years and thus get the chance to intervene before other challenges become critical. This is supported by the findings by Nikolaraizi (2000) who has indicated that children who experience language delays attain poor spelling and reading outcomes at the elementary level; therefore, if they are not given early appropriate support, they may end up lagging behind their peers academically.

The findings highlighted the need for making pre-primary education compulsory to all deaf pupils in order for them to get the opportunity for sign language learning before attaining the age of enrolling into primary school education. Early sign language development among deaf children is important for future literacy development (Nikolaraizi, 2000). Likewise, the findings agree with Stone et al. (2015) who found that sign language skills had significant contribution to English reading comprehension among deaf children. Therefore, solid basis in a first language, which is sign language for the pre-lingual deaf, is important for deaf children with known learning needs in reading skills development.

The study further revealed the importance of making learning games part of chaining strategy when teaching reading skills to deaf pupils in Tanzania. This is in line with the study by Khenissi et al. (2015) who found that the use of computer games strengthens various deaf pupils' skills such as literacy skills as well it promotes

learning motivation among the students. Also, the study by Costa et al. (2018) acts as the base for the current study through its findings which show that the use of game-based learning approaches promotes substantial and constructive impact in different areas of cognition development which consequently influence reading skills development among deaf children. The findings are further in line with Miller et al., (2021) who demonstrate that the use of games in teaching the deaf contribute significantly to their improved learning.

It is worth noting that, if learning is not interesting and motivating, children find it unfulfilling. That is why the current study underscores the fact that making learning games part of the chaining strategy will make deaf children become motivated and actively engaged in their learning. This implies that, for chaining strategy to be more fruitful in improving reading skills of deaf pupils, the use of attractive learning games along with the strategy is inevitable.

The findings also emphasize the value of strengthening the use of visual materials when applying chaining strategy in teaching reading skills to the deaf. This corresponds with a study by Staden (2013) which found that visualization helped in creating mental images which in turn contributed to reading comprehension development among deaf children. Gentry et al. (2004) also support the findings by highlighting that the use of strong relevant visual materials when applying chaining strategy impacts positively on reading skills development among deaf students. Again, findings in a study by Knoors and Marschark (2014) and Subasno et al. (2021) bolster the current study by showing that, when teaching reading skills to deaf children, it is

important to visualize concepts that the deaf children are reading because it concretizes their language comprehension. Similarly, studies by Puente et al. (2006) and Herrera-Fernández et al. (2014) support the current study by showing that deaf students show improved literacy skills when teachers use a number of visual materials to supplement their sign language knowledge and written concepts.

The use of visual materials as part of chaining strategy is important because visualization helps in creating mental images among deaf pupils as they are visual learners. When more attractive visual materials are used along with fingerspelling, sign language as well as learning games, deaf students will be able to associate easily the concepts they are being taught with those materials; hence, making that knowledge and skills to remain in the memory of the deaf for a long time. This is because, when deaf children remember the visual material used during the lesson, they also develop the ability to remember the whole content of that day. Sometimes, deaf children have a lot of pictures and images in their mind but they do not have their clear meaning as they lack incidental learning due to their hearing loss. Therefore, when teachers use visual materials along with chaining strategy, deaf students will generate meaning of the concepts being taught by starting from the visual materials used.

Moreover, the findings highlight on having learning content that is relevant to deaf pupils' learning needs. Deaf children have different learning needs, and as a result, teachers should be able to make curriculum adaptation so as to meet the leaning needs of this group. Curricula need to be flexible so as to provide chance for teachers to improvise the leaning material based on the learning pace of the deaf students. Thus,

flexible curriculum contributes in decreasing the number of learning obstacles among the deaf. The current study does not take curriculum adaptation as an act of overprotecting deaf children, but rather as a way of creating conducive learning environment for the deaf. Curriculum adaptation should ensure that deaf children learn the same content as that of their hearing peers in a way and pace that conforms to their individual learning needs. Thus, adaptation discourages any issue that forces teachers for the deaf to compromise or rush the process of teaching and learning.

The findings revealed that the availability of teaching and learning materials increased the chance for reading skills development among deaf pupils through the use of chaining strategy. This is supported by Dzulkifli (2021) who argues that the use of relevant teaching aids fosters deaf learning and understanding speed. Easy access of teaching and learning materials among teachers increases their innovation and creativity which in turn helps in easy understanding of what is being taught among the deaf pupils.

The findings showed the need for having teachers for deaf who are competent in sign language. This finding agrees with the studies by Khasawneh (2021) and Ngobeni et al. (2020) who established that sign language skills were the foremost and important skills for any teacher for the deaf to have. The findings are further supported by Yusuf et al. (2023) who show that, if teachers are not competent in sign language, deaf students will not acquire the intended skills. Thus, Teachers who are incompetent in sign language need to undergo frequent training on sign language so as to be relevant to the deaf students.

It should be underscored that teachers are key players when it comes to teaching and learning processes. If teachers cannot communicate effectively the content due to language barrier, their efforts in teaching the subject matter will be meaningless. Therefore, teaching and learning activities need effective communication since, for any communication to be effective, the recipient of the information or message need to understand clearly the massage from the sender. Thus, understanding cannot be attained if the media of communication used is not common between two interlocutors. Basing on the fact that deaf individuals use sign language as media of communication, teachers need also to be competent in sign language for teaching and learning to be effective.

From the above views, the study has come up with a model that will be known as Mutatembwa's Model which will be used for enhancing the use of chaining strategy in developing reading skills among deaf pupils. The model combines a number of important techniques that include early disability identification which is vital in ensuring that deaf children's needs are identified before they are enrolled in formal education program and provides the opportunity for early intervention and support. Moreover, the model prescribes enrolling of deaf children into pre-primary education for the intention of building up their sign language foundation as it is the first language for the pre-lingual deaf. Sign language is important in developing reading skills among deaf children.

Similarly, the model highlights on the importance of integrating learning games as part of the chaining strategy. When the games are chained, they make the learning process

more engaging and active for deaf pupils. Also, the model emphasizes the use of different visual materials that effectively boosts the understanding and retention of reading skills among deaf students. The visual materials include visual aids, diagrams, and other visual learning tools appropriate to the needs of deaf learners.

The model emphasizes on the curriculum adaptations as an important process for addressing learning needs of deaf children. The process of adaptation includes making some modifications and adjustments to the curriculum to make sure that it is accessible and advantageous to deaf pupils by taking into consideration their unique learning needs. Additionally, the model recognizes the importance of having teaching and learning materials readily available all the time to supplement literacy learning among deaf children.

The mode identifies the availability of teachers who are competent in sign language skills as another important aspect for supporting the development of reading skills through the use of chaining strategy. Teachers who are competent and fluent in sign language communicate effectively with deaf pupils; hence, making it easy for them to apply chaining strategy in teaching reading skills to deaf children. The model is shown in Figure 5.1.

Figure 5 presents the graphic illustration of the proposed Mutatembwa Model that shows how to enhance the impact of chaining strategy in developing reading skills among deaf pupils in Tanzania.

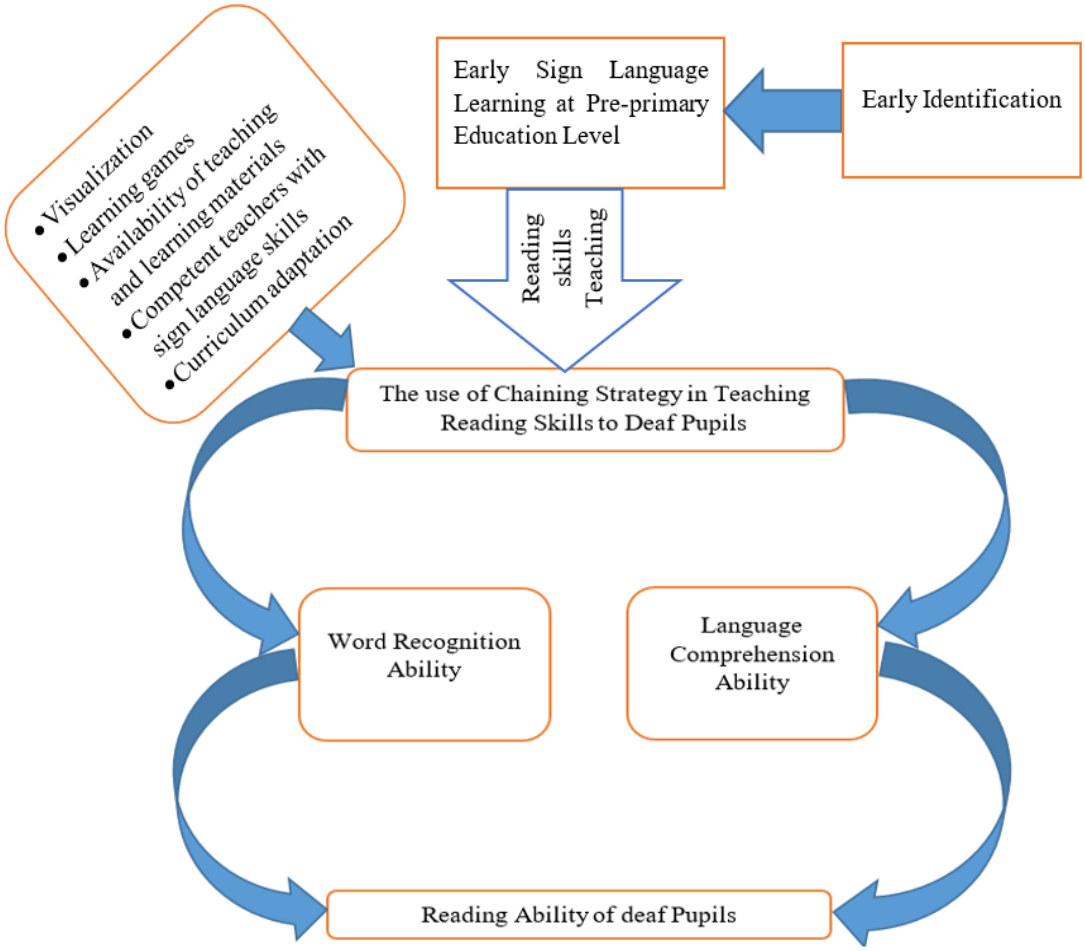


**Figure 5.1: Researcher's Model for Enhancing the Use of Chaining Strategy in Developing Reading Skills among Deaf Pupils Developed from the Findings of this Study**

Therefore, the model proposes that chaining strategy works better if deaf children are identified early, given appropriate intervention and enrolled into pre-primary education for early sign language learning, and integrating learning games and visualization aspects as the part of chaining strategy. Furthermore, chaining strategy will be more efficient if the curriculum for the pupils is adapted accordingly, teaching and learning materials are made available all the time and allocation of competent teachers with sign language skills to teach reading skill to deaf pupils. This is owing

to the fact that when the highlighted strategies are put into implementation together with the use of chaining strategy, they will promote the development of word recognition ability and language comprehension ability among deaf children which ultimately will promote effective reading ability among deaf pupils.

# CHAPTER SIX

# SUMMARY, CONCLUSION AND RECOMMENDATIONS

## 6.1 Introduction

This chapter presents the summary, conclusion and recommendations of the study based on the findings. The overall objective of this study was to investigate the effectiveness of chaining strategy in developing reading skills among deaf pupils in Tanzania. Specifically, the study sought to examine the extent to which chaining strategy contribute to the development of word recognition ability among deaf pupils in Tanzania, determine the usefulness of chaining strategy in developing language comprehension ability among deaf pupils, identify challenges facing teachers in applying chaining strategy when teaching reading skills to deaf pupils and develop a model that can be employed to enhance the use of chaining strategy in developing reading skills among deaf pupils in Tanzania.

## 6.2 Summary of the Findings

This study sought to investigate the effectiveness of chaining strategy in developing reading skills among deaf pupils in Tanzania. It collected data from selected deaf pupils and teachers for deaf from four primary schools for the deaf in Tanzania. The summary of this study is presented based on the four specific research objectives as outlined in chapter one of this study.

### 6.2.1 The Contribution of Chaining Strategy in Developing Word Recognition Ability among Deaf Pupils

The findings of the study revealed that the chaining strategy significantly contributed

to the improvement of word recognition skills among deaf pupils. Through the structured connection of words and concepts, this strategy enhanced cognitive processing and vocabulary retention, thereby leading to greater progress in literacy development.

### 6.2.2 Chaining Strategy in Developing Language Comprehension Ability among Deaf Pupils

The study findings indicated that there was a significant impact of chaining strategy in developing deaf pupils' ability to understand individual words and short written sentences. On the other hand, it was found that chaining strategy had insignificant influence in developing deaf pupils' ability of comprehending long written sentences. Also, despite the employment of the chaining strategy, the pupils read written texts with difficulty.

### 6.2.3 Challenges Facing Teachers in Applying Chaining Strategy when Teaching Reading Skills among the Deaf

The challenges that teachers faced when applying chaining strategy included limited preparation time and lack of sign language competency among teachers and deaf pupils. Late disability identification and dealing with pupils with multiple disabilities were also among the critical challenges revealed by this study.

### 6.2.4 Enhancement of Chaining Strategy in Developing Reading Skills among Deaf Pupils

Key strategies for enhancing the use of chaining strategy in developing reading ability among deaf pupils highlighted by this study included early disability identification and

early exposure to sign language. They also included incorporating visualization techniques and educational games in the chaining strategy, curriculum adaptation and ensuring that teachers are proficient in sign language.

## 6.3 Conclusions

Based on the findings, this study draws four (4) main conclusions as follows:

Firstly, chaining strategy contributes in building crucial word recognition sub-skills among the deaf which subsequently support the development of word recognition ability. Secondly, the use of chaining strategy does not guarantee deaf pupils' language comprehension. Thirdly, limited preparation time and lack of sign language competency among teachers and deaf pupils, late disability identification and dealing with pupils with multiple disability are among the prominent challenges that impede teachers' efforts from effectively applying chaining strategy. Additionally, scarcity of materials for developing teaching aids and the established system of measuring key performance indicator among teachers significantly thwart effective application of chaining strategy.

Fourthly, the impact of chaining strategy is enhanced when deaf children are identified early, get early exposure to sing language, and inclusion of learning games and visualization as the part of chaining strategy. Moreover, chaining strategy becomes more efficient if curriculum for the pupils is accordingly adapted and teaching and learning materials are available all the time as well as if competent teachers with sign language skills are allocated to teach reading skills to deaf pupils.

## 6.4 Recommendations

From the key findings, the study makes some recommendations that can be adopted to enhance the effectiveness of chaining strategy in developing reading skills among deaf pupils in Tanzania. Some recommendations that have been made are meant for action from stakeholders while the others are for further research. These are provided in the subsequent sections.

### 6.4.1 Recommendations for Action

Based on the key research findings, the study makes the following recommendations:

i) In order to enhance the impact of chaining strategy in developing deaf pupils' reading ability, the government through related ministries should ensure that various learning needs of deaf children are identified before they are being enrolled in schools.

ii) The government through the ministry of education should also ensure that sign language instruction is accommodated into the pre-primary education curriculum and deaf children should attend pre-primary education program before they are enrolled into primary education. This will give them the opportunity to get early exposure to sign language and be oriented to the world around them.

iii) The government through the ministry of President's Office Regional Administration and Local Government (PO-RALG) should ensure that competent teachers for the deaf are employed. Also, in collaboration with different stakeholders, the government should ensure that teachers for deaf are

given frequent in-service training to update their sign language skills as well as the skills to teach reading to deaf pupils.

### 6.4.2 Recommendations for Further Studies

The findings of this study revealed several areas in which more research should be conducted as indicated below:

i) The study recommends that further research should be carried out on the effectiveness of chaining strategy in developing reading skills among deaf pupils in inclusive primary schools in Tanzania. This will help in comparing the effectiveness of chaining strategy when it is used in teaching deaf who are in inclusive schools and when used in teaching deaf who are in special schools.

ii) The other proposed study is that which will investigate on the effectiveness of Mutatembwa's Model for enhancing the use of chaining strategy in developing reading skills among deaf pupils. If conducted, this study will help to reveal the information on whether the model will have filled the gaps in the application of chaining strategy identified in the current study.

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# APPENDICES

**Appendix 1: Table of Qualitative Data Analysis**

| Objective | Theme | Description |
|---|---|---|
| The Contribution of Chaining Strategy in Developing Word Recognition Ability among Deaf Pupils. | Chaining strategy and fingerspelling development among deaf | I appreciate the role of chaining strategy. It has helped me in teaching the deaf on different skills such as fingerspelling in my class. From its application, most of my deaf are good at fingerspelling and they can tell components of different words through fingerspelling. However, there are some who fingerspell with difficulties. Sometimes they misspell or even forget some letters making up the words. |
| | | Through the use of chaining strategy, the deaf have been capable of breaking words into their component letters through fingerspelling. Although fingerspelling is among the skills that the deaf master easily and very fast, the chaining strategy has made it the easiest skill. When you show a word to the deaf in my class and you direct them to fingerspell it, they do it fast. For that matter, I have no problem with fingerspelling skills among my deaf students. |
| | Chaining strategy and deaf pupils' competency of matching signs with their corresponding words | Through the use of chaining strategy, the deaf have been capable of matching the written words with their corresponding signs. I usually make sure that their class is full of well-labelled pictures as they help in enabling the pupils in making associations with corresponding signs. |
| | | As I said before, majority of the deaf students in standard IB are good at matching signs with their corresponding words owing to the impact of the use chaining strategy when teaching them. For example, when you sign and tell them to select the card with the word corresponding to the given sign, almost 88% of them can do that without hesitating. |
| | Chaining strategy and deaf pupils' ability in selecting specific words from the group of words | Chaining strategy has made it easy for deaf students to differentiate certain word from groups of words written either on the board or cards. I usually show a word on one card in my hand and tell the class or individuals to select and give a similar word from the group of words collected together or to cycle such a word on the written paragraph and they do it without problem. |

| Objective | Theme | Description |
|---|---|---|
| | Chaining strategy and deaf pupils' ability of identifying misspelled words. | Noticing the misspelled words is somehow tricky and difficult to the deaf students who I am teaching. Through chaining strategy and word cards, I have been trying, now and then, to make sure that they can differentiate a word with correct spelling from that with spelling errors. Unfortunately, it is still difficult to some of them. However, there are others who demonstrate their ability to do it on that on some days, but on other days the problem occurs. I really fail to understand what happens to such students. |
| Chaining Strategy and Development of Language Comprehension among Deaf Pupils | Deaf pupils' competence of understanding individual words. | As you might have noticed, when our students are shown words they give the sign of that word without hesitation or if there is a picture or real object they point at it directly. I am 100% sure that this is the impact of chaining strategy as it helps in generating identification and connecting skills. I assure you that the strategy has helped me to enhance this skill among the students in my class. |
| | | When deaf children enrol in primary school, we usually start teaching them sign language and fingerspelling. Once they show some level of mastering the two skills, it is when we start introducing them to different vocabularies through the use of chaining strategy. Chaining strategy is very useful in creating or generating meaning of different words to deaf students because it enables them to connect pictures of objects they have in mind with the signs and fingerspelling they have learnt in beginning of their education together with new written vocabularies under study. |
| | | Majority of deaf students here (almost 98% of them) understand meaning of individual words. I mean that they are good at giving the signs corresponding to individual words because when teaching vocabularies, I usually use the strategy that bring different information concerning a certain vocabulary together (chaining strategy) and thus students get to understand the word in details as all information related to it will be exposed to them. |
| | Deaf pupils' competence of generating meaning | I usually use chaining strategy in teaching my deaf students, but it takes time for them to acquire the ability to read sentences. At least, they try to read short sentences but when it comes to long sentences they only end up giving one to two signs of the words in the sentences. They can't tell what the entire sentence means. |

| Objective | Theme | Description |
|---|---|---|
| | from short written sentences | More than half of my class is capable of reading and understanding short sentences. One of the strategies I am using involves signing words, fingerspelling them, showing pictures related to those words and connecting ideas to generate meaning of the written sentences (chaining strategy). The strategy is very helpful in teaching deaf students with different levels of understanding. However, the strategy is demanding and you need to be creative when using it because, sometimes, in addition to what I say, I also need to connect videos through tables so as to make my students understand and get a clear concept or mental picture of the words and sentences they are learning. |
| | Deaf pupils' competence of generating meaning from long written sentences. | I usually use chaining strategy in teaching my deaf students, but it takes time for them to acquire the ability to read sentences. At least, they try to read short sentences but when it comes to long ones, they only end up giving one to two signs of the words in the sentences. They can't tell what the entire sentence means. |
| | | Although, I apply chaining strategy but very few deaf students are able to generate meaning from long sentences, paragraphs or pages of written texts. About 3 students out of 16 students are capable of generating meaning from long sentences, paragraphs or pages of written texts. |
| | Deaf pupils' ability to generate meaning from written texts without facing challenges | Frankly speaking, very few deaf students can read without challenges. Some can read, but at some level, they face difficulties. For example, a high percentage of the students are capable of comprehending up to word level, but they struggle when it comes in reading sentences, paragraphs and long texts. |
| Challenges Facing Teachers in Applying Chaining Strategy when Teaching Reading Skills | The application of chaining strategy in teaching deaf pupils require much time for preparation | The use of chaining strategy in teaching reading to deaf pupils isn't an easy task because it needs much time for preparing the materials. Despite the much time being devoted to preparing what is needed, the deaf pupils understand what they are being taught at a slow pace. It takes time for them to understand what you are teaching them. |
| | | This work is very tiresome, because the use of chaining strategy demands that a teacher prepares adequately and uses different techniques concurrently when teaching reading to deaf pupils. It does not end up there, you are forced to repeat several times similar content for |

| Objective | Theme | Description |
|---|---|---|
| to Deaf Pupils in Tanzania | | some days so as for the deaf to follow and understand. Without doing that, students will not acquire the intended skills. |
| | | I can admit that the presence of some teaching strategies like chaining strategy have somehow brought about a relief to us. Although chaining strategy needs much time for preparing pictures and designing how to apply it effectively so as to make meaningful, it contributes significantly to developing important skills easily like word recognition and meaning generation from written texts. |
| | | Some deaf pupils forget easily what they are taught through chaining strategy and this forces a teacher to repeat an idea several times. Even after spending a lot of time repeating the content still there are some who fail to catch-up. It really needs teachers to be patience. |
| | Lack of sign language skills | Many deaf pupils, if not all, are enrolled in standard one with poor or no sign language skills. This is due to the fact that most of the deaf are from hearing families and community. Therefore, it is very difficult to teach reading skills to deaf students who do not have language of communication. |
| | | When deaf pupils are enrolled in standard one, we are forced to teach them sign language skills until they are somehow competent in the language. This is when we start teaching them reading and other related skills. Most of the deaf come to school with either no sign language skills or local signs. I believe that this is one of the reasons of having some deaf pupils who are struggling to learn reading even after completing standard three. This is because they don't have much vocabulary and they don't understand well the world around them. |
| | | Deaf children who are enrolled in standard one do not know sign language. It should be noted that one of the components of chaining strategy is sign language and we use pictures accompanied with signs to teach different concepts. If students do not know sign language, it becomes difficult for the strategy to yield the intended results. Thus, although it is not stipulated in the syllabus, we use the first months of these pupils in schools to develop their sign language skills. Consequently, this hinders us from completing up the syllabus on time. |
| | Delay in enrolling deaf pupils | There are some deaf children who enrol into education program very late just because their families delayed to identify their hearing challenges. When they are identified they are not |

| Objective | Theme | Description |
|---|---|---|
| | | exposed to sign language until they come to school. Sometimes when they come to school they isolate themselves because of age differences between them and other students. With such kind of students, it becomes difficult in integrating them in class when using chaining strategy because the strategy need active students. Thus, when there are some who don't interact effectively with the class in general or with others they are usually left behind. |
| | | My standard one class has few students who are older than the others, for instance, one is 11 years old. Due to his age, he always feels shy in responding to questions. Also, when you group students, he ends up fighting others. Sometimes he goes to stay with standard three friends during class hours. |
| | The presence of some student with multiple disabilities | I specialized in teaching deaf students and knowing that this school is for the deaf, when I prepare the lesson, in my mind there are only the deaf. Surprisingly, in the last month of standard two, we noticed that there was a student who had intellectual disability. In all her education life ever since she came here, she has been struggling in learning. Unfortunately, we have been punishing her without knowing that she had the problem of intellectual disability. |
| | | Sometimes I use more efforts in teaching because in my class there is a deaf student who seems to have also visual problems. I really don't know how to make her learn effectively. When I prepare and use teaching aids during lessons, she does not see well despite making her to sit near the teacher's table. |
| | | I really advice that all deaf students should be well screened at their enrolment time so as to identify the existence of multiply disabilities. I am sure in my class there are other deaf students who have multiply disabilities because I use much time in teaching. Sometimes, I repeat and use different visual aids as well as video games from my tables but some end up gaining nothing. |
| | Scarcity of resources to be used in | Chaining is a good strategy but it requires the use of different techniques that involve application of different teaching aids. Sometimes I use my money to by materials for preparing teaching aids. |

| Objective | Theme | Description |
|---|---|---|
| | developing teaching aids | From what I know, each school is given a budget for purchasing some materials, but at our school the head of school does not purchase the required materials on time. So, it becomes difficulty for me to prepare what is needed to be used along with chaining strategy. When materials are prepared and posted in classes, naughty students destroy them within a few days. It becomes difficult to place another request for other materials from respective offices, thus I am forced to teach without using teaching aids. |
| | Established system of key performance indicator | Another challenge facing us in teaching reading skills to deaf through chaining strategy is the academic calendar with key performance indicator introduced by the ministry of education. When deaf pupils join school, we begin by teaching them sign language which they understand after several repetitions. This impedes us from completing all the content of the syllabus on time. This brings misunderstandings between teachers and the heads of schools as well as school quality assurers. There are some of us, who, in trying to avoid confusion at the work place decide to rush through the syllabus so as to accomplish it within the academic calendar. However, the consequences remain serious for the deaf pupils who end up acquiring no reading skill. |
| Enhancement of Chaining Strategy in Developing Reading Skills among Deaf Pupils | Early identification and screening of deaf pupils | So as to make the use of chaining strategy effect, I suggest that deaf students should be screened thoroughly. This will help us to understand the child in details in such a way that when you are designing the techniques to teaching using chaining strategy, you are aware of the learning needs of all students in the class. This will make us use different techniques together which are relevant and appropriate to all students in the class. |
| | | Early identification of deafness will make parents find appropriate enrolment for their children. Thus the child will learn sign language when still young and when enrolled into primary education teachers can apply chaining strategy which involve the use of sign language. |
| | | I really advice that all deaf students should be well screened at their enrolment time so as to identify the existence of multiply disabilities. I am sure that, in my class, there are other deaf students who have multiply disabilities because I use much time in teaching for the to understand me. Sometimes, I repeat and use different visual aids as well as video games from |

| Objective | Theme | Description |
|---|---|---|
| | | my tables but some end up gaining nothing. Therefore, when we understand the status of each student it will be easy for me and other teachers for deaf to teach them. |
| | Enrolling deaf pupils into pre-primary education before joining primary education | Deaf students should be enrolled in pre-school at their early years so that they can be taught Tanzanian Sign Language and be oriented to the world around them before beginning literacy classes in primary education. This will make them to be competent in the language rather than leaning sign language at the time of learning reading skills in standard one. |
| | | If pre-primary education is made compulsory to all deaf pupils before joining primary education, it will eliminate the possibility of having very old deaf students in the lower primary school classes. It will be a relief to such students because they have been facing a lot of challenges as well as neglect form others. |
| | | When deaf pupils enrol into standard one with sign language skills having been acquired in pre-primary education, it will be simple for us to apply chaining strategy. This is from the argument that for deaf to benefit from the use of chaining, they need to be good at sign language. |
| | Making learning games part of the chaining strategy | For me, I suggest that learning games should be used together with chaining strategy. This is owing to the fact that learning games help the deaf in memorizing different concepts and vocabularies. Deaf pupils remember easily when they are actively involved in their learning. Thus, games actively involve all students in class; hence, it becomes easy for them to remember the concept through remembering game events. |
| | | I usually make learning games one of the techniques that I use together with the chaining strategy. Games help in consolidating the lesson as well as assessing the understanding of students. Its effectiveness depends on teachers' creativity. If teachers are creative and make good use of proper planning, the games can take different forms that will build a number of skills relating to reading. |
| | The use of different visual materials as | My suggestion on how to enhance the use chaining strategy is to adopt the use of visualization as part of the strategy. Visualizations help in creating mental pictures about the concepts under study, thus, enabling deaf pupils to easily remember either the lesson or concepts |

| Objective | Theme | Description |
|---|---|---|
| | part of the chaining strategy | through remembering the visual aids used by the teachers during lessons. It has been of great importance to my students. |
| | | I recommend that one of the components for chaining strategy should be audio visual technique. The audio visual technique is very important to both the deaf and hard of hearing students. Therefore, when it is used along with the chaining strategy, I am sure it will be helpful because hard of hearing students will benefit from both audio and visual materials while the deaf will benefit from only visual materials. |
| | Curriculum adaptation | Even if you apply chaining strategy, if the content you are teaching is not relevant to the needs of the deaf, it will not work. For instance, one of the sub-topics for standard one is that they are required to learn under reading subject is "Alama za Uandishi." It is like crushing water into a motor because the pupils are still struggling with generating meaning from short to long sentences. On the other hand, we need them to understand writing symbols (Alama za Uandishai). Therefore, I propose that the curriculum should be reviewed so as to make some adaptation to meet learning needs of deaf students. |
| | Availability of materials | Chaining is a good strategy but it requires the use of different techniques that involve different teaching aids. Sometimes I use my money to buy materials for preparing teaching aids. Therefore, so as the application of chaining strategy to be more appropriate, I recommend that the materials for preparing teaching aids should be made available all the time. |
| | | If heads of schools are educated on the importance of the teaching aids in teaching reading skills to the deaf through chaining strategy, they will make sure that necessary resources are available. Also, they will understand that there is no any teacher who misuses the materials, because chaining strategy involves preparing a lot of materials that consume resources. |
| | Sign language skills | Without being competent in sign language, it will be difficult to apply chaining strategy. Therefore, teachers should teach deaf pupils at lower primary classes sign language because without this skill, no competent students will be produced. |

| Objective | Theme | Description |
|---|---|---|
| | | I suggest that the government should make sure that all teachers teaching in schools for the deaf have deaf education which include learning sign language. If they employ someone who has no special needs education, that person should not be allocated to teach in lower primary levels. |
| | | There are many regular teachers at our schools who are allocated to teach the deaf though they don't have sign language skills. I suggest that in-service trainings should be provided so as to equip such teachers with appropriate skills. |

# APPENDICES

## Appendix 2: Questionnaire for Teachers

This questionnaire will be used to collect data from standard one, two and three teachers who teach reading subject to deaf pupils from four selected special primary schools for the deaf in Tanzania. Since the aim of this study is to assess the effectiveness of chaining strategy in developing reading skills among deaf pupils in Tanzania, data from teachers teaching reading subject to deaf pupils will be particularly instrumental in achieving the goal of this study. You are, therefore, asked to answer the questions truthfully to enable making objective conclusions and recommendation. The information that you provide will be handled confidentially and will be used for scholarly purposes only.

**PART A: Demographic Data**

1. Date: [ / / 202…]
2. District: _____
3. Region: _____
4. Specialization
    a) Hearing Impairment Teacher
    b) Regular Teachers
    c) Other special needs specialization
5. Working experience
    a) 0-5
    b) 6-10
    c) 11 and above
6. Education level
    a) Certificate
    b) Diploma
    c) Bachelor

**PART B:**

1. How many deaf pupils can identify components of the words through fingerspelling?
    a) 0
    b) 1-5
    c) 6-10
    d) 11 and above
2. How many deaf pupils can match a written word with its sign?
    a) 0
    b) 1-5
    c) 6-10
    d) 11 and above
3. How many deaf pupils can identify misspelled words?
    a) 0
    b) 1-5
    c) 6-10
    d) 11 and above
4. How many deaf pupils are able to identifying the shown word from the group of written words?
    a) 0
    b) 1-5
    c) 6-10
    d) 11 and above
5. How many deaf pupils are able to understand the meaning of separate individual words?
    a) 0
    b) 1-5
    c) 6-10
    d) 11 and above
6. How many deaf pupils are able to generate meaning from short written sentences of two to three words?
    a) 0

b) 1-5
c) 6-10
d) 11 and above

7. How many deaf pupils are able to generate meaning from long written sentences of more than three words?
   a) 0
   b) 1-5
   c) 6-10
   d) 11 and above
8. How many deaf pupils are able to generate meaning from a written paragraph or texts?
   a) 0
   b) 1-5
   c) 6-10
   d) 11 and above
9. How many deaf pupils are able to generate meaning from written pages of texts?
   a) 0
   b) 1-5
   c) 6-10
   d) 11 and above
10. How many deaf pupils can read written texts without facing challenges?
    a) 0
    b) 1-5
    c) 6-10
    d) 11 and above
11. On a scale of 1 to 5 where 1=Very incompetent, 2=incompetent, 3=Fairly competent, 4 = competent, and 5=Very competent; rate deaf pupils' competency in the listed aspects.

| | | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| A | Deaf pupils' ability of identifying the selected (shown) word from the group of written words | | | | | |
| B | Deaf pupils' ability of matching signs with their corresponding words | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| C | Deaf pupils' ability of identifying misspelled words | | | | | |
| D | Deaf pupils' words fingerspelling ability (manual breaking words into its component letters) | | | | | |

12. On a scale of 1 to 5 where 1=Very poor, 2=Poor, 3=Fair, 4=Good, and 5=Excellent; rate the contribution of chaining strategy in developing the following abilities.

| | | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| A | Deaf pupils' ability of identifying the selected (shown) word from the group of written words | | | | | |
| B | Deaf pupils' ability of matching signs with their corresponding words | | | | | |
| C | Deaf pupils' ability of identifying misspelled words | | | | | |
| D | Deaf pupils' words fingerspelling ability (manual breaking words into its component letters) | | | | | |

13. On a scale of 1 to 5 where 1=Very incompetent, 2=incompetent, 3=Fairly competent, 4 = competent, and 5=Very competent; rate deaf pupils' competency in the listed aspects.

| | | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| A | Deaf pupils' ability of understanding the meaning of separate words | | | | | |
| B | Deaf pupils' ability of generating meaning from short written sentences of two to three words | | | | | |
| C | Deaf pupils' ability of generating meaning from long written sentences of more than three words | | | | | |
| D | Deaf pupils' ability of generating meaning from a written paragraph | | | | | |
| E | Deaf pupils' ability of generating meaning from written pages of texts | | | | | |
| F | Deaf pupils' ability to read written texts without facing challenges | | | | | |

14. On a scale of 1 to 5 where 1=Very poor, 2=Poor, 3=Fair, 4=Good, and 5=Excellent; rate the usefulness of chaining strategy in developing the following abilities.

| | | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| A | Deaf pupils' ability of understanding the meaning of separate individual words | | | | | |
| B | Deaf pupils' ability of generating meaning from short written sentences of two to three words | | | | | |
| C | Deaf pupils' ability of generating meaning from long written sentences of more than three words | | | | | |
| D | Deaf pupils' ability of generating meaning from a written paragraph | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| E | Deaf pupils' ability of generating meaning from written pages of texts | | | | | |
| F | Deaf pupils' ability to read written texts without challenges | | | | | |

**Appendix 3: Interview Guide for Teachers**

This interview guide will be used to collect data from standard one, two and three teachers who teach reading subject to deaf pupils from four special primary schools for deaf in Tanzania. Since the aim of this study is to assess the effectiveness of chaining strategy in developing reading skills among deaf pupils in Tanzania, data from teachers teaching reading subject to deaf pupils will be particularly instrumental in achieving the goal of this study. You are, therefore, asked to answer the questions truthfully to enable making objective conclusions and recommendations. The information that you provide will be handled confidentially and will be used for scholarly purposes only.

1. How do you find the work of teaching reading skills to deaf pupils?
2. What challenges do you face when teaching using chaining strategy?
3. What can be done by the government and stakeholders so as to overcome these challenges?
4. What is the status of reading ability among deaf students in your class?
5. What is your opinion on the effectiveness of chaining strategy in teaching reading skills to deaf pupils?
6. How can the use of chaining strategy in teaching reading skills to deaf pupils in Tanzania be enhanced?

**Appendix 4: Observation Checklist**

This check list will be used to collect data from standard one, two and three reading classes of deaf pupils from four special primary schools for deaf in Tanzania. Since the aim of this study is to assess the effectiveness of chaining strategy in developing reading skills among deaf pupils in Tanzania, data from observation will be particularly instrumental in achieving the goal of this study.

1. The listed scenarios will be observed

| | |
|---|---|
| A | Deaf pupils' fingerspelling competency |
| B | Deaf pupils' ability of identifying the selected (shown) word from the group of written words |
| C | Deaf pupils' ability of matching signs with their corresponding words |
| D | Deaf pupils' ability of identifying misspelled words |
| E | Deaf pupils' words fingerspelling ability (manual breaking words into its component letters) |
| F | The use of chaining strategy in teaching reading skills to deaf pupils (the use of sign language, pictures and written words in teaching reading skills to deaf or the use of games, story and pictures in teaching reading skills to deaf) |
| G | Deaf pupils' ability of understanding the meaning of separate individual words |
| H | Deaf pupils' ability of generating meaning from short written sentences of two to three words |
| I | Deaf pupils' ability of generating meaning from long written sentences of more than three words |
| J | Availability of teaching and learning materials that support reading |
| K | Teachers' sign language competence |

## Appendix 5: Word Recognition and Language Comprehension Test for Deaf Pupils

This test will be used to collect data from standard one, two and three deaf pupils from four special primary schools for the deaf in Tanzania on their word recognition and language comprehension abilities.

**PART A: Demographic Data**

1. Date: [ / / 2023]
2. District: _____
3. Region: _____
4. Sex: Male [ ]; Female [ ]

**PART B:**

1. Scoring of the task below will use a **tick** for correct response and a **cross** for incorrect response on the score column. The total of correct responses will be graded following the scale of 0 to 5 where 0=Not capable, 1=Very poor, 2=Poor, 3=Fair, 4=Good, and 5=Excellent

| Fingerspell the following words for each item | | |
|---|---|---|
| **S/N** | **Word** | **Score** |
| 1 | Zamani za kale | |
| 2 | Kisu | |
| 3 | Kikombe | |
| 4 | Mbogo | |
| 5 | Mbuni | |
| Total number of correct responses | | |

2. Scoring of the task below will use a **tick** for correct response and a **cross** for incorrect response on the score column. The total of correct responses will be graded following the scale of 0 to 5 where 0=Not capable, 1=Very poor, 2=Poor, 3=Fair, 4=Good, and 5=Excellent

| Demonstrate what the following sentences tell you to do | | |
|---|---|---|
| S/N | Sentence | Score |
| 1 | Jina lako ni nani? | |
| 2 | Unasoma darasa la ngapi? | |
| 3 | Niletee kalamu yako na daftari lako la hisabati | |
| 4 | Unaumri wa miaka mingapi? | |
| 5 | Leo ni siku gani? | |

3. Scoring of the task below will use a **tick** for correct response and a **cross** for incorrect response on the score column. The total of correct responses will be graded following scale of 0 to 5 where 0=Not capable, 1=Very poor, 2=Poor, 3=Fair, 4=Good, and 5=Excellent

| Match the word or sentence with its corresponding Signs and picture provided below | | |
|---|---|---|
| S/N | Sentence | Scores |
| 1 | Mtoto anacheza mpira | |
| 2 | Kuku | |
| 3 | Bomba la maji | |
| 4 | Kikombe | |
| 5 | Kiti | |

| | |
|---|---|
| **1.**  | **2.**  |
| **3.**  | 4.  |
| **5.**  | 6.  |

**Appendix 6: Research Permit Letters**

**THE UNITED REPUBLIC OF TANZANIA**

MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY

**THE OPEN UNIVERSITY OF TANZANIA**

**Ref. No OUT/PG202100959** **10th November, 2023**

Municipal Director,

Ilala Municipal Council,

P.O.Box 20950,

**DAR ES SALAAM.**

Dear Director,

**RE: RESEARCH CLEARANCE FOR MR. FRATERINUS OSWARD MUTATEMBWA, REG NO: PG202100959**

2. The Open University of Tanzania was established by an Act of Parliament No. 17 of 1992, which became operational on the 1st March 1993 by public notice No.55 in the official Gazette. The Act was however replaced by the Open University of Tanzania Charter of 2005, which became operational on 1st January 2007.In line with the Charter, the Open University of Tanzania mission is to generate and apply knowledge through research.

3. To facilitate and to simplify research process therefore, the act empowers the Vice Chancellor of the Open University of Tanzania to issue research clearance, on behalf of the Government of Tanzania and Tanzania Commission for Science and Technology, to both its staff and students who are doing research in Tanzania. With this brief background, the purpose of this letter is to introduce to you **Mr. Fraterinus Osward**

**Mutatembwa, Reg. No: (PG202100959),** pursuing **PhD**. We here by grant this clearance to conduct a research titled **"Effectiveness of Chaining Strategy in Developing Reading Skills among Deaf Pupils in Selected Primary Schools in Tanzania"**. He will collect his data at your area from 13th November 2023 to 30th June 2024.

4. In case you need any further information, kindly do not hesitate to contact the Deputy Vice Chancellor (Academic) of the Open University of Tanzania, P.O.Box 23409, Dar es Salaam. Tel: 022-2-2668820.We lastly thank you in advance for your assumed cooperation and facilitation of this research academic activity.

Yours sincerely,

**THE OPEN UNIVERSITY OF TANZANIA**

Prof. Magreth S.Bushesha

**For: VICE CHANCELLOR**

# THE UNITED REPUBLIC OF TANZANIA

MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY

**THE OPEN UNIVERSITY OF TANZANIA**

**Ref. No OUT/PG202100959** **10th November, 2023**

Municipal Director,

Tabora Municipal Council,

P.O.Box 45182,

**TABORA.**

Dear Director,

**RE: RESEARCH CLEARANCE FOR MR. FRATERINUS OSWARD MUTATEMBWA, REG NO: PG202100959**

2. The Open University of Tanzania was established by an Act of Parliament No. 17 of 1992, which became operational on the 1st March 1993 by public notice No.55 in the official Gazette. The Act was however replaced by the Open University of Tanzania Charter of 2005, which became operational on 1st January 2007.In line with the Charter, the Open University of Tanzania mission is to generate and apply knowledge through research.

3. To facilitate and to simplify research process therefore, the act empowers the Vice Chancellor of the Open University of Tanzania to issue research clearance, on behalf of the Government of Tanzania and Tanzania Commission for Science and Technology, to both its staff and students who are doing research in Tanzania. With this brief background, the purpose of this letter is to introduce to you **Mr. Fraterinus Osward**

**Mutatembwa, Reg. No: (PG202100959),** pursuing **PhD**. We here by grant this clearance to conduct a research titled **"Effectiveness of Chaining Strategy in Developing Reading Skills among Deaf Pupils in Selected Primary Schools in Tanzania"**. He will collect his data at your area from 13th November 2023 to 30th June 2024.

4. In case you need any further information, kindly do not hesitate to contact the Deputy Vice Chancellor (Academic) of the Open University of Tanzania, P.O.Box 23409, Dar es Salaam. Tel: 022-2-2668820.We lastly thank you in advance for your assumed cooperation and facilitation of this research academic activity.

Yours sincerely,

**THE OPEN UNIVERSITY OF TANZANIA**

Prof. Magreth S.Bushesha

**For: VICE CHANCELLOR**

# THE UNITED REPUBLIC OF TANZANIA

MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY

**THE OPEN UNIVERSITY OF TANZANIA**

**Ref. No OUT/PG202100959** **10th November, 2023**

Town Director,

Njombe Town Council,

P.O.Box 693,

**NJOMBE.**

Dear Director,

**RE: RESEARCH CLEARANCE FOR MR. FRATERINUS OSWARD MUTATEMBWA, REG NO: PG202100959**

2. The Open University of Tanzania was established by an Act of Parliament No. 17 of 1992, which became operational on the 1st March 1993 by public notice No.55 in the official Gazette. The Act was however replaced by the Open University of Tanzania Charter of 2005, which became operational on 1st January 2007.In line with the Charter, the Open University of Tanzania mission is to generate and apply knowledge through research.

3. To facilitate and to simplify research process therefore, the act empowers the Vice Chancellor of the Open University of Tanzania to issue research clearance, on behalf of the Government of Tanzania and Tanzania Commission for Science and Technology, to both its staff and students who are doing research in Tanzania. With this brief background, the purpose of this letter is to introduce to you **Mr. Fraterinus Osward**

**Mutatembwa, Reg. No: (PG202100959),** pursuing **PhD**. We here by grant this clearance to conduct a research titled **"Effectiveness of Chaining Strategy in Developing Reading Skills among Deaf Pupils in Selected Primary Schools in Tanzania"**. He will collect his data at your area from 13th November 2023 to 30th June 2024.

4. In case you need any further information, kindly do not hesitate to contact the Deputy Vice Chancellor (Academic) of the Open University of Tanzania, P.O.Box 23409, Dar es Salaam. Tel: 022-2-2668820.We lastly thank you in advance for your assumed cooperation and facilitation of this research academic activity.

Yours sincerely,

**THE OPEN UNIVERSITY OF TANZANIA**

Prof. Magreth S.Bushesha

**For: VICE CHANCELLOR**

# THE UNITED REPUBLIC OF TANZANIA

MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY

**THE OPEN UNIVERSITY OF TANZANIA**

**Ref. No OUT/PG202100959** **10th November, 2023**

Municipal Director,

Kagera Municipal Council,

P.O.Box 284,

**KAGERA.**

Dear Director,

**RE: RESEARCH CLEARANCE FOR MR. FRATERINUS OSWARD MUTATEMBWA, REG NO: PG202100959**

2. The Open University of Tanzania was established by an Act of Parliament No. 17 of 1992, which became operational on the 1st March 1993 by public notice No.55 in the official Gazette. The Act was however replaced by the Open University of Tanzania Charter of 2005, which became operational on 1st January 2007.In line with the Charter, the Open University of Tanzania mission is to generate and apply knowledge through research.

3. To facilitate and to simplify research process therefore, the act empowers the Vice Chancellor of the Open University of Tanzania to issue research clearance, on behalf of the Government of Tanzania and Tanzania Commission for Science and Technology, to both its staff and students who are doing research in Tanzania. With this brief background, the purpose of this letter is to introduce to you **Mr. Fraterinus Osward**

**Mutatembwa, Reg. No: (PG202100959),** pursuing **PhD**. We here by grant this clearance to conduct a research titled **"Effectiveness of Chaining Strategy in Developing Reading Skills among Deaf Pupils in Selected Primary Schools in Tanzania"**. He will collect his data at your area from 13th November 2023 to 30th June 2024.

4. In case you need any further information, kindly do not hesitate to contact the Deputy Vice Chancellor (Academic) of the Open University of Tanzania, P.O.Box 23409, Dar es Salaam. Tel: 022-2-2668820.We lastly thank you in advance for your assumed cooperation and facilitation of this research academic activity.

Yours sincerely,

**THE OPEN UNIVERSITY OF TANZANIA**

Prof. Magreth S.Bushesha

**For: VICE CHANCELLOR**

**THE UNITED REPUBLIC OF TANZANIA**
**NJOMBE TOWN COUNCIL**
***(All correspondence should be addressed to the Town Director)***

**NJOMBE REGION:**

Tel. No: 026-2968833
Fax. No: 026-2968832

P. O. Box 577,
**NJOMBE.**

**In reply please quote:**

NTC/ES/UT/I/176

15th - 11 -2023

**ALL HEADTEACHERS FOR PRIMARY SCHOOLS INNJOMBE TOWN**

**RE: PERMISSION TO CONDUCT A RESEARCH FOR FRATENUS OSWARD MUTATEMBWA FROM OPEN UNIVERSITY**

Iam delighted to inform you that the Town Education Officer has granted a an academic research permit to the above mentioned Schools for **FRATENUS OSWARD MUTATEMBWA** from **OPEN UNIVERSITY**

The title of the research is "***Effectiveness of Chaining Strategy in Developing Reading Skills among Deaf Pupils in Selected Primary Schools in Tanzania.***

Kindly give them any required support to enable him to realize the objective of the study.

**PROCHESIUS J. MGULI**
**FOR TOWN DIRECTOR,**
**NJOMBE TOWN COUNCIL**

**Copy:**

Town Director
Njombe Town Council
P.o Box 577

MKURUGENZI
CRI YA MJI
NJOMBE

THE UNITED OF REPUBLIC OF TANZANIA
PRIME MINISTER'S OFFICE
REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT
TABORA MUNICIPAL COUNCIL

**Ref. No.** TMC/AEM/132 VOL I/128

**Date:** 27th November, 2023

HEADTEACHER,
TABORA VIZIWI P/S,
P.O. BOX 174,
**TABORA.**

**RE: A PERMIT TO COLLECT RESEARCH DATA**

Refer to the heading above,

2. I am pleased to inform you that **Mr. Fraterinus Osward Mutatembwa** pursuing **PHD of Education** has been permitted to collect data from your area on **"Effectiveness of chaining strategy in Developing Reading Skills among Deaf Pupils in Selected Primary schools in Tanzania".** I, therefore request your office to grant him any required assistance to enable him to accomplish his assignment. The programme will be conducted form 24th November, 2023 to 30th June, 2024.

3. Thanks.

*Flora Mwitula*
**For: MUNICIPAL DIRECTOR**
**TABORA MUNICIPAL COUNCIL**
For. MUNICIPAL DIRECTOR
P. O. Box
TABORA

Copy to:
1. Municipal Director,
   4 Airport Road,
   P.O. BOX 174,
   **45182 TABORA.**
2. Fraterinus Osward Mutatembwa

Tabora Municipal Council, 4Airport Road, P.O. Box 174, 45182Tabora, Tel No.+255262604835, Fax No. +255262604835,
Email:md@taboramc.go.tz, Website: www.taboramc.go.tz

JAMHURI YA MUUNGANO TANZANIA

OFISI YA RAIS
TAWALA ZA MIKOA NA SERIKALI ZA MITAA
HALMASHAURI YA JIJI LA DAR ES SALAAM

**Tafadhali unapojibu Taja:**

**KUMB. NA. DCC/AT.9**

**07/12/2023**

Mkuu wa Divisheni,
Divisheni ya Elimu Msingi,
S L. P. 20950,
**DAR ES SALAAM.**

**YAH: KUWATAMBULISHA FRATERINUS OSWARD MUTATEMBWA**

Tafdahli rejea barua yenye kumbukumbu Na. **OUT/PG202100959101** ya tarehe 10/11/2023 yahusika.

2. Namtambulisha Ndugu **Fraterinus Osward Mutatembwa** kufanya utafiti wa **"Effectiveness of Chaining Strategy in Developing Reading Skills among Deaf Pupil in Select Primary Schools in Tanzania"** Ufatifi huu unaanza tarehe **31 Novemba, 2023** hadi **30 Juni, 2024.**

3. Naomba apokelewe na kupewa ushirikiano.

4. Naambatanisha na nakala ya barua kwa rahisi ya rejea.

Ahsante kwa Ushirikiano.

*B Mwaikambo*

*Kny:* MKURUGENZI WA JIJI
HALMASHAURI YA JIJI LA DAR ES SALAAM

Kny: **MKURUGENZI WA JIJI.**

**NAKALA** : Mkurugenzi wa Jiji - **(Aione kwenye Jalada)**

" : Fraterinus Osward Mutatembwa - **kwa ufuatiliaji.**

**OFISI YA MKURUGENZI, 1 MTAA WA MISSION, S.L.P 20950, 11883 DAR ES SALAAM, SIMU NA 2128800, 2128805,**
**Tovuti:www.dcc.go.tz, Barua Pepe: info@ilalamc.go.tz**

THE UNITED REPUBLIC OF TANZANIA
PRESIDENT'S OFFICE
REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT

**BUKOBA MUNICIPAL COUNCIL**
*(All Correspondences should be directed to the Municipal Director)*

*When replying please mention:*

Ref. No. BMC/E.10/19/XXX/26 11st December, 2023

**TO WHOM IT MAY CONCERN**

**RE: RESEARCH PERMIT FOR MR. FRATERINUS OSWARD MUTATEMBWA**
**REG.NO.PG202100959**

The above heading refers.

2. The above mentioned is a student from the Open University of Tanzania, pursuing PhD .He has been granted the permit for conducting her research in Bukoba Municipality on the topic titled " **Effectiveness of Chaining Strategy in Developing Readings Skills among Deaf Pupils in Selected Primary Schools in Tanzania".**

3. This permit is valid until **30th June 2024.**

4. Please accord her any necessary assistance she may need from you.

Yours sincerely,

Erick N. Bazompora
**For: MUNICIPAL DIRECTOR**
**BUKOBA**
KURUGENZI WA MANISPAA
YA MASHAURI YA MANISPAA
BUKOBA

**P.O.Box** 284, **Bukoba, Kagera**
**Tel**: 028 2220226, **Fax**: 028 2220226, **Email**: md@bukobamc.go.tz, **Website**: www.bukobamc.go.tz

# PUBLICATIONS