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# Evidence-based educational practices and efficacy of teachers of the deaf and hard of hearing in Kenyan Units

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**Inaugural-Dissertation zur Erlangung des Doktorgrades der Philosophie an der Fakultät für Psychologie und Pädagogik der Ludwig-Maximilians-Universität München**

vorgelegt von Susan Wamae aus Kenia

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## Abstrakt

Untersuchungen legen nahe, dass die Aufklärung von Menschen mit Hörbehinderung (MmH) eher von Vermutungen und ungerechtfertigten Vorurteilen als von wissenschaftlichen Beweisen geprägt wird (Marschark et al., 2006; Luckner, 2006).

Es wurde festgestellt, dass Lehrer der MmH pädagogische Praktiken anwenden, die nicht auf Basis wissenschaftlicher Erkenntnisse entstanden sind, was bedeutet, dass es eine Lücke zwischen Forschung und Praxis gibt bezüglich der Bildung von MmH.

Bildung benötigt daher wissenschaftliche Belege und muss wissenschaftlich begründet werden für die Bildung von MmH. Frühere Studien belegen niedrige akademische Leistungen von Schülern mit Hörbehinderung in Kenia sind, aufgrund einer Reihe von unzulänglichen Lehrerattributen und dem tatsächlichen Unterricht im Klassenzimmer (Adoyo & Maina, 2019; Nyeris & Koross, 2015). Daher ist es für Lehrer MmH unbedingt erforderlich, evidenzbasierte Praktiken in ihren Klassenzimmern zu etablieren und zu implementieren, die zu einer Verbesserung der Leistungen von Schülern mit einer Hörbehinderung führen können.

In Kenia haben frühere Studien nahegelegt, dass die Lehrer der MmH traditionelle Unterrichtsmethoden anwenden, die nicht den pädagogischen Anforderungen entsprechen Anforderungen und den Bedürfnissen der Schüler entsprechen oder gerecht werden (Adoyo & Maina, 2019; Maina et al., 2014). Es ist jedoch nicht erforscht, inwieweit Lehrer der MmH in Kenia angemessene Strategien in ihren Klassenzimmern umsetzen. Es gibt einen Mangel an Literatur in Bezug auf evidenzbasierte Bildungspraktiken für MmH-Studenten in Kenia.

Es wurden keine umfassende Studien zu tatsächlichen evidenzbasierten Praktiken, die von Lehrern der MmH eingesetzt werden, zum Zeitpunkt der Erstellung der vorliegenden Studie in kenianischen Einheiten gefunden. Als Antwort auf diese Lücke in Forschung und Befolgung der Empfehlungen aus früheren Studien, untersucht die vorliegende Studie pädagogische Praktiken in Zusammenarbeit mit kenianischen Lehrkräften von MmH, insbesondere ob Sie evidenzbasierte Praktiken in ihren Klassenräumen anwenden. Studien haben gezeigt, dass die Wirksamkeit von Lehrern ein wichtiges Attribut ist, das das Lernen und Lernen beeinflusst. Es wurde festgestellt, dass Lehrer mit einem höheren Grad an Wirksamkeit auch diejenigen sind, die einen höheren Grad an Offenheit beweisen zum Lernen und Implementieren neuer, fortschrittlicher und innovativer

Ansätze und Strategien für das Unterrichten. Darüber hinaus wurde festgestellt, dass Lehrer mit hoher Wirksamkeit eine größere Begeisterung zeigen, als ihre Kollegen mit geringerer Wirksamkeit. Relevant für die vorliegende Studie ist die Implementierung evidenzbasierter Praktiken für Lehrer von MmH in kenianischen Einheiten.

Dieses Lehrerattribut war für die vorliegende Studie von Interesse. Wirksamkeitsstudien haben überwiegend in der Allgemeinbildung und in der Sonderpädagogik mit Lehrern für Schüler stattgefunden, die Lernbehinderungen, leichte geistige Behinderungen und Verhaltensstörungen haben. Nur wenige Studien wurden zur Wirksamkeit des Lehrers von Schülern mit Hörbehinderung durchgeführt.

Es gibt keine Literatur über die Wirksamkeit von Lehrern der MmH in Lehr-Einheiten in Kenia. Die vorliegende Studie zielte darauf ab, die Wirksamkeit von Lehrern der MmH in kenianischen Einheiten zu erheben, um einen Beitrag für diese Lehrerschaft zu leisten. Darüber hinaus wurden, wenn überhaupt, nur sehr wenige Studien durchgeführt über die Wirksamkeit der Lehrkräfte und Umsetzung evidenzbasierter Praktiken. Frühere Studien belegten einen Zusammenhang zwischen Wirksamkeit und Unterrichtsfaktoren wie dem Klassenzimmer, so wie Management, Verhalten außerhalb der Rolle gegenüber einem Team und einer Organisation, Arbeitszufriedenheit und Unterrichtspraktiken unabhängig von den kulturellen Hintergründen der Lehrer, den Ergebnissen der Schüler wie Leistung und das Gefühl der Wirksamkeit der Schüler. Es gibt, wenn überhaupt, begrenzte Studien, in denen der Zusammenhang zwischen Wirksamkeit und dem Einsatz evidenzbasierter Praktiken in den Einheiten für MmH untersucht wurden. In der vorliegenden Studie wurde daher versucht, diese Wissenslücke durch eine Bewertung zu schließen und herauszufinden, ob es einen Zusammenhang zwischen der Umsetzung evidenzbasierter Praktiken und Wirksamkeit der Lehrer der MmH gibt. In Kenia sind die Bildungsmöglichkeiten für Kinder mit Hörbehinderung etwas eingeschränkt. Sie können entweder Sonderschulen für die MmH, Sondereinheiten für die MmH oder reguläre Schulen besuchen. Eine Einheit ist ein eigenständiges Klassenzimmer auf dem Gelände einer regulären Schule, in der Schüler mit Behinderungen ihre Anweisungen erhalten. In Kenia wurden Empfehlungen verschiedener Bildungskommissionen, die auf die Integration von behinderten Schülern in reguläre Schulen abzielen, angenommen. Einheiten für die MmH sind Klassenräume, in denen die Schüler ihren gesamten Unterricht in den Klassenräumen für die MmH von einem spezialisierten Lehrer der MmH erhalten. Es gibt nur

wenige Studien, die die Qualität des Unterrichts untersuchen bezüglich verschiedener Praktikumsmöglichkeiten für Studierende mit Hörbehinderung. In dieser Studie wurde versucht, die Umsetzung evidenzbasierter Praktiken in Einheiten für die MmH zu etablieren. In der vorliegenden Studie wurden Bildungspraktiken so ausgelegt, dass sie evidenzbasiert sind als Bildungsstrategien und Bildungsansätze im Bereich der Hörgeschädigtenbildung.

Die Erhebung fasste die Bildungsstrategien in sieben Kategorien zusammen: Organisation des Klassenzimmers und Unterrichtsroutinen; visuelle Hilfsmittel und Unterrichtssprache; optimale visuelle und akustische Bedingungen; differenzierter Unterricht; soziale Organisation im Klassenzimmer; Klassenzimmerstruktur; und Wissensrahmen. Basierend auf dieser Perspektive bestand der Zweck dieser Studie darin, zu bestimmen inwieweit Lehrer der MmH evidenzbasierte Bildungspraktiken umsetzen.

Einheiten der MmH in Kenia dokumentieren die Erfahrungen der Lehrer mit der Umsetzung von evidenz-basierten Praktiken in Einheiten für die MmH in Kenia und den Bildungsansatz zu entwickeln. Darüber hinaus sollte in der Studie die Wirksamkeit nachgewiesen werden. Die Lehrer unterrichteten Schüler, die MmH Einheiten sind. Schließlich der Zweck der Studie war, festzustellen, ob es einen Zusammenhang zwischen der Verwendung von evidenzbasierten und der Wirksamkeit von Lehrern von Schülern, die DHH in kenianischen Einheiten sind. Mit der vorliegenden Studie sollte der Untersuchungsbereich in der Forschung zu evidenzbasierten Praktiken erweitert werden in der Hörgeschädigtenbildung, indem versucht wird, das Ausmaß der Verwendung der evidenzbasierten Praktiken in Einheiten zu erfassen sowie die Erfahrungen der Lehrer an den Einheiten, ihre Wirksamkeit und ob dort in der Tat ein Zusammenhang zwischen der Verwendung evidenzbasierter Praktiken und Wirksamkeitsniveaus in Lehrer besteht.

Um den Zweck der Studie angemessen zu erreichen, war es unvermeidlich, sowohl quantitative als auch qualitative Daten zu sammeln. Daher verwendete die vorliegende Studie einen gemischten Methodenansatz. Die verwendeten qualitativen Methoden waren Fokusgruppendiskussionen (REA) und strukturierte Beobachtungen, während die verwendeten quantitativen Methoden die Verabreichung von strukturierten Fragebögen waren. Die qualitativen Methoden lieferten Informationen über die evidenz-basierten Strategien, die in Schulen für die MmH angewendet werden, die Erfahrungen von Lehrern der MmH in kenianischen Einheiten, und im Kontext der Studie. Andererseits lieferten die quantitativen Methoden Informationen über die Wirksamkeit der

Lehrer der MmH, ihren Ansatz zur Bildung der MmH und ob es einen Zusammenhang zwischen der Verwendung evidenzbasierter Strategien für die MmH und die Wirksamkeit der Lehrer gab. Die Studie folgte dem konvergenten Design (das früher als Triangulation bekannt war), wobei die Datentransformationsvariante als am besten geeignet erachtet wird. Daten zum Lehrer und der Wirksamkeit bestanden aus quantitativen Daten, während Daten zur Umsetzung evidenzbasierter Praktiken qualitative Daten waren, beide wurden getrennt gesammelt. Die Bandbreite an verschiedenen Daten aus dem Design erlaubte qualitative Daten, die in Form strukturierter Beobachtungen im Klassenzimmer gesammelt wurden zu quantifizieren, sie in quantitative Daten umzuwandeln und Korrelationsanalysen durchzuführen zwischen den beiden quantitativen Datensätzen, um diese zu testen. So wurden Ergebnisse generiert für die Forschungsfrage, ob es einen Zusammenhang zwischen Wirksamkeit und Verwendung von evidenzbasierte Pädagogik in Einheiten für die MmH gibt.

Die Zielgruppe für die vorliegende Studie waren Lehrer der DHH, die in Einheiten in den Nairobi und Kiambu unterrichteten. Nairobi County ist die Hauptstadt von Kenia und Kiambu County von Nairobi County. Die Stichprobe zum Zeitpunkt der Feldarbeit betrug 27 Lehrer der MmH in Einheiten für die MmH. In Kenia besteht ein akuter Mangel an Lehrern der MmH in Einheiten für die MmH. Aufgrund der geringen Populationsgröße wurden nicht wahrscheinliche Stichprobenverfahren angewendet als geeignet erachtet. Die Stichprobe für die vorliegende Studie in einem Stichprobenverfahren auszuwählen, hätte eine noch kleinere Stichprobengröße ergeben. Zur Auswahl wurde die Schneeball-Methode verwendet. Diese Methode wurde für die vorliegende Studie ausgewählt, weil die Zielgruppe klein war und sehr spezifisch, da die Studie ausschließlich daran interessiert war, Teilnehmer, die MmH in Einheiten unterrichten, aber keine Schulen für die MmH waren.

Der Forscher forderte die Teilnehmer auf, Einheiten für die MmH zu empfehlen, und der Forscher besuchte die Einheiten und forderte die Lehrer auf, freiwillig an der Studie teilzunehmen. Obwohl keine Wahrscheinlichkeitsstichprobenverfahren angewendet wurden, konnten Teilnehmer aus allen Teilbereichen ausgewählt werden, aus den Grafschaften in Nairobi und Kiambu, von denen bekannt ist, dass sie Einheiten für die MmH haben. Dies ermöglichte dem Forscher, Teilnehmer aus verschiedenen Regionen der Grafschaften zu gewinnen, die zur Vielfalt in der Stichprobe beitrugen. Dies brachte 23 Lehrer der MmH in diesen Einheiten zusammen.

Quantitative Daten wurden mithilfe von drei Fragebögen gesammelt: der Skala für das Wirksamkeitsgefühl der Lehrer (TSES), das entwickelt wurde, um die Wirksamkeit von Lehrern zu messen; die Überzeugungen und Einstellungen über Deaf Education (BADE) eine Skala, die ermöglicht, die beiden Bildungsansätze für MmH zu untersuchen und einen kurzen demografischen Fragebogen, in dem relevante Informationen gesammelt wurden von den Teilnehmern.

Die qualitativen Daten wurden unter Verwendung strukturierter Beobachtungen, Fokusgruppendiskussion (REA) und Feldnotizen gesammelt. Die vorliegende Studie verwendetem einen Beobachtungsplan, um strukturierten Beobachtungen zu bekommen. Der Forscher entwarf einen eigenen Beobachtungsplan. Dies war auf die Nichtverfügbarkeit eines standardisierten Instruments zurückzuführen, das treffend Daten zu speziell verwendeten evidenzbasierten Strategien sammeln könnte von Lehrern der MmH. Ein Fokusgruppendiskussionsleitfaden wurde vom Forscher entwickelt und leitete die Diskussion in der REA. Die Daten wurden auch durch Feldnotizen gesammelt, die aufgezeichnet wurden in einem Notizbuch. Die Feldnotizen enthielten Informationen, die nicht in der anderen Datenerfassung enthalten waren, Informationen wie Kontaktinformationen des Lehrers, demografische Informationen der Schüler im Klassenzimmer, die in den Einheiten enthaltene Infrastruktur, verfügbare Lern- und Lehrressourcen, besondere Erfolge Herausforderungen, allgemeines Klima im Klassenzimmer und Herausforderungen der Lehrer, Vorschläge zur Lösung des Problems.

Die durch die REA erhaltenen qualitativen Daten wurden mit der Software MAXQDA 10 analysiert. Die Ergebnisse wurden gemäß den Belegen für evidenzbasierte Strategien, die für den Einsatz in Schulen für die MmH vorgeschrieben sind generiert. Die aus den Fragebögen erhaltenen quantitativen Daten wurden unter Verwendung von SPSS 24 analysiert, um Mittelwerte und Standardabweichungen festzustellen, die in Tabellen und Textzusammenfassungen angegeben wurden.

Die erste Forschungsfrage betraf den Umfang, in dem Lehrer in Einheiten für die MmH in Kenia evidenzbasierte Praktiken in ihren Klassenzimmern verwenden. Ergebnisse der vorliegenden Studie gaben an, dass die Mehrheit der Lehrer in Einheiten für die MmH ziemlich oft evidenzbasiert Strategien verwenden, die visuellen Hilfsmitteln und Unterrichtssprache

zugeschrieben werden. Darüber hinaus verwendeten die Lehrer der MmH optimale visuelle Strategien, die von der Wissenschaft unterstützt werden. Die Ergebnisse wiesen auch darauf hin, dass die Lehrer in gewissem Umfang evidenzbasierte Strategien umsetzten, die einen darauf abzielenden Wissensrahmen der Schüler festlegen. Trotz der Tatsache, dass Lehrer in der vorliegenden Studie individuelle Unterschiede bei ihren Schülern erkannt haben, verwendeten sie selten differenzierte Anweisungen in ihren Klassenzimmern, um diese Unterschiede zu beheben. Wenn es um Strategien ging, die Ergebnisse der sozialen Organisation im Klassenzimmer belegten, zeigte sich, dass die Lehrer überwiegend den Schülern individuelle Aufgaben gaben und kein Buddy-System verwendeten. Die Mehrheit der Lehrer widmet minimale Zeit im Kleingruppenunterricht und schien Unterricht in der ganzen Klasse zu bevorzugen, ähnlich wie in einer Vorlesung. In den Strategien bezüglich der Klassenstrukturen waren die Lehrer in der vorliegenden Studie gewillt etwas zu tun. Die Ergebnisse zeigten, dass in den meisten Fällen ein Stundenplan für den Unterricht ausgestellt war. Die wichtigsten Ergebnisse für den Einsatz evidenzbasierter Praktiken erfolgten im Bereich der Klassenzimmerorganisation und der Klassenzimmersroutinen. Die Ergebnisse zeigen, dass die Klassenzimmer in den Einheiten überfüllt und unorganisiert waren. Des Weiteren, dass Schüler verschiedener Klassenstufen von Vorschule 1 (Kindergarten) bis zur achten Klasse, die alle im selben Klassenzimmer oder in einigen Einheiten gelernt haben, auf zwei Klassenräume aufgeteilt wurden. Die Klassenzimmer hatten nicht genügend Platz, um Lernmaterialien aufzubewahren, und in den meisten Klassen war es schwierig, durch das Klassenzimmer zu manövrieren, was die Schüler-Lehrer-Interaktion weiter behinderte. Die vorliegende Studie war auch daran interessiert, den Bildungsansatz der Lehrer zu bestimmen in den Einheiten für die MmH. Die Ergebnisse zeigten, dass visuelle Sprache und Zweisprachigkeit (M = 4,03, SD = 0,88) die Ansätze zur Ausbildung der MmH sind, die in den Einheiten gemäß den Ergebnissen verwendet werden (BADE). Basierend auf den Ergebnissen kam die vorliegende Studie zu dem Schluss, dass Lehrer der MmH in den Einheiten den Total-Communication-Ansatz mit einer Neigung zu visuellen Sprachen (Kenianisch Gebärdensprache), Zeichensysteme (Signed Exact English und Simultaneous Communication) und unsignierte Zweisprachigkeit (Kenianische Gebärdensprache und Englisch) haben. Mit der zweiten Forschungsfrage sollte die Wirksamkeit der Lehrer der MmH in Kenia untersucht werden. Die Ergebnisse des TSES zeigten, dass die Lehrer in der vorliegenden Studie allgemein hohe Werte (M = 8,00, SD = 0,67) hinsichtlich ihrer Gesamtwahrnehmung der Selbstwirksamkeit haben.

Lehrer in der vorliegenden Studie zeigten starkes Vertrauen in ihre Fähigkeit, Studenten zu unterrichten. Die Ergebnisse zeigen, dass die Teilnehmer sich selbst als ziemlich wirksam bewerteten (M = 7,92, SD = 0,83) bei der Anwendung von Unterrichtsstrategien in ihren Klassenräumen. Diese Erkenntnisse waren vergleichbar mit den Ergebnissen der strukturierten Beobachtungen im Klassenzimmer.

Die letzte Forschungsfrage versuchte festzustellen, ob es einen Zusammenhang zwischen Selbst-Wirksamkeit und Anwendung evidenzbasierter Praktiken in Einheiten für die DHH in Kenia gibt. Die Studie fand keine signifikante Beziehung (r2 = -. 04, p = .86, N = 23) zwischen der Verwendung von evidenzbasierten Strategien und dem Wirksamkeitsniveau der Lehrer der MmH. Der Mangel an statistischer Bedeutung in den Ergebnissen der vorliegenden Studie könnte die Folge der kleinen Stichprobengröße sein und dem Fehlen eines standardisierten Instruments zur Messung des Einsatzes evidenzbasierter Strategien. Einige der Empfehlungen beinhalten die Notwendigkeit, Aktionsforschung zu betreiben, um die Situation an Lern- und Lehrbedingungen in der Ausbildung von MmH-Studierenden zu verbessern. Es besteht Bedarf für die Einrichtung einer vollwertigen Schule für Schüler mit Hörbehinderung in Nairobi. Zusätzlich für Lehrer an getrennten und integrativen Schulen der DHH sind Forschungsarbeiten erforderlich. Eine solche Forschung würde einen Vergleich der Verwendung evidenzbasierter Praktiken durch die Lehrer liefern und deren Wirksamkeit in den verschiedenen Einstellungen. Weitere Forschung, die praktische Empfehlungen bietet für die Umsetzung der evidenzbasierten Strategien für Studenten mit Hörbehinderung in Kenia sind erforderlich. Weitere Forschungsarbeiten sollten durchgeführt werden, um den Praxisleitfaden zu verbessern, der in der vorliegenden Studie entwickelt wurde und Wege aufgezeigt werden, an die die Strategien angepasst und modifiziert werden können. Schließlich wurde den Lehrern der MmH empfohlen, Schulung zu evidenzbasierten Strategien für MmH einzufordern. Lehrerausbildungsprogramme in Hochschulen und Universitäten sollten intensive Lehrerausbildungsprogramme entwickeln sowie angehende Lehrkräfte mit forschenden Fähigkeiten und Kenntnissen auszubilden. Darüber hinaus ist das Training für erfahrene Lehrer in Form von Konferenzen, Workshops, Schulungen und anderen Veranstaltungen wichtig, um Bildungsveranstaltungen zur Überbrückung der Kluft zwischen Empfehlungen aus wissenschaftlichen Studien und tatsächliche Unterrichtspraktiken zu überwinden.

## Definition of Terms

It is crucial to establish from the onset how a number of terms have been operationalized in the present study to establish a common understanding. These terms could elicit different meanings and connotations among readers therefore it is prudent to provide a glossary that would facilitate a similar understanding to all readers. Therefore, in the present study, to set boundaries on the scope, the following terms have been operationalized thus:

**Hearing loss**: any difficulty by an individual in receiving stimuli through the auditory channel regardless of the type or degree of hearing impairment (Cole & Flexer, 2007; Scheetz, 2012).

**Hard of hearing**: a term that is used to describe individuals with mild to moderate hearing loss and who could benefit from amplification devices (Marschark, 2018; Scheetz, 2012) and who use spoken language predominantly (Laugen, 2019).

**Deaf**: individuals whose hearing loss is quite severe such that they cannot understand speech through their ears, with or without amplification devices (Downs et al., 2000; Scheetz, 2012).

**Deaf and hard of hearing (DHH)**: a widely accepted term that refers to both groups of individuals who are deaf and those who are hard of hearing. The terms deaf and hard of hearing are the distinctive terms used with greater frequency to describe hearing loss in educational research literature (Mitchell & Karchmer, 2004).

**Unit**: a type of school placement where students who are DHH receive most of their instruction from a teacher of the DHH in separate classrooms that are located in schools for students with typical hearing (Stinson & Kluwin, 2012).

**General education classrooms**: are those that have children with typical hearing and are taught by general education teachers (Stinson & Kluwin, 2012).

**Evidence-based practices**: these are educational approaches whereby current, high-quality research is integrated with professional expertise, and student and family values and applied in the process of making educational decisions (American Speech-Language-Hearing Association, 2005). In the present study they encompass teaching strategies and educational approaches of the DHH.

**Efficacy**: “a teacher’s belief in his or her capability to organize and execute courses of action required to successfully accomplish a specific teaching task in a particular context” (Tschannen-Moran et al., 1998, p. 233).

# 1 Introduction

It has been observed that education of the deaf and hard of hearing (DHH) is guided by belief systems, history, and unjustified generalizations instead of scientific evidence (Marschark et al., 2006). It has been said of education of the DHH that "educational practices have most often been based on opinion rather than any form of investigation" (Luckner, 2006, p. 50). Further, research documents that in the field of education, "politics, culture, and personal experiences often trump empirical evidence relating to educating deaf children" (Marschark et al., 2006, p. 47). Traxler (2017) records that very little research informs teaching practice for students who are DHH. There is therefore need to shift to evidence-based educational practices in the education of the DHH. Marschark et al. (2011) concur with this observation and add that there is need to shift focus of the education for the deaf from beliefs to evidence. Various studies report that there is still a large gap between research and practice in the education of the DHH (Easterbrooks, 2017; Luckner, 2017; Trezek & Wang, 2017). One of the aims of conducting research in the area of deaf studies and deaf education is to improve the education of students who are DHH so that they can improve their overall achievement and better participate in the society (Knoors et al., 2019). In this regard, children who are DHH need improved outcomes in their educational achievement (Luckner, 2006). For this to happen, there are calls for research to be translated into applicable practices in the classroom (Knoors et al., 2019). It is argued that "if teachers are not applying evidence-based practices, there is only a slight chance that relevant research will improve, directly, or indirectly, deaf students' achievement" (Knoors et al., 2019, p. 603). Therefore, it is imperative for teachers of the DHH to implement evidence-based practices in their classrooms.

In Kenya, studies have indicated that teachers of the DHH use traditional teaching methods that do not meet the educational requirements of students who are DHH (Adoyo & Maina, 2019; Maina et al., 2014). Evidently, there is need for the implementation of evidence-based practices in schools for the DHH in Kenya. Additionally, previous studies have attributed low academic achievement of students who are DHH in Kenya to a number of teacher attributes, more so to the actual teaching in the classroom (Adoyo & Maina, 2019; Nyeris & Koross, 2015).

It has been observed that studies on teacher attributes are among several factors that have a significant impact on the academic outcomes of students who are DHH yet, few studies are dedicated to such variables (Marschark & Knoors, 2019). One such attribute is that of self-efficacy

in teachers. Self-efficacy in education has led to research about the teachers' self-efficacy beliefs and how these beliefs are associated with the teachers' actions and the outcomes they achieve in classrooms (Tschannen-Moran et al., 1998; Wheatley, 2002). It has been suggested that "teachers' self-efficacy belief is a little idea with big impact" (Tschannen-Moran & Hoy, 2007, p. 954). This is because the concept has far reaching impacts on teaching and learning. Teacher efficacy has to do with the teacher's own feelings of competence as a teacher (Tschannen-Moran et al., 1998). Further, it has been stated that teacher efficacy in the classroom is important to the understanding of classroom practices (Dixon et al., 2014) since strong self-efficacy has been seen to yield to better performance by teachers (Malinen et al., 2013).

### 1.1 Problem statement

As described beforehand it has been reported that "the field of deaf education is strewn with rampant myths, assumptions, and misconceptions about deaf people, best practices in deaf education, and crucial factors for success" (Garberoglio, 2017, p. 125). Teachers and the quality of their teaching are crucial for the educational outcomes of students who are DHH (Knoors et al., 2019). One of the factors identified by Nyeris and Koross (2015) as a challenge in the education of children with disabilities in Kenya was unskilled or inadequately trained teachers in the area of special needs education. Past studies have made general recommendations on the need for teachers of the DHH to utilize "new pedagogical approaches" (Adoyo & Maina, 2019, p. 84). There is dearth literature regarding evidence-based educational practices for students who are DHH in Kenya. One study was conducted through a descriptive survey to establish the learning strategies used by students in four secondary schools for the DHH in Kenya to learn English (Maina et al., 2014). No comprehensive studies on actual evidence-based practices utilized by teachers of the DHH in Kenya were found at the time of writing the present study. In a response to this gap in research and following the recommendations made in previous studies, the present study makes enquiry into the educational practices by Kenyan teachers of the DHH, specifically on whether they utilize evidence-based practices in their classrooms. Moreover, few studies exist that explore quality of instruction among different placement opportunities for students who are DHH (Stinson & Kluwin, 2012). To address this gap in literature, the present study sought to establish the implementation of evidence based practices in Units for the DHH.

Multiple authors report that there is lack of evidence-based instructional strategies for students who are DHH (Beal-Alvarez, 2017; Cannon & Guardino, 2012; Luckner, 2006; Trezek & Wang, 2017). Consequently, it has been recommended that researchers need to identify instructional factors that would be effective for students who are DHH regardless of their educational placement and conceptual knowledge that they possess (Marschark et al., 2011). Additionally, researchers have been extolled to continue for the search of evidence-based practices which when implemented, will enable children who are DHH to achieve their fullest potential (Wolsey et al., 2015). In line with this, the present study sought to synthesize educational approaches based on scientific evidence and recommendations for best practices that teachers of the DHH could implement in their classrooms. This is because teachers need to be empowered to use research evidence to develop evidence-based strategies that they can utilize in their classrooms (Knoors et al., 2019) hence reduce the gap that exists between research and practice.

Research suggests that "teacher and teaching variables might be the most important factors in educating DHH learners" (Knoors et al., 2019, p. 592). Teacher efficacy is one such important attribute as it is considered a universal factor that affects learning and teaching (Klassen et al., 2009). There is a growing body of research on teacher efficacy (Klassen & Tze, 2014; Malinen et al., 2013). However, majority of these studies address themes regarding the correlation between teachers' self-efficacy and classroom management (Woolfolk et al., 1990); extra-role behavior towards a team and an organization (Somech & Drach-Zahavy, 2000); job satisfaction and classroom practices independent of the teachers' cultural backgrounds (Vieluf et al., 2013); teacher's well-being (Brouwers & Tomic, 2000, 2013); student outcomes such as achievement (Moore & Esselman, 1992); and students' sense of efficacy (Anderson et al., 1988). Very few studies, if any, have been conducted on the association of teacher efficacy and evidence-based practices.

Further, efficacy studies have predominantly been conducted in general education and when in special education, in teachers for students who have learning disabilities, mild intellectual disabilities, and behavioral disabilities (Allinder, 1994). In the field of special education teacher efficacy has been associated with teacher satisfaction (Coladarci & Breton, 1997); inclusion of students with disabilities in regular classrooms (Sharma et al., 2012); attitudes towards inclusion (Malinen et al., 2013; Weisel & Dror, 2006); and teachers' perceived efficacy while working with

students with language impairments (Guo et al., 2014). Few studies if any have been conducted on the efficacy of teacher of students who are DHH. The present study aimed to establish the efficacy of teachers of the DHH in Units in a bid to contribute to this body of research.

Pertinent to the present study is the implementation of evidence-based practices for teachers of the DHH in Kenyan Units. Teachers with higher levels of efficacy have been found to be the ones more likely to learn and use new approaches and strategies for teaching (Ross, 1994). In addition, such teachers have been found willing to try different ways of teaching and they exhibit greater enthusiasm for teaching than those with lower efficacy (Allinder, 1994). A study conducted to investigate the use of differentiated instruction, which is an evidence-based practice, reported that teachers who lack self-efficacy did not think that they were able to make necessary adjustments to their lessons to meet the needs of their learners (Dixon et al., 2014). Additionally, teacher efficacy was found to be associated with instructional experimentation, which included the willingness of teachers to try a variety of materials and teaching approaches, the desire to find better methods of teaching, and the propensity to implement progressive and innovative teaching methods (Allinder, 1994; Ross, 1994). Further, Guskey (1988) reported that highly efficacious teachers were more open to new ideas and were found to be more willing to experiment with new teaching strategies to meet their students' needs unlike their colleagues with low efficacy. However, the study was conducted with teachers from regular and secondary schools and not with teachers in special education. Evidence-based practices are ideally innovative and a break from traditional practices therefore it was prudent to make an inquiry of the implementation of evidence-based strategies used by teachers of the DHH alongside teacher efficacy. Although previous studies have reported the relationship between efficacy and the aforementioned teaching factors, there are limited studies, if any that have explored the association between efficacy and the use of evidence-based practices in Units for the DHH. The present study sought to address this gap in knowledge through an evaluation of whether there was an association between the implementation of evidence-based practices and efficacy of teachers of the DHH. Findings from such inquiry could inform research on the implementation of evidence-based practices by teachers of the DHH which as demonstrated, is insufficient.

## 1.2 Structure of the dissertation

The report started off with a brief introduction of the present study. This introduction provided the reader with an overview of the background of the study and highlighted the problem that necessitated the conduction of the study. The second chapter was a description of the context where the study was conducted. The third chapter highlighted the characteristics of students who are DHH that make them a unique population of students. The fourth chapter delved into the concept of evidence-based practices for students who are DHH. The chapter defined the concept of evidence-based practices and presented an argument for the need of evidence-based strategies for the DHH. Chapter five addressed the different educational approaches available for the education of the DHH. Chapter six contained teacher efficacy, its sources and nature in an educational setting. The methodology of the present study was detailed in chapter seven. It contained the study's design, sample selection, data collection procedures, data collection instruments, and ethical considerations that guided the entire data collection process. Further, the chapter described a pilot study conducted prior to the actual data collection exercise of the present study. The findings of the present study were presented in chapter eight, summarized in tables and graphs. The last chapter contained a detailed discussion of the major findings obtained from the present study and a comparison of findings from the present study with those of previous studies. It also contained the limitations of the present study and recommendations for future research and practice.

## 2 Study context

Kenya is located in Sub-Saharan Africa, on the Eastern part of Africa and it shares borders with Tanzania to the South and Southwest, Uganda to the West, South Sudan to the North-West, Ethiopia to the North, and Somalia to the North-East. It covers 581,309 $Km^2$ (MoE, 2019). It has a population of 47,564,296 (KNBS, 2019). Kenya is considered a lower middle income country with a Gross Domestic Production (GDP) of US $ 87.78 billion (World Bank, 2018). In Sub-Saharan Africa, there are numerous languages and children are born into a bi/multi-lingual environment (Adoyo, 2002, 2007; Kiru, 2019). Kenya is a typical representation of a multilingual society (Kiru, 2019; Ogechi, 2003; Okombo & Akach, 1997) with 44 officially recognized ethnic communities (NMG, 2017). Previously, English was regarded as the official language while Swahili was the national language (Adoyo, 2002). Presently, as per Kenya's Constitution of 2010, English and Swahili are the official languages (Makokha, 2012; Constitution of Kenya, 2010). Nationally, both English and Swahili are taught and examined at both the primary and secondary levels of education (Adoyo, 2002; Makokha, 2012; Wamae & Kang'ethe-Kamau, 2004). It is difficult to tell the exact number of languages spoken in the country as there are sources that only consider grammatically stable languages while other sources include grammatically unstable languages in their count (Ogechi, 2003).

According to the 2019 national census, 2.2% (0.9 million people) of Kenyans have a disability, of which 1.9% are men and 2.5% are women (KNBS, 2019). This is a much lower prevalence rate compared to the World Health Organization (WHO) estimates of a global prevalence of 15% (WHO, 2011). The lower prevalence rates reported in the 2019 census reports have been attributed to: stigma associated with disability that prevented people from accurate reporting during enumeration, inaccurate translation of questions pertaining disability into the numerous local languages, and the fact that Kenya has a young population whereas countries with higher prevalence rates have been associated with older populations (DI, 2020). Previous studies have extensively documented the lack of statistics on persons with disabilities in Kenya and the prevalence of various domains of disabilities such as hearing loss (Emmett et al., 2015; Mwoma, 2017; Piper et al., 2019). Providentially, at the conduction of the present study, the national census of 2019 was conducted and it included a number of questions on disability, which generated more recent statistics. Reports from the national census indicate that majority (42%) of people with disabilities in Kenya were categorized in the mobility domain (KNBS, 2019). A breakdown of the

number of persons with disabilities in the various domains is depicted in Figure 2:1 and it shows that approximately 150, 000 Kenyans were DHH (DI, 2020).

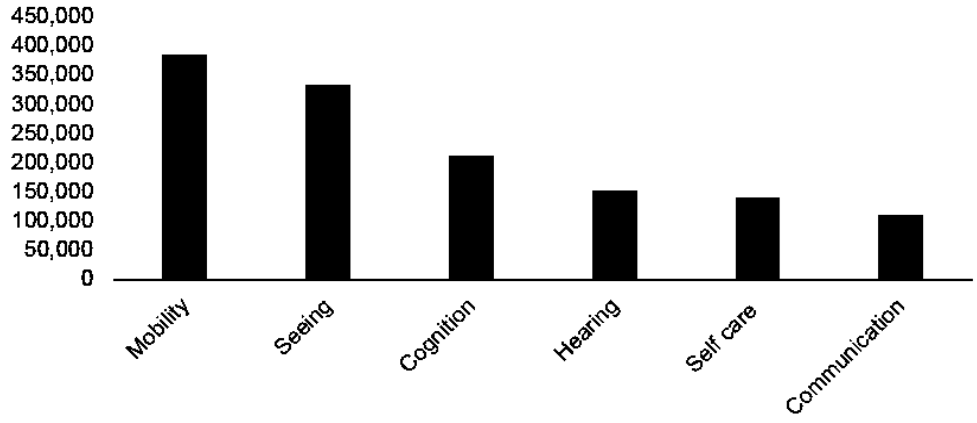



*Figure 2:1.* A bar graph showing the number of Kenyans with disabilities per domains.

Source: Development Initiatives based on KNBS (KNBS, 2019)

Majority of people who have a disability in Kenya live in the rural areas rather than urban areas (KNBS, 2019). The reports from the census indicate that the prevalence rates for Kenyans who are DHH range between 0.1% to 0.9% of people with disabilities across the country (DI, 2020). This suggests that hearing loss is a low incidence disability in Kenya since the majority of the Kenyan population is composed of people with typical hearing. Similarly, hearing loss has been categorized as a low incidence disability in previous studies from various countries (Beal-Alvarez, 2017; Easterbrooks, 2017; Luckner, 2017; Shaver et al., 2014; Stinson & Antia, 1999; Trezek & Wang, 2017; Wolsey et al., 2015). This leaves people who are DHH as the minority in terms of language and culture (Mweri, 2014). The distribution of people who are DHH living in Kenya is depicted in Figure 2:2 (DI, 2020).

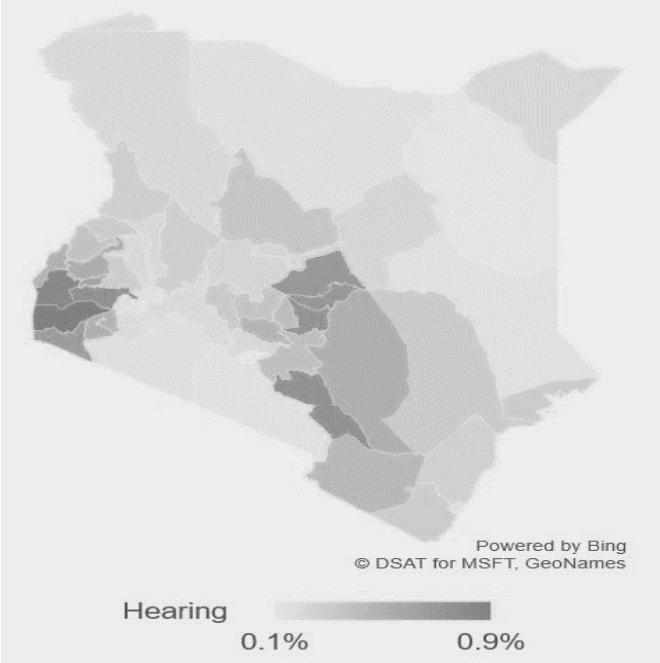



*Figure 2:2.*The distribution of people who are DHH across Kenya

Source: Development Initiatives based on KNBS (KNBS, 2019)

## 2.1 Special education in Kenya

Special education lies under the jurisdiction of the Ministry of Education (MoE) in Kenya (Adoyo, 2007; MoE, 2009, 2018a, 2019; Nyeris & Koross, 2015). At primary school level, 44% of students with disabilities were categorized as having intellectual disabilities, 17% as DHH, 17% as having visual impairment, 14% had physical disabilities and 8% had multiple disabilities (MoE, 2018a). However, a majority of students with disabilities, especially those in rural areas, do not access educational services (Elder et al., 2015). More recent statistics on the actual number of students with disabilities who do not attend school do not seem available.

All schools in Kenya, with the exception of a few private schools that use international curriculum, use a similar curriculum (Adoyo & Maina, 2019; Chomba et al., 2004). This curriculum is known as the 8-4-4 Curriculum that was initiated in 1985 (MoE, 2018c). Invariably, students who are DHH use a similar curriculum to that of students without disabilities (Adoyo, 2007; Mukuria & Korir, 2006). This approach has been criticized as it is argued that the regular curriculum is extensive, demanding, centrally designed and rigid making it difficult for the teachers to adapt it to suit students who are DHH (Adoyo, 2007). The MoE (2018a) acknowledged the fact that the 8-4-4 Curriculum did not adequately address the needs of learners with disabilities and that there

was need for a curriculum tailored to meet the diverse needs of all students, with or without disabilities. At the time of writing the present report, the MoE was in the pilot phase of testing a new curriculum, Competency-Based Curriculum, which was acclaimed as being an all-encompassing curriculum that would address the needs of all learners. The fieldwork for the present study coincided with teacher training on the new curriculum in readiness for its implementation. Previously, national assessments in schools predominantly tested the cognitive domain of learning which posed challenges to students with disabilities since the administration and grading processes of these assessments were not cognizant of their educational needs (MoE, 2018a, 2018c). Further, in national examinations, few accommodations are in place for students with disabilities (Wamae & Kang'ethe-Kamau, 2004). The only accommodation accorded to students who are DHH during national examinations is 30 extra minutes to complete their examinations (Makokha, 2012). The new Competency-Based Curriculum sought to address the issue of assessment through conduction of both formative and summative evaluations of a wider range of knowledge and skills, and implementation of more flexible assessment processes that accommodate students with special needs (MoE, 2018c).

Kenya lacks well established programs comparable to universal newborn hearing screening programs which have contributed to early identification of hearing loss and early provision of intervention services to children who are DHH in countries such as the US (Luft, 2017) and Germany (Schönweiler & Schmidt, 2009). It is reported that newborn screening programs have been initiated in a few Kenyan hospitals at a small scale to screen for multisensory disabilities (Adoyo & Maina, 2019) which is a nascent step toward achieving universal newborn hearings screening that could lead to early detection of hearing loss, and provision of intervention services. Kenya has Educational Assessments and Resource Centers (EARCs), estimated to be 72 (Adoyo & Maina, 2019) that are spread in the 47 Counties across the country and are charged with the screening, diagnosis and placement of students with disabilities (Adoyo, 2007; Emmy, 2020; Kiru, 2019; MoE, 2009, 2018b). The EARCs are vital in that they enable students with disabilities to receive appropriate educational services and placements (Emmy, 2020; Kiru, 2019). Additionally, they provide guidance and counseling services to parents of children with disabilities, and offer trainings for teachers in special schools (Emmy, 2020; Kiru, 2019; MoE, 2009). It has been reported that students with disabilities, students who are DHH included, join school later than their peers without disabilities due to lack of early identification and intervention (KISE, 2018). This

could be attributed to the reports by various authors, that the EARCs are encumbered with numerous challenges that hinder the efficient execution of their mandate. A summary of these challenges include: lack of funds (Elder et al., 2015; MoE, 2009; Nyeris & Koross, 2015), inaccessible to persons with disabilities (Chomba et al., 2004), acute lack of trained personnel (Emmy, 2020; KISE, 2018; MoE, 2018a), lack of necessary facilities and equipment to assess children with disabilities (KISE, 2018; MoE, 2018a), lack of an integrated data management system for early identification, assessment and placement (KISE, 2018; MoE, 2018a), and a lack of expertise and formal structures to promote multidisciplinary teams for identification, assessment and placement (KISE, 2018; MoE, 2018a). Due to the shortcomings of the EARCs, the MoE in its recent policy pledged to strengthen the identification, assessment, early intervention, and adequate placement services of students who have disabilities (MoE, 2018b). To achieve this feat, the MoE proposes to make disability screening a requirement before students are admitted into pre-primary and primary schools. Additionally, the MoE intends to create cross referral systems within the various EARCs, Ministry of Health, Department of Social Services, and National Council for Persons with Disabilities which will facilitate a multidisciplinary approach towards the diagnosis, medical intervention, and registration of persons with disabilities (MoE, 2018b).

Many children with disabilities in Kenya live in hostile environments where their safety and security is compromised as they are marginalized due to inbuilt social, cultural, and economic prejudices and abuse (Adoyo & Maina, 2019; Gathumbi et al., 2015; MoE, 2009; Muhombe et al., 2015). Various authors chronicle a number of misconceptions regarding persons with disabilities in Kenya. To begin with, some cultural and religious beliefs assume that children with a disability are due to an incestuous relationship, or a sin committed by the parents or other family members (MoE, 2018b), or a curse (Adoyo, 2007; Chomba et al., 2004), or retribution from ancestors for past misdeeds (Mukuria & Korir, 2006) or a result of witchcraft (Ndurumo, 1993). Moreover, some Kenyan communities use derogatory terms, for instance terms that are used to refer to inanimate objects, to refer to persons with disabilities and view them as a burden to society (Ndurumo, 1993; Nyeris & Koross, 2015; Wamae & Kang'ethe-Kamau, 2004). Families that hold such notions towards their children with disabilities would most likely seek redress from spiritual and traditional practices such as witchcraft, instead of from medical intervention such as from hospitals and EARCs which keeps them from medical services such as immunization (MoE, 2018a). Further, such families would view their children with disabilities as an embarrassment that needs to be

hidden (Elder & Kuja, 2019; Elder & Odoyo, 2018; Gathumbi et al., 2015; MoE, 2018a; Mukuria & Korir, 2006). Therefore, majority of such families consider educating a child with a disability a waste of resources (Elder & Kuja, 2019) and some resort to engaging children with disabilities in child labor to supplement their sources of income (Elder et al., 2015). These retrogressive cultural perceptions towards people with disabilities and prejudices against them lead to their discrimination and stigmatization (Adoyo, 2007; Mwoma, 2017) and it also hinders students with disabilities from access to education and related services (Elder et al., 2015). It is reported that these cultural practices are gradually changing as awareness campaigns are held to sensitize the society about children with disabilities (Elder & Kuja, 2019; Elder & Odoyo, 2018) and that more parents are enrolling their children with disabilities to schools (Elder & Kuja, 2019; Mwoma, 2017). The ongoing sensitization on attitude change towards people with disabilities is conducted through mass media, workshops and policy frameworks (Adoyo & Maina, 2019; Awori, 2010). Additionally, associations for persons with disabilities, such as Kenya National Association of the Deaf which was formed in 1987, have been instrumental in the creation of awareness about people who are DHH in Kenya (Kiru, 2019; Okombo & Akach, 1997). The intent is that the creation of awareness could lead to the appreciation of children with disabilities and the realization that with the right education, they have the potential to be productive citizens in future (Wamae & Kang'ethe-Kamau, 2004). However, the change in perception is slow and still hampered by the geographical location and religious beliefs of people in the country (Mukuria & Korir, 2006).

Education provision for children with disabilities, like in most developing countries, continues to be a challenge to the education sector (Muhombe et al., 2015).

> "The major challenges inhibiting access and equity include: cultural prejudice and negative attitude; poverty; inadequate data; inadequate tools and skills for assessing and identifying learners with special needs; inadequate funding; absence of adaptation of curricula and curriculum support materials; as well as inadequate assistive devices and technologies, facilities and teachers/trainers" (MoE, 2019, p. 29).

In addition, a majority of parents for children who have a disability display ineptitude in the early identification of their children's disability unless in the cases where it was an obvious physical disability or a major developmental milestone had not been met (KISE, 2018; MoE, 2018a). This was particularly the case for parents of children who are DHH and it was reported that most parents of children who were DHH had little to no information on their children's hearing loss as the children did not have complete hearing tests and diagnosis (Lawal et al., 2016).

In high income countries, the continued trend has been to place more and more students who are DHH in inclusive settings thereby raising predictions that residential schools for the DHH would eventually be closed in the near future (Moores, 2009; Stinson & Antia, 1999). In contrast, majority of children with disabilities in Kenya are either taught in special schools or special units (Piper et al., 2019). The students who have disabilities are placed in segregated special schools according to their specific category of disability (Elder et al., 2015). Special schools, for instance segregated special schools for the deaf, have been known to provide a range of special services for instance audiology, counseling, psychology (Stinson & Kluwin, 2012), assessments, evaluations, occupational therapy, auditory training, and teaching of life skills (Kiru, 2019). Additionally, the schools provide a wide array of academic and vocational courses to the students and extra-curricular activities (Stinson & Kluwin, 2012) which is similar to the Kenyan context. Religious institutions have historically been instrumental in offering support to special education institutions in Kenya (Kiru, 2019; Mwoma, 2017). Their involvement can be traced back to 1946 where the Salvation Army Church established a special school for the blind and the trend was replicated by other religious institutions such as the Anglican, Catholic, Presbyterian, and Methodist churches which established schools to support people with various disabilities (Kiaritha & Maina, 2003; Kiru, 2019; MoE, 2009, 2018a; Muhombe et al., 2015; Ndurumo, 1993). Over the years, the special schools in Kenya have relied on donations from well-wishers, churches, private and Non-Governmental Organizations to support school development (Awori, 2010; Elder et al., 2015; Piper et al., 2019). Presently, management of these institutions has since been taken over by the Ministry of Education (MoE, 2009, 2018a; Muhombe et al., 2015). This was because the faith-based organizations lacked the necessary expert personnel, coordination ability, standardized curriculum, and legal and policy guidelines required to run the special schools (MoE, 2009, 2018a; Mwoma, 2017).

The Kenya Institute of Special Education (KISE) was established in 1986 as an institution under the MoE to train teachers in curriculum delivery in special schools and to develop curriculum materials for students with disabilities (MoE, 2009; Mukuria & Korir, 2006). KISE offers Certificate and 2-year Diploma level programs on Special Needs Education (SNE) and courses such as Braille and Kenyan Sign Language (Kiru, 2019; MoE, 2009). The programs provide the trainee teachers with requisite knowledge, skills, and attitudes for teaching students who have various disabilities (Piper et al., 2019). Teacher training in Kenya falls under four categories: Early

Childhood Development Education (ECDE); Primary teacher education; Diploma education; and Graduate teacher education (Adoyo & Maina, 2019; Kiru, 2019). Teachers of the DHH who graduate from KISE attain a certificate or Diploma in SNE. Alternatively, teachers can attend four-year university programs from both public and private universities and attain a degree in SNE (Adoyo, 2007; Adoyo & Maina, 2019). The teachers also have the opportunity to further their educational endeavors by pursuing graduate studies at various public and private universities to attain a Masters or PhD degree in SNE. There is also another group of teachers of the DHH who receive training and experience as general education teachers but opt to branch off into schools for the DHH after taking a course in SNE (Adoyo, 2007). ECDE programs are offered at ECDE centers and District Centers for Early Childhood Development Education (DICECE) and are charged with the training of preschool teachers, related services personnel and officers interested in the supervision and inspection of preschool programs (MoE, 2009, 2019).

## 2.2 Educational policies in Kenya

Over the years, Kenya, through various legislation and policy guidelines has made strides to provide education and training to persons with disabilities. Various Education Commissions and Task Forces have been constituted to govern special needs education through the provision of specific recommendations on how to make improvements in all education sub-sectors. The various policies and pieces of legislation on general education in Kenya are outside the purview of the present study. Therefore, herein is a summary (see Table 2:1) of the various policies and legislation with their specific contributions and recommendations to the development of SNE from various sources (Awori, 2010; MoE, 2009; Mwoma, 2017; Nyeris & Koross, 2015; Ogola, 2010). Kenya seems to show commitment to the provision of education to students who are DHH through the number of regulations and policy frameworks (Elder et al., 2015; Muhombe et al., 2015).

Table 2:1.Summary of legislative and policy frameworks on SNE in Kenya

| Legislation | Recommendation/Contribution to SNE |
|---|---|
| Committee for the Care and Rehabilitation for the Disabled in Kenya (Ngala Mwendwa Committee, 1964) | Sessional Paper No. 5.<br>First rehabilitation center for PWDs to prepare them for the job market. |
| Kenya Education Commission (Ominde Commission, 1964) | Integration of children with mild disabilities in regular schools.<br>SNE courses taught in teacher-training colleges to facilitate integration of children with mild disabilities.<br>Establishment of the Department of Vocational Rehabilitation in Ministry of Social Services.<br>Improve delivery of services for children with disabilities. |
| National Education Commission (Gachathi Commission, 1976) | Establishment of Education Assessment and Resource Centers (EARCs) for identification, assessment and placement.<br>Establishment of the Department of Special Needs Education at the Kenya Institute of Education for research in SNE to inform service delivery.<br>Establishment of the Kenya Institute of Special Education for teacher training in SNE.<br>Creation of public awareness on causes and prevention of disabilities.<br>Establishment ECDE programs in special schools.<br>Development of policy for integration of students with disabilities. |
| Mackay Commission (1981) | Establishment of 8-4-4 Curriculum.<br>SNE degree program to be taught at university level. |

| | |
|---|---|
| | Center for Special Needs Education at Kenyatta University to train personnel on SNE and provide educational services to students with disabilities. |
| Presidential Working Committee on Education and Training for this Decade and Beyond (Kamunge Report, 1988) | Expansion of the concept of SNE to include children who were gifted and talented.<br>Deployment of educational inspectors in Districts for supervision of service delivery in SNE. |
| The Totally Integrated Quality Education And Training Taskforce (The Koech Report, 1999) | Establishment of a national special education advisory board.<br>Need for comprehensive SNE policy or legal framework. |
| Children's Act, 2001. | Establishment of education as a basic right of all children. |
| Kochung Taskforce, 2003. | Sessional Paper No. 1.<br>Train in-service teachers in SNE.<br>Increased budgetary allocations to the EARCs.<br>Conduction of national survey to establish the population of children with special needs.<br>Generate an inventory of equipment and assistive devices used in special schools.<br>Enhance access to special education services through barrier free schools. |
| Free Primary Education, 2003. | Recognition of education as a basic right for all children.<br>Provision of basic learning/teaching materials to public schools.<br>Abolishment of all kinds of fees/charges levied in schools. |
| Persons with Disabilities Act, 2003. | Admission of all children to any learning institution regardless of their disability. |

| | |
|---|---|
| National Special Needs Education Policy Framework, 2009. | Provision of equal access to special education services for all students with disabilities.<br>Implementation of Education for All in SNE.<br>Expansion of scope of SNE to include students, who were orphaned, internally displaced from their homes of origin, and from nomadic communities. |
| Kenya Constitution, 2010. | Prohibition of any forms of discrimination against persons based on their disability.<br>Provision of access to relevant education and training to all PwDs.<br>Inclusion of children with disabilities in all schools. |
| Basic Education Act, 2013. | Stipulation of powers of governance and management of education.<br>Ensure basic education for all children is free and compulsory.<br>Bolster early identification and assessment of children with disabilities.<br>Ensure children with disabilities have equal opportunities to education.<br>EARCs be established in each County. |

In addition to the local policies summarized in Table 1, Kenya has been quite progressive in its polices on special education as it has ratified and domesticated a number of global policy frameworks in education that provide for free and compulsory education for all children with disabilities (Kiru, 2019; MoE, 2009; Mwoma, 2017). To begin with, Kenya is a signatory of the Universal Declaration of Human Rights of 1948 which recognizes that one of the basic rights of children is access to formal education (MoE, 2009). In addition, Kenya ratified the United Nations Convention on the Rights of the Child of 1989 (KISE, 2018; MoE, 2009, 2012) and the African Charter on the Rights and Welfare of the Child of 1990 (MoE, 2009), which mandate member countries to provide free education to children with disabilities. Further, Kenya is a signatory of the Salamanca Statement of 1994 (KICD, 2017; MoE, 2009), which reiterates that each child has unique attributes, characteristics, interests, abilities and learning needs.

Moreover, Kenya signed and ratified the Convention on the Rights of Persons with Disabilities of 2006 (KISE, 2018; MoE, 2018a) indicating its commitment towards inclusion of persons with disabilities, protection of their human rights, and ensuring their access to education and other public services such as public information. Lastly, Kenya is a signatory of the Millennium Development Goals and Education for All by 2015 (KICD, 2013; KISE, 2018; MoE, 2009, 2012), which shows that it made a commitment to provide access to education to marginalized populations, which include people with disabilities.

Through the provisions of the declarations and policy frameworks in Kenya, children with disabilities are regarded equal in as far as provision of education is concerned (Nyeris & Koross, 2015). Efforts the Kenyan Government has taken to address the education of children with disabilities have been appreciated and reported. For instance, Mukuria and Korir (2006) observe that the Kenyan Government has exerted good efforts to address the education of students with various needs. However, in spite of the policies in place to ensure the provision of education for children with disabilities, their education is still mired with challenges such as low enrollment rates, inadequate teacher training, geographical locations that hinder physical access to services, limited resource allocation to the sector, negative cultural practices and perceptions, and underdeveloped identification and assessment procedures (Kiru, 2019; KISE, 2018). It was observed that the much acclaimed free primary education did not translate to increased enrollment rates for students from low social economic backgrounds and those who had disabilities. The poor

uptake of free primary education by children who have disabilities has been attributed to unaffordable ancillary costs (such as the cost of school uniform) of primary education (Kiru, 2019), lack of proper implementation of the policy by schools (Gathumbi et al., 2015), insufficient government funding in special schools (Chomba et al., 2004; KISE, 2018; Mwoma, 2017; Nyeris & Koross, 2015) , lack of access to Government funds in rural schools (Elder et al., 2015), limited training for special education personnel and poor assessment procedures (Chomba et al., 2004; Elder, 2016), and lack of special facilities and equipment to facilitate mobility and learning (Mwoma, 2017). Therefore, in spite of the declarations and policy frameworks, the right to education for children with special needs is yet to be attained and there is need to bridge the gap between policy and practice (Chomba et al., 2004; Nyeris & Koross, 2015).

## 2.3 Education of the DHH in Kenya

In Kenya, the educational options for children, who are DHH are somewhat limited: special schools for the DHH, special Units for the DHH or regular schools (Adoyo & Maina, 2019). Programs in which students, who are DHH receive their education in general education settings, with minimal or no special education support are not fully represented in literature. Majority of children, who are DHH in Kenya receive their education either in special schools for the DHH or in special Unit for the DHH. Additionally, the exact number of students, who are DHH, is yet to be established (Adoyo & Maina, 2019). There are few schools for the DHH and they are not distributed evenly across the country (Okombo & Akach, 1997). It is estimated that there are 118 special needs schools for the DHH from primary to tertiary level (Omulo, 2018) of which it is estimated that 41 are special primary schools for the DHH (Mwoma, 2017). Since the schools are few, they are typically residential schools and the majority of the students are educated in these residential special schools for the deaf (Okombo & Akach, 1997). The students remain in the schools for extended periods and go back to their families during school holidays and short mid-term breaks. Residential schools have been found to be a center for Deaf culture as students are sometimes taught by teachers who are DHH (Scheetz, 2012) and the school community forms a point of innovation for sign language (Okombo & Akach, 1997). Further, schools for the deaf have been found to provide good ground for students, who are DHH to communicate with their peers since they have regular opportunities to interact among themselves (Stinson & Kluwin, 2012). Typically, the schools for the DHH provide classes with only DHH students (Stinson & Kluwin, 2012). Generally, it has been observed that in most schools for the deaf, sign language is the

primary mode of communication and it is present with or without simultaneous communication; an observation that holds true in Kenyan schools and Units for the DHH (Allen & Anderson, 2010; Stinson & Kluwin, 2012).

Research in the education of the DHH over the years has shown that there is no single form of education placement, that has been considered the best for all students, who are DHH (Shaver et al., 2014). The present study was based in Units for the DHH therefore, more focus was ascribed to the Units in this section. A Unit is a self-contained classroom within a regular school where students who are DHH receive their instruction (Mitchell & Karchmer, 2004). The schools have predominantly students with typical hearing and a small Unit for the DHH is housed within the compounds (Elder et al., 2015; Mweri, 2014). The present study distinguishes Units and resource rooms as distinct categories. The students, who learn in separate classrooms or Units receive all or most of their instruction from a teacher of the DHH while those is resource rooms receive instruction in selected subjects from a teacher of the DHH (Stinson & Kluwin, 2012). The Kenyan context has Units for the DHH, where the students receive all of their instruction in the classrooms for the DHH from a specialized teacher of the DHH.

In Kenya, special Units were established following the adoption of recommendations from various Commissions on education that pushed for the integration of students who have disabilities in regular schools and these Units and integrated programs can be traced back to the 1970s (MoE, 2009). Research shows that one of the potential benefits of the Units is the interaction of students, who are DHH with peers who also wore hearing devices and who encountered many similar frustrations and challenges (Miller, 2008). However, practices in the Units imply that they are mainstreaming programs rather than inclusion programs. This is because, mainstreaming has the implications that students who are DHH receive their education in general education settings but not necessarily within the general educational classrooms while inclusion has the implication that the students who are DHH receive most or all of their instruction in the general education classroom (Stinson & Antia, 1999). Therefore, inclusion is more than mere physical placement of students who are DHH in regular classrooms (Stinson & Antia, 1999). In the Kenyan setting, the students with disabilities are taught in special classes and interact with children without disabilities outside the classroom during break time (Mwoma, 2017). Another potential benefit of Units is that, the rest of the school stands to benefit from the diversity the students who are DHH bring to

the school (Miller, 2008). Typically, this school setting uses sign language for instruction (Mitchell & Karchmer, 2004) and the students are taught by specialist teachers trained in special education (Adoyo, 2007).

### 2.4 Language of instruction for students who are DHH

In the recent past, students who were DHH were obligated to learn three languages: English, Swahili and KSL at school (Makokha, 2012). This kind of expectation is common in multilingual societies (Cannon & Guardino, 2012). It was thought that students who were post-lingually deaf and hard of hearing could benefit from learning Swahili as it would help them integrate with members of the wider society since it is a national language (Makokha, 2012). However, this expectation was found to be a daunting task for the children who are DHH to simultaneously acquire all these languages (Adera et al., 2016). Over the years, various studies established that Swahili was the worst performed subject by students who are DHH both in continuous assessments made at schools and at the national examinations (Adera et al., 2016; Makokha, 2012). Educators in the country argued that the majority of children who are DHH in Kenya could neither learn their first language, KSL, at home, nor the languages used in the catchment areas such as Swahili and English, since they are spoken languages hence inaccessible to them (Mweri, 2014). This observation is not unique in the Kenyan context as children who are DHH in cultural backgrounds where they use multiple languages, have been found to have problems with the access of their first language (Musengi et al., 2013). The Ministry of Education thereby mandated Kenyan Sign Language as the second language taught to students who are DHH in place of Swahili (KICD, 2017; MoE, 2004). The use of Kenyan Sign Language (KSL) was officially adopted as a means of instruction in 2004 for students who are DHH since other modes of communication did not seem to meet the communication needs of the students (MoE, 2004). This practice is contrary to emerging literature that indicates no evidence-based reason to discourage students who are DHH from learning more than one spoken language (Crowe, 2019). Presently, Kenyan Sign Language is used in schools for the DHH as the medium of active communication while English is the language for written communication (Adera et al., 2016; Adoyo, 2002; Adoyo & Maina, 2019). KSL as a subject was first examined in the Kenya Certificate of Primary Education (KCPE), the national examination for primary school leavers, in 2010 and results from national examinations showed that KSL was the best performed subject by students who are DHH in Kenya (Sambu et

al., 2018), which bolstered its recognition as an appropriate replacement of Swahili for students who are DHH.

KSL is viewed as the first language of children who are DHH in Kenya (Adoyo, 2002; Adoyo & Maina, 2019; Okombo & Akach, 1997). It is considered a minority language, just like other sign languages in other countries, since it is used by a restricted population (Rinaldi et al., 2014). KSL, like other signed languages, is a fully fledged language, one that is not based on any other sign language and is culturally transmitted through socialization with members of the Deaf community (Okombo & Akach, 1997). Residential schools for the DHH played a major role in the transmission of sign language and are therefore vital to an individual who is DHH (Marschark et al., 2006). Similarly in Kenya, residential schools for the DHH are credited to the development of KSL since the schools facilitated the formation of communities of people who are DHH (Okombo & Akach, 1997). KSL like many other sign languages does not have a written form (Ogada et al., 2014). An example of a typical sentence in KSL would be:

**KSL**: BROTHER MINE EAT FINISH

**English**: My brother ate.

The KSL sentence is written in capital letters since each "word" represents a sign or a concept and not a word in any spoken language (Mweri, 2014). KSL does not have a written form (Ogada et al., 2014) just like other sign languages (Mayer & Akamatsu, 2012). From the example, one can deduce that KSL has its own grammar and syntax structure distinct from English and other spoken languages (Mweri, 2014; Ogada et al., 2014; Okombo & Akach, 1997). KSL follows the subject-object-verb word order while English follows a subject-verb-object word order (Okombo & Akach, 1997). This denotes that KSL has its own structure that is sufficient for communication among its users (Mweri, 2014; Okombo & Akach, 1997). Though KSL seems to use English words, it has its own grammatical and syntax Further, KSL uses more content words than function words unlike most spoken languages (Mweri, 2014). It is used in schools for the DHH based on the premise that the children use their first language, in this case KSL, to facilitate the acquisition of the second language, which is written English, and world knowledge (Adoyo, 2002; Namukoa, 2012). Continued efforts are made to provide trainee teachers with KSL skills so that they can develop the requisite competencies to teach in schools for the DHH (Piper et al., 2019).

Amplification systems are relatively rare in developing countries (Kyle, 2006). In Kenya, there is minimal access to hearing aids as they are considered expensive to acquire and maintain (Adoyo & Maina, 2019). Emmett et al. (2015) report that few countries in Africa have existing cochlear implant programs. South Africa (230 implants annually), Kenya (6 implants annually) and Nigeria (5 implants annually) have been documented as having existing cochlear implantation programs. The implantation cost for a cochlear implant, which includes the device cost, surgery costs, maintenance cost, rehabilitation cost and support has been estimated to US$ 83,783. In countries with low-income economies, this cost is rather prohibitive and not cost effective when compared to the cost of provision of deaf education. However, subsidized costs of devices could lower the overall implantation costs, increasing the opportunity for cost-effective CI programs to expand in these countries (Emmett et al., 2015). Research shows that cochlear implantation was strongly correlated with the placement of students who are DHH in speech-only programs (Allen & Anderson, 2010) which could explain the preference for placements that predominantly use sign language in the present context.

**Summary**

This chapter provided the context in which the present study was undertaken. Hearing loss is considered a low incidence disability in Kenya. Efforts to educate children with special needs in Kenya are faced with a myriad of social, cultural, and economic challenges. Kenya has progressive legislative and policy frameworks that are in full support of the equal access to education by all persons with disabilities. However, these policies are yet to be fully implemented. The present study was conducted in Units for the DHH which are separate classrooms located in regular primary schools where students who are DHH receive all their classroom instruction. Ideally, the Units were resultant of disability mainstreaming efforts in the country.

# 3 Characteristics of children who are DHH

This chapter contains the salient characteristics of students who are DHH. It has been established that students who are DHH differ from students with typical hearing. In fact, Marschark et al. (2011, p. 4) caution that "deaf children are not hearing children who cannot hear, and trying to make them more like hearing children is unlikely to be the best way to support their development and learning." It was prudent to highlight the characteristics of students who are DHH to understand just what makes the students who are DHH unique that warrants the use of specific teaching strategies suitable for this population (Tomlinson et al., 2003). Luft (2017) reiterates the fact that children who are DHH are unique from all other children. Research shows that students who are DHH vary more than their peers with typical hearing as a function of their individual differences in addition to the unique differences brought upon by their hearing loss (Blom et al., 2017). Students who are DHH have been found to be an extremely heterogeneous population, a fact that compounds efforts to obtain accurate information concerning them (Shaver et al., 2014). Further, Marschark and Knoors (2019) propose that there is greater diversity among students who are DHH and larger individual differences than among their peers with typical hearing. It was therefore imperative for the present study to highlight the unique characteristics of the students who are DHH that warrant specific educational practices that addresses their needs. The scope of the present study was to investigate the educational practices teachers used to teach students who are DHH therefore it would be amiss not to take cognizance of the characteristic of this population of students since the actual characteristics inform the educational practices teachers would utilize in their classrooms. In fact, it would also be deemed unethical and disrespectful to ignore the differences between children who are DHH and those with typical hearing (Marschark et al., 2006). Herein is a description of the salient characteristics of students who are DHH based on the impacts of a hearing loss that make them inherently unique from students with typical hearing.

## 3.1 Language

Arguably, the greatest impact of reduced hearing is in the area of language and communication (Markey et al., 2003; Vissers & Hermans, 2019; Wolsey et al., 2015). Language is seen as a vehicle through which needs and wants are conveyed (Wamae & Kang'ethe-Kamau, 2004). One of the serious consequences of a hearing loss in young children is that they have limited access to sounds and signals in their environment (Friedmann & Szterman, 2011; Luft, 2017). This lack of full access to language has been observed in children who are DHH regardless of their preferred

language modality and the assistive devices they use (Marschark & Knoors, 2019). Consequently, these children lack a consistent neurological access to the stimuli that is vital for language development. For most children with typical hearing, their acquisition and development of syntactic, semantic, and pragmatic language skills is through hearing and listening (Luft, 2017). The age before five years is considered a crucial age for speech and language development (Geers & Brenner, 2003) and by the age of 36 months, most children who have typical development display the ability to engage in sophisticated conversations (Luft, 2017). This is not the case for most children who are DHH as inadequate stimulation during this critical period could result to substantial, lifelong language deficits (Marschark & Knoors, 2019) which is consistently different from students with typical hearing and typical development. Therefore, a child's full access to the language in their environment is crucial for their language development (Luft, 2017).

Additionally, hearing loss has been found to have adverse effects on normal **speech**. Studies have documented that children who are born with a hearing loss have a deficit in the acquisition of speech-language skills (van Wingerden et al., 2019). This is seen as a consequence of the lack of full access to spoken language in their environment. Therefore, children who are DHH exhibit less detailed phonological knowledge than age-matched peers as evidenced in their lower performance in phonological awareness tasks (Kyle & Harris, 2006). It has been postulated that some children who are DHH may never achieve speech production levels commensurate to their peers with typical hearing (Hoof, 2019).

The other area of language that has been found to be affected by hearing loss is that of v**ocabulary** development. "Vocabulary are the words people must know so as to communicate effectively" (Cannon & Guardino, 2012, p. 81). Lund and Douglas (2016) report, as have previous authors, that children with a hearing loss have been found to demonstrate lower vocabulary or have restricted vocabulary knowledge than their peers with typical hearing (Qi & Mitchell, 2012). Moreover, children who are DHH presented delays in their productive vocabulary when compared to children with typical hearing (Kyle & Harris, 2006). The most frequent explanation provided for this observed vocabulary deficit is that children who are DHH are faced with relative inaccessibility to incidental learning through overhearing the language of others (Convertino et al., 2014). This deficit has been observed in children who are DHH regardless of age and use of cochlear implants (Borgna et al., 2011; Convertino et al., 2014). Further, emerging evidence

suggests that children who are DHH not only have restricted vocabulary than their age-matched peers with typical hearing, but that they also differ in the manner they build their lexical knowledge (Sahlén et al., 2019). Unfortunately, it has been observed that the gap between the vocabulary of students who are DHH and those with typical hearing widens with age (Stinson & Antia, 1999) as the vocabulary deficits are more likely to persist at multiple levels (Lund & Douglas, 2016). Lund and Douglas (2016) recommend that researchers must identify instructional strategies that lead to fastest rate in vocabulary growth in children who are DHH.

**Syntax** is word arrangement in a sentence to communicate an idea (Wamae & Kang'ethe-Kamau, 2004). Children who are DHH have been found to have problems with limited vocabulary, syntactical structures, idiomatic expressions and words with multiple meanings (Wamae & Kang'ethe-Kamau, 2004). They have been found to have problems with comprehension and formulation of wh-questions (e.g., who, what, when, why, where and how) and the use of grammatically correct utterances. These w-questions are common in spoken language and important in daily use to understand conversations, and in classroom or academic situations. Further, the ability to comprehend and produce the wh-questions has been linked to the ability to produce other syntactic structures such as the wh-movement. It is theorized that this challenge to comprehend and develop syntactic structures is due to the limited linguistic input during the critical period of first-language acquisition (Friedmann & Szterman, 2011).

### 3.2 Cognition

Developments in research have debunked the misconceptions that individuals who are DHH are less capable of abstract thought than those with typical hearing (Marschark et al., 2006). Presently, it is well established that a hearing loss and an inability to use spoken language is not an indication of inferior intelligence (Marschark et al., 2006). Research has also established that the use of sign language does not have a negative impact on the cognitive abilities of children who are DHH (Lieberman, 2015). However, research has also established that there are indeed cognitive differences between students who are DHH and those with typical hearing (Marschark & Knoors, 2019). Some of the differences are considered an advantage to the students who are DHH such as spatial abilities, while "some are a weakness such as executive functioning and multi-dimensional problem solving" (Marschark & Knoors, 2019, p. 21). Further, research suggests that compared to children with typical hearing, children who are DHH utilize more cognitive resources to enable

them to listen leaving proportionally fewer cognitive resources available for comprehension tasks (Sahlén et al., 2019). Additionally, children who are DHH have been found to exhibit higher prevalence of difficulties in executive functioning compared to their age-matched peers (Dirks, 2019).

Arguably, language is greater than a mere tool for the conveyance of information and creation of knowledge; language is used to construct and regulate thoughts, and is the ground on which socialization and cognition are based (Kelman & Branco, 2009). Based on this premise, studies have shown that early exposure to visual languages may have a positive impact on the development of literacy and other cognitive skills in children who are DHH (Rodriguez & Allen, 2018).

### 3.3 Socialization

Due to language delays, children who are DHH find it difficult to establish relationships with peers and adults in schools (Swanwick, 2019). Students who are DHH have been found to struggle with social exchanges with their peers at school, have been observed as having fewer friends and report feelings of rejection and neglect more often than their peers who have typical hearing (Wauters & Knoors, 2008). It is postulated that one of the impacts of a hearing could result to children entering schools with less social and emotional maturity than their peers with typical hearing (Swanwick, 2019). This could be because the children lack interactions with adults and peers which denies them socially mediated learning. These interactions are helpful for any child to acquire world schemata, cultural beliefs, and knowledge on gender, social roles, class, race, and ethnic affiliations (Luft, 2017). "Current research suggests that any degree of hearing loss represents a risk for psychosocial difficulties, even for children with good language skills" (Laugen, 2019, p. 449). It is reported that children who are DHH are at a higher risk for psychosocial problems than children with typical hearing (Laugen, 2019). Further, authors have reported that children and adolescents who are DHH have a higher prevalence of socio-emotional problems than their peers with typical hearing (Dammeyer, 2019; Vissers & Hermans, 2019). Arguably, these findings indicate that a school setting is challenging for the students who are DHH since they find it difficult to behave appropriately and manage their emotions (Swanwick, 2019).

### 3.4 Academic performance

Research has persistently shown that students who are DHH graduate from high school with reading levels comparable to those of fourth grade students with typical hearing (Miller, 2019).

Over the years, researchers have observed that "academic outcomes for DHH students remain unacceptably low" (Marschark et al., 2011, p. 12). Moreover, children who are DHH have poorer reading and comprehension skills compared to their age-matched peers who have typical hearing (Kyle, 2019; Piper et al., 2019). Also, they continue to score significantly lower than their peers with typical hearing on standardized achievement tests (Marschark et al., 2011). The poor academic achievement compared to their peers with typical hearing has been observed in students who are DHH regardless of their educational setting (Sahlén et al., 2019). It is explained that the lack of access to language at an early age largely explains future development and achievement of individuals who are DHH (Luft, 2017). This is because language, which facilitates learning for most children with typical hearing, is largely unavailable to students who are DHH (Luft, 2017; van Wingerden et al., 2019). As the educational levels progress, the educational content increasingly uses abstract symbols and concepts which require higher-order thinking and sufficient linguistic abilities to successfully engage with the curricular content. Typically, educational content is presented in compound and complex sentence structures (Luft, 2017). With the increased demands at higher levels in schools, students who are DHH therefore lag behind their peers with typical hearing in academics due to their lack of higher-level language abilities (Sahlén et al., 2019). Further, research indicates that students who are DHH, compared to their peers with typical hearing, demonstrate lags in background world knowledge which is crucial for comprehension of print. Consequently, students who are DHH lag behind their peers with typical hearing when it comes to reading-related knowledge and skills which again, is said to stem from their language deficits (Marschark & Knoors, 2019). "For many deaf children, learning to read and becoming literate is one of the biggest challenges they will face at school" (Kyle, 2019, p. 217) and such students are at risk of dropping out of the educational system altogether (Sahlén et al., 2019). However, children who are DHH who received early access to language, be it spoken or signed, have been found to perform at higher levels academically than those who did not receive early access to language (Marschark & Knoors, 2019). This is an indication that good language skills, irrespective of whether they are spoken or signed, are imperative for the reading comprehension skills for students who are DHH (Kyle, 2019).

**Summary**

This chapter highlighted the unique characteristics, which stem from having a hearing loss, of students who are DHH. The predominant impact of a hearing loss is on language. A majority of students who are DHH exhibit a limited vocabulary repertoire, atypical speech, and challenges with syntax of the English language. Research has also evidenced that their cognition, socialization and academic performance are significantly different from students with typical hearing. It is imperative for the present study to highlight these characteristics because they inform the educational practices in the education of the DHH. Evidence-based practices for the DHH are those that build upon the strengths of this population of students and seek to mitigate their needs for them to achieve meaningful educational gains. The implication is that evidence-based practices for the DHH are unlike those of other student populations because the nature of the student' hearing loss has major ramifications on their academic achievement.

# 4 Evidence-based educational practices for the DHH

This chapter provides a synthesis of evidence-based practices for students who are DHH. Piper et al. (2019) explains that students who are DHH have unique educational needs that necessitate qualified teachers and specialized materials and equipment. Further, Marschark et al. (2006) assert that children who are DHH learn in different ways from students with typical hearing. The previous chapter demonstrated that students who are DHH are significantly different from students with typical hearing ergo require educational practices suitable to address their strengths and needs. Marschark and Knoors (2019) cogently argue that educating students, who are DHH is more complex than educating students with typical hearing. To achieve this fete and address the educational needs of students who are DHH, as aforementioned in the previous chapter, there is need for evidence-based practices in the education for the DHH (Marschark & Knoors, 2019; Traxler, 2017) whereby instructional decisions and practices are data-driven and are aligned to the students' skill levels (Beal-Alvarez, 2014). This means that educational policies and practices should be based upon scientific evidence (Luckner, 2006).

There is set criteria that qualify an educational practice as "evidence-based". Some of the criteria are, that the educational practices should have emanated from studies, that have relatively large sample sizes that utilized experimental or quasi-experimental designs with randomly assigned control groups to determine their effectiveness, and that the practices should be replicated by other researchers who obtained similar findings (Luckner, 2017; U.S. Department of Education, Office of Elementary and Secondary Education, 2002). Researchers report that it is challenging to apply the quality indicators for evidence-based practices to studies in deaf education (Trezek & Wang, 2017). This is due to the facts that hearing loss is a low-incidence disability thereby it lacks large samples that could be assigned to treatment and control groups, and there is limited data to establish actual evidence-based practices (Luckner, 2006). Garberoglio (2017) reiterates that even in topics that have been widely researched in deaf education, there is still a lack of strong evidence to inform best practices, which limits the evidence base in deaf education. At the time of writing the present report, Easterbrooks (2017) pointed out that there were no programs for the DHH that had met the requirements for them to be called "evidence-based". An additional constraint is that there is scarcity of replication studies, not only in the field of deaf education, but in special education in general attributed to the general negative perception towards replication research, and minimal intervention research (Makel et al., 2016). Consequently, researchers are forced to build

upon findings from other subpopulations that may have some similarities with those of children who are DHH (Garberoglio, 2017). To mitigate the lack of evidence-based practices, the teachers of the DHH have to modify and adapt instructional practices from general education to meet the individual needs of learners who are DHH (Easterbrooks, 2017). Since there is a dearth of studies in the field of education, it is argued that all kinds of studies are encouraged, regardless of whether they are randomized and controlled (Luckner, 2006). Therefore, teachers need to implement teaching materials and practices that have been adapted to harness the strengths of the students who are DHH and accommodate their needs or teach the students requisite skills to overcome their needs (Marschark & Knoors, 2019).

In spite of these limitations in deaf education, it has been observed that "there are instructional strategies that have the potential to improve learning and academic outcomes for DHH learners" (Marschark & Knoors, 2019, p. 16). Educators agree that good instruction requires the teacher to gain mastery of educational content and pedagogical skills; that is, they should know what to teach and how to teach it (Chu, 2013). The present study reviewed current approaches and recommended practices from various studies that have varied levels of evidence, books, periodicals and other available resources publicly available, and compiled a practice guide (see Appendix 1). This practice guide was regarded as a compilation of evidence-based educational practices that guided the inquiry of the present study. This procedure to generate a practice guide from a systematic review of literature is not unique to the present study as it is documented in previous studies (Luckner, 2017). The intension was that teachers would adapt the strategies to suit their contexts and implement them in their classrooms. The educational practices and classroom strategies described herein are not based on conjecture, rather on evidence that they are effective with students who are DHH.

### 4.1 Classroom organization and classroom routines

This is the physical organization of the classroom. It encompasses aspects such as seating arrangements, lighting and general arrangement of the classroom. Arguably, the physical environment of the classroom is a simple factor to control. Obviously, structural features of the classroom such as the placement of doors and windows cannot be changed, however, the space within the classroom can be rearranged to promote student engagement (Guardino & Antia, 2012). The teacher can make adjustments to the seating arrangements to improve the students' visual and

auditory access to the speaker (Berndsen & Luckner, 2012). Guardino and Antia (2012) report that visual or auditory distractions, poor lighting, obstruction of line of sight, sitting near windows or doors that have high traffic are factors that influence the academic engagement of students who are DHH in a classroom environment. Various studies corroborate the fact that most DHH students have an acute sense of peripheral vision (Dyer et al., 2009). Subsequently, students who are DHH may be susceptible to visual distractions leading to their reduced ability to attend to academic tasks in the classroom. They might exhibit disruptive behavior due to additional disabilities that hinder them from attending to the academic task at hand or due to their susceptibility to visual or auditory distractions. Moreover, they could be prone to visual distractions which could reduce their ability to focus on relevant classroom content which could in turn negatively affect their academics (Guardino & Antia, 2012). If the classroom has visual distractions in the periphery, the child who is DHH may not pay attention to the classroom teacher or sign language interpreter as their attention might be drawn to the events taking place in the periphery (Dyer et al., 2009). Research shows that a physical environment can actually affect the behavior of students. For instance classrooms that are cluttered with furniture can result to students constantly colliding with each other hence fostering disruptive behavior from the students (Guardino & Antia, 2012). Therefore, students who present with attention deficits, behavioral disabilities in conjunction with their hearing loss could have greater attention challenges in environments that are visually distracting and disorganized.

Previous observation studies revealed that grouping desks in classrooms encouraged students to socialize with each other. However, this type of arrangement has a converse impact on the academic engagement of the students (Zifferblatt, 1972). In agreement with this, Guardino and Antia (2012) report that certain seating arrangements can facilitate student interaction but can also be a source of distraction for students during individual work. Zifferblatt (1972) observed that, in classrooms that were deemed difficult, students conducted both group and independent work at their seats, which were arranged in clusters while in classrooms that were deemed satisfactory, students had separate areas designated for independent and group work. Therefore, the ideal seating arrangement should foster both individual and group work.

Materials and classroom supplies need to be organized and visible in centers. Weinstein (1977) reports that organized and visible centers increase the students' appropriate use of the centers. This

way, the teachers and students do not waste time searching for instructional materials (Guardino & Antia, 2012). Consequently, an organized classroom leads to overall increased instruction time and proper time management. Conversely, disorganized materials could be a source of visual distraction to the DHH students, therefore, teachers should make improvements to the classrooms to make them aesthetically appealing (Luetke-Stahlman, 1998). In addition, an organized classroom enables the teacher to move around the classroom with ease and make individual contact with students. Consequently, students remain engaged in classroom activities. Lastly, this contributes to general increased academic success by the students (Guardino & Antia, 2012).

**Student seating**

Studies have shown that the horseshoe or circular seating arrangement (see Figure 4.1) is optimal for self-contained classrooms with students who use sign language since this arrangement allows students to see their classmates during communication (Downs et al., 2000; Guardino & Antia, 2012; Mweri, 2014). Dyer et al. (2009) recommend that the optimal seating arrangement for students who are DHH is one that is consistent and presents the student with minimal auditory and visual distractions. This could be achieved by placing the student in front where they can see the teacher, interpreter and the rest of the class (Downs et al., 2000). In an inclusive setting, Luetke-Stahlman (1998) explains that the student who is DHH should sit at one end of the semicircle facing the teacher or sign language interpreter.

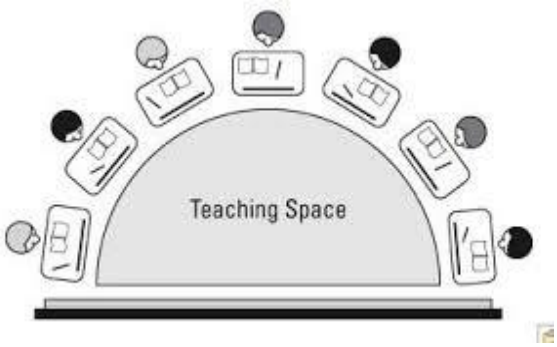



*Figure 4:1.* Horse-shoe seating arrangement

(http://wp.vcu.edu/suzannelauer/wp-content/uploads/sites/6401/2017/01/Classroom-Seating-and-Best-Practices.pdf, 2020)

Alternatively, in an inclusive classroom setting, Luetke-Stahlman (1998) suggests that the classroom could be arranged in clusters. This way, the student who is DHH sits on the outer side of one cluster which allows him/her to sit among his/her peers and still be able to view the majority of his/her classmates, the teacher and or interpreter.

**Positioning of the teacher's desk**

Research in general education classrooms shows that the teacher's desk should not be in a central position; it should be inaccessible. This type of arrangement allows the teacher to spend most of the time interacting with the students as opposed to a central position (Guardino & Antia, 2012; Zifferblatt, 1972). Classroom physical arrangement that increases teacher-student interaction has the likelihood to increase student academic engagement. There are no studies specifically conducted to establish the relationship between the placement of the teacher's desk and the teacher's interactions with students who are DHH. However, any physical arrangement that promotes student-teacher interaction would likely lead to increased academic engagement of students who are DHH (Guardino & Antia, 2012). See suggestions of actual classroom organization and classroom strategies in Appendix 1.

## 4.2 Visual aids and language of instruction

**Language of instruction**

By the time the children who are DHH arrive at school, they struggle to acquire a complete and fluent language (Luft, 2017). As depicted in the characteristics of students who are DHH, a hearing loss has adverse impacts on the language acquisition of this population of students. Therefore,

effective communication by teachers of the DHH is regarded as one of the most crucial characteristics a teacher of the DHH should possess (Lang et al., 1993). Leonhardt (1996) posits that the language of instruction occupies a central position in the learning of students who are DHH. This indicates that the teacher is charged with the responsibility to impart academic content to the students thereby making their language, especially their manner of speaking and linguistic expression, critical to learning. More so for young children, whose main instructional content pertains language (Wamae & Kang'ethe-Kamau, 2004). It is therefore important for the teacher's language to be direct, clear, concise and related to the objectives set out for learning (Konrad et al., 2011).

Further, the language used in the classroom should be at a developmentally appropriate level for the students. Therefore, teachers need to be conscious of the student's language level (Luetke-Stahlman, 1998). However, it has been found that oversimplification of language has a negative impact on the student's language growth (Berndsen & Luckner, 2012) therefore, teachers need to strike a good balance when it comes to language. On one hand, the teacher should ensure that the language of instruction is simple and clear. On the other hand, the teacher should use language that is slightly above the student's assessed ability level (Luetke-Stahlman, 1998). This way, the students are encouraged to stretch beyond their present levels to increase their language skills (Mounty et al., 2013).

As aforementioned, one of the salient characteristic of students who are DHH is that they display gaps in their vocabulary and world knowledge. Vocabulary as an area of instruction for students who are DHH is based on the assumption that an increase in their vocabulary could increase their ability to engage successfully in literacy activities (Pizzo, 2018). There has been a controversy as to which methods are effective to teach vocabulary to children who are DHH. Researchers are torn between explicit instruction of vocabulary and naturalistic interventions. Naturalistic interventions, also referred to as embedded teaching, include the use of everyday interactions with the child and activities that the child shows interest in to provide learning opportunities through social responses. One strategy used is the follow-in labels where the adult or instructor provides a label to an object that has captured a child's focus (Lund & Douglas, 2016). Explicit instruction is the direct and systematic instruction of vocabulary which is targeted and intentional (Pizzo, 2018). Direct instruction requires the teachers to provide explanations for new instructional material,

modeling desired skills and offering extra support to students that are struggling (Trussell & Rivera, 2019). Findings by Lund and Douglas (2016) seem to demonstrate that explicit instruction of vocabulary is most effective with students who are DHH and these findings are similar to those of previous studies (Konrad et al., 2011; Scott & Kasun, 2018). Convertino et al. (2014) concur that explicit attention to vocabulary remains an important aspect to vocabulary acquisition for students who are DHH. In addition, explicit instruction could be an appropriate method to supplement learning opportunities for children who are DHH especially those who are not likely to benefit from incidental learning (Lund & Douglas, 2016). Bennett et al. (2014) reiterate this assertion by stating that teachers can use direct and explicit instruction to teach language skills which some children who are DHH may not be able to learn through incidental learning. The approach of explicit instruction is similar when it comes to the teaching of signed vocabulary in that the teacher should explicitly teach aspects of handshapes, hand movements, and location (Pizzo, 2018). Explicit instruction of vocabulary combined with the provision of opportunities for the children to utilize the new words throughout the day would facilitate the learning of vocabulary in children who are DHH instead of the use of only the naturalistic methods (Lund & Douglas, 2016). For instance, teachers could utilize explicit instruction of vocabulary and an explanation of information and events (Scott & Kasun, 2018) to combine the two approaches. Additionally, teachers can pre-teaching target vocabulary before instruction and this has been found to have a positive association with students' retention (Downs et al., 2000) and has been found to increase the rate of vocabulary recognition in the students (Cannon & Guardino, 2012). Teachers are advised to supply the students and their interpreters with a list of unfamiliar words or technical terminology before the presentation of new materials (Downs et al., 2000). Teachers of the DHH need to take advantage of multiple domains of teaching and ways of making meaning so that the students who are DHH can acquire language (Hayashi & Tobin, 2014). Further, teachers are advised to utilize the different approaches of teaching vocabulary to children who are DHH, starting with the most effective one, instead of choosing one approach over the other (Lund & Douglas, 2016).

Some interaction strategies similar to those used by mothers of younger children with typical development can be used to support language of instruction for children who are DHH. One of these strategies is the use of gestures during interaction with students who are DHH. This has been found to aid the child who is DHH put two or more words together following interactions with an

adult who uses gestures and words during their conversations (Mahon, 2007). Similarly, a number of non-verbal indicators such as oral-facial and body expressions, vocalizations, silent lip articulations, gestures, sounds, smiles, looks, touch, and mimicry are all useful to support communication with students who are DHH (Kelman & Branco, 2009).

Richels et al. (2016) recommend that the teacher should target specific grammatical structure such as the use of wh-questions and teach the children who are DHH through language modeling and expansion techniques. Moreover, the teacher should model the target grammatical structure, recasting-restating a child's statement in the target grammatical form, pitch highlighting- using tonal emphasis to highlight important features of syntax, and providing praise for the proper use of the target grammatical form. It is also advisable for the teacher to correct any errors directly and quickly while at the same time stating the correct response or providing a model on how to complete a task correctly then immediately after, providing the student with an opportunity to make a second attempt (Richels et al., 2016). Generally, the teachers should engage in instructional modeling, the modeling of high quality language either spoken or signed, by the repetition of the student's language at the next level of difficulty, and by students modeling the language of their peers. This strategy scaffolds the students' language to the next level as it exposes the students to higher levels of language while allowing them to think critically about their language choices (Pizzo, 2018). The pace of instruction for students who are DHH needs to be slower. Luetke-Stahlman (1998) posits that if information is presented too quickly without ample processing time, the students who are DHH will not participate in the classroom thereby denying them an equal opportunity to learn. Additionally, a slower pace would facilitate a classroom interpreter to keep up with the lesson presented and the discussions in the classroom (Downs et al., 2000). Periodically pausing after a question has been asked to students who are DHH allows them time to reconsider the information received and this verbal strategy has been found beneficial to the them (Marschark et al., 2017). Lastly, teacher should also provide occasional rest breaks for the students who are DHH because reception of information visually is tiring and could cause eye fatigue (Downs et al., 2000).

**Visual aids**

Students who are DHH should be immersed in rich and varied language experiences so that they learn through listening, speaking, reading and writing (Pizzo, 2018). Signs and speech provide a

transient signal therefore, visuals have been found to be beneficial to students who are DHH as they could help the students focus on important information, see the connection of concepts, and aid in the integration of prior knowledge with new knowledge (Berndsen & Luckner, 2012; Luckner et al., 2001). It has been found that with visuals such as printed materials, the students have the opportunity to reread the content provided in contrast to the fleeting nature of signed and spoken language (Borgna et al., 2011). Therefore, the use of visual materials in the learning environment are strategies that build upon the strengths of students who are DHH (Luckner et al., 2001) since they are used to activate multiple sensorial channels available to enhance communication with these students (Kelman & Branco, 2009). Mounty et al. (2013) aver that deaf students need a visually maximized environment for the stimulation of language and literacy development. This might enhance reading proficiency for students who are DHH since they have less access to incidental language learning. The presentation of classroom instruction in both verbal and visual form has been found to be effective in the education of students who are DHH in general (Nugent, 1983) and in the area of vocabulary instruction (Lund & Douglas, 2016). Other than the fact that visuals transmit information to students who are DHH that aid in literacy development, Truckenbrodt and Leonhardt (2015) explain that visuals support students' attention and aid in memory performance. Nugent (1983) argued that when information is supported with visuals, individuals who are DHH will benefit from it leading to gains in learning. Findings confirmed that students who are DHH and those with typical hearing could learn from both visual and print presentation of instructional information and that a combination of both visuals and print yielded the greatest achievement in promoting learning. Based on these findings, teachers should incorporate visuals and captioned instruction for students who are DHH (Nugent, 1983). The teachers should exploit the power of pictures and prints while designing instruction for students who are DHH (Friedmann & Szterman, 2011; Nugent, 1983). To achieve this, educators of the DHH recommend an establishment of visually rich environments to enhance learning (Luckner et al., 2001). Visually rich environments could use a number of instructional aids such as sign, fingerspelling, speech reading, overhead projectors, computers, bulletin boards, televisions, pictures, illustrations, artifacts, slides, computer graphics, and films with captions (Luckner et al., 2001) and drawings, movements, and visual artifacts (Kelman & Branco, 2009). For classrooms where sign language is used, the teacher could put up print, pictures of signs, and finger spelled words as labels for objects and concepts (Scott & Kasun, 2018). Luckner et al. (2001) explain that

the teacher should teach students how to access the information provided on the visual supports used so that the students can better use the visuals and thereby enhance their participation in the lesson. Further, they suggest that when students who are DHH understand the use of visuals, it could prepare them to comprehend other items in their daily lives such as packages, menus, logos, maps, and assembly instructions. Since most students who are DHH utilize visual channels for speechreading or to watch sign language, all other presentations of materials would be lost. For instance when they attend to visual material, verbal material that may accompany it may be lost, or when asked to take notes while watching a visual model, chart or video, auditory explanations may be lost since the student who is DHH is able to access only part of this content (Luft, 2017). Therefore, it is imperative that the teacher ensures that the student is attentive since if the student does not pay attention then they will miss the input. Otherwise, as Pizzo (2018) explains, students cannot build upon their language until they attend to the language itself. See suggestions of actual visual aids and language of instruction strategies in Appendix 1.

### 4.3 Optimal visual and acoustic conditions

Students who are DHH are prone to auditory distractions. Environments that have excessive background noise and reverberation are an impediment to listening. Luetke-Stahlman (1998) asserts that noise, reverberation and distance combined can greatly hamper the communication reception of students. Students who are DHH who use spoken language find it difficult to listen to their teachers and peers in such environments (Guardino & Antia, 2012). A noisy learning environment would affect the students' ability to understand classroom instruction and the ability to focus on their work. Environmental noise such as that emanating from road traffic, adjacent classrooms, noise from other students (Sahlén et al., 2019), heating, ventilation and air-conditioning systems, close proximity to playgrounds, sliding of classroom furniture, and shuffling of hard-soled footwear (Saravanan et al., 2019) all contribute to the poor acoustic conditions of classrooms which affect the comprehension and learning of students who are DHH. A number of authors have documented that the level of background noise, signal-to-noise ratio, and reverberation time are crucial factors that have been found to affect the ability of students who are DHH to understand spoken language (Crandell & Smaldino, 2000; Guardino & Antia, 2012; Sahlén et al., 2019; Saravanan et al., 2019; Stinson & Antia, 1999; Woolner & Hall, 2010). This is because poor classroom acoustics have been found to degrade the intelligibility of the speaker's voice (Downs et al., 2000). Woolner and Hall (2010) argue that a noisy environment could have a

negative impact on the ability of DHH students to remain engaged on academic tasks. Therefore, it is imperative to control the classroom environment of students who are DHH. The teacher can reduce the impact of noise in the classroom through a few strategies such as closing the classroom door during teaching and softening hard surfaces in the classroom (Berndsen & Luckner, 2012). The installation of acoustic ceiling and wall tiles, gypsum boards on walls, and rubber bushes on the legs of classroom furniture could also contribute to the reduction of noise and reverberation in the classroom (Saravanan et al., 2019). Moreover, the use of amplification technology such as personal FM and sound field amplification system in the classroom can improve the quality of the signal transmitted to the students (Berndsen & Luckner, 2012).

Studies indicate that students with less hearing are more likely to depend more on vision (Marschark et al., 2017). It is therefore imperative to provide sufficient lighting in the classrooms and to control any excess lighting to increase their attention and academic engagement (Guardino & Antia, 2012; Mweri, 2014). Kaderavek and Pakulski (2002) observe that appropriate lighting conditions are necessary especially for students who are DHH who supplement audition with speech reading. Downs et al. (2000) caution that teachers should not stand in front of a light source such as a window as it would create a shadow that prohibits students who are DHH from speech reading and gaining non-verbal communication through the teacher's facial expressions. Further, teachers should be cognizant of their eye gaze behaviors to ensure that they help their students who are DHH to maintain and control attention to instructional content (Marschark et al., 2011). Research suggests that conversation partners should establish and maintain eye contact in order to communicate. Therefore, it is not enough for the student who is DHH to visually attend to the speaker but the speaker should also attend to the student for successful interaction to take place (Lieberman, 2015). Therefore, the teacher should avoid speaking while writing on the board or walking around the room because it prevents the students from maintaining eye contact (Downs et al., 2000). This is because such behaviors would obstruct their faces while talking and would conceal their signs and gestures thereby inhibiting proper communication with the students. Lastly, EarQ (2020) caution that teachers should also refrain from chewing gum as it is not only distracting but it also alters how the teacher from some words. See suggestions of actual optimal visual and acoustic strategies in Appendix 1.

### 4.4 Differentiated instruction

Differentiation is the effort teachers make to respond to the variance among the learners in their classrooms (Tomlinson, n.d.). "Homogeneity by virtue of chronological age" is a myth that plagues most classrooms (Tomlinson et al., 2003, p.119). This is because students in any given classroom, regardless the similarity in age, are quite diverse. Guardino and Cannon (2015) assert that diversity is encompassed within even the most "typical" student who is DHH and the differences are evidenced when schools consider providing the students with appropriate educational services. Part of this diversity is the fact that there are students who are DHH and that have additional disabilities, now referred to as DHH with a disability (DwD). "Most teachers teach every child the same material in the same way, and measure each child's performance by the same standards" (Tomlinson et al., 2003, p. 125). This uniformity in teaching has been found to fail many learners. This is because there is an inherent mismatch between the task presented and the learners' ability levels. With this in mind, teachers are urged to learn how to develop classroom routines that attend to their students' diverse readiness, interests, and learning profiles (Tomlinson et al., 2003). Differentiation should be viewed as a pedagogical rather than an organization approach (Stradling & Saunders, 1993). Meaning that effective pedagogy should also take into consideration student differences when it comes to readiness to learning how to read and write (Mayer & Akamatsu, 1999) and the students' unique interests, vulnerabilities, and abilities (Clark, 2019). Differentiated instruction calls for the teachers to be cognizant of their students' diverse backgrounds, knowledge level, readiness, language, and preferences in learning and interests and to act on that knowledge during their planning of instruction (Dixon et al., 2014). This requires the teachers to modify their teaching and learning routines to cater for the students' differences (Dixon et al., 2014; Tomlinson et al., 2003). It also includes the modification of the curricula, teaching methods, resources, learning activities, and student products to address the students' diverse needs (Dixon et al., 2014).

Leonhardt (1996) observes that the most consistent form of differentiated instruction is individualized instruction and recommends that the teacher's choice of didactic method should be grounded upon the provision of the best possible support for the individual learner. Therefore, the teacher should also be aware of and respond to the student's unique learning profile which constitutes the student's preferred mode of learning which is affected by their learning style, intelligence preference, gender, and culture (Tomlinson et al., 2003). Some students have been found to be adept with theories and abstractions, while others with facts, figures, and observable

phenomenon; some students prefer active learning, while others prefer silent introspection; some are visual learners while others are verbal learners- none of the styles are inferior or more preferable than others, they simply capture the students' differences. Therefore, teaching and learning should cater for the diverse interests of the learners (Gathumbi et al., 2015). Cannon and Guardino (2012) reiterate the need for individualized instruction that matches instructional practices with the individual learning styles of the students as much as possible. This can be achieved through cooperative learning groups and peer tutoring (Luetke-Stahlman, 1998). Additionally, the teacher could address these different learning styles by being flexible with their teaching and through counseling of the students to maximize their potential (Dixon et al., 2014; Tomlinson et al., 2003). Differentiation of instruction therefore requires the teacher to multi-task since different groups of students in the same classroom are engaged in slightly different work within the same overall content in each discipline (Dixon et al., 2014).

Advisably, differentiation should be preplanned in that the teacher should plan lessons that have embedded modifications to meet the varied educational needs of all the students (Tomlinson et al., 2003). A teacher can differentiate at least four elements in their classroom: content, process, products, and learning environment (Tomlinson, n.d.). Additionally, differentiation can be achieved through the selected mode of communication that is, spoken language, sign languages, and mixed forms (Leonhardt, 1996). The teacher should adapt the classroom activities according to the student's abilities (Scott & Kasun, 2018) and learning needs (Makokha, 2012). The adaptation can be in form of qualitative differentiation such as the application of different difficulty levels of instructional tasks, and quantitative differentiation such as the assignment of different amounts of tasks to different students in the classroom (Truckenbrodt & Leonhardt, 2015). In classrooms that use sign language as the primary mode of communication, the teacher should consider the student's language level, their individual needs for vocabulary, and their social language needs when they choose the signs to use in the classroom (Pizzo, 2018). Such adjustments are not easy to accomplish and teachers who might not identify opportunities to differentiate or those who do not feel efficacious to teach students with different abilities struggle with the implementation of differentiated instruction (Dixon et al., 2014).

Ideally, for differentiated instruction to be feasible, the class sizes for students who are DHH should be limited (MoE, 2018c). Findings show that teachers emphasize the importance of reduced

class sizes for provision of adequate individualized attention. Reduced class sizes could translate to the teacher focusing more on individual interaction with the students instead of majorly relying on whole group instruction. Subsequently, the students who are DHH will have more opportunities for linguistic expression and language development (Cawthon, 2001). See suggestions of actual differentiated instruction strategies in Appendix 1.

### 4.5 Classroom social organization

One dichotomy used to describe classroom organizations is a teacher-centered vs student-centered classroom. Teacher-centered classrooms are characterized by emphasis on the teacher to provide information and the use of structured group lessons. In contrast, in child-centered classrooms, the teacher facilitates learning by providing students with guidance and opportunities for them to explore objects in the environment and academic topics (Lerkkanen et al., 2016). Learner-centered classrooms are those that focus on the needs of students and strive to build upon the knowledge that their students bring to a learning task. In such classrooms, the students play an active role in learning (Cornelius-White, 2007). Truckenbrodt and Leonhardt (2015) state that the advantages of a teacher-centered approach to instruction are the clarity of the current speaker in the classroom is, and that the classroom retains a general calm. However, research shows that teacher-directed instruction is negatively associated with the development of reading skills (Lerkkanen et al., 2016). Conversely, child-centered approaches to instruction have been found to promote the development of reading skills (Lerkkanen et al., 2016) and have been found to explain learning gains by students who are DHH (Marschark & Knoors, 2019). Truckenbrodt and Leonhardt (2015) support a student-centered approach to teaching by explaining that just like in differentiated instruction, this approach is beneficial for the students who are DHH in that it reduces the emphasis on attention and strenuous communication and the students can receive quality support from the teacher. Child-centered practices have also been associated with the development of positive relationships among students (Cornelius-White, 2007).

The social organization in the classroom is also of importance. Observations made indicate that the primary means of classroom learning takes place between teacher to student communication and student-to-student communication (Stinson & Antia, 1999). Findings show that what students receive from teacher-child interaction is entirely different from what they receive from child-child interaction (Hayashi & Tobin, 2014). Literature suggests that children acquire language most

effectively during both teacher-to-child and child-to-child interactions (Mashburn et al., 2008, 2009) specifically, studies show that children stand to benefit from peer-to-peer interactions with children who have different levels of vocabulary knowledge (Wasik et al., 2006). It is of importance for children to be influenced by other children and not entirely by the teacher. Hayashi and Tobin (2014) propose that teachers should provide the children with rich and authentic childlike environments so that they can learn from situations that are not entirely teacher-directed. This involves the teacher providing the students with opportunities to solve their own problems while offering minimal help. Obviously, this does not negate the need for a teacher in the classroom. Students who are DHH may experience language delays, cognitive and or social/emotional delays therefore, the teacher would be required to scaffold their interactions.

Research also indicates that students who require additional instructional support effectively benefit from small group instruction (Klubnik & Ardoin, 2010) preferably comprising of three members (Helf et al., 2009). Small groups for students who are DHH provides them an opportunity to teach each other and seek clarification from peers when instruction is not fully or correctly understood (Klubnik & Ardoin, 2010). In addition, students who are DHH were observed to be more actively engaged in classroom activities when group activities were implemented (Elder et al., 2015). They have also been found to benefit in the area of specific grammatical forms, from their peers who do not have a hearing loss as they act as their listening models (Richels et al., 2016). Buddy systems, programs that match low to average and high achieving students together to form peer tutoring pairs (Cannon & Guardino, 2012), have been found to be an effective system for students to learn from each other. Preferably, teachers should plan instruction in such a way that the students work with a variety of peers over a period of time in the school term. This includes sometimes students working with peers with the same readiness, sometimes working with peers of mixed readiness, with peers of similar interests and sometimes with those of different interests. Such flexible groupings allow students to learn how to work in different contexts and allows the teachers to assess the students in different settings and with different content (Tomlinson, n.d.). See suggestions of actual classroom social organization strategies in Appendix 1.

### 4.6 Classroom structure

Structure and predictability in the classroom are crucial for increased efficiency as they allow a teacher to focus on actual instruction rather than on behavior management (Konrad et al., 2011).

Pospischil (2018) accentuates the need for structure by arguing that the clearer the course of the day, the easier it is for students who are DHH to follow along the lessons, have the right orientation and concentrate on the lessons. Thus, the classroom structure should be well thought out and in line with intended instruction. Konrad et al. (2011) recommend that the teacher should develop a clear day schedule that divides the classroom into segments that describe the major activities of the day. When establishing a classroom structure, the teacher should determine the instructional priorities for the students and develop a schedule that allows the students to learn the content during a time of day when they are most alert and focused. Further, the schedule should have a clear label for each segment of the day such that the teacher can use the labels to make references to the schedule throughout the day. Literature supports the use of pictures to illustrate segments of a daily schedule especially for students who do not read (Konrad et al., 2011). Provision of adequate information pertaining classroom procedures has been found to create a task-oriented classroom environment (Kluwin & Lindsay, 1984).

Moreover, the teacher should develop classroom management routines such as those for giving directions, making sure the students know how to move in the classroom, and making sure students are aware of where to place their books once they have finished with their work (Tomlinson, n.d.). Truckenbrodt and Leonhardt (2015) recommend having classroom rituals as part of the daily classroom routines. A classroom ritual is an act or a symbol that occurs frequently in the classroom (Truckenbrodt & Leonhardt, 2015). Classroom symbols should be age appropriate for instance, a puppet for children at the primary school level and word cards for secondary school students. Once the students agree on a particular ritual, it is immediately understood, without much explanation, any time it is presented. The teacher could involve the students in the selection of the classroom symbols and rituals. This way, Truckenbrodt and Leonhardt (2015) explain that the ritual will be better accepted and imprinted by the students. It is advisable for the teacher to use the classroom symbols regularly for the students to retain them in memory. Once the routines are created, the teacher should monitor whether they are effective and the teacher should discuss with the students the results of the routines and whether they need to make adjustments (Tomlinson, n.d.).

Students who are DHH find it difficult to determine topic shifts in conversations (Luetke-Stahlman, 1998). Therefore, it is recommended to provide them with prior information concerning the structure and contents of a lesson to enhance their learning to some extent (Borgna et al., 2011).

Additionally, the teacher should provide a clear description of the goals of a lesson (Konrad et al., 2011). Following this structure, the teacher would then present the instructional content in a sequential manner that would help students who are DHH follow along the lesson.

Teachers should consider the incorporation of play as instructional strategies for students who are DHH. The use of play-based interventions have been suggested as possible strategies for teaching syntax and grammatical morphemes for students who are DHH (Richels et al., 2016) and vocabulary growth (Marschark et al., 2011). One way the teacher can generate children's interest is through one of their favorite activities, playing games. For most children, games in the classroom generate both excitement and involvement in the classroom activities. Further, due to the interactions that arise during play activities, games foster discussions among students and between the students and their teachers (Markey et al., 2003). Pizzo (2018) values the importance of play as an instructional strategy and asserts that during play, children who are DHH can interact with teachers and other staff, and also engage in language scaffolding provided by peer models. Markey et al. (2003) in a study with a group of students who were DHH aged between 11 and 12 years old, observed that during play activities in the classroom, the students would clarify their own thinking and question each other's understanding of mathematical concepts. The competitive nature of the games and the need to work as a team in order to win, provided opportunities for the students to use meaningful language. In the study, some games compelled the students to make requests of others which further facilitated meaningful interaction among the students and not just manipulation of the play materials (Markey et al., 2003). Therefore, play as an instructional strategy is not only suitable for young students but also for older students who are DHH, as long as the games selected are age-appropriate. See suggestions of actual classroom structure strategies in Appendix 1.

### 4.7 Knowledge framework

Unlike children with typical hearing, children who are DHH do not benefit from incidental learning. This is the acquisition of new words without direct instruction from an adult and with limited exposure to the words (Brackenbury et al., 2005). Incidental learning has been observed in children who are bilingual, those that use sign language and English. These children cannot learn spoken language nor garner world knowledge through overhearing conversations (Hoof, 2019). Therefore, they must consciously and intentionally expand their world knowledge (Pospischil,

2018). For this reason, teachers should assess prior knowledge of the students before the presentation of new subjects or topics or lesson content (Konrad et al., 2011; Pospischil, 2018). Prior knowledge is the information an individual has about the world from previous experiences (Recht & Leslie, 1988). This prior knowledge includes the knowledge about the text being read, reading processes (e.g., story grammar, theme, topic, time period) and knowledge about an individual's culture (Jackson et al., 1997).

Students who have higher prior knowledge about a particular topic have been found to demonstrate better comprehension of the text they are reading as opposed to their counterparts with lower prior knowledge (Jackson et al., 1997). Further, it has been established that students who possess prior knowledge pertaining a specific topic are able to differentiate new instructional material from what they already know which would in turn enable them to focus attention on the new content (Marschark et al., 2011). Therefore, there is need to build the students' foundational knowledge since they could have limited exposure to education and communication which could limit their knowledge of certain concepts (Scott & Kasun, 2018). Jackson et al. (1997) assert that teachers of students who are DHH need to expend efforts to elicit, activate and enrich the prior knowledge of these students. To achieve this, the teacher should provide a connection between the instructional content and the student's lived experiences (Scott & Kasun, 2018). Additionally, the teacher should establish the student's existing foundation which includes knowledge, vocabulary and direct experiences, and the student's knowledge gaps that might have an impact on learning. The family can also be a good source of information on where the student's knowledge gaps exist (Berndsen & Luckner, 2012). For the teachers who use sign language, they could connect signs, print and other media to help build the schema of certain concepts taught in the classroom (Scott & Kasun, 2018). See suggestions of actual knowledge framework strategies in Appendix 1.

**Summary**

This chapter opened with a reiteration that students who are DHH are different from students with typical hearing thus requires different educational practices to address their educational needs. It then clarified the concept of evidence-based practices and the set criteria that qualifies practices as "evidence-based". It is documented that the field of the education of the DHH has limited evidence-based practices that meet these set criteria due to a number of factors, notably, the low-incidence nature of the disability that limits the type of research conducted in the field.

Consequently, the field is wrought with practices based on opinions rather than on science. One of the solutions proposed to mitigate this challenge has been to consider instructional practices that have the potential to improve the educational outcomes of students who are DHH, even though they do not fully qualify as evidence-based practices. The present study synthesized such practices from multiple media ad summarized them according to seven themes. The actual classroom strategies in each theme are presented in Appendix 3 and could be adapted by teachers of the DHH to suit their specific context in a bid to narrow the gap between research and classroom practice and increase the implementation of evidence-based practices in classrooms for the DHH.

# 5 Educational approaches

This chapter addresses the educational approaches used in schools for the DHH. The tenets of present study are that educational practices for the DHH encompass the educational approaches used to teach the students who are DHH. The proper approach to teach children who are DHH has been a controversial topic for over 200 years now. The controversy primarily revolves around which is the best through-the-air mode of communication, spoken or signed. There is general consensus that written communication is vital for the education for the DHH leaving the controversy to rage between spoken communication versus manual communication (Moores, 2010). The present study refrained from delving into the deep history of the development of language and communication for the DHH, and the controversies therein. This was done in keeping within the purview of the objectives of the study. Therefore, the present study provided a summary of the main approaches to the education of the DHH in a bid to lay the foundation for the understanding of teachers' approaches to education in Units for the DHH in Kenya.

## 5.1 Oral-Aural approach/ oral method/ pure oral method

The oral approach tends to focus on the development of spoken language of people who are DHH and does not include the use of sign language. The method places emphasis on training children who are DHH to develop speech, speechreading, and use of their residual hearing (Moores, 2010). Oral education continues to be applied in many parts of the world (Kyle, 2006) This is because listening devices such as digital hearing aids and cochlear implants continue to be more advanced and sophisticated (Marschark, 2018; Moores, 2010). The oral method has evolved from speech training exercises, drills, and compulsion to talk into a more natural aural method where the students are trained to hear and communicate (Kyle, 2006). However, this approach is still viewed by its critics as a means used by hearing educators and parents to normalize the child who is DHH (Kyle, 2006; Moores, 2010) and has been accused of focusing on the child's hearing loss as opposed to a whole individual who could learn a signed language as a first language and a spoken language as a second language (Scott & Kasun, 2018).

### Auditory Verbal

This oral approach places emphasis on the development of speech, where the child who is DHH relies more on their residual hearing rather than on speechreading. To attain this goal, the auditory therapy takes place with the therapist or teacher standing behind the child or with their lips covered

to avoid speechreading. This approach has increased due to advancement in hearing aid technology and cochlear implants (Moores, 2010).

**Cued speech**

This is a supplement to spoken language. In essence, it is spoken language that is supported with a set of sound-related handshapes in particular positions (Marschark, 2018). It is a system whereby consonants are represented using eight hand shapes and vowels represented using four hand shapes placed near a speaker's mouth. This manual system of cues is combined with speech to aid speechreading of lip movements by the individuals who are DHH (Moores, 2010). Cued Speech was motivated by the fact that when one is pronouncing words, many speech sounds look the same on the lips. Cued Speech therefore was designed to aid children who are DHH to distinguish spoken sounds that look alike on the lips. This way, it is argued that children who are DHH will learn to speech read and reproduce the lip movements in spoken communication. The handshapes, unlike in sign language, bear information about sounds but not meaning. Therefore, Cued Speech is not a language rather, a support for spoken language (Marschark, 2018). This method is not a widely used system of communication (Moores, 2010).

## 5.2 Sign approach/ bilingual-bicultural approach

This approach holds that sign language, being the first language of people who are DHH, should be the language of instruction for students who are DHH for their entire education duration. Sign language, not speech, should be the primary mode to teach students who are DHH other spoken languages such as English (Moores, 2010). This approach is based upon the premise that sign languages, like spoken languages have great communicative potential that allow their users to communicate ideas about phenomenon in different time and place (Okombo & Akach, 1997). Therefore, this approach places much emphasis on the development of sign language as the first language of the DHH and a subsequent development of the second or majority language through reading (Moores, 2010). Kyle (2006) states that the approach places emphasis on the child's early mastery of sign language while ensuring that the child still has access to spoken language of their community. The argument proffered is that if the children who are DHH have a solid foundation in their L1, sign language, they could use it to learn the written form of the other language without the exposure to its speech or a sign system (Mayer & Akamatsu, 1999; Mweri, 2014). In sign bilingualism, sign and spoken language have equal status and play an equal role as modes of

instruction for students who are DHH (Adoyo, 2002). Teachers in bilingual classrooms engage in vocabulary selection and instruction with both sign language and English in mind. Further, instructional activities, such as ASL poems, are selected to highlight Deaf culture which promote Deaf identity and culture. In addition, the teachers with typical hearing rely on sign language specialists to serve as the primary teachers of new signs to the students (Pizzo, 2018). This approach requires the parents to learn sign language, the involvement of a deaf role model, and contact with the Deaf community since approximately 95% of children who are DHH are born to parents with typical hearing and a majority of these parents are not fluent users of sign language (Beal-Alvarez, 2014; Convertino et al., 2014; Marschark & Knoors, 2019; Moores, 2018).

The sign approach is considered an opposing perspective to the oral approach in that it regards hearing loss as a normal human condition therefore, sign language should be supported in a bid to accept deaf communities (Moores, 2010). It is viewed as a shift from the perception that the child is "hearing impaired" to one of the child being "culturally deaf" thereby different from the parents and other members of the family with typical hearing. Proponents of the approach thereby hail it for its provision of seemingly a natural language framework where the child receives both sign language, and cultural experience of the Deaf (Kyle, 2006). However, the use of sign language for instruction has been on the decline even in countries that officially recognize their country's sign language. This decline has been attributed to: advancement in technology with digital hearing aids and cochlear implants, worldwide trend towards inclusion of students who are DHH in regular education settings, and neonatal screening for hearing loss and early intervention programs (Moores, 2010). One of the challenges leveled against this approach is that the students who are DHH do not have literacy skills from texts in their L1 that they could transfer as they learned their L2 since sign languages do not have a written form. Additionally, from the time the bilingual-bicultural programs have been implemented, neither pedagogical change nor better literacy outcomes have been achieved in the education of the DHH using this approach (Mayer & Akamatsu, 2012).

### 5.3 Sign systems

Sign systems are different from actual sign language because they were developed to represent spoken and written languages for educational purposes. Moreover, sign systems are not actual languages. This approach supports the development of a sign system that is based on the syntax of

a spoken language or a modification of a sign language for instruction. The sign systems use the vocabulary of an actual sign language but they use the syntax and morphological patterns of a spoken language (Moores, 2010). **Signing Exact English (SEE**) is a sign system that was developed to follow the English word order and it contained invented signs to represent pronouns, prefixes, and suffixes for verb tenses, number, and adverbial markers. To note is that a country's sign language differs from their signed system. For instance, Kenya has its own sign language, KSL and a sign system, SEE. Debate continues on the need for the sign systems in the education settings. Some authors in Kenya are proponents of the use of SEE to teach English to students who are DHH and they argue that it would help the students acquire the correct grammar. Moreover, they argue that since all subjects, except Swahili, are taught in English, the use of SEE would help the students who are DHH acquire proper English language skills which could subsequently lead to improved performance in English and all other subjects (Wamae & Kang'ethe-Kamau, 2004). The opponents of SEE in Kenya have castigated it as a system that tries to impose the English structure upon sign languages and is thereby ineffective (Mweri, 2014).

### 5.4 Simultaneous Communication (SimCom)

SimCom refers to the use of both sign and speech at the same time (Marschark, 2018; Moores, 2010). The spoken language is represented through signs and an individual with residual hearing can access information through the voice and signs presented alongside each other (Moores, 2003). This approach does not involve the use of sign language because an actual sign language is independent of any spoken language therefore, cannot be represented simultaneously by speech (Moores, 2010). It is used mainly at home and in school settings between people who are DHH and people with typical hearing who sign. Proponents of SimCom argue that it works as well as sign language in the classroom (Marschark, 2018).

### 5.5 Total Communication

Total communication refers to the use of all available sources of communication including sign, speech and amplification (Marschark, 2018). Additionally, total communication approach utilizes speech, fingerspelling, auditory training, print, gestures, sign language (Moores, 2010), gestures, writing, pantomime and mimicry (Awori, 2010). Moores (2010) reiterates that this approach encourages the use of all forms of communication available to meet the needs of the individual who is DHH. The rationale behind this approach is to use whichever elements of communication

that meet the needs of a child who is DHH depending on their stage of development (Moores, 2010). As a communication philosophy in schools, it means the support of spoken language, sign language or both with students who are DHH in order for them to best communicate in an educational and social setting. Research has established that total communication lays emphasis on the importance of sign language and urges the entire family to learn sign language to support the child who is DHH (Marschark, 2018).

**Summary**

This chapter highlighted the age-old debate on the educational approach for students who are DHH. In keeping within the scope of the present study, the researcher refrained from delving deep into the historical controversy surrounding the educational approach for students who are DHH. The chapter highlighted the different approaches that teachers use in the education of the DHH. Evidence-based practices for the DHH have been operationalized in the present study to include teaching strategies and educational approaches for the DHH. Therefore, it was imperative to highlight the different approaches used. This is because studies show that the educational approaches ascribed by teachers influence their overall educational practices. Evidently, educational practices and educational approaches are intricately connected and an inquiry into one would be incomplete without the other.

# 6 Teacher efficacy

This chapter delves into efficacy, specifically, teacher self-efficacy and its importance in the education setting. Perceived self-efficacy is "people's beliefs in their capabilities to mobilize the motivation, cognitive resources, and courses of action needed to exercise control over events in their lives" (Wood & Bandura, 1989, p. 364). Perceived efficacy is important to human beings in that it directly affects behavior and also indirectly affects goal setting, aspirations, expectations, perceptions of challenges, and opportunities in the social environment (Bandura, 2000). It is prudent at this juncture to distinguish self-efficacy from other conceptions of self, for instance, self-esteem and self-worth. Efficacy is a belief about one's abilities to coordinate skills and abilities to achieve a desired goal in a particular domain or situation (Maddux, 2012) while self-esteem is the overall affective evaluation of self (Rosenberg, 1965). Self-esteem is a belief about self and how a person feels about what they believe about themselves (Maddux, 2012). It is associated with one's respect and liking of self. In contrast, self-efficacy is a judgement about task capability. Self-efficacy is associated with performance of an activity at a desired level. Therefore, a person could have low efficacy in an activity and not suffer from low self-esteem. This is because the individual has not attached their self-worth to the performance of the particular activity (Tschannen-Moran et al., 1998). Efficacy beliefs in a certain domain can only contribute to an individual's self-esteem in direct proportion to the importance a person has placed on the said domain (Maddux, 2012). Conversely, people described as high achievers could display tremendous skill but suffer from low self-esteem because they have set for themselves standards that are difficult to attain (Tschannen-Moran et al., 1998). Further, despite their competence at a skill, some people could question their self-worth if significant others do not value their accomplishments, or if their skills cause harm to others, or if they are members of groups not valued in the society (Bandura, 1997). In summary, self-efficacy has to do with self-perception of competence rather than actual competence (Tschannen-Moran et al., 1998; Tschannen-Moran & Hoy, 2007).

Bandura's social cognitive theory forms the theoretical understanding of the concept in the present study. This theory defines self-efficacy as, "a future oriented belief about the level of competence a person expects he or she will display in a given situation" (Bandura, 1997, p. 3). People are seen not only as mere products of their environment but that they are also the producers of their environment since they have the capability to select, create and transform the circumstances of

their environments. Further, people are agents who have the capability to influence events to shape their lives. An agent is an individual who can intentionally influence their functioning and life circumstances (Bandura, 2002). The theory postulates that, juxtaposed with individuals with low efficacy, individuals with high efficacy are more likely to put in effort to accomplish challenging goals and to persist in times of challenges because they have the belief that they possess the capabilities to successfully master the challenges and difficulties (Bandura, 1997). An individual with strong efficacy beliefs will relatively resist the disruptions to their self-regulation, that could arise from difficulties and challenge, leading to perseverance that yields to the successful attainment of the desired results (Maddux, 2012). Therefore, for an individual to be successful in their endeavors, they must possess the required skills and resilient belief in their ability to exercise control over events (Wood & Bandura, 1989).

Research on self-efficacy contributes to the understanding of how people guide their behavior in the pursuit of their desired goals (Maddux, 2012). The present study focuses on self-efficacy as it pertains to teachers in an educational setting. Teacher efficacy "represents teachers' beliefs in their own ability to affect student learning" (Allinder, 1994, p. 86). Additionally, teacher efficacy is defined as "the teacher's belief in his or her capability to organize and execute courses of action required to successfully accomplish a specific teaching task in a particular context" (Tschannen-Moran et al., 1998, p. 233). Self-efficacy in education has led to research about the teachers' self-efficacy beliefs and how these beliefs are associated with the teachers' actions and the outcomes they achieve in classrooms (Tschannen-Moran et al., 1998; Wheatley, 2002). For instance, it has been established that teachers who perceive that they would be unsuccessful when working with certain students are likely to exert less effort in their preparation and delivery of instructions, and they are also likely to give up at any difficulty even though they possess the requisite strategies to assist these students if they applied the strategies (Tschannen-Moran & Hoy, 2007). On the other hand, teachers with a strong sense of efficacy firmly believe that they have the ability to help nearly all students learn, even those who might be regarded as difficult or unmotivated to learn (Guskey, 1988). Further, teachers' self-efficacy beliefs are associated with the amount of effort teachers invest in teaching, the goals they set in their career, their persistence in times of difficulties, and their resilience when faced with setbacks (Dixon et al., 2014; Hoy & Spero, 2005). For instance, an efficacious teacher can respond to the difficulty and character of content in a given content and adjusts it to suit the capabilities of the students and the educational purposes (Dixon et al., 2014;

Zee et al., 2016). It follows therefore that teachers with general low self-efficacy are prone to experience stress and burnout compared to those with high self-efficacy (Lauermann & König, 2016). Without a doubt, efficacy is an important concept for teachers and teacher trainers (Allinder, 1994). In summation, teacher efficacy is of importance to the present study because teachers with higher levels of efficacy have been found to be the ones more likely to learn and use new approaches and strategies for teaching (Ross, 1994). Furthermore, efficacy has been associated with the propensity of teachers to be open to new ideas and be willing to experiment with new teaching strategies (Guskey, 1988) which is in the purview of the present study on evidence-based practices of teachers in Units for the DHH.

## 6.1 Sources of efficacy

Self-efficacy beliefs are as a result of learning processes and social relationships play a key role in these learning processes (Brouwers & Tomic, 2000). The learning processes have four sources of efficacy information: mastery experiences, physiological and emotional states, vicarious experiences, and social persuasion (Bandura, 1997).

### Mastery experiences

These are the perceptions that a performance has been successful (Bandura, 1997; Hoy & Spero, 2005; Tschannen-Moran et al., 1998). These are garnered by teachers after actual teaching accomplishments with the students (Bandura, 1997). Mastery experiences have been found to be the most powerful sources of efficacy information (Tschannen-Moran et al., 1998). When an individual perceives that their performance was successful, their efficacy is raised and it contributed to their expectation of a similar future performance (Hoy & Spero, 2005; Maddux, 2012; Tschannen-Moran et al., 1998; Tschannen-Moran & Hoy, 2007; Wood & Bandura, 1989). Conversely, when an individual perceives that their performance was a failure, their efficacy is lowered and it contributes to their expectation of a similar dismal performance (Hoy & Spero, 2005; Maddux, 2012; Tschannen-Moran et al., 1998; Tschannen-Moran & Hoy, 2007; Wood & Bandura, 1989). Attribution plays a role in the mastery of experiences as a source of efficacy information. When an individual attributes their success to internal or controllable causes such as their ability or effort, then their self-efficacy is enhanced. However, if they attribute their success to external, uncontrollable causes such as luck or intervention from other more capable individuals, then their efficacy may not be enhanced (Hoy & Spero, 2005). For teachers to develop mastery

experiences, they need to practice the knowledge learned in professional development in their classrooms so as to garner sufficient experiences of success that translate to mastery of experience (Perera et al., 2019). The experience of overcoming setbacks is gainful in teaching an individual that success usually is as a result of sustained perseverance. Therefore, repeated successes assure individuals of their capabilities and they are better placed to manage setbacks and failures without suffering adverse effects (Wood & Bandura, 1989).

**Vicarious experiences**

These are experiences which the desired skill is modeled by another person (Bandura, 1997; Tschannen-Moran et al., 1998; Tschannen-Moran & Hoy, 2007). Self-efficacy beliefs are influenced by a person's observations of the behavior of others and the consequences of the behaviors (Maddux, 2012). People can increase their knowledge and skills through information conveyed by modeling other individuals (Wood & Bandura, 1989).The modeling could be in the form of a student learning from an instructor or mentor, or it could be from images portrayed in the media about the nature of teaching (Bandura, 1997; Tschannen-Moran et al., 1998). The model conveys to the observer effective strategies to manage different situations thereby building their self-efficacy beliefs (Wood & Bandura, 1989). The closer the observer identifies with the model, the stronger the impact the experience will have on their efficacy (Bandura, 1997; Maddux, 2012; Tschannen-Moran et al., 1998; Wood & Bandura, 1989). In the case that the model differs in ways that are significant to the observer, for instance, in terms of their level of experience, training, gender, or race then the self-efficacy may not be enhance even though the model is competent (Tschannen-Moran & Hoy, 2007). The observer uses the information observed to form expectations about their own behavior and its consequences (Maddux, 2012). For trainee teachers, models of successful teachers form a base for making the decision as to whether a specific teaching task is manageable and whether the teacher trainee has the adequate resources to execute the task (Tschannen-Moran et al., 1998). In addition, the model's performance on the desired task also affects efficacy in that if the model performs well, the efficacy of the observer is enhanced and vice versa (Bandura, 1997; Tschannen-Moran et al., 1998). The observation of admired and credible teaching models perform a teaching task successfully could affect the observer's personal teaching competence. Lastly, individuals are more likely to implement modeled information if the

information is perceived to produce desired outcomes rather than punitive ones (Wood & Bandura, 1989).

**Social or verbal persuasion** is what other people say to an individual regarding what they believe the individual can or cannot do (Maddux, 2012). Social persuasion has to do with verbal interactions that a teacher receives about their teaching performance and input from significant individuals in the teaching context (Tschannen-Moran & Hoy, 2007). This could be in the form of specific feedback on an individual's teaching performance, or it could be general information about the nature of teaching, encouragement and strategies to overcome situational obstacles (Bandura, 1997; Tschannen-Moran et al., 1998). It could also come from support or feedback from colleagues, administrators, and parents (Hoy & Spero, 2005; Tschannen-Moran & Hoy, 2007). Teachers could receive such feedback through coursework and professional development workshops that provide them with information about teaching tasks thereby increasing the teachers' repertoire of skills (Tschannen-Moran et al., 1998). Realistic feedback and encouragement could dispel doubts and increase self-efficacy of individuals. In contrast, unrealistic encouragement could lead individuals to failure that could decrease their sense of efficacy (Wood & Bandura, 1989). To note is that, social persuasion is limited in its power to increase self-efficacy (Bandura, 1997; Maddux, 2012; Tschannen-Moran et al., 1998). However, it has been found to boost self-efficacy to some extent which led to some individuals to initiate a task, attempt a new strategy or even exert more effort to succeed at an activity. The effectiveness of social persuasion depends on the credibility, trustworthiness, and expertise of the one trying to persuade an individual on an activity or performance (Bandura, 1997). Tschannen-Moran et al. (1998) caution that if the feedback provided is extremely harsh or is too general, then social persuasion in this case could lower self-perception of teaching competence. Consequently, the teachers could despair and conclude that the desired result for the particular teaching task was impossible to achieve. Feedback that highlights the teacher's positive achievements and encourages attributes that are within the teacher's control such as effort could have a positive effect on the development of efficacy beliefs. Lastly, social persuasion needs to be accompanied by the development of new skills that could help improve performance on a teaching task otherwise, its impact will be short-lived (Tschannen-Moran et al., 1998).

**Physiological and emotional states** are the levels of emotional and physiological arousal experienced by an individual when teaching and these contribute to their self-perceptions of teaching competence (Bandura, 1997; Tschannen-Moran et al., 1998; Wood & Bandura, 1989). When a teacher teaches a successful lesson, the feelings of joy or pleasure they experience may increase their sense of efficacy and in contrast, if they feel high levels of stress or anxiety due to a feeling of lack of control then it may result to low efficacy beliefs (Tschannen-Moran & Hoy, 2007). Typically, the feelings of relaxation and general positive emotions are a sign of self-assurance and the anticipation of future success. In contrast, physiological arousal such as trembling of hands, increased heart and respiratory rates, increased perspiration, could be a sign of negative stress and anxiety (Bandura, 1997). These physiological and emotional states affect self-efficacy when an individual associates perceived poor performance or failure with aversive physiological arousal and perceived success with pleasant emotional states. General observations indicate that individuals feel more efficacious when they are calm than when they are aroused and distressed (Maddux, 2012). High levels of arousal could impair an individual's functioning and interfere with their ability to utilize their skills and capabilities (Tschannen-Moran et al., 1998). This occurs when an individual is aware of their unpleasant physiological arousal and doubts their capabilities to perform a given task based on the physiological states (Maddux, 2012).

## 6.2 Cyclic nature of teacher efficacy

Tschannen-Moran et al. (1998) proposed an integrated model which reflects the cyclic nature of teacher efficacy. Similar to Bandura's theory, the model maintains that there are four sources of efficacy information: mastery experiences, physiological and emotional arousal, vicarious experience, and social persuasion. These four sources of information contribute to a teacher's analysis of the teaching task and their perceived teaching competence. The proposed model is depicted in Figure 6:1 and it shows the cyclic nature of teacher efficacy.

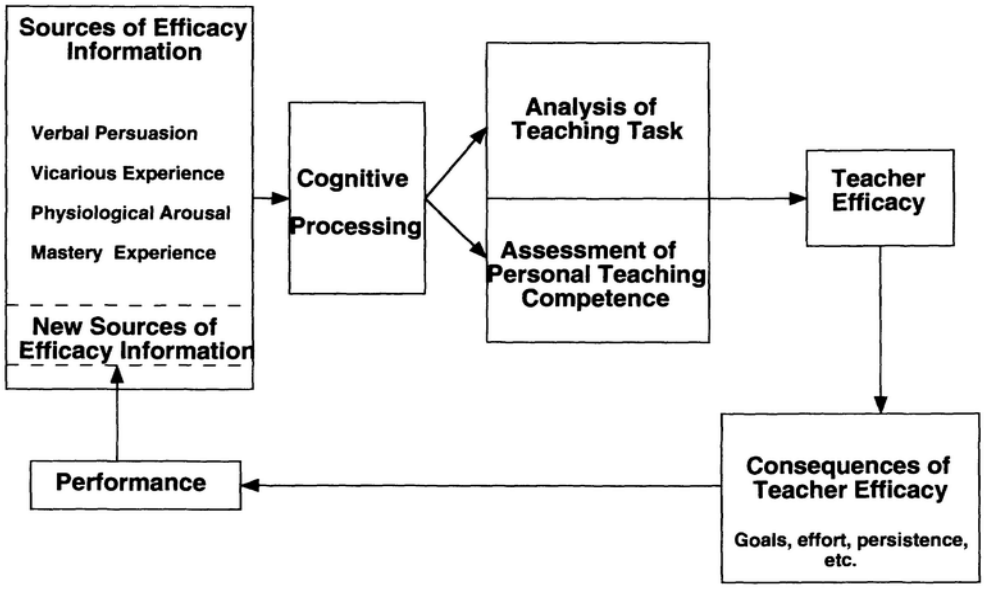



*Figure 6:1.* Cyclic nature of teacher efficacy.

(Tschannen-Moran et al., 1998, p. 228)

**Cognitive processes**: this is the interpretation of the sources of efficacy information. The cognitive processes determine how the teacher will assess the sources of information and analyze the teaching task and determine their personal teaching competence (Tschannen-Moran et al., 1998). The sources of information the teacher attends to or considers important, greatly influences their efficacy beliefs (Bandura, 1997). When the teachers reflect on their teaching performance, they can attribute their success or failure to either external factors or to personal factors (Tschannen-Moran et al., 1998). In their proposed model, this reflection and judgement that the teacher makes about their capabilities and shortcomings is their self-perception of their teaching competence. The teacher's reflection and judgement regarding the resources and the limitations found in their teaching context is the analysis of teaching task. The implication is that when a teacher is making judgements about their teaching efficacy, they assess their perceived teaching competence in light of their assessment of the requirements of the teaching task (Tschannen-Moran et al., 1998). Teaching efficacy thereby is a teacher's judgement of both the teaching task and personal competence.

**Analysis of the teaching task**: this is the teacher's assessment of what is required of them in a particular teaching situation. The teacher weighs the difficulty of the teaching task and considers the abilities required to successfully accomplish the task. The teacher considers other factors such

as the students' abilities and motivation, and social economic status; appropriate instructional strategies; managerial factors; availability and quality of instructional materials; access to technology; and the physical conditions of their teaching space or classroom (Tschannen-Moran et al., 1998; Tschannen-Moran & Hoy, 2007). The teacher also considers contextual factors such as the leadership of the school principal, the climate of the school, and the characteristics (e.g., supportiveness) of the other teachers (Tschannen-Moran et al., 1998; Tschannen-Moran & Hoy, 2007).

**Assessment of personal teaching competence**: the model separates the assessment of personal teaching competence from teacher efficacy. Self-perception of teaching competence is regarded as a part of teacher efficacy rather than the whole. This self-perception of teaching competence would be assessed through questions that inquire about a teacher's current functioning (Tschannen-Moran et al., 1998). The assessment of the teaching competence contributes to the judgement of teacher efficacy which is a prediction of the teacher's future capability (Hoy & Spero, 2005; Tschannen-Moran et al., 1998).

Following this model, **teacher efficacy** is a composition of the teacher's perception of their teaching competence (an assessment of internal resources and constraints) and their beliefs about the requirements to perform a teaching task in a particular teaching situation (an assessment of resources and external constraints) which eventually yield to the consequences of teacher efficacy (Tschannen-Moran et al., 1998). The teacher's judgement about their self-efficacy is the result of an interaction between their personal appraisal of the factors that make teaching difficult and an assessment of their personal teaching capabilities. Therefore, the teacher's judgement about their self-efficacy is the result of an interaction between their personal appraisal of the factors that make teaching difficult and an assessment of their personal teaching capabilities (Brouwers & Tomic, 2000). The argument is that a teacher who is aware of their capabilities and deficits in a particular teaching task and holds the belief that the deficits can be addressed will have a resilient sense of teacher efficacy (Tschannen-Moran et al., 1998).

**The consequences of teacher efficacy** can be viewed as the goals the teachers set for themselves, the effort they put into attaining the set goals, and their persistence in face of difficulties (Wood & Bandura, 1989). These consequences of teacher efficacy influence the teacher's **performance levels**, which consequently serve as **the new sources of efficacy information**.

The model thereby captures the cyclic nature of teacher efficacy in that when a teacher performs a task proficiently, it creates a new mastery experience, which in turn provides new information that will be processed to inform future efficacy beliefs (Tschannen-Moran et al., 1998). Greater efficacy leads to greater effort and persistence, which leads to better performance and subsequently lead to greater efficacy (Tschannen-Moran et al., 1998; Wood & Bandura, 1989). In contrast, lower levels of efficacy lead to lower levels of effort and persistence, which lead to a deterioration of performance, in turn, leading to lower efficacy. This is because when people with low efficacy beliefs face difficulties, they tend to reduce their efforts , give up prematurely or quickly settle for mediocre solutions (Wood & Bandura, 1989).

**Summary**

This chapter introduced the concept of self-efficacy and its theoretical underpinnings. A growing body of research indicates that teacher efficacy is an attribute that has far reaching implications in education and the present study highlighted the various educational themes that have been associated with teacher efficacy. Relevant to the present study is the suggested association between teacher efficacy and the implementation of new approaches, and strategies in education. In a bid to expand the inquiry on the implementation of evidence-based strategies in the education of the DHH, it also sought to establish whether highly efficacious teachers were more likely to implement these strategies than their counterparts with low efficacy. This could illuminate research on the uptake of evidence-based practices in classrooms for the DHH, which as described, is wanting.

# 7 Research Objectives

This chapter provides an explanation of the purpose of the study. It also provides an outline of the research objectives that the present study sought to achieve. Lastly, it enumerates the research questions that were answered in the present study.

## Purpose of the Study

In the present study, educational practices were construed to encompass evidence-based educational strategies, and educational approaches in the field of deaf education. Based on this perspective, the purpose of this study was to determine the extent to which teachers of the DHH implement evidence-based educational practices in the Units of the DHH in Kenya; document the teachers' experiences of implementing evidence-based practices in Units for the DHH in Kenya and it sought determine the educational approach used in Units for the DHH in Kenya. In addition, the study sought to establish the efficacy of these teachers as they taught students who are DHH in Units. Lastly, the purpose of the study was to ascertain whether there was an association between the use of evidence-based practices and the efficacy of teachers of students who are DHH in Kenyan Units.

## Objectives of the Study

The following were the main objectives of the study:

1. To determine the extent to which evidence-based practices was employed in Units for the DHH in Kenya.
2. To establish the efficacy of teachers of the DHH in Kenyan Units.
3. To ascertain whether there was a relationship between the use of evidence-based practices and efficacy of teachers of students who are DHH in Kenyan Units.

## Research Questions

The present study sought to answer the following research questions:

1. What is the extent of use of evidence-based practices in Units for the DHH in Kenya?
    a. What is the teachers' experience in the use of evidence-based practices in Units for the DHH in Kenya?
    b. What approach to the education of the DHH is utilized in Kenyan Units?

2. What is the efficacy of teachers teaching in Units for the DHH in Kenya?
3. Is there a relationship between self-efficacy and use of evidence-based practices in Units for the DHH in Kenya?

# 8 Method

This chapter contains the methodology undertaken to achieve the objectives of the present study.

## 8.1 Research methodology

The present study used a mixed methods approach. “Mixed method studies are those that combine the qualitative and quantitative approaches into the research methodology of a single study or multi-phased study” (Tashakkori & Teddlie, 1998, p. 21). Onwuegbuzie and Johnson (2006) assert that the researcher should be careful to combine the approaches and concepts of quantitative and qualitative methods that have complementary strengths but not their weaknesses. Therefore, the goal of mixed methodology is to utilize the in-built strengths of quantitative and qualitative approaches while making attempts to minimize their shortcomings (Onwuegbuzie & Johnson, 2006). The present study took cognizance of the fact that both quantitative and qualitative approaches are important (Easterbrooks, 2017) and utilized the strengths of both qualitative and quantitative approaches in that the findings from each aspect were used to complement and corroborate the overall findings of the study.

The present study sought to broaden the scope of inquiry in research on evidence-based practices in deaf education by seeking to capture the extent of use of the evidence-based practices in Units for the DHH, the teachers’ experiences at the Units, their levels of efficacy and whether there was indeed an association between the use of evidence-based practices and efficacy levels in teachers. To adequately achieve the purpose of the study, it was inevitable to collect both quantitative and qualitative data. Mixed research methods have been found suitable to answer different research questions in a bid to expand a research enquiry (Bryman, 2006). The present study utilized mixed methods to respond to different research questions found in the study as depicted in Figure 1.

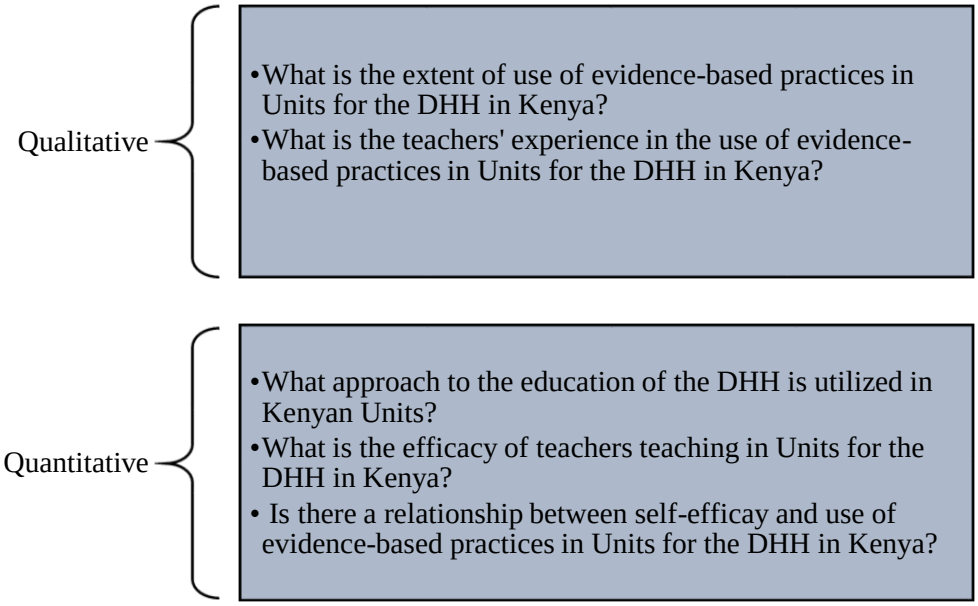



*Figure 8:1*. Research questions addressed by the mixed-methods approach.

The qualitative methods utilized in the present study were focus group discussions (FGD) and structured observations while the quantitative methods used were the administration of structured questionnaires. The qualitative methods provided information about the evidence-based strategies used in schools for the DHH, the experiences of teachers of the DHH in Kenyan Units, and the context of the study. Quantitative data alone, say through the use of questionnaires, would have been an inadequate method to ascertain the extent teachers implemented evidence-based practices, their experiences in the implementation of evidence-based practices in the Units, and research context due to the inherent limitations of self-reports. Therefore, structured observations as opposed to self-reports were apt to collect this data as they had the potential to mitigate the response bias, and the challenges participants often face during self-introspection while completing questionnaires. The structured classroom observations showed the teachers in their natural setting and facilitated the researcher to objectively collect data on the teachers' educational practices without an overreliance on their perception or introspection as in the case of questionnaires, for instance. Literature suggests that well designed questions during FGDs lead to deep, interactive discussions among the participants in FGDs (Easterbrooks, 2017). The use of FGD allowed the study participants, teachers of the DHH, to adequately express their experiences of teaching students who are DHH in Units. Such elaborations could not have been achieved with

a purely quantitative approach. Lastly, observations were suitable to describe the context under which the study was undertaken which would not have been captured adequately through quantitative methods. On the other hand, the quantitative methods provided information on the efficacy of the teachers of the DHH, their beliefs about education of the DHH, and whether there was an association between the use of evidence-based strategies for the DHH and efficacy of the teachers. Psychological concepts such as efficacy and beliefs are adequately measured using structured questionnaires hence their use in the present study (Creswell, 2012). Therefore, questionnaires were an adequate method to collect data on teacher efficacy and the approach they use in education of the DHH. Further, establishment of associations between variables is best achieved through correlation analyses which are quantitative methods. The use of both methods thereby yielded more comprehensive answers to the study's research questions which otherwise would not have been adequately answered by either one of the methods. With the rationale presented, mixed-methodology was deemed the most suitable approach to achieve the research objectives of the present study.

## 8.2 Research design

Research designs describe the actual procedures utilized in the research procedures including data collection, data analysis, and report writing (Creswell, 2012). The present study followed the convergent design (which previously was known as the triangulation design) with the data transformation variant deemed the most appropriate. This design allows for a comparison of quantitative and qualitative data so that one can obtain a complete comprehension of a phenomenon under study (Creswell & Clark, 2018). The premise of the convergent design is to "bring together the results of the quantitative and qualitative data analysis so they can be compared or combined" (Creswell & Clark, 2018, p. 65). In the data transformation variant of the convergent design, quantitative and qualitative data are collected separately and the researcher analyses both data types separately (Creswell, 2007; Creswell & Clark, 2018; Martella et al., 2013; Tashakkori & Teddlie, 1998). Once the initial analysis is complete, one data type is transformed into another data type such that either quantitative data is qualified or qualitative data is quantified. This data transformation paves way for a mixture of the data to facilitate comparisons or interrelations and interpretations (Tashakkori & Teddlie, 1998). The data transformation variant is illustrated in Figure 7:2.

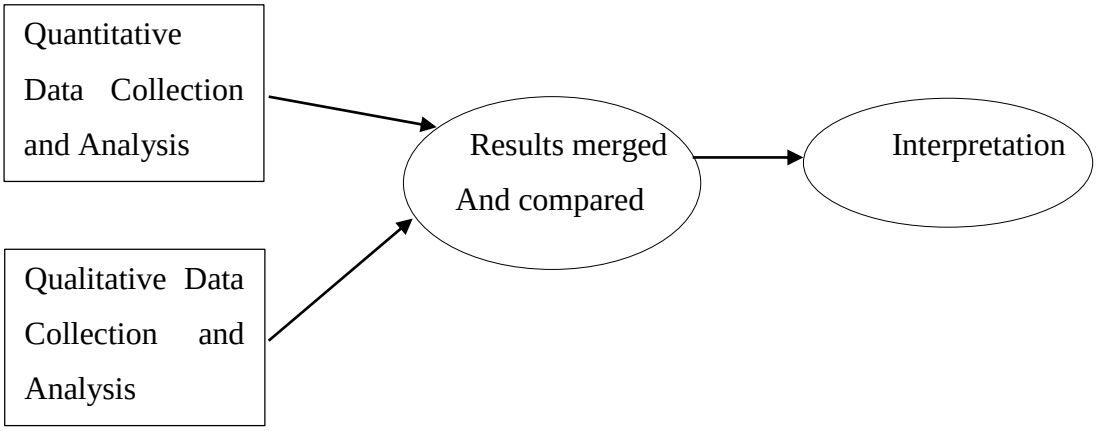



*Figure 8:2*. The convergent design: data transformation model

(Creswell & Clark, 2018, p. 66)

This model was appropriate for the present study because both qualitative and quantitative data were initially collected and analyzed separately. It has been documented previously, that teachers with a strong sense of self-efficacy are open to new ideas and are willing to experiment with and apply new strategies to meet the needs of students (Tschannen-Moran & Hoy, 2001a). The present study sought to establish whether there exists a relationship between teachers' self-efficacy and use of evidence-based practices in Units for the DHH in Kenya. Data on teacher efficacy was quantitative data while data on the implementation of evidence-based practices was qualitative data, both collected separately. The data transformation variation of the convergent design permitted the qualitative data collected in the form of structured classroom observations were quantified, transforming them into quantitative data and correlation analysis conducted between the two quantitative sets of data to test for correlation. This provided an answer to the research question on whether there was a relationship between efficacy and the use of evidence-based pedagogy in Units for the DHH. The process of the actual data transformation was described in detail in Chapter Eight of the present report. The qualitative and quantitative findings were then interpreted to answer the research questions of the present study. Therefore, in the present study, the data transformation variant of the convergent design was most suitable to obtain answers to the research questions of this study.

## 8.3 Population and sample selection

A research population is the sum of people a researcher can potentially draw a sample from (Aidley, 2019). The target population for the present study was teachers of the DHH who taught

in Units in Nairobi and Kiambu Counties. Nairobi County is the capital city of Kenya and Kiambu County neighbors Nairobi County. The total population at the time of field work was 27 teachers of the DHH in Units for the DHH. Generally, as described in the context of the study (Chapter Two) there is a shortage of teachers of the DHH in Units for the DHH. This situation was greatly compounded during data collection the data collection exercise because the body that employs teachers in Kenya, the Teachers Service Commission, had directed that teachers in certain job groups would be promoted to managerial positions in the schools (Wanzala, 2019). This scenario was similar to observations made by Adoyo (2002) who reported such misplacement of skills, where teachers of the DHH are posted to teach in regular schools. Consequently, a number of teachers of the DHH were transferred from the Units of the DHH and given managerial positions in regular schools which significantly reduced the target population of the present study.

The use of probability sampling procedures and designs such as experimental designs in studies with students who are DHH has been found to be challenging due to the low incidence rate of DHH population (Cannon & Guardino, 2012) a fact that has already been alluded to in Chapter Four. This was evidenced in the present study as the population of teachers of the DHH was 27 in the regions identified as research sites. Therefore, with such a small population, non-probability sampling methods were considered suitable to select the sample for the present study as random sampling procedures would have yielded an even smaller sample size. Snowball sampling method was used to select the sample of the study. Snowballing is viewed as a recommended practice for small or specific populations (Aidley, 2019). The method was selected for the present study because the target population was small and very specific in that the study was solely interested in participants who taught students who are DHH in Units, not schools for the DHH. Snowballing entails asking the participants to identify and recruit other suitable participants of the study (Aidley, 2019). The researcher requested the participants to recommend Units for the DHH and the researcher visited the Units and requested the teachers therein to voluntarily participate in the study. Through this method, the researcher garnered 23 participants. The main criticism leveled against snowballing is that it is susceptible to bias since participants would only recommend people that they are familiar with (Aidley, 2019). In the present study, this potential bias was mitigated considerably because the researcher approached all known Units of the DHH in Nairobi and Kiambu Counties and gave each teacher of the DHH an opportunity to voluntarily participate in the study. Suffice it to say, the number was considerably small hence it was feasible to take this

approach unlike in larger populations. Even though non-probability sampling procedures were utilized in the present study, the participants were selected from all sub-counties in Nairobi and Kiambu that are known to have Units for the DHH. This enabled the researcher to draw participants from different regions of the Counties which contributed to the diversity in the sample.

## 8.4 Data collection instruments

Both qualitative and quantitative data were collected since it was a mixed-methods study. Quantitative data was collected using three questionnaires and qualitative data was collected using structured observations, focus group discussion (FGD) and field notes.

### 8.4.1 Quantitative instruments

The first questionnaire was **the Teachers' Sense of Efficacy Scale (TSES)**. The TSES was developed to measure the efficacy of teachers (Tschannen-Moran et al., 1998). The present study chose to use TSES as it was deemed superior to other measures of efficacy and it had a stable factor structure as previous scales were reported to have a number of psychometric problems (Hoy & Spero, 2005; Tschannen-Moran & Hoy, 2001a). Further, the present study utilized this scale because it encompassed a wide aspect of teaching resulting to items that assess a broader range of teaching tasks as compared to other scales that measure efficacy (Tschannen-Moran & Hoy, 2001a). The scale has two versions: the long, 24-item version and the short, 12-item version. The present study utilized the short, 12-item version of the TSES since it was found to be analogous to the original 24-item instrument (Dixon et al., 2014; Zee et al., 2016).

The TSES has three interrelated facets of teacher-efficacy: Instructional strategies (IS), Classroom Management (CM), and Student Engagement (SE). The IS subscale measures the extent to which teachers feel capable of using different instructional methods for student learning. The CM subscale seeks to measure the teacher's perceptions about their capability to organize and guide the behavior of the students. Lastly, the SE subscale seeks to measure the teacher's perceived ability to activate the students' interest in schoolwork (Tschannen-Moran et al., 1998; Tschannen-Moran & Hoy, 2001a, 2007; Zee et al., 2016). The psychometric properties of the short, 12-item version of the TSES have been found to be adequate and quite comparable to the original, 24-item version (Dixon et al., 2014; Tschannen-Moran & Hoy, 2001a). In previous studies, alpha coefficients ranged from between .71 and .87 for IS, .83 and .94 for CM, and .74 and .88 for SE which are considered adequate (Klassen et al., 2009; Tschannen-Moran & Hoy, 2001a). Results

from the analysis indicated that both the 24-item and 12-item scales were reasonably valid and reliable (Tschannen-Moran & Hoy, 2001).

The TSES (short version) has 12 items assessed along a 9-point continuum with anchors at 1- Nothing, 3- Very Little, 5- Some influence, 7- Quite a Bit, and 9- A great deal (Tschannen-Moran et al., 1998; Tschannen-Moran & Hoy, 2007). A sample of the items in the instrument is provided below (Tschannen-Moran & Hoy, 2001b) and the complete TSES availed in Appendix 2:

> Item 5: To what extent can you craft good questions for your students?
> Item 9: How much can you use a variety of assessment strategies?
> Item 12: How well can you implement alternative strategies in your classroom?

The second questionnaire was **the Beliefs and Attitudes about Deaf Education (BADE)**. The scale was developed to allow parents, early interventionists, and teachers to better understand their own attitudes about the best practices for learners who are DHH (Clark et al., 2013; Rodriguez & Allen, 2018; Wolsey et al., 2015). The scale attempted to capture the two approaches of education of the DHH. The first approach is the cultural one which holds that deaf people represent a linguistic minority and are part of a visual culture while the second model is the medical model which holds that deaf people need to learn spoken language (Clark et al., 2013; Moores, 2010). The scale was intended to allow parents, early interventionists, and teachers to better understand their own attitudes about the best practices for learners who are DHH (Clark et al., 2013). The instrument asks respondents about their beliefs and attitudes on a number of issues pertinent to the education of the DHH: early intervention services, communication options, language choices, school placements, support services, and assistive technology (Wolsey et al., 2015). The present study selected the BADE instrument to measure teachers' approach towards deaf education due to its strong reliability and validity characteristics. In addition, the questionnaire was selected on a pragmatic basis since it was the only instrument, at the time of conducting the research, developed to specifically measure the beliefs and attitudes of teachers, other practitioners, and parents, towards education of the DHH. It was found that it sufficiently suited the objectives of the present study.

BADE has four subscales: literacy through hearing technologies, visual language and bilingualism, listening and spoken language, and difficulties for hearing parents to learn ASL (Clark et al., 2013). Analysis conducted resulted in high reliable subscales with coefficients of: Factor 1 $\alpha = .91$; Factor

2 α = .89; Factor 3 α = .80 and Factor 4 α = .85 which were considered adequate (Clark et al., 2013).

BADE comprises of 26 items anchored on a 5-point Likert scale that represented different levels of agreement: 1= Strongly Disagree to 5= Strongly Agree. In the present study, some items in the questionnaire were slightly adapted to suit the Kenyan context. The original items that read "American Sign Language (ASL)" in their statements were adjusted to read "Kenyan Sign Language (KSL)" which provided clarity to the participants. A sample of the items in the instrument is provided below (Clark et al., 2013) and the complete BADE Scale availed in Appendix 3:

> Item 5: If children have early access to spoken language through hearing, without visual supports, then they will develop better language skills.
> Item 13: Hearing parents cannot learn KSL; therefore, the focus should be on the child's oral language skills.
> Item 22: Being a member of a Deaf community with a unique culture and language enriches one's life.

The third quantitative data collection instrument was a brief **demographics questionnaire** that collected pertinent demographic information from the participants. The questionnaire was intended to collect data about the gender, age bracket, teaching experience, and educational background of the participants. Most of the items in the questionnaire were closed questions and a few were short-answer questions and were generally easy to complete. See Appendix 4 for the complete demographics questionnaire.

### 8.4.2 Qualitative instruments

The present study utilized an **observations schedule** to guide the structured observations. The researcher designed their own observation schedule. This was due to unavailability of a standardized instrument that was culturally appropriate for the present study and one that could aptly collect data on evidence-based strategies specifically used by teachers of the DHH. This practice is recommended when a researcher lacks an instrument that could be modified or adapted to measure the desirable attribute, in the present study, evidence-based strategies used by teachers of the DHH (Creswell, 2012).

At the initial stage of the development of the observation schedule, the goal was to identify and list every possible observable classroom activity that pertained evidence-based practice of students

who are DHH. Literature on evidence-based strategies for the DHH was extensively reviewed from varied media including books, periodicals, handbooks and other available resources publicly available. A comprehensive list of the resources analyzed can be obtained from the reference section at the rear end of this report. The evidence-based strategies summarized from the literature formed the items in the observation schedule. These items were written in clear language, were overtly observable, and applicable to the pedagogy of students who are DHH. The observation schedule was organized into seven themes that encompass evidence-based strategies for the DHH. The themes in the classroom observations schedule included: classroom organization and classroom routines; visual aids and language of instruction; optimal visual and acoustic conditions; differentiated instruction; classroom social arrangement; lesson structure; and knowledge framework. The project supervisor, an expert in the field of education for the DHH, and some other educators of the DHH, provided feedback that ensured the items in the observation schedule were a sufficient representation of evidence-based strategies of the DHH.

Items under each theme were measured on a three-point scale. The three levels of measurement were: “Never”, “Sometimes”, and “Often”. “Never” meant that the strategy was not observed during the lesson, “Sometimes” meant that the strategy was observed at least twice during the lesson and “Often” meant that the strategy was observed more than twice during the lesson. These groupings were to generate ordinal type data; the present study did not assume that the differences between “never,” “sometimes” and “often” on the observation schedule were equal. A sample of the items are provided below and the complete observation schedule is availed in Appendix 5:

> Item 102: The students are seated in a horse-shoe/semi-circular or L-shape arrangement.
> Item 308: The teacher turns to the blackboard when talking/signing.
> Item 701: The teacher assesses prior knowledge of students before the lesson.

A **focus group discussion guide** was developed by the researcher to guide the discussion in the focus group discussion (FGD). This was a short list of questions on the implementation of evidence-based strategies in the classroom and the teacher’s experiences. The list of questions was merely used as a guide to keep the discussion but it did not limit free flow of discussion from the participants as long as the discussions remained within the scope of the research topic. The questions were open-ended to allow unrestricted provision of details on each question.

A sample of the questions is provided below and the complete Focus Group Discussion Guide is availed in Appendix 6:

> Explain whether your familiarity with the strategy.
> Describe how you implement the strategy in your classroom.
> Share any challenges that you have encountered while using the strategy.

Due to the diversity of qualitative studies, the validity of these studies has remained elusive. Recommendations have been made on how to evaluate qualitative studies. Patton (2002) proposes five sets of criteria for the judgment of qualitative inquiry: traditional scientific research criteria; social construction and constructivist criteria; artistic and evocative criteria; critical change criteria; and pragmatic utilitarianism. The traditional scientific criterion was utilized to uphold validity of the qualitative aspect of the present study. Patton (2002, p. 266) explains that "science has traditionally emphasized objectivity, so qualitative inquiry within this tradition emphasizes procedures for minimizing investigator bias". One of the documented ways to minimize bias is by the use of multiple coders and the calculation of inter-coder consistency. The present study had one other coder who carried out classroom observations with the primary researcher. The second coder was a sign language interpreter and an itinerant but untrained teacher of the DHH. The researcher trained the second coder on what to observe in the classrooms. Both the researcher and the second observer made structured classroom observations during the pilot phase of the study and a high interrater agreement was attained.

Additionally, on the aspect of validity in qualitative studies, Creswell (2012) recommends member checking as a method of validating qualitative findings. "Member checking is a process in which the researcher asks one or more participants in the study to check the accuracy of the account" (Creswell 2012, p. 259). The researcher requested one participant who was involved in the classroom observations and the FGD to ascertain, whether the findings of the present study, specifically, the findings that emanated from the FGD, were an accurate representation of what transpired. The participant approved that the findings from the FGD were accurate, to the best of their recollection, of what was discussed during the FGD.

Lastly, data was also collected through **field notes** that were recorded in a notebook. The field notes contained information not contained in the other data collection instruments such as teacher's contact information, demographic information of the students in the classroom, infrastructure

contained in the Units, available learning and teaching resources, special successes and challenges experienced by the teachers, suggestions on how to resolve the challenges, and general climate of the classroom. The researcher also captured information about the FGD and the environment the discussion was held. Lastly, the filed notes contained instances of observer effect identified during the classroom observations and the FGD.

### 8.5 Data collection procedures

Data, both qualitative and quantitative, was collected from Units for the DHH in Nairobi and Kiambu Counties. Before the actual study was conducted, a pilot study was conducted and the details are provided herein. The researcher paid reconnaissance visits to different Units and met with the school principals and heads of Units of the DHH to make introductions, explain the purpose of the research and request for their participation in the study. Once permissions were granted and rapport created, the researcher made appointments for actual data collection dates. The visits were necessary to ensure that forge a trusting relationship that would enable the participants feel at ease to participate in the study, especially when being observed in their classrooms. The researcher also introduced the research assistant who assisted with the data collection.

#### 8.5.1 Pilot study

In social studies, a pilot study can be used in two ways: as a small scale version in preparation of the main study and it can also mean the pre-testing of a particular research instrument (van Teijlingen & Hundley, 2002). The present study utilized the latter definition of a pilot test, restricting it to the pretest of research instruments before they were used in the main study. The purpose of this kind of pilot study is to find out how the instruments operates under realistic conditions (Creswell, 2012; Hassan et al., 2006; Martella et al., 2013). The present study found a pilot study vital since pilot studies have been found to provide advance warning about where the main research project could fail, where the research protocols may not be followed, or whether proposed instruments were inappropriate or too complicated (van Teijlingen & Hundley, 2002).

The pilot study was used to discover the approximate time it would take for the participants to fill the questionnaires, whether the instructions in the questionnaires were clear, and whether the items in the questionnaires were comprehensible to the participants. Further, the pilot study was used to ascertain whether the observation schedule had any structural or formatting errors, whether the language was clear and comprehensible, and whether the items were well defined and presented

in a consistent manner. More importantly, the pilot study helped determine the rate of agreement between the observations made by the primary observer and the secondary observer.

The researcher recruited a research assistant who acted as the secondary observer. The assistant identified was a seasoned Kenyan Sign Language Interpreter and an untrained teacher of the DHH. The researcher explained the purpose of the study, the role of the assistant and the aims of the classroom observations. The researcher then described each item in the observation schedule and provided the rationale of each item in regard to the entire purpose of the study as recommended by Rizvi (2010). Thereafter, the research assistant was trained on how to conduct the structured classroom observations. The training helped ensure that the primary and secondary observers had a mutual understanding of the observation schedule (Rizvi, 2010). Additionally, the researcher explained in detail the three levels of measurement used in the observation schedule and provided relevant examples to foster clarity. Any words in the observation checklist that were confusing to the secondary observer were extensively clarified and classroom examples provided to further elucidate the concepts. Lastly, the researcher explained issues of ethics in research and general professional conduct expected during the observations.

The pilot study was conducted in two schools for students who are DHH. Two teachers of the DHH volunteered to participate in the pilot study and they were not involved in the main study. It is advisable to pilot research instruments on a small group of volunteers who bear similarities with the target population (van Teijlingen & Hundley, 2002). In the present study, the volunteers in the pilot study resembled the participants in the main study in that they were teachers of the DHH. However, these volunteers taught in schools for the DHH not in Units. This was a pragmatic decision made to preserve the already small number of eligible participants who could take part in the study. The questionnaires were administered to the volunteers and they were encouraged to provide feedback on their comprehension of the instructions and items, the length of the questionnaires, relative ease or difficulty to complete the questionnaires, the format of the questionnaires, and any other outstanding challenges they faced during their interaction with the questionnaires.

The feedback from the volunteers was taken into consideration and errors were rectified. The main adjustments made were that some redundant items were deleted from the questionnaires, the layout of observation schedule was reformatted, some items in the observation schedule were rearranged

to facilitate logical flow, some items in the observation schedule that read "class" were changed to "grade" to reflect the new educational curriculum in the country, and some items in the BADE questionnaire that read, "ASL" were changed to "KSL". Once these modifications were made, the instruments were deemed fit to utilize in the main study (see Appendix for actual instruments). The interrater agreement was calculated for the observations made by the two observers in the two schools. Cohen's Kappa analysis resulted to K= 0.807 and K= 0.815, an indication that there was almost perfect agreement between the two raters. The strong interrater agreement warranted the participation of the secondary observer in the main study.

### 8.5.2 Qualitative data

Qualitative data was collected through classroom observations, focus group discussion and field notes.

**Observations**

The researcher conducted direct observations where the researcher carried out the observations as the events unfolded at the moment they occurred (Ciesielska et al., 2018). This was a suitable method for the present study since it allowed the researcher to observe the participants teaching and undertaking their natural routines in their classrooms which provided deeper insights into the actual situation in the Units. The use of an observation schedule during the direct observations provided the researcher with the opportunity to collect objective data on whether or not the teachers were engaged in evidence-based pedagogy in their actual teaching. This method was found to be the most suitable as opposed to self-reports. One limitation of self-reported data is that the researcher can only trust that the respondents gave truthful and adequate reports (Dixon et al., 2014). Further, self-reports are deemed unsuitable when one needs to gather information about context in the environment of deaf education (Cawthon, 2017). Therefore, to mitigate these limitations and ensure that accurate data was collected, direct observations were conducted. The researcher was cognizant of the fact that observer effect, changes in the participants' behavior in the presence of the observer, is always a concern when it comes to observational studies (Martella et al., 2013). Therefore, the researcher recorded the few instances when it occurred and presented these observations alongside the study findings.

The structured classroom observations were conducted during Math, English and Kenyan Sign Language lessons. Each participant was observed teaching at least two lessons. In the present

study, the researcher took the stance of a non-participant observer whereby the researcher made observations without any involvement in the activities taking place (Ciesielska et al., 2018). The researcher would introduce themselves and the research assistant to the class before the lessons began and took a seat behind the students to minimize distraction. The researcher proceeded to make observations guided by the observation schedule. The researcher and research assistant made independent observations guided by the observation schedule to maintain objectivity in their observations. It was prudent for the researcher to use a second observer as a measure to reduce observer bias.

Additionally, the researcher recorded field notes during the classroom observations in a notebook. The present study did not collect detailed information on the students in the Units since the scope of the study was on the evidence-based practices of the teachers and their efficacy and not on the students per se.

**Focus Group Discussion**

The present study used a focus group discussion to collect qualitative data from participants. The purpose of the FGD was to gather in-depth information of the use of evidence-based strategies and the teacher's experience of teaching students who are DHH in Units. The researcher chose to conduct a focus group discussion since it is apt for homogenous interviewees (Creswell, 2012) such as the participants in the present study who were all teachers of the DHH who teach in Units. In addition, FGD was used because it has been found to be a suitable method that uses a small number of people to generate detailed and rich data (Cohen et al., 2011). The FGD had nine participants who were all teachers of the DHH in Units. The researcher recognized the participants as experts in their context as teachers of the DHH in Units. These participants were selected because they had exhibited great knowledge in the area of the education of the DHH and were also eager to share their teaching experiences with the researcher. The participants had already created rapport during an informal session before the actual FGD activities ensued. The FGD was conducted in a comfortable, quiet room that was devoid of any distractions. The researcher explained in detail the purpose of the FGD and obtained written consent from the teachers to participate in the FGD. The researcher also clarified that the role of the participants in the FGD was that of expert while that of the researcher was that of a moderator of the discussion. One of the criticisms leveled against focus group discussions is that it is challenging for the researcher to

take notes since a lot of information is forthcoming all at once (Creswell, 2012). To counter this challenge, the present study used two voice recorders to capture the information provided by the participants. The researcher, who was the moderator of the FGD, made a presentation of the evidence-based strategies. The presentation was organized according to the seven themes of evidence-based pedagogy that are summarized in the present study. This was an unconventional way of conducting an FGD but the researcher found it imperative to make the presentation so as to clarify exactly what was considered a strategy steeped in scientific evidence in the present study. Ideally, the teachers would have training on the evidence-based strategies and queried on their use. However, at the time of fieldwork, the teachers were engaged in a nation-wide training on a new curriculum that was to be implemented in the country therefore, extra training on the evidence-based strategies was not feasible. The presentation eventually worked as a way to maintain the discussions, with minimal digressions, within the scope of the study. After a presentation of each theme, the moderator, using open-ended questions from the Focus Group Discussion Guide, queried the key informants on their familiarity with the strategies presented, their application of the strategies in their own classrooms, and their perceived suitability of the strategies in their Units. The researcher encouraged contributions from all participants and ensured that none were domineering. At the conclusion of the FGD, the researcher reviewed the focus group guide and purpose of the FGD to ensure that no points were left undiscussed. The researcher then profusely thanked the participants and closed the FGD. The researcher thereafter made transcripts of the deliberations from the audio recordings of the FGD which were analyzed and findings presented in the ensuing chapters.

### 8.5.3 Quantitative data

Quantitative data was collected through the administration of questionnaires. Data was collected through the TSES, BADE and a brief demographics questionnaire. Beforehand, the researcher explained to the participants the purpose of the study and that their participation was voluntary. The questionnaires were administered face-to-face and collected immediately after completion. This method was suitable for the present study because the sample size was manageable and the data collection process involved multiple visits to the Units. The participants were given directions on how to complete the questionnaires, especially the meaning of the rating scales used. Further, the participants were informed on the time it would appropriately take to complete the questionnaires and were assured of their anonymity. The researcher was present to provide any

clarifications in regards to any items in the questionnaires. When completed, the participants were thanked and the questionnaires collected.

### 8.6 Ethical considerations

The researcher obtained a research permit from the National Commission for Science, Technology and Innovation (NACOSTI), the Kenyan institution that is mandated by the Government to regulate and assure quality in the sector of science, technology and innovation in the country (see Appendix 7). The researcher also received a research permit from the Ministry of Education since the research involved the education sector. Lastly, the researcher obtained permission to conduct research from the school principals in charge of the schools that housed the Units.

The researcher explained in detail the purpose of the study and the research procedure entailed in the study so as to gain informed consent from the participants. Participation in the present study was entirely voluntary. The participants were given the option to all together decline participation, or to leave parts of the questionnaires incomplete in case they were uncomfortable to share any of the information required. All participants were asked to read and sign consent forms prior to their participation in the study. They were given the option to permit the researcher to either take pictures and/ or short videos of them during the lessons or not to take pictures and videos entirely. Some teachers gave consent for their lessons to be video recorded and all teachers gave consent for the researcher to take pictures of the classrooms. The consent forms (see Appendix 8) detailed information on the purpose of the study, voluntary participation, confidentiality, duration of their participation, and any risks or benefits they would incur from their participation in the present study. They were assured that they would not suffer from any physical or psychological harm directly related to participation in the present study. To ensure anonymity, the participants were assigned unique research IDs and the name of the Units remained anonymous. Also, they were simply asked to sign and write their initials on the consent forms as opposed to names and other markers of personal identification. The key informants in the FGD were assigned pseudonyms that were culture and gender neutral which is a good rule of thumb to ensure anonymity of research participants (Patton, 2002). The participants received a small token of appreciation at the end of the study to compensate the participants for their time and their overwhelming support in the study. The small monetary token was neither mentioned nor alluded to before participation in the study as it was not used as an incentive to increase participation. This was to ensure that the participants

gave their consent motivated by their interest to enhance knowledge and research in the field of education of the DHH rather than base interests such as monetary gain. All completed data collection instruments were safely stored away to prevent unauthorized access.

**Data management**

Research data is data that was collected, observed, or created then analyzed to produce original research results (Chigwada et al., 2017). Researchers are extolled to properly store and share it since this allows the verification of research findings and allows further research to be built upon existing research findings. Some researchers do maintain some raw data in analogue formats (Koopman & de Jager, 2016). Similar to the present study, hard copy data, such as questionnaires and field notes, were collected and will be stored in lockable cabinets away from ease of access from unauthorized individuals. The raw data in soft copy format such as Excel Sheets, SPSS files, and MAXQDA files will be stored securely in external hard drives with participant IDs devoid of any personal identifying information. All forms of data collected in the present study are devoid of any unique identifiers such as the names of the participants. Surkis and Read (2015) observe that librarians have the resources required to assist researchers with data management. Findings from the present study will be made public through the LMU Online Repository and the researcher will adhere to the data management guidelines provided by the institution's librarians. The findings from the present study will be devoid of any personal or sensitive information to mitigate the growing concern of sharing data that contains personal or sensitive information about the participants (Akers & Doty, 2013).

# 9 Data analysis procedures and results

The purpose of the study was to determine the extent to which evidence-based practices were employed in Units for the DHH. The evidence-based practices were mainly the strategies teachers implemented in their classrooms and their approach to the education of the DHH. Further, the study sought to document the teachers' experience in the use of evidence-based practices in Units for the DHH in Kenya. In addition, the study sought to establish the efficacy of teachers of the DHH. Lastly, the purpose of the study was to ascertain whether there was a relationship between the use of evidence-based pedagogy and efficacy of teachers of students who are DHH. To achieve the purpose of the study, the researcher was guided by three main study objectives: to determine the extent of use of evidence-based practices in Units for the DHH in Kenya; to establish efficacy of teachers for students who are DHH in Kenya and to ascertain whether there was a relationship between the use of evidence-based practices and efficacy of teachers of students who are DHH.

The study was based on a mixed-methods approach. Quantitative and qualitative data were collected through questionnaires, structured classroom observations, focus group discussions and field notes. This chapter details the descriptive and inferential statistics undertaken to analyze the data collected following the clarion call by Patton (2002, p. 276) that "analysts have an obligation to monitor and report their own analytical procedures and processes as fully and truthfully as possible."

Additionally, the chapter contains results obtained from the analyses. These results were organized according to the research questions. This method of organization has been found useful since it gathers all the relevant data for the issue under investigation and preserves the coherence of the information (Cohen et al., 2011). The present study found this method of organization of the findings pragmatic in answering of the study's research question. The quantitative data for a specific research question was presented followed by the qualitative data and this systemization was to allow for a clear comparison and qualification of data from both data types. The findings were presented in text, tabular and figure formats.

## 9.1 Data analysis procedures

This section details the data collection procedures undertaken to answer the research questions. Separate data analyses were conducted for the qualitative and quantitative and later, data transformation was conducted.

**Qualitative data**

The research questions that sought to determine the extent of use of evidence-based practices in Units for the DHH in Kenya and to document the teachers' experience in the use of evidence-based practices in Units for the DHH in Kenya yielded qualitative data. The data was obtained through structured classroom observations, FGD and field notes.

Data obtained through the FGD was analyzed using MAXQDA 10 software. Caution is given by previous studies that the computer software does not necessarily analyze qualitative data, rather, the researcher is responsible for the data analysis while the software is responsible for data storage, coding, retrieval, and management (Bernard & Ryan, 2010; Patton, 2002). Audio recordings from the FGD were first transcribed and field notes compiled. Transcripts have been found to be useful as they can provide important details and a verbatim record of the interview (Cohen et al., 2011). In as much as voice recognition software is becoming popular, the researcher chose not to use any such software because of the diverse accents of the participants and the fact that majority of the participants code switched between English and Swahili during the discussion. The transcription process yielded 35 pages that captured the FGD discussion excluding the moderator's presentation on evidence-based strategies (see Appendix 9). Then the transcript was exported to MAXQDA. The researcher read through the transcript, marked sentences and phrases and assigned these into relevant codes and memos. Primarily, manifest coding was conducted. This was done to maintain the reliability of the process since manifest coding is highly reliable (Bernard & Ryan, 2010). However, to ensure that all the codes were thoroughly thrashed out, some latent coding was also conducted, taking into account the context of the text. This resulted to the generation of 492 codes. Subsequent analysis led to the generation of four themes from the codes generated. Finally, the findings that included verbatim quotes from the key informants, using their pseudonyms, were reported organized according to the evidence-based strategies prescribed for use in schools for the DHH and the themes generated. The use of verbatim quotations have been found to add a dimension of realism, authenticity and humanity to an issue under study since they convey the views and values of the participants concerning the issue (Cohen et al., 2011). Therefore, the present study presented the qualitative data using the pseudonyms (e.g., Onyesha) instead of research IDs (e.g., Participant 1) in order to enhance the realism and authenticity of the participants' experience.

The other source of qualitative data was obtained from structured classroom observations. Typically, observations are considered qualitative data. In the present study, the observations were transformed into quantitative data through the recording of the frequencies of the use of evidence-based strategies using an observation schedule. Likert Scales are a set of items used together and psychometric evaluations examine the performance of the items as a group (Harpe, 2015). These scales would be considered to be interval level measures since one can combine individual items through summation and the arithmetic mean. In contrast, Likert-type Scales have individual items that use a Likert response (Harpe, 2015). Ergo, the observation schedule in the present study was not a Likert-scale, rather, a Likert-type scale in that it merely used a Likert response format to document observation data. The data collected from the observation schedule was treated as ordinal data. Experts recommend that median is the best measure of central tendency in this kind of data (Sullivan & Artino, 2013). In keeping with the best practice recommendation, the present study calculated and reported medians of the strategies observed in the classrooms as opposed to the mean as the arithmetic mean was found to be of limited value in this particular data set. The present study conducted an item-by-item analysis of items in the observation schedule and presented the findings in tables that consist of frequencies and valid percentages. This approach has been found acceptable in the treatment of items that have been constructed in a meaningful way but have not undergone psychometric evaluation (Harpe, 2015).

**Quantitative data**

The research questions that sought to establish efficacy of teachers for students who are DHH, their approach towards the education of the DHH and to ascertain whether there was a relationship between the use of evidence-based strategies and efficacy of teachers of students who are DHH yielded quantitative data. Analyses were conducted using SPSS 24 to generate means and standard deviations that were reported in tables and text summaries. Data obtained through the demographics questionnaire was analyzed to generate the descriptive statistics for the presents study. The findings were presented in tables and figures.

The inferential statistics conducted in the present study were non-parametric tests. The use of non-parametric tests was found suitable because of the small sample size in the present study. The use of non-parametric tests to analyze data that from small samples is not unique to the present study, other studies have set precedence (Rinaldi et al., 2014). Additionally, non-parametric tests were

utilized in the present study because the sampling method used to arrive at the sample size was non-probability sampling. Lastly, some of the data collected in the present study was ordinal type data. Nominal and ordinal data are considered non-parametric and typically do not have normal distributions thereby do not make assumptions about the population (Aidley, 2019; Cohen et al., 2011). The present study concluded that it would thereby be incorrect to apply parametric statistics on non-parametric data. The Mann-Whitney U test, Kruskal-Wallis, and Spearman's rank correlation coefficient tests were conducted using SPSS 24 and the results presented in tables.

## 9.2 Research Results

Findings from the study were organized according to the research questions. The current study was guided by the following research questions:

1. What is the extent of use of evidence-based practices in Units for the DHH in Kenya?
    a. What is the teachers' experience in the use of evidence-based practices in Units for the DHH in Kenya?
    b. What approaches to the education of the DHH is utilized in Kenyan Units?
2. What is the efficacy of teachers teaching in Units for the DHH in Kenya?
3. Is there a relationship between self-efficacy and use of evidence-based practices in Units for the DHH in Kenya?

### 9.2.1 Descriptive findings

The present study had 23 participants, all of whom were teachers of the DHH drawn from 11 Units of the DHH in Nairobi and Kiambu Counties. The participation rate was 85.19% and the breakdown of participation is outlined in Table 8:1. There was 100% response rate to the questionnaires administered in the present study.

Table 9:1. Percentage rate of participation in different Units of the DHH

| School | Participants | Total number of teachers | % Participation |
|---|---|---|---|
| 1 | 4 | 5 | 80 |
| 2 | 3 | 4 | 75 |
| 3 | 1 | 1 | 100 |
| 4 | 2 | 2 | 100 |
| 5 | 1 | 1 | 100 |
| 6 | 1 | 1 | 100 |
| 7 | 4 | 4 | 100 |
| 8 | 2 | 4 | 50 |
| 9 | 1 | 1 | 100 |
| 10 | 2 | 2 | 100 |
| 11 | 2 | 2 | 100 |
| Total | 23 | 27 | 85 |

Gender distribution of the teachers (see Figure 8:1) shows that the majority (91%) of the teachers were female.

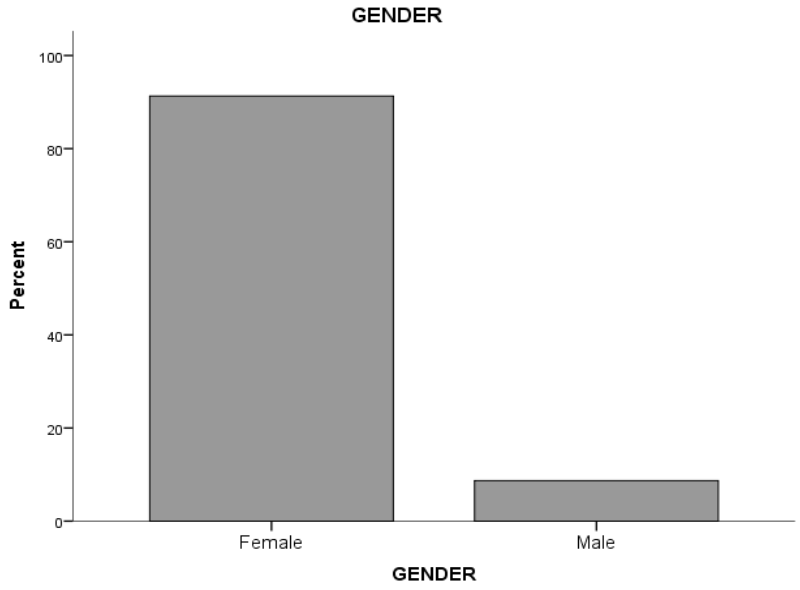



*Figure 9:1*. Bar chart showing the gender distribution of the participants.

Majority of the teachers (91%) of the DHH were individuals with typical hearing and only 8% were DHH themselves. The age distribution (see Figure 8:2) of the participants showed that majority (48%) of the participants was between 50-59 years. Very few (8%) participants were below 30 years of age while the rest (44%) were between the ages of 30 to 49 years.

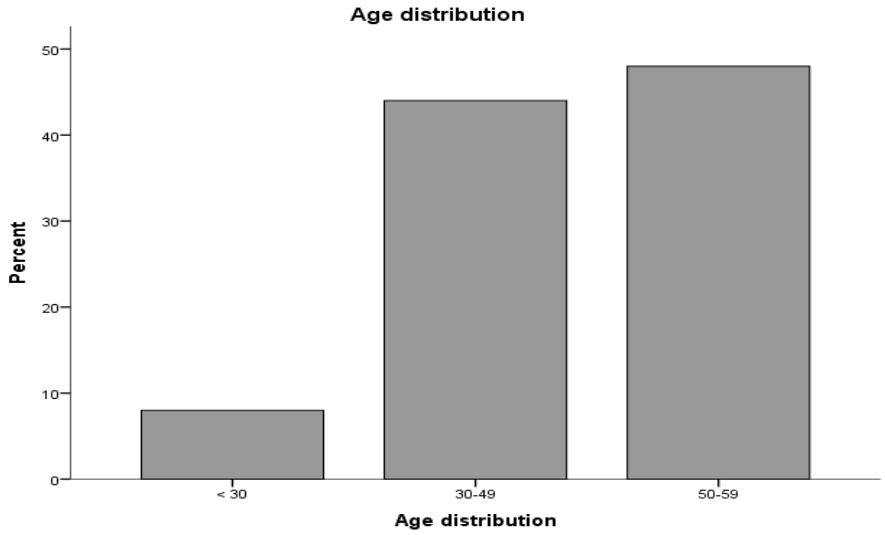



Figure *9:2*. Bar chart showing the age distribution of the participants.

The participants' teaching experience in DHH settings was juxtaposed with their experience in general education settings as depicted in Figure 8:3. The results show that the median for teaching in schools for the DHH was nine while the median for teaching in general schools was ten. These findings show us that on average, the respondents taught slightly longer at the general schools than at schools for the DHH. The interquartile range for the respondents' experience in schools for the DHH was eleven while that of the respondents at general schools was 18. The interquartile range for the respondents' experience teaching at general schools was larger which indicates that there was more variability in the number of years the respondents taught in general schools compared to that in schools for the DHH.

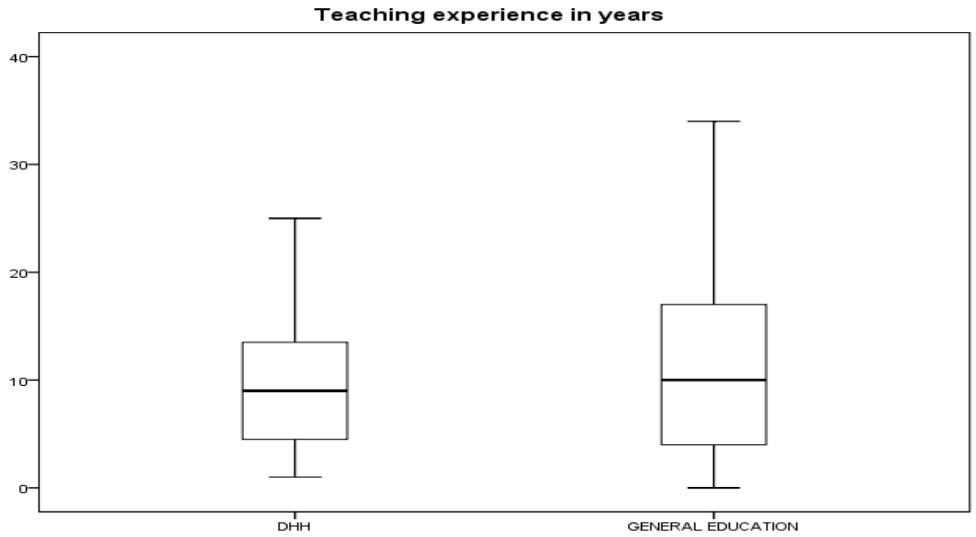



Figure 9:3. Box Plot showing the teaching experience of participants in general and schools for the DHH

Majority (87%) of the respondents had received training in Special Needs Education (SNE) with a specialization in the Education of the Deaf and Hard of Hearing as shown in Figure 8:4. One respondent had received training in General Education. Two had received training in other fields of education: one in Early Childhood Education and the other in Special Needs Education with a focus on Intellectual Disability.

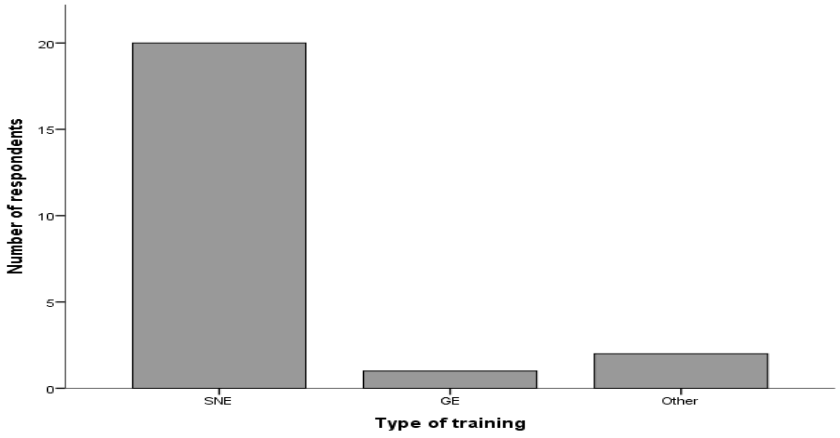



*Figure 9:4*. Bar chart showing the type of training received by the respondents

Majority (57%) of the participants had attained a degree as their minimum level of education as depicted in Figure 8:5. Only two had received a Master's in Education while five respondents had attained Diplomas and three Certificates in Education.

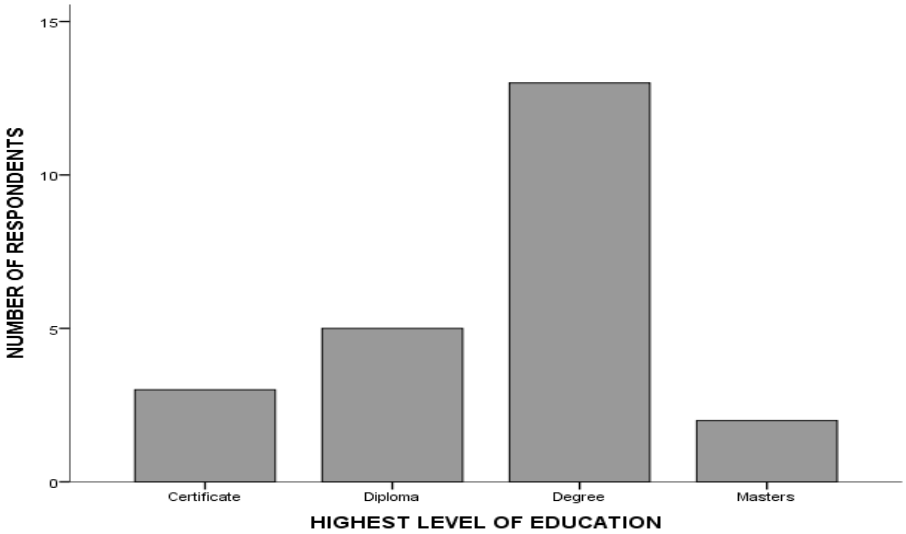



*Figure 9:5.* Bar chart showing the highest level of education completed by the respondents

### 9.2.2 Extent of use of evidence-based practices in Units for the DHH in Kenya

The first research question in the present study was to establish the extent teachers of the DHH in Kenyan Units utilized evidence-based practices in their classrooms. The findings are organized according to the themes summarized in this study and presented herein.

**Classroom organization and classroom routines**

All (100%) the classrooms had enough natural lighting and no dark corners. It was often (69.6%) observed that the classrooms had functional electric bulbs. A majority (56.5%) of the teachers did not seat their students in a horse-shoe/ semi-circular or L-shaped arrangement while the others (43.5%) arranged their classroom in this format which has been found to be optimal for students who are DHH. Students therefore had their backs to windows only 39.1% while the other times, they would be facing the windows. The teachers were often able to move around the classrooms only 47.7% of the time. It was observed that the classrooms often (73.9%) displayed a classroom timetable. However, the teachers were observed 43.5% often following the timetables. A summary of the observed evidence-based strategies used for classroom organization and routines is

presented in Table 8:2. Overall observations showed that the teachers often (*Mdn*=3) utilized evidence-based strategies pertaining classroom organization and routines.

Table 9:2. Strategies for classroom organization

| | Never | | Sometimes | | Often | |
|---|---|---|---|---|---|---|
| | Count | Row Valid N % | Count | Row Valid N % | Count | Row Valid N % |
| 102. Students are seated in a horse-shoe or semi-circular or L-shape arrangement. | 13 | 56.5 | 0 | 0.0 | 10 | 43.5 |
| 103. The students have their backs to the windows. | 8 | 34.8 | 6 | 26.1 | 9 | 39.1 |
| 104. The classroom is cluttered with furniture. | 8 | 34.8 | 3 | 13.0 | 12 | 52.2 |
| 105. Teacher's desk is placed at the center of the room. | 16 | 69.6 | 1 | 4.3 | 6 | 26.1 |
| 106. Classroom materials are easy to access. | 6 | 26.1 | 3 | 13.0 | 14 | 60.9 |
| 107. Students' materials are well organized. | 6 | 26.1 | 0 | 0.0 | 17 | 73.9 |
| 108. Teacher can move around the classroom with ease. | 8 | 34.8 | 4 | 17.4 | 11 | 47.8 |
| 109. There are visual distractions. | 7 | 30.4 | 6 | 26.1 | 10 | 43.5 |
| 110. The classroom has enough natural lighting. | 0 | 0.0 | 0 | 0.0 | 23 | 100.0 |
| 111. The classroom has some dark areas. | 21 | 91.3 | 1 | 4.3 | 1 | 4.3 |
| 112. The classroom has functional electric bulbs. | 7 | 30.4 | 0 | 0.0 | 16 | 69.6 |
| 113. There is a classroom timetable on display. | 6 | 26.1 | 0 | 0.0 | 17 | 73.9 |
| 114. The timetable has visuals to aid comprehension. | 23 | 100.0 | 0 | 0.0 | 0 | 0.0 |
| 115. The teacher is following the timetable. | 8 | 34.8 | 5 | 21.7 | 10 | 43.5 |

Observations showed that all the Units had permanent buildings. A breakdown of data collected as field notes in respect to the number of classrooms per Unit, number of students, and teachers per Unit is presented in Table 8:3. These findings indicate that the Units had few teachers and classrooms.

Table 9:3. The Number of students, teachers, and classrooms per Unit

| **School** | **No. of Pupils** | **No. of Teachers** | **No. of Rooms** |
|---|---|---|---|
| 1 | 90 | 5 | 3 |
| 2 | 23 | 4 (+2)[a] | 2 |
| 3 | 9 | 1 | 1 |
| 4 | 13 | 2 | 2 |
| 5 | 34 | 1 (+1)[a] | 2 |
| 6 | 30 | 1 (+1)[a] | 2 |
| 7 | 21 | 4 | 1 |
| 8 | 35 | 4 | 2 |
| 9 | 4 | 1 | 1 |
| 10 | 11 | 2 | 1 |
| 11 | 27 | 2 | 1 |

[a] number of student-teachers that were conducting their practicum in the Units at the time of data collection.

The students, who were of different grades were all taught in on classroom and in some Units, they were all taught by one teacher. Onyesha explained the situation thus:

> In my class because sometimes when I am just alone, and I have the PP1 PP2 class 1, 2, 3, and 4. I am alone (Appendix 9, 120).

The FGD findings on the seating arrangement of students in the classroom were in line with findings from the structured classroom observations. The findings showed that in most of the Units, the students were not seated according to the preferred seating arrangement for students who are DHH. In some Units, the students sat in rows as described by Inira:

> No, the straight lines, forms, straight, then the Class Twos are sitting behind the class ones, get me right. SO this teacher works with the Grade Ones first then finishes then goes to the Grade Twos you see? We have arranged in such a way that the Grade Sixes are facing behind, they have a portable board, Grade Sevens facing towards the door, there is a wall there, then we have the Grade Fives facing the other side, the side of the window, then we have the Grade Fours facing in front. That is why, when you came to that class you saw somehow there was confusion (Appendix 9, 146).

An example of the benches described by some of the participants as "straight lines" or "forms" is shown in Photograph 1.

Photograph 1: Sitting options in some Units.

The benches are typically not arranged in a horseshoe formation as depicted in Photograph 2.


Photograph 2: Students sitting on benches.

The participants reported that the actual sizes of their classrooms were small: Tamu reported, "we have very small classes; I do not know about the others so being small" (Appendix 9, 108) which contributed to their choices of classroom organization. Another participant, Hodari, decried the lack of adequate space thus,

> Okay, doing what my colleagues are saying maybe turning the class, facing this one on that side, is a bit difficult because one, the room is one then {laughs} the learners in class are 27, two teachers, the blackboard is one, from one end to another. The space is limited (Appendix 9, 215).

Some participants reported that they used portable boards to section their classrooms according to the different grades. The teachers would then allocate work to the different groups and would teach them on rotation basis. This kind of arrangement is described by Onyesha:

> What I do sometimes I put them facing different directions and I get those portable boards and then I write let's say PP1 and PP2 I let them face me, the PP1 is facing me but their

> desks are to the left maybe the PP2 their desks are to the right, then I put Class One facing the right side, Class Two facing the left side then I put Class Three and Class Four facing the back side of the class, all of them, they are in the same class (Appendix 9, 121).

Photograph 3 shows a typical classroom in the Units where the furniture is arranged facing different directions. This arrangement is in a bid to accommodate the students of different grade levels that are in a single classroom.


Photograph 3: Sitting arrangement in some Units.

Further, the teachers reported that this type of classroom organization generated distractions while teaching. Some participants, such as Tamu and Hodari respectively, provided examples of the distraction that arose in their classrooms:

> So you find that sometimes I give the PP1 these blocks to do something then the PP2 I give them work to write. You find that those ones they want also to join to do the easier work. They tend to see that this other work, manipulating materials is better so that is a distraction in itself and it is within one class (Appendix 9, 95).

> I am teaching here, my colleague is teaching here so you can imagine maybe there is an interesting lesson here and this other one is not so yeah, {laughs} so they turn. So getting that attention is a little bit difficult from the learners (Appendix 9, 226).

The teachers explained their efforts to try minimize the classroom distractions in their classrooms by either physically withdrawing students of a certain grade from the classroom so as to teach them a specific subject outside or to combine students of different grades to teach them all similar content. Inira and Onyesha described their experience:

> It so tricky sometimes when the teacher is teaching arithmetic, it forces her to merge because once you have given work then you start teaching the Second Grade it becomes difficult. The Grade Ones stop writing then they start looking at you seeing what you are doing to the Grade Twos (Appendix 9, 148).

> If I want to do something different, for let's say Class Three that needs practicals I will withdraw that class and we go out with it and we do it outside there because if we start doing it practically in the class the babies will join us so that is a way of reducing distractions (Appendix 9, 127).

Observations showed that some students in the Units had additional disabilities such as autism spectrum, attention deficit hyperactivity disorder, and cerebral palsy. All the Units observed did not have teaching assistants or auxiliary staff to attend to students with additional disabilities. Some teachers explained that the presence of students who are DHH with comorbidities were a source of distraction in their classrooms. Here is Imani's account:

> For example, in these classes you find that maybe it is a school for the deaf for example in our case and then because of the communication modality you find children who have other disabilities for example mental retardation, CP, and they have deafness. This is another kind of distraction because now the behavior of a child who is MR and now these who are normal, in quotes, deaf, it is different so maybe when you want to teach the curriculum of the deaf then again you have this child who is MR with you sometimes his behaviors is totally different from this one (Appendix 9, 196).

The teachers acknowledged that the classroom organization in their Units, with the limited space, students of different grades, and varied abilities was not conducive for learning. One participant, Sultan, summarized the context thus:

> They use one room to teach from level one, PP1, PP2 up to grade 8 in one regular class. Now, when the children are seated in one corner, another corner and another, do not think there is a lot of teaching taking place! Why? As you said attention, these children depend on vision, therefore the attention is carried away (Appendix 9, 326).

**Visual aids and language of instruction**

With respect to the use of visual aids, it was observed that the teachers often (91.3%) displayed charts and supplementary materials in their classrooms. The teachers often (60.9%) made use of the chalkboard. The teachers often (78.3%) provided visual supports for questions asked during the lessons. However, the teachers were never (82.6%) observed providing the students with

handouts before lessons. All classrooms observed did not have overhead projectors. With respect to the evidence-based strategies on the language of instruction, all the teachers had adapted their language to suit the level of students. The teachers often (82.6%) used clear language and all of them used short sentences, and made emphasis of important words during classroom instruction. However, it was observed that the teachers never (78.3%) used higher-level language or new vocabulary while teaching the students. The teachers were observed often (91.3%) using nonverbal communication to support spoken/signed communication. Analysis showed that overall, the teachers were often (*Mdn*= 3) observed utilizing evidence-based strategies pertaining visual aids and language of instruction. The use of evidence-based strategies pertaining visual aids and language of instruction is summarized in Table 8:4.

Table 9:4. Table showing strategies for visual aids and language of instruction

| | Never | | Sometimes | | Often | |
|---|---|---|---|---|---|---|
| | Count | Row Valid N % | Count | Row Valid N % | Count | Row Valid N % |
| 201. The teacher uses clear language. | 0 | 0.0 | 4 | 17.4 | 19 | 82.6 |
| 202. The teacher uses short sentences. | 0 | 0.0 | 0 | 0.0 | 23 | 100.0 |
| 203. The sentences have a clear beginning and end. | 0 | 0.0 | 2 | 8.7 | 21 | 91.3 |
| 204. The teacher makes emphasis on the important words. | 0 | 0.0 | 0 | 0.0 | 23 | 100.0 |
| 205. The teacher uses clear WH-questions. | 4 | 17.4 | 4 | 17.4 | 15 | 65.2 |
| 206. The teacher provides visual support for the questions (e.g., writes on board). | 4 | 17.4 | 1 | 4.3 | 18 | 78.3 |
| 207. The teacher allows for processing time after each question. | 0 | 0.0 | 2 | 8.7 | 21 | 91.3 |
| 208. The teacher has adapted the language of instruction to suit the level of the students. | 0 | 0.0 | 0 | 0.0 | 23 | 100.0 |
| 209. The teacher occasionally uses higher language or new vocabulary. | 18 | 78.3 | 3 | 13.0 | 2 | 8.7 |
| 210. The teacher gives corrective feedback when the students make a mistake. | 1 | 4.3 | 2 | 8.7 | 20 | 87.0 |
| 211. The teacher uses nonverbal communication to support spoken/ signed communication. | 1 | 4.3 | 1 | 4.3 | 21 | 91.3 |
| 212. The teacher gives the students handouts before lesson. | 19 | 82.6 | 0 | 0.0 | 4 | 17.4 |
| 213. The teacher gives a list of keywords before a new topic. | 16 | 69.6 | 0 | 0.0 | 7 | 30.4 |
| 214. The teacher uses symbols, diagrams or pictures during the lesson. | 9 | 39.1 | 5 | 21.7 | 9 | 39.1 |
| 215. The teacher makes use of the chalkboard. | 8 | 34.8 | 1 | 4.3 | 14 | 60.9 |
| 216. The teacher uses an overhead projector. | 23 | 100.0 | 0 | 0.0 | 0 | 0.0 |
| 217. Charts and supplementary materials are displayed in the classroom. | 0 | 0.0 | 2 | 8.7 | 21 | 91.3 |

Table 9:4. Table showing strategies for visual aids and language of instruction

| | Never | | Sometimes | | Often | |
|---|---|---|---|---|---|---|
| | Count | Row Valid N % | Count | Row Valid N % | Count | Row Valid N % |
| 218. The teacher addresses the students by their names/ sign names. | 10 | 43.5 | 1 | 4.3 | 12 | 52.2 |
| 219. The teacher displays a list of keywords. | 15 | 65.2 | 0 | 0.0 | 8 | 34.8 |
| 220. The teacher checks for comprehension. | 1 | 4.3 | 4 | 17.4 | 18 | 78.3 |
| 221. Students have a signal to indicate that they have not understood content. | 22 | 95.7 | 1 | 4.3 | 0 | 0.0 |
| 222. The teacher makes regular summaries of content covered. | 4 | 17.4 | 3 | 13.0 | 16 | 69.6 |
| 223. The teacher pauses after speaking to allow for processing time. | 0 | 0.0 | 1 | 4.3 | 22 | 5.7 |

It was recorded in the field notes that some Units displayed torn wall charts, and in some Units, the wall charts were numerous, inappropriate, and not visible to the students. One participant, Tamu, admitted that some of the wall charts were simply displayed for the sake of appearances but were in fact a source of distraction to the students.

> Some materials that are not to their level but we have them to just make the class somehow *eeh*, a learning institution {laughs} a talking class (Appendix 9, 109).

One of the Units had numerous wall charts covering all the classroom walls and some hanging from the ceiling as shown in Photograph 4.


Photograph 4: Examples of charts used in some Units.

Participants in the FGD explained that in addition to charts, pictures, diagrams and other wall hangings, some of the teachers provided visual support to the learners using smart phones. Inira's experience is given:

> Some of us use smart phones especially when trying to explain social studies, explaining the environment and so on. We use our smart phones to explain because you cannot draw everything and in some situations also we use the pictures from the books. In some cases,

> we draw what we can and that is obvious and we use them to help these children at least understand what is happening in the world (Appendix 9, 676).

The use of ICT devices was limited in the Units. The FGD revealed that some of the Units had received some ICT devices from the Government. Sultan explained:

> The Government there has really tried. We also have projectors, some schools have projectors and if you are not aware, just go to the deputy head teachers because those things are in the schools, they were given by the Government and some few ICT gadgets. We have some laptops in various schools (Appendix 9, 706).

Some participants like Amani and Onyesha detailed their use of these facilities to enhance their classroom instruction:

> In our school we have pictures from the text books and we have the TV and the DVD. So like when teaching science Standard Eight, reproduction, the baby in the womb, there is a video you see the baby in the 1st trimester, 2nd and 3rd. For wild life, you can take the children and watch the film (Appendix 9, 688).

> We have a TV room where we go to watch every now and then… If it is mathematics and we want to do multiplication we can go, get a CD about multiplication now we put it there and we move slowly. After one step I may pause and then we can do in our books. Then I continue, we go to the next step, that way until we understand then later I may do the whole process with the TV (Appendix 9, 699).

However, majority of the participants exclaimed that they were unaware of the availability of the ICT devices in their Units while others divulged the fact that they did not possess the skills to operate such devices. Similarly, the structured classroom observations had not captured the use of ICT devices in the Units since the teachers had not used them during the observations and they were not present in the classrooms. Imani questioned the teachers' technical knowledge on the use of ICT devices:

> It is good that many schools have these things but do not use them. And then, they could be available but do we have the knowledge the knowledge to use these things? Some people have ICT phobias! So I think that every teacher maybe should be trained in ICT because you might be having those materials there but you do not know how to connect a projector (Appendix 9, 274)

There was wide held misconception that students who are DHH can only learn concrete concepts, not abstract concepts, as Imani explained:

> These children are deaf and they can only understand mostly the concrete things. Some words do not make meaning for them at all. *Akisema* cup this, but now this is, is, what does IS mean? It is there, this is a cup, it is there. *Akisema* [when he says] cup this, *hiyo ndio iko*

*sawa kwao* [that is how it seems correct to them] because what is this IS? Because *hii* is *inakujia hapa katikati* [this is that comes in the middle] where is it? That is the problem (Appendix 9, 571).

**Optimal visual and acoustic conditions**

All the teachers observed never presented with distracting behavior while teaching. The teachers were observed to often (91.3%) utilize appropriate facial expressions while teaching. The teachers were observed to often (87%) maintain eye contact with the students before transmitting instructional content and would often (87%) wait for the students to look up before they addressed them in the classroom. The teachers were often (82.6%) observed to utilize visible signs and gestures. However, they were sometimes (43.5%) observed talking/signing as they walked around the classroom. Table 8:5 summarizes the observations conducted on evidence-based strategies for optimal visual and acoustic conditions. Items on evidence-based strategies pertaining optimal acoustic conditions were not included in the observation schedule as they were not applicable in the present context. However, it was observed that the Units often (60.9%) had audible distractions. In general, the participants often (*Mdn*=3) utilized strategies for optimal and acoustic conditions in the Units.

Table 9:5. Strategies for optimal visual and acoustic conditions

| | Never | | Sometimes | | Often | |
|---|---|---|---|---|---|---|
| | Count | Row Valid N % | Count | Row Valid N % | Count | Row Valid N % |
| 301. The teacher maintains eye contact with the students. | 0 | 0.0 | 4 | 17.4 | 19 | 82.6 |
| 302. The teacher waits for the students to look up before addressing them. | 1 | 4.3 | 2 | 8.7 | 20 | 87.0 |
| 303. The teacher talks/signs as they walk around the classroom. | 12 | 52.2 | 10 | 43.5 | 1 | 4.3 |
| 304. The teacher mouths signed words to facilitate speech reading. | 3 | 13.0 | 0 | 0.0 | 20 | 87.0 |
| 305. The teacher uses appropriate facial expressions while teaching. | 2 | 8.7 | 0 | 0.0 | 21 | 91.3 |
| 306. The teacher uses visible signs and gestures. | 0 | 0.0 | 4 | 17.4 | 19 | 82.6 |
| 307. The teacher obstructs their face while talking. | 20 | 87.0 | 0 | 0.0 | 3 | 13.0 |
| 308. The teacher turns to the blackboard while talking/ signing. | 16 | 69.6 | 6 | 26.1 | 1 | 4.3 |
| 309. The teacher has distracting behavior (e.g., chewing gum, unkempt beard). | 23 | 100.0 | 0 | 0.0 | 0 | 0.0 |
| 310. The classroom has audible distractions. | 4 | 17.4 | 5 | 21.7 | 14 | 60.9 |

It was observed that the students in the Units did not use amplification devices. In one Unit, on the first day of observation, the teacher gave the students hearing aids to wear. However, on subsequent observation visits, the teacher did not give the students the hearing aids to wear. Upon enquiry, the teacher revealed that the students are prohibited from taking the hearing aids home for fear of loss or damage of the hearing aids.

Only one teacher, Onyesha, had implemented strategies to acoustically treat the classroom:

> Yes, I have acoustic tiles, acoustic walls and the acoustic carpet is coming, School 6. It is a donation from some people (Appendix 9, 950).

**Differentiated instruction**

In regards to evidence-based strategies on differentiated instruction, it was observed that the teachers often (73.9%) provided the students with additional explanations during individual work. However, it was observed that the teachers rarely ("never" = 65.2%) planned their instructional content according to the students' learning styles. It was also observed that the teachers rarely utilized various differentiation strategies such as the provision of different amounts of tasks and assignment of tasks of different difficulty levels to different students ("never" = 78.3%) as seen in Table 8:6.

Table 9:6. Strategies for differentiated instruction

| | Never | | Sometimes | | Often | |
|---|---|---|---|---|---|---|
| | Count | Row Valid N | Count | Row Valid N | Count | Row Valid N |
| 401. The teacher has planned content according to students' learning styles. | 15 | 65.2 | 2 | 8.7 | 6 | 26.1 |
| 402. The teacher provides additional explanations to the students during individual work. | 3 | 13.0 | 3 | 13.0 | 17 | 73.9 |
| 403. The teacher gives different work according to the ability of students. | 15 | 65.2 | 1 | 4.3 | 7 | 30.4 |
| 404. The teacher gives different students different amounts of tasks. | 18 | 78.3 | 1 | 4.3 | 4 | 17.4 |
| 405. The teacher gives tasks of different difficulty level. | 18 | 78.3 | 1 | 4.3 | 4 | 17.4 |
| 406. The teacher asks questions of different levels on Bloom's Taxonomy. | 17 | 73.9 | 4 | 17.4 | 2 | 8.7 |

Figure 8:6 provides an overall depiction of the frequency in which the teachers were observed implementing differentiation strategies in their lessons.

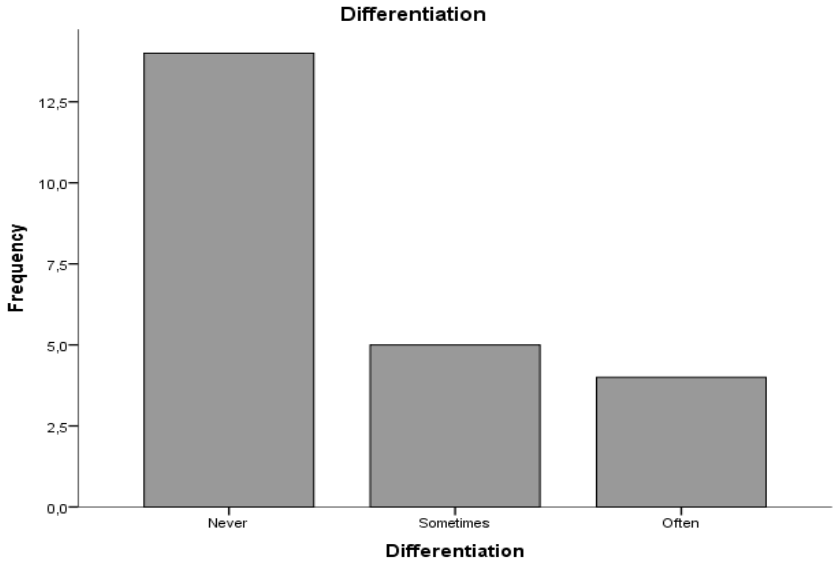



Figure 9:6. The frequency teachers implemented differentiation strategies

In the FGD, the teachers acknowledged that their students were diverse academically and that some had additional disabilities. They also acknowledged that it was important to address these differences and ensure that all children participated in the lesson. Tamu described the students in their classroom:

> I have realized that we really take care of the children as per their capabilities. I am having PP1 and PP2 and in the same class I am having those ones with MH and autism, I will always make sure that as I give the work if it is number work we are counting, if this one is able to count 1 up to 5 this one is only able to sign 1 I will make sure that this child is also involved to try even if it is doing his hands like this at least she has done an activity, he is not able to sign 1-2-3, but she knows that there is something going on…make sure that at least you try to tell that child at least do something even if it will be just standing and smiling that child has participated in the lesson so we do not leave them behind (Appendix 9, 811).

The teachers explained that they were familiar with Individualized Education Programs (IEPs) however, due to the constraints they faced, they were not able to implement the IEPs. The participants admitted that they wrote the IEPs for the students merely because it was required of them to write them, but they did not utilize the IEPs. Contained herein are excerpts from Imara and Hodari respectively:

> It is a document that is always asked for but with the numbers of kids that we have we are not able to follow the IEP. We do write them yes, for the office as a document but for the many kids we have in the classroom, we are not able follow (Appendix 9, 789).
>
> In some cases, that IEP is not practical because of having the different levels and different learners. *Yaan*i [that is] the work that you have to do is just too much for you so in some cases that IEP does not work in as much as you really want to have it and you really know you must have it but just sitting down to prepare it is not practical and yes you know and deep within you in your mind you know you must have it but you are willing yes but because of all these things it is a bit difficult (Appendix 9, 800).

Ideally, IEPs are developed and implemented by a multidisciplinary team which also involves the parents of the child with the disability. However, the teachers such as Imara and Imani explained that they were entirely responsible for the development of the IEPs.

> Even writing down the IEP we do not have the personnel because you need the therapists, you need the EARCs you need the parent, *mwalimu* [teacher], a community *sijui* [I do not know] what so that one we usually write it ourselves as teachers (Appendix 9, 787).
>
> For the IEP I think this work of the IEP has been left solely to the teacher alone because most of the parents you will find you expect them to disclose the real nature of disability but most of the parents, not all, will come saying my child can do this, my child can do this, they do not want to talk the truth about the child even if the child has some other disabilities the parents mostly will want to hide (Appendix 9, 793).

In spite of the challenges experienced in their classrooms, some teachers reported that they made attempts to differentiate instruction for their students. Here are excerpts from discussions with Tamu, Onyesha and Ujana:

> So the IEP is there we are not following it but at least back in my mind I know that this particular child the much I am supposed to do for her is toileting, maybe feeding so when it comes to that I'm very much focused on that to ensure that he is able to get those social behaviors he is able to acquire them but when it comes to academics, they are not able to do it but they are still in that class, I have to make sure that they are involved in the lesson (Appendix 9, 824).
>
> In the class you may give some work and you know this is work for class 2 and you give that work for class 2 but to a particular child who is unable to cope with the class the class 2 work so you go back and you give work for a lower level whereby the child will be able to do something and be appreciated after being told you have done well (Appendix 9, 832).
>
> The way I teach there are different levels PP1 PP2 including the playgroup so when teaching maybe a concept I have to integrate. I have to integrate PP1, PP2 same thing, then after I finish now that point *ndio ntarudi kwa yule mdogo* [I'll go back to the young one] to try and teach them that *kasame* [same] level but you see it is a challenge. The level of understanding is different you see so to me it is kind of a challenge but I try (Appendix 9, 837).

However, majority of the participants explained that they resorted to teaching the same content to all students regardless of their grade and ability levels. The teachers taught the students using the same materials and they required the students to engage in similar activities and accomplish similar assignments. Onyesha summarized the classroom practice thus, “Sometimes we are forced to do that Class 4, 6, 8 we teach the same thing” (Appendix 9, 856).

**Classroom social organization**

It was observed that in all the Units, the students were mainly (“often” = 100%) given tasks to accomplish on their own and rarely (“never” = 100%) as a group. The teachers rarely (“often” = 8.7%), if ever, encouraged the students to work with a partner and had installed a clear buddy system in few classes (“often” = 26.1%) as depicted in Table 8:7.

Table 9:7. Strategies for classroom social organization

| | Never | | Sometimes | | Often | |
|---|---|---|---|---|---|---|
| | Count | Row Valid N% | Count | Row Valid N% | Count | Row Valid N% |
| 501. Students work on their own. | 0 | 0.0 | 0 | 0.0 | 23 | 100.0 |
| 502. Students work with a partner. | 16 | 69.6 | 5 | 21.7 | 2 | 8.7 |
| 503. Students work as a group. | 23 | 100.0 | 0 | 0.0 | 0 | 0.0 |
| 504. The teacher encourages a buddy system. | 14 | 60.9 | 3 | 13.0 | 6 | 26.1 |
| 505. The teacher alternates between student-centered and teacher centered approaches. | 10 | 43.5 | 8 | 34.8 | 5 | 21.7 |

Overall observations showed that the teachers never (*Mdn*=1) utilized evidence-based strategies pertaining varied classroom social organization as depicted in Figure 8:7.

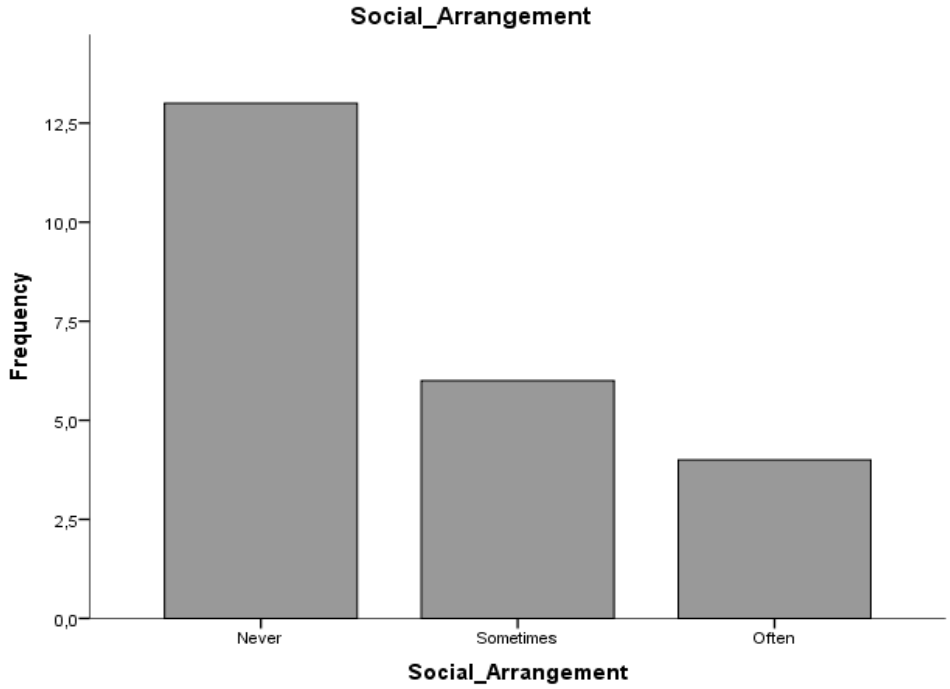



*Figure 9:7.* The frequency teachers implemented classroom social organization strategies

The FGD revealed that only one teacher, Inira, utilized a buddy system in their classroom.

> The buddy system is good. For a deaf child to be an expert in sign language they need the buddying. I have a sharp boy in my class, he is very good. When the teacher is late, you will find him doing all sorts of calculations on the blackboard and the others are following what he is doing and that has improved my class performance so much. So the boy has really encouraged the others to put in much effort in learning and education so that is helping others and he is sharing and it is the buddy system in the classroom (Appendix 9, 878).

**Classroom structure**

Observations showed that the teachers often (60.9%) introduced their instructional content in a step by step manner. However, the teachers rarely ("never" = 87%) provided a day schedule. As shown in Table 8:8 it was also observed that the teachers rarely ("never" = 95.7%) provided the students with an outline of the lesson objectives.

Table 9:8. Strategies for classroom structure

| | Never | | Sometimes | | Often | |
|---|---|---|---|---|---|---|
| | Count | Row Valid N % | Count | Row Valid N % | Count | Row Valid N % |
| 601. Teacher provides a day schedule. | 20 | 87.0 | 3 | 13.0 | 0 | 0.0 |
| 602. Teacher provides an outline of lesson objectives. | 22 | 95.7 | 0 | 0.0 | 1 | 4.3 |
| 603. Teacher introduces instruction in step-by-step fashion. | 4 | 17.4 | 5 | 21.7 | 14 | 60.9 |
| 604. Teacher uses play as an instructional strategy. | 20 | 87.0 | 1 | 4.3 | 2 | 8.7 |
| 605. Teacher uses classroom rituals and symbols. | 16 | 69.6 | 3 | 13.0 | 4 | 17.4 |

In summary, the observations showed that the teachers never (*Mdn*=1) utilized evidence-based strategies pertaining proper classroom structure as depicted in Figure 8:8.

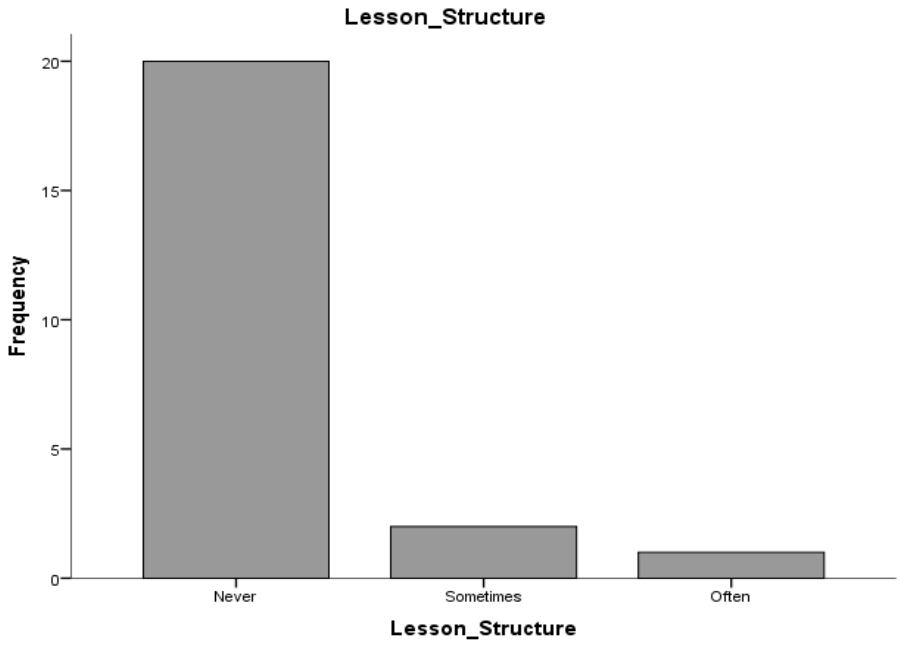



*Figure 9:8.* The frequency teachers implemented classroom structure strategies

In the FGD, the teachers explained that they did not have a daily schedule and would often not follow the timetable. The reasons provided for a lack of structure were varied. Some like Hodari, cited the fact that they were grossly understaffed therefore expected to teach all subject content to students of Grades PP1 to Grade 8.

> I have this PP1 PP2 up to Grade Eight we are only 2 of us, I can only teach eight lessons in a day, my colleague can only teach eight lessons in a day. When I sit to teach when I decide now I am starting with the Class One, I take Math, English, and whatever, I sit there and make sure I cover all of my three. I do not teach one and move because I am not sure of the next of the next day. So when you sit down to teach your three lessons in a class, make sure you cover them the three (Appendix 9, 256).

Some teachers cited unforeseen interruptions such as parental visits as a reason why they lacked structure in their classrooms. Hodari described a typical scenario:

> Remember again, there is this issue of a parent coming. He wants admission, he doesn't know what to do with a child. So you give allowance to that because you find that you will waste even 1 hour just talking to a parent who has come to class (Appendix 9, 266).

Others reported that their school administrations expected them to assist teachers in the regular classroom with tasks such as filling in for absent teachers and marking exams undertaken by regular students. Amani described the situation thus:

> First after the regulars do exams, we have to mark the *Inshas* [written compositions]. So they see as if we are doing nothing in the school. Even if one teacher from either Grade One, Grade Two or Grade Three is absent, you will see the admins coming to our class looking for someone to go teach that class so we have that challenge. Now as a teacher I am present today and my children will not learn, I will go and teach Grade One (Appendix 9, 307).

Due to the conditions in the Units, the teachers questioned the quality of teaching taking place as Sultan described the situation thus:

> Like at School 5, where we have one teacher and dealing with almost eight levels, you teach one level, you teach another level and another level and that is just Mathematics. Maybe teach just teach one subject per day, are we giving those learners equal opportunities with the regulars? Are they going to compete in life? (Appendix 9, 343).

Majority of the teachers admitted to not using play activities in their lessons. Tamu, being one of those who did, albeit inconsistently, described their experience with this strategy thus:

> We have a play activity even if it is for 2 or 3 minutes where maybe they can stand they do the maybe the jumping the clapping, jumping or maybe they sing a *kasong* [short song] related maybe to what you are doing next because we say when you are introducing another

> lesson how you introduce it so having an activity that shows you are through with this subject and going to another. Sometimes it is not easy to do it but we are trying it sometimes in some subjects we do sometimes we find ourselves moving across without those distinct changes (Appendix 9, 757).

Lastly, the teachers who did not implement evidence-based strategies pertaining to lesson structure explained that the time allocated for each lesson was too short to incorporate these evidence-based strategies. An excerpt from Imara explains it:

> I once saw this kind of thing … in fact the class was conditioned that they knew what was expected this time and like that. Many are the times we do not do it because you start a lesson of 30 min, a class with 4 levels doing different subjects it cannot work. For the deaf 30 min is not enough. Introduce a topic even before they get what you are telling them, *kengele imelia* [the bell rings] you cannot leave it there, *lazima uendelee* [you must continue], you continue so this one, many are the times they do not they are not practical in our classes (Appendix 9, 768).

**Knowledge framework**

Observations showed that the teachers often (65.2%) embedded their lessons upon the knowledge of students. The teachers were observed to considerably ("often" = 47.8%) assess the prior knowledge of their students before they started a new lesson. However, the teachers less often ("never" = 47.8%) used examples from their students' daily lives, and experiences to expound on instructional content in their classrooms as depicted in Table 8:9. Analysis showed that overall, the teachers were often (*Mdn*= 3) observed utilizing evidence-based strategies pertaining knowledge framework of students.

Table 9:9. Strategies for knowledge framework

| | Never | | Sometimes | | Often | |
|---|---|---|---|---|---|---|
| | Count | Row Valid N % | Count | Row Valid N % | Count | Row Valid N % |
| 701. Teacher assesses prior knowledge of students before lesson. | 9 | 39.1 | 3 | 13.0 | 11 | 47.8 |
| 702. Teacher uses examples from students' daily lives and experiences. | 11 | 47.8 | 2 | 8.7 | 10 | 43.5 |
| 703. Teacher embeds lessons upon knowledge of students. | 5 | 21.7 | 3 | 13.0 | 15 | 65.2 |

The teachers acknowledged that students who are DHH did not benefit from incidental learning which necessitated the teachers to establish the students' knowledge framework before embarking on a lesson as described by Hodari:

> When a child is hearing, this child can get information not necessarily from the teacher, it does not have to be from the classroom. But for deaf child if the child does not get somebody to really give information a lot of information will just pass. That is why I am saying education to them, the knowledge for them is not so automatic. You do not assume that they know, you have to teach them. You don't assume that they have gotten that knowledge from home, from the parents, because maybe the parent does not know how to communicate, the parent cannot give that information to the child (Appendix 9, 229).

However, the teachers complained that most parents of the students who are DHH did not provide their children with varied experiences, therefore, the students' world knowledge was rather limited. One participant, Imani, described the situation thus:

> Even in our classes we can really tell the children who are exposed; those who are allowed to attend functions and those who are never allowed because you see the difference. You'll find children coming on Monday talking about the wedding, the places they went to and others they even if *yuko tu* [they are only] deaf, he doesn't have any other disability but the fact that this child is always enclosed *ako tu hapo, hawana habari* [the child is just there, clueless] some parents are very… Some of them when these things are taking place going for burials, they are left at home (Appendix 9, 956).

A few participants explained that some parents were averse to the idea of their children learning sign language yet they wanted their children to perform well academically. One teacher, Amani, explained their dilemma:

> I have a question please. My colleagues, now what should I do? *Mzazi amekuletea mtoto, anakuambia mtoto ni deaf umfunze lakini hataki awe anaongea na mikono*. [A parent brings you their child and tells you that the child is deaf but they do not want the child to use hands to communicate]What should you do? (Appendix 9, 656).

Some participants admitted that they were not conversant with how to use examples from students' daily lives and experiences to explain classroom content. One participant, Ujana, described their experience thus:

> I'm teaching the lower class and when you talk of teaching using examples from their daily lives. First these kids, they do not even have language. You first have to teach them, mother, *yaani, mama*, [that is mother] when you use a picture *ukimuuliza* [when you ask them] where is your mother *atakutolea picha akuonyeshe huyu ni mama yangu* [they will produce a photograph and tell you that this is their mother]. So first I think using examples of their daily life to me with those kids is kind of tricky (Appendix 9, 894).

### 9.2.3 Teachers' experience in the use of evidence-based practices

Four themes emerged from the qualitative analysis that can summarize the experience of teachers' experience with evidence-based strategies in their classrooms.

**Theme 1: The practitioner could not apply it to their practice**

The participants explained that in their present context, implementation of the evidence-based strategies was not feasible. Sultan described it thus:

> I have taught deaf for a long period and I believe horseshoe is better for the deaf except when you are introducing a topic using different resources which are in different corners of the class. But do you think it is possible in our current situation where we have EIGHT levels? Are we helping these children really? (Appendix 9, 332).

**Theme 2: The practitioners did not find the research relevant to their context**

It also emerged that the teachers considered some aspects of evidence-based strategies irrelevant, especially in their context. Here is an excerpt from Hodari:

> You sit down and ask yourself am I going to plan my lesson, am I going to make the rubric am I going to write the IEP, *yaani* [that is] the work that you have to do and to it is just too much for you so in some cases that IEP does not work (Appendix 9, 804).

**Theme 3: The research did not tell the practitioners what to do**

In some cases, the participants expressed frustration with the evidence-based strategies because it was not clearly stipulated how they would implement it in their classrooms. Hodari exclaimed:

> This KSL is affecting the English structure so SO much that I wish we would get somebody to even in-service us on how to go about it because making them to get this English structure, I am telling you, it is a nightmare (Appendix 9, 426).

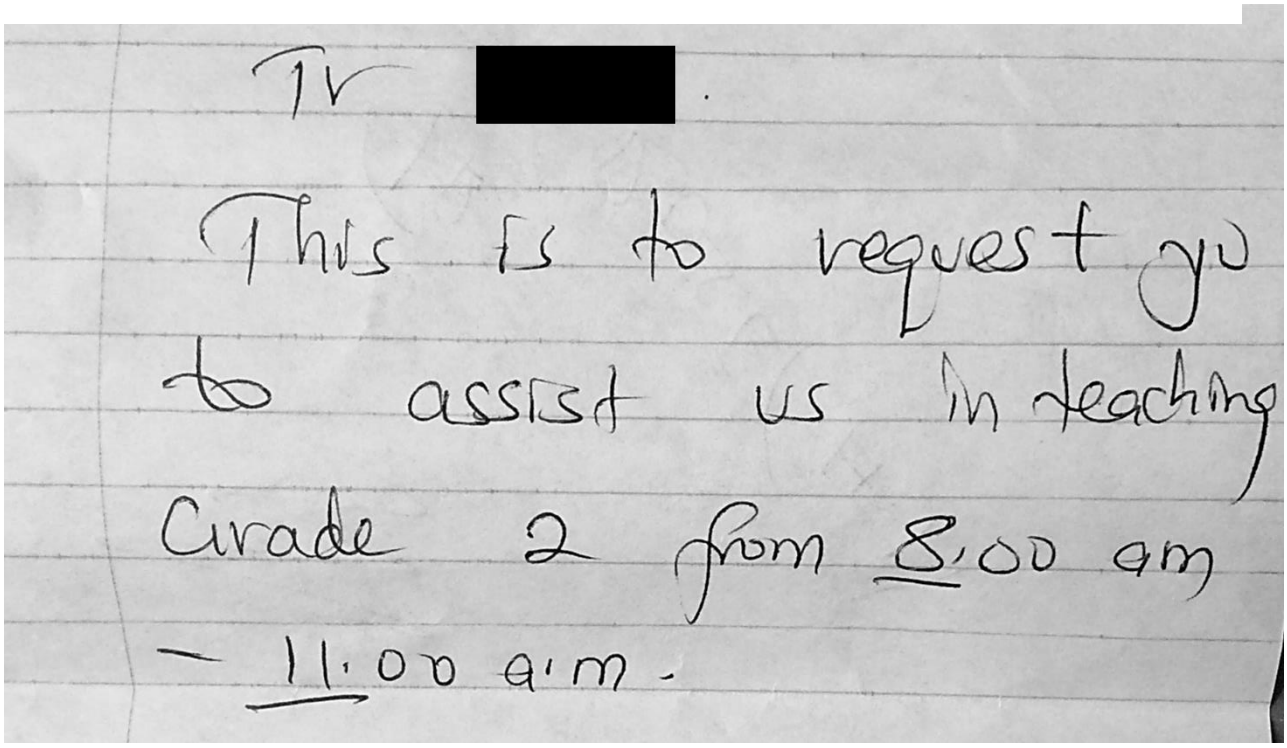
**Theme 4: The practitioners felt that they already knew the information provided by the research**

In some cases, the participants stated that they were familiar with the evidence-based strategies. Imani explained:

> Thank you so much for the opportunity and in fact we have heard about all these pedagogies and what is needed in our HI classes but how we wish that it could be applicable at the ground (Appendix 9, 194).

The overarching theme was that the teachers could not implement the evidence-based strategies due to the multiple challenges they faced in their present context. The participants were unanimous in the comments they gave on the challenges they experienced teaching students who are DHH in Units. One of the challenges the teachers face was the lack of personnel in the schools that necessitated the teachers of the DHH to leave their students and teach in regular classrooms. This was seen as a disregard of the needs of students who are DHH and extra duties that increased the teachers' workload. Photograph 5 shows a note a teacher of the DHH received from a school administrator requiring them to leave their classroom and go teach in a regular classroom.

Photograph 5: A note requesting a teacher for the DHH to teach regular students.




More of such challenges have been summarized in Table 8:10 accompanied by a sample of verbal excerpts from the FGD.

Table 9:10. Challenges faced by teachers of the DHH in Units

| Challenge | Comments |
|---|---|
| Lack of classrooms | Hodari: Like in my school we do not have ANY extra room, the school admin one time tried to get an extra room for us but we DON'T (Appendix 9, 256).<br>Sultan: Actually in Nairobi, we need a school for the deaf whereby a whole room will belong to a certain level (Appendix 9, 337).<br>Hodari: If we had a special school that could not happen because we would take all those teachers from all those units and all those learners make this school and we will teach normal and these children will perform (Appendix 9, 253). |
| Lack of personnel | Inira: We are just wishing that if the Government did something to us, to add us more teachers, to consider the deaf, to consider the deaf children as any other child in the society because teaching the deaf child is not as teaching the regular child (Appendix 9, 183).<br>Imani: How I wish maybe we could have teacher aids even in schools for the deaf so that the can help us manage the classes better, yeah (Appendix 9, 211). |
| Student characteristics | Tamu: So even for those who are maybe having one level E.g., a class where I am having PP1 and PP2 and in the same class I am having those ones with MH and autism (Appendix 9, 814).<br>Ujana: I'm teaching the lower class… these kids, they do not even have language…, they don't even understand according to me (Appendix 9, 894). |
| Insufficient teaching materials | Hodari: The blackboard is one so sometimes I teach on one corner and my colleague stands on the other corner, depending on which class you are teaching (Appendix 9, 219).<br>Sultan: To teach the deaf you must be practical so lack of RESOURCES, resources, for different concepts like Mathematics (Appendix 9, 338). |

Table 9:10. Challenges faced by teachers of the DHH in Units

| Challenge | Comments |
|---|---|
| Lack of parental support and involvement | Imani: You can imagine a parent on a visiting day comes, gives the child food, the child eats, they will eat when the parent is quiet and when they finish, *anashika* [they hold] the child *mkono* [the hand] then brings the child to the teacher and asks, *muulize anataka nini*, [ask him what he wants] what else does he or she need? (Appendix 9, 960).<br>Amani: I do not know *kama ni* [if it is] ignorance *ama ni* [or it is] over protection I have a student, class 7. She had a problem with the mother (Appendix 9, 975).<br>Sultan: This parent is still in denial. The first thing is counseling the parent. If you are not capable, call different people to talk to the parents so that the parent can first of all get out of denial (Appendix 9, 662). |
| Heavy workload and time constraints | Tamu: We are stressed by time (Appendix 9, 754).<br>Inira: I am teaching all the subjects the 6 subjects in class 4, I am also teaching the SIX (emphasis) in class 7 now you can imagine it is 35min, you have to jump like a cartoon give an example, give work very fast to the class 7 then you come in the same 35min you give the class 4s (Appendix 9, 172).<br>Imani: Sometimes you are supposed to handle activities of daily living this child you have to maybe they do not know how to manage themselves so you take them to the washroom so when that need comes in then you have to leave the other children and take this one and you find that it sometimes it may not work because now these 35min as I agree with my colleague um these are the 35 min that you are using to manage all these (Appendix 9, 206).<br>Hodari: You realize that all these children need an IEP but because of the amount of work that you have and remember that we also have the madness that we have about mean score that you sit down and ask yourself |

Table 9:10. Challenges faced by teachers of the DHH in Units

| Challenge | Comments |
|---|---|
| | am I going to plan my lesson, am I going to make the rubric am I going to write the IEP, *yaani* [that is] the work that you have to do and to it is just too much for you (Appendix 9, 802). |
| School administration | Amani: Support from the administration is very minimal (Appendix 9, 317).<br>Sultan: The admins in a school with Units for the deaf especially they are supposed to know, maybe if not, the Government should make sure that they have at least psychology for the deaf, they need to learn some basics in KSL and psychology,… they need to have that knowledge (Appendix 9, 367). |

### 9.2.4 Educational approach

The approach taken by teachers to educate students who are DHH in Units was measured using BADE. The results were presented according to its four subscales as displayed in Table 8:11. Findings from the FGD corroborated the results from the BADE.

Table 9:11. Educational approach of teachers of the DHH

| | N | M | SD |
|---|---|---|---|
| Hearing technologies | 23 | 3.81 | .810 |
| Visual language & bilingualism | 23 | 4.03 | .881 |
| Listen & spoken language | 23 | 2.35 | .807 |
| Hearing parents | 23 | 1.52 | .761 |
| Valid N | 23 | | |

The findings show that the participants were uncertain (*M*=3.8, *SD*= 0.81) about items on literacy through hearing technologies and/or visual support for speech comprehension. Further, the findings show that the participants were in agreement (*M*=4.03, *SD*= 0.88) with approaches on visual language and bilingualism. The findings also indicated that the participants were not in agreement (*M*=2.35, *SD*= 0.81) with approaches on listening and spoken language. Lastly, the findings show that the participants strongly disagreed (*M*=1.52, *SD*= 0.76) with the notion that hearing parents were incapable of learning sign languages.

The findings on the use of the approach on use of hearing technologies and/or visual support for speech comprehension were not surprising as observations and FGD showed that majority of the students did not consistently wear hearing technologies and none of the teachers utilized cued speech as a visual support for speech comprehension.

The findings from BADE indicate that the teachers of the DHH in Units leaned towards visual language and bilingualism approaches to the education of the DHH. These findings were congruent with findings from the FGD. Findings from the FGD showed that there was considerable but not absolute unanimity among the participants in respect to the use of visual language and bilingualism. Apart from one participant, who was in support of the listening and spoken language approach, the others were in support of visual language and bilingualism. During the FGD, there was a considerably lengthy debate on the different approaches to the education of the DHH which

signaled that this was an important issue. The historic debate on the right approach raged on in the present study. Imara stated:

> I believe I have been there during oral, we used to teach the deaf, to speak to them kwa assembly, {exaggerated mouthing}*mpaka unachoka* [until you get tired]. Signs were not there I want to bring the development, we used oral. *Unaongea na mtoto hata kwa darasa* [you also talk to the child in the classroom] TWO PLUS TWO {exaggerated mouthing} write 2, *hata hakukuwa na* [even there was no] sign language ya [for] 2, *hata* [even]4 then you write it. Then I came to ASL, *si tumeifunza?* [did we teach it?] ASL met us teaching the deaf. *Tukang'ang'ana nayo* [we struggled with it]. *Tumeletewa* [we were brought for] KSL it is here with us with a lot of problems (Appendix 9, 602).

In as much as the participants supported the use of visual language and bilingual approaches, the findings from the FGD indicated that there was much incongruity amongst the participants concerning the use of KSL, SEE, and bilingual approaches. The participants in support of the use of KSL argued that it was the mother tongue of the students who are DHH and a language in its own right, therefore, should be used to present instructional content. Here is Imani's take:

> That is their language, KSL is a language by itself so you cannot equate he or she is communicating in KSL so do not say that it is broken English because that is their pattern and each language has its own pattern… The time that we will understand that it is not the right thing to do to force the deaf to use English, we embrace them and if it is examining we can examine them through KSL. Now we want to give them an easy time, not to force them into this English language, it is good yes, if they could but now you torture them, *mtoto umemfundisha ameelewa* [you have taught the child and he has understood] but now you want to examine them in English (Appendix 9, 578).

Those opposed to KSL and in favor of SEE argued that KSL was difficult and that it had a negative impact on the acquisition of English. Hodari and Tamu gave their opposing remarks:

> KSL is affecting the English structure. This KSL is affecting the English structure so SO much that I wish we would get somebody to even in-service us on how to go about it because making them to get this English structure, I am telling you, it is a nightmare (Appendix 9, 426).

> You have taught the children to write KSL, *me home go*, *teacher home go*, the you come to English, the same children you are teaching them, *the teacher is going home* and you are the same teacher you are teaching KSL and you are teaching English. This child gets even more confused because you are telling them, this is KSL and mind you maybe they have not reached that point of understanding the difference between KSL and English because the words all of them are in English. Now this change of the wording it becomes very hectic for them so I think that this issue is affecting English language the fact that KSL is being done as a subject and it is being written, they are being tested then again they come to English they do the exam, they get confused (Appendix 9, 554).

The participants, such as Sultan and Onyesha, in favor of bilingualism cited policy requirements for the approach:

> Our policy advices us when you are teaching other subjects you can use KSL but when you are teaching English as a lesson, you are supposed to use SEE, SEE and teach vocabulary using SEE but you can emphasize through bilingualism that is use of two languages KSL and the structure of English when you are teaching. But from Class Four, the policy is very clear, you are supposed to use SEE, write everything in SEE EXCEPT when you are emphasizing on concepts, you use bilingualism, you use mother tongue but remember that everything will be in SEE (Appendix 9, 497).

> I understand, moderator, that there is this discussion in the KNEC, where they are talking of every student who is deaf they should learn English, they should not just learn KSL but their language should be turned into SEE (Appendix 9, 434).

Comments from the FGD were congruent with findings from BADE on the question of whether parents of the DHH can and should learn sign language. The teachers were unanimous in their view that majority of the parents of students who are DHH had typical hearing and were not able to communicate with their children who are DHH. For instance, Sultan explained:

> Majority of the deaf actually, their parents are regular, they are hearing and they do not have SL. The environment they are brought up is talking, speech, which they do not hear. The environment is not enriched with KSL, their mother tongue (Appendix 9, 630).

The participants unanimously supported the idea to teach KSL to the so as to foster communication with their children who are DHH. One participant, Imani, recommended the revival of homebased programs to teach sign language to parents and siblings of the DHH:

> We have a problem with our EARCs because the personnel at EARC are not qualified, they do not do homebased programs which we used to do. Homebased programs were really helping because we could give SL to the environment. When the child is identified early enough, the parents are given SL, the siblings and the children playing with them. Teachers used to do homebased as itinerant teachers, we used to give basic language in KSL so that the parents could accommodate the children in home social activities so that they could come to school at least with some vocabulary (Appendix 9, 647).

Some participants, such as Onyesha, explained that they had already taken the initiative to teach KSL to the parents of students who are DHH in their Units:

> In my school, I have no problem with parents because I decided to be calling the parents, on Wednesdays the parents are there in my school, lunch time. I told them I do not want them to waste the children's time so, on Wednesday I just devote myself and teach the parents sign language so I have no problem with the parents, I teach them (Appendix 9, 981).

### 9.2.5 Teacher efficacy

The efficacy of teachers of the DHH in Units was measured using TSES and the results from its three subscales presented in Table 8:12. The results indicated that the total efficacy of teachers of the DHH in Units in Kenya was very high (*M*=8.00, *SD*=0.67). Of particular interest to the present study was the subscale on the efficacy of use of instructional strategies. Findings indicate that the participants rated themselves as being quite a bit efficacious (*M*= 7.92, *SD*= 0.83) in the use of instructional strategies in their classrooms. These findings were comparable to findings obtained from the structured classroom observations.

Table 9:12. Efficacy of teachers of the DHH

| | | Student Engagement | Instructional Strategies | Classroom Management |
|---|---|---|---|---|
| N | Valid | 23 | 23 | 23 |
| | Missing | 0 | 0 | 0 |
| M | | 7.95 | 7.92 | 8.12 |
| SD | | .892 | .831 | .661 |
| Minimum | | 6 | 7 | 7 |
| Maximum | | 9 | 9 | 9 |

The present study did not conduct a confirmatory factor analysis on the TSES. This is because the sample size in present study did not meet the minimum threshold required to yield reliable results.

### 9.2.6 Association between implementation of evidence-based strategies and efficacy

To establish whether there were statistical differences between efficacy and variables in the present study, the Mann-Whitney U statistic, Kruskal-Wallis statistic, and Spearman's rank correlation coefficient were calculated and the results presented in tables.

**Gender and Efficacy**

When the Mann-Whitney U statistic was calculated to determine whether there was any statistically significant difference in the efficacy of male and female teachers, the mean ranks as presented in Table 8:13 seemed to suggest that male participants were more efficacious than the female participants. However, the differences were not statistically significant (U= 17, p= .23) therefore it can be concluded that efficacy levels for the male participants were not more than those of the females.

Table 9:13. Mann-Whitney U Results on Gender and Efficacy

| | Gender | N | Mean Rank | Sum of Ranks |
|---|---|---|---|---|
| Efficacy | Male | 3 | 16.33 | 49.00 |
| | Female | 20 | 11.35 | 227.00 |
| | Total | 23 | | |

Test Statistics[a]

| | Efficacy |
|---|---|
| Mann-Whitney U | 17.000 |
| Wilcoxon W | 227.000 |
| Z | -1.190 |
| Asymp. Sig. (2-tailed) | .234 |
| Exact Sig. [2*(1-tailed Sig.)] | .268[b] |

a. Grouping Variable: Gender

b. Not corrected for ties.

**Age and efficacy**

When the Kruskal-Wallis statistic was calculated to determine whether there was any statistically significant difference in the efficacy of three age groups of teachers as depicted in Table 8:14, the mean ranks seemed to suggest that the teachers between the ages of 30-49 had higher levels of efficacy than the teachers in the other age groups. However, this difference was not statistically significant ($\chi^2 = 2.60$, $p = .27$).

Table 9:14. Kruskal-Wallis Results on Age and Efficacy

| | Age | N | Mean Rank |
|---|---|---|---|
| Efficacy | < 30 | 2 | 5.00 |
| | 30-49 | 10 | 13.45 |
| | 50-59 | 11 | 11.95 |
| | Total | 23 | |

Test Statistics[a,b]

| | Efficacy |
|---|---|
| Chi-Square | 2.601 |
| df | 2 |
| Asymp. Sig. | .272 |

a. Kruskal Wallis Test
b. Grouping Variable: Age

**Training and efficacy**

When the Kruskal-Wallis statistic was calculated to determine whether there was any statistically significant difference in the efficacy of participants according to the educational training they had received, the mean ranks seemed to suggest that the teachers who had received training in Special Needs Education were more efficacious than the ones who had received training in General Education and other kinds of training (see Table 8:15). However, this difference was not statistically significant ($\chi^2 = 3.71$, $p = .16$).

Table 9:15. Kruskal-Wallis Results on Training and Efficacy

| Training | | N | Mean Rank |
|---|---|---|---|
| Efficacy | SNE | 20 | 13.00 |
| | General | 1 | 2.00 |
| | Other | 2 | 7.00 |
| | Total | 23 | |

**Test Statistics[a,b]**

| | Efficacy |
|---|---|
| Chi-Square | 3.714 |
| df | 2 |
| Asymp. Sig. | .156 |

a. Kruskal Wallis Test
b. Grouping Variable: Training

**Qualification and efficacy**

When the Kruskal-Wallis statistic was calculated to determine whether there was any statistically significant difference in the efficacy of participants according to the educational qualification they

possessed, the mean ranks seemed to suggest that the teachers who had attained a Master's degree were more efficacious than the ones who had received a Bachelor's degree, a Diploma and a Certificate (see Table 8:16). However, this difference was not statistically significant ($\chi^2 = 2.89$, $p = .41$).

Table 9:16. Kruskal-Wallis Results on Qualification and Efficacy

| | Qualification | N | Mean Rank |
|---|---|---|---|
| Efficacy | Certificate | 3 | 8.50 |
| | Diploma | 5 | 14.20 |
| | Degree | 12 | 10.88 |
| | Masters | 3 | 16.33 |
| | Total | 23 | |

**Test Statistics[a,b]**

| | Efficacy |
|---|---|
| Chi-Square | 2.894 |
| df | 3 |
| Asymp. Sig. | .408 |

a. Kruskal Wallis Test
b. Grouping Variable: Qualification

**Experience in teaching students who are DHH and Efficacy**

When the Kruskal-Wallis statistic was calculated to determine whether there was any statistically significant difference in the efficacy of participants based on the number of years they had taught children who are DHH. The mean ranks seemed to suggest that the teachers who had taught for between 6-5 years were more efficacious than those who had taught for less than six years and those who had taught for more than 16 years as depicted in Table 8:17. However, this difference was not statistically significant ($\chi^2 = 2.71$, $p = .26$).

Table 9:17. Kruskal-Wallis Results on DHH Experience and Efficacy

| Experience with DHH | | N | Mean Rank |
|---|---|---|---|
| Efficacy | 0-5 | 9 | 9.33 |
| | 6-15 | 10 | 14.45 |
| | over 16 | 4 | 11.88 |
| | Total | 23 | |

**Test Statistics[a,b]**

| | Efficacy |
|---|---|
| Chi-Square | 2.711 |
| df | 2 |
| Asymp. Sig. | .258 |

a. Kruskal Wallis Test

b. Grouping Variable: Experience with DHH

**Experience in teaching in general education and Efficacy**

When the Kruskal-Wallis statistic was calculated to determine whether there was any statistically significant difference in the efficacy of participants based on the number of years they had taught in general education settings. The mean ranks seemed to suggest that the teachers who had taught the least number of years, less than six years, in general education settings, were more efficacious than those who had taught for more than six years as shown in Table 8:18. However, this difference was not statistically significant ($\chi^2 = .58$, $p = .75$).

Table 9:18. Kruskal-Wallis Results on General Education Experience and Efficacy

| Experience in General Education | | N | Mean Rank |
|---|---|---|---|
| Efficacy | 0-5 | 9 | 13.17 |
| | 6-15 | 7 | 11.93 |
| | over 16 | 7 | 10.57 |
| | Total | 23 | |

Test Statistics[a,b]

| | Efficacy |
|---|---|
| Chi-Square | .581 |
| df | 2 |
| Asymp. Sig. | .748 |

a. Kruskal Wallis Test

b. Grouping Variable: Experience in General Education

**Relationship between the use of evidence-based strategies and efficacy**

Spearman's rho correlation coefficient was used to ascertain whether there was a relationship between the use of evidence-based strategies and efficacy of teachers in the present study. The findings as depicted in Table 8:19 indicate that there was no statistically significant correlation between the two, $r_2$=-.04, $p$= .86, $N$= 23.

Table 9:19. Correlation between evidence-based strategies and efficacy

| | | | Efficacy | Strategy Use |
|---|---|---|---|---|
| Spearman's rho | Efficacy | Correlation Coefficient | 1.000 | -.040 |
| | | Sig. (2-tailed) | . | .855 |
| | | N | 23 | 23 |
| | Strategy Use | Correlation Coefficient | -.040 | 1.000 |
| | | Sig. (2-tailed) | .855 | . |
| | | N | 23 | 23 |

# 10 Summary, conclusions and recommendations

This chapter contains a review of the major results from the present study and a discussion of the findings in relation to relevant literature. The chapter also contains limitations of the study and recommendations for future research and practice.

## 10.1 Summary of the study

Herein is the discussion of the major results of the present study contrasting the findings with those from previous studies and a commentary on the meaning of these findings. The discussion is organized according to the research questions.

### 10.1.1 Descriptive findings

The present study investigated the extent to which evidence-based pedagogy is utilized in Units for the DHH in Kenya and the efficacy of teachers of the DHH in the Units. The sample was drawn from 23 participants, all teachers of the DHH who taught at Units for the DHH in Kenya. The sample size, albeit small, was arguably an accurate representation of the majority of Units for the DHH in Nairobi and Kiambu Counties as it was drawn from all the Sub-Counties in Nairobi and Kiambu that had Units for the DHH. The present study refrained from making any generalizations to all Units in Kenya and confined the findings to Units drawn from Nairobi and Kiambu Counties. The small sample size is a wide spread challenge in studies in deaf education. This is because hearing loss is a low-incidence disability which precludes researchers from drawing large sample sizes (Beal-Alvarez, 2017; Easterbrooks, 2017; Luckner, 2017; Trezek & Wang, 2017). Additionally, Garberoglio (2017, p. 121) asserts that educational researchers who work in the field of deaf education face a number of challenges, among them, “low numbers of available participants” because hearing loss is an extremely low incidence disability.

Findings from the demographic information indicate that the number of female teachers was disproportionately larger than that of male teachers. These findings are not unique to the present study as previous authors have documented that the teaching workforce is comprised predominantly of women than it is of men (Malinen et al., 2013; Pas et al., 2012; Sambu et al., 2018). Majority of the participants in the present study had an educational background in Special Needs Education, having obtained at least a Diploma and very few having obtained a Master’s degree. These findings are comparable to findings from previous Kenyan studies that documented the educational background of teachers in schools and Units for the DHH (Muhombe et al., 2015;

Sambu et al., 2018). The findings seem to suggest that the majority of the teachers had received knowledge and skills on how to teach students who are DHH. However, there were still a number of participants who reported that they did not have a background in Special Needs Education. Such participants either had a background in general education, SNE but a different specialization from deaf education, and some simply had Certificates in KSL. The presence of untrained teachers in schools and Units for the DHH has been observed in previous studies where these teachers are said to be "helping" at the institutions due to the insufficient number of trained teachers of the DHH in Kenya (Adoyo, 2007). Observations from the present study showed that these teachers were not merely "helping", they were in charge of actual teaching instructional content and classroom management. The present study observed that these untrained teachers were not well versed in the pedagogy of the DHH. In as much as there is an acute shortage of staff in Units for the DHH, it is imperative that the onus for actual teaching be placed upon trained teachers of the DHH, conversant with the unique characteristics of students who are DHH that demand specialized educational practices, an argument already submitted in the present study.

Some elements of observer effect were recorded during the structured classroom observations. To begin with, some teachers admitted to teaching a lesson due to the presence of the researcher. This was because some of the teachers were engaged in instructional content revision in preparation for mid-term examinations while others were engaged in practice and rehearsal activities in preparation of the students for Sub-County sports competitions and Music Festival competitions. The teachers reiterated the importance of extracurricular activities in the education of the DHH as it was an avenue the students could explore their talents. Another instance of observer effect was evidenced in one Unit where the teacher gave students their hearing aids to wear on the first day of observation but on subsequent observations, when observer effect had worn off, kept the hearing aids in storage. Observer effect is not unique to the present study and is inherent in observation studies. The present study tried to mitigate the observer effect by making reconnaissance visits prior to the actual data collection for the teachers and students to get accustomed to being observed. Additionally, the present study collected data on more than one occasion per school which could have reduced the observer effect.

### 10.1.2 Classroom organization and classroom routines

The present study found that students who are DHH in most of the Units sit in rows facing the front as opposed to the horseshoe or L-shaped arrangement prescribed by research. These findings are congruent with reports made about primary schools for children who are DHH in Kenya that showed students who were DHH were seated in rows rather than horseshoe or L-shaped formation (Makokha, 2012). This kind of arrangement is oriented towards a single focal point, who in this case is the teacher. This kind of seating arrangement suggests that there are limited peer-to-peer interactions and that the interactions are mediated by the teacher. These conclusions are consistent with findings from the present study that indicate that the students actually work individually, not with peers.

Students who are DHH from different grades ranging from PP1 (nursery) to Grade Eight, all learned in the same classroom or in a few Units, split between two rooms. These findings have been documented in previous studies (Mweri, 2014). Findings from the present study indicate that these rooms were crowded and disorganized. Classroom organization is crucial as a classroom cluttered with furniture could foster an environment where disruptive behavior such as students bumping into each other, likely to occur. In addition, a classroom that is disorganized could lead to reduced instruction time and increased probability of students to engage in disruptive behavior (Guardino & Antia, 2012). The lack of classrooms designated to respective grades was prohibitive to effective teaching and learning as the environment was rather chaotic and far from ideal as the teachers are expected to teach children of different age groups, different academic levels, and different education and communication needs. The classrooms did not have adequate room to store learning materials and in most classes, it was difficult to maneuver through the classroom which further hindered student-teacher interaction. Surprisingly, the findings from the study indicate that the teachers were often utilizing evidence-based classroom organization and routine strategies which was contrary to the FGD findings and field notes. This discrepancy between expected and obtained results could be attributed to the multiple items on the physical attributes of the classroom (e.g., items on lighting) and fewer items on the organization of the room, which could have tilted the overall score to reflect a higher median.

### 10.1.3 Visual aids and language of instruction

The present study indicated that majority of teachers in Units for the DHH quite often utilized evidence-based strategies attributed to visual aids and language of instruction. There was presence of a variety of visuals in the Units observed. These findings corroborate previous findings reported by Makokha (2012) who observed that schools for the DHH in Kenya had visual aids such as charts, flash cards, posters, pictures, objects, and labels in the classrooms. However, in the present study, it was observed that the visual aids, especially the wall charts, were numerous, not placed at the students' vantage point for optimal reading, old and, tattered. They served as visual distractions instead of visual aids to learning. The teachers reported to utilizing information technology gadgets such as smart phones and televisions to promote classroom instruction. They also reported in the FGD that the schools had ICT facilities such as laptops and projectors. Past studies document limited to no technological devices such as computers, overhead projectors, and television sets in schools for the DHH in Kenya (Makokha, 2012). The discrepancy between observations from the present study, past studies and reports from participants in the present study could be attributed to recent noble efforts by the Kenyan Government to furnish schools with ICT devices facilities. It is plausible that the technological devices were not specifically assigned to the Units for the DHH, and were situated in special, secure rooms in the general education buildings, which were not visited in the present study. These findings also highlight one of the benefits of mixed-methods approach that utilize the in-built strengths of both quantitative and qualitative approaches (Onwuegbuzie & Johnson, 2006). However, the availability of the devices did not necessarily translate to their effective use in the Units for the DHH. Majority of the teachers were unaware of the availability of such devices in their schools and fewer still, consistently utilized these facilities. Teachers of the DHH need to be trained on how to harness the established benefits of ICT in their classroom instruction (Pizzo, 2018).

In regards to language of instruction, the findings from the present study indicate that the teachers used simple, clear language, which was modified to suit the level of students. However, the teachers did not use new vocabulary or higher level language which denied the students models for higher level language. The use of simplistic language could stem from the widely held misconception that students who are DHH had concrete intelligence and less abstract intelligence (Moores, 2018). Studies show that as the educational levels progress, the educational content increasingly uses abstract symbols and concepts which require higher-order thinking and sufficient

linguistic abilities to successfully engage with the curricular content (Luft, 2017). Therefore, it is imperative for the teachers of the DHH to model higher level language and explicitly teach the students vocabulary that would address the language deficits that characterize students who are DHH.

### 10.1.4 Optimal visual and acoustic conditions

Findings from the present study indicate that to a large extent, the teachers of the DHH utilize optimal visual strategies that are backed by science. The teachers maintain eye contact with their students while teaching, use appropriate signs, gestures, and facial expressions. However, when it came to acoustic conditions in the classrooms, majority of the classrooms have audible distractions from within and outside the classroom. Only one Unit had made attempts to acoustically treat the classrooms using acoustic tiles. The lack of acoustic treatment of the classrooms could be explained by the fact that the teachers did not utilize an oral/ aural approach to teaching students who are DHH. In fact, the few students who wore hearing aids did not wear them consistently and were prohibited from taking the amplification devices home. Findings from the present study corroborate observations made by previous studies that reported that students who are DHH in Kenyan schools and Units for the DHH did not wear their hearing aids consistently (Lawal et al., 2016; Makokha, 2012). Reasons given for not wearing the hearing aids consistently were that the hearing aids caused irritation and discomfort when used (Makokha, 2012), the costs of hearing aids in Kenya was prohibitive (Awori, 2010), and they feared that the amplification devices would be lost, sold, or damaged (Lawal et al., 2016). The teachers in the present study cited the fear of possible damage or loss of the rather expensive devices as reasons for students not wearing their amplification devices consistently. Consistent use of amplification has been related to higher academic achievement of students who are DHH (Stinson & Antia, 1999). Arguably, the teachers and or parents are unaware of the immense benefits associated with the consistent use of amplification devices.

### 10.1.5 Differentiated instruction

Findings from the present study show that in spite of the fact that teachers in the present study acknowledge individual differences in their students, they rarely use differentiated instruction in their classrooms to address these differences. The teachers provide students with additional explanations during individual work but little is done to design instruction to cater for the students'

unique characteristics and differences. Further, the teachers provide the students with similar amounts of work that is also of similar difficulty level. These teachers were therefore more likely to plan for whole-class instruction as opposed to differentiated instruction based on the students' readiness, interest, or learning style. The findings show that the most common method of differentiated instruction in the Units is IEPs. However, the teachers admitted to generating the IEPs but not implementing them in their classrooms. They cited a heavy workload, lack of sufficient planning time, too many students, lack of a team approach to IEP development and implementation, and a lack of relevance of the IEP document in their classrooms as reasons why they did not implement IEPs. These findings are congruent with findings reported in Kenyan Schools for the deaf where the researchers observed that teachers at the schools did not use IEPs with their students who are DHH (Makokha, 2012; Mukuria & Korir, 2006). Moreover, Makokha (2012) reports that the teachers of the DHH resulted in teaching the students as a group, and using lecture method, regardless of their learning differences. These findings are not unique to the Kenyan context, neither to teachers of the DHH/ A survey of teachers in regular middle schools, showed that 50% of the teachers responded to not using differentiated instruction in their classrooms because they did not find a reason to do so (Dixon et al., 2014). Additionally, previous research has shown that most teachers do little to adjust their classroom instruction to effectively meet the diverse academic needs of their diverse students (Tomlinson et al., 2003). Studies further detailed that special education teachers, in resource rooms, use whole-class instruction and little differentiated instruction or materials provided to students (Vaughn et al., 1998). For differentiated instruction to be effective, the teachers need to be more proactive through preplanning of specific ways to adjust instruction for the different students in their classrooms. Further, the teachers need to translate their comprehension of the diversity of their students into classroom practices. Granted, the implementation of IEPs seem to be problematic in the present context. However, the teachers could explore other methods of differentiating instruction such as the provision of different amounts of work and different difficulty level to the students of varying needs instead of simply relying on the IEP as recommended by (Truckenbrodt & Leonhardt, 2015). With the advent of the new curriculum, CBC, that places emphasis on student's individual competencies, teachers could engage with the parents and encourage their students to select their own projects based upon their interests and talents (Tomlinson et al., 2003) all which are aligned to differentiated instruction. In addition, the teachers could consider the differentiation of four elements in their classrooms:

content, process, products, and learning environment (Tomlinson et al., 2003) all which could be viable in their context and could help them achieve the ideals of the CBC. It is imperative for the teachers to provide the appropriate accommodations for the students who are DHH to attain their goals and achieve their highest capabilities and aspirations.

### 10.1.6 Classroom social organization

Findings from the observations showed that the teachers in Units for the DHH predominantly assign the students individual tasks and do not utilize a buddy system. Further, the teachers rarely assign the students classroom tasks to be accomplished in pairs, and or in groups. The teachers devote minimal time in small group instruction and activities and seem to prefer whole class instruction and activities, akin to a lecture. This kind of approach to teaching assumes that the students have similar learning characteristics and disregards the students' unique learning characteristics. These findings are not unique to the present findings and context. A study conducted in Mexico also reported that students in the school for the DHH seemed to work in isolation rather than in a community of learners (Scott & Kasun, 2018). The documented findings from research on peer-to-peer and small group interactions overwhelmingly indicate that students stand to benefit from improved language development and a strengthened sense of self-concept (Helf et al., 2009; Tomlinson et al., 2003). Students who are DHH, whose characteristics indicate that they have deficits in their language, could potentially benefit from these kinds of classroom social arrangements. Peer-to-peer and small-group interactions would ensure students are active, rather than passive participants in the learning process. Only one teacher reported of having established a buddy system in their Unit. In a context such as the Units in the present study, buddy systems could be of great benefit to the students and teachers alike. The students could benefit from the language development (Tomlinson et al., 2003) and development of social skills (Adams, 2016) while the teachers could benefit from improved classroom management and increased instruction time.

Additionally, the findings from the present study indicate that the classroom instruction is teacher-controlled rather than student-centered. These findings are in line with previous studies that reported that interactions in schools for the deaf in Kenya were teacher-centered (Adoyo & Maina, 2019; Maina et al., 2014). Research shows that it is of importance for children to be influenced by other children and not entirely by the teacher (Hayashi & Tobin, 2014). This tendency to use a

whole-class instructional approach dominated by the teacher is a characteristic observed in general education classrooms where the focus is to move the curriculum content (Stinson & Kluwin, 2012). Teachers in the present study had spent on average more years teaching in general education settings than in schools for the DHH. It appears reasonable to infer that there could be a carryover effect of the strategies they used in general education settings to special education settings. As argued in the present study, students who are DHH require pedagogy that is distinct from that of students with typical hearing in general education settings; some teaching strategies that were permissible in the general education settings are more likely ineffective with students who are DHH.

### 10.1.7 Classroom structure

Findings form the present study show that teachers in Units for the DHH introduce their instructional content in a sequential manner which is important for the students to follow along with the lesson. However, when it came to other evidence-based strategies pertaining to classroom structures, the teachers in the present study were found to be wanting. The most salient observation was the lack of a day schedule and the fact that though a classroom timetable was on display in most classrooms, the teachers more often than not do not follow it. The FGD revealed both internal and external factors that seemed to explain this lack of a daily schedule that was adhered to in the Units. Internally, the teachers cited the large number of students, different grade levels of students, students with additional disabilities, limited personnel, heavy workload and limited time to execute an actual lesson. The teachers cited external interference such as impromptu visits from parents and other guests at the Units and the requirement by the school administration to stand in for absent teachers in the general education classrooms. From the teachers' narration, it seems that the teachers of the DHH are viewed as auxiliary members of staff for the teachers in the regular school who are required to abandon their own classrooms to attend to regular classrooms. Pospischil (2018) accentuates the need for structure by arguing that the clearer the course of the day, the easier it is for students who are DHH to follow along the lessons, have the right orientation and concentrate on the lessons. Evidently, the frequent disruptions and lack of an actual schedule is detrimental to students who are DHH.

### 10.1.8 Knowledge framework

Findings from the present study showed that to an extent, the teachers implemented evidence-based strategies that seek to establish the students' knowledge framework. Findings indicated that the teachers make attempts to embed their lessons upon the knowledge of the students. However, they routinely do not assess the students' prior knowledge at the beginning of a lesson or new topic neither do they often utilize classroom examples drawn from their students' daily living. The teachers in the FGD voiced their frustration at their students' language deficits that hindered them from adequate communication in the classroom. The teachers explained that since the students had limited language capabilities, it was problematic for them to assess the students' knowledge on certain topics. It is widely documented that approximately 90% of children who are DHH are born to parents with typical hearing (Scheetz, 2012). The implication of this statistic for students in the present context is that their parents did not expose the them to KSL at home and cannot effectively communicate with them in sign language (Mweri, 2014) which could explain the teachers' sentiments. Children who are DHH do not benefit from incidental learning unlike their counterparts with typical hearing. Therefore, they must be exposed to vocabulary and world knowledge explicitly through direct instruction (Konrad et al., 2011; Lund & Douglas, 2016; Pospischil, 2018; Scott & Kasun, 2018). However, the onus for this exposure is not limited to the teachers but extends to the parents as well. The teachers in the present study explained that a majority of the parents of children who were DHH did not provide their children with varied life experiences which was a constraint to the teachers' use of examples from the students' daily living. Additionally, some parents were averse to the idea that their children would learn sign language. This is not peculiar as parents of the DHH who do not understand sign language may resort to the use of home signs to communicate with their children while others might not wish to communicate with their children entirely (Musengi et al., 2013; Rodriguez & Allen, 2018). There is need for parents to be actively involved in the education of their children who are DHH, a recommendation made by previous authors (Mweri, 2014; Mwoma, 2017). It is crucial for the parents to learn how best to communicate with their children who are DHH in the first years of the children's growth and development. Past findings show that these first years are crucial for the children's speech and language as the language deficits are more prominent in later years (Friedmann & Szterman, 2011). These benefits have also been observed with children who use sign languages as their primary mode of communication. Research has established that children's abilities to use sign language

develops as the children grow and it has been established that those who were exposed to fluent sign language models at an early age perform better in sign language assessments (Beal-Alvarez, 2014). Therefore, it is imperative for the parents to provide children who are DHH with the appropriate language intervention as early as possible to try mitigate the language delays and deficits in later years (Friedmann & Szterman, 2011). In the present context, it would be of benefit if parents learned KSL to foster communication between them and their children which would help reduce the language deficits the students exhibit in the Units, sentiments that have been documented by previous authors (Mweri, 2014; Mwoma, 2017). Additionally, it would be of value to the children if the parents exposed them to other deaf adults so that the children can acquire aspects of Deaf culture. This is because the parents with typical hearing may not be aware of or even accepting of the cultural views of deafness (Rodriguez & Allen, 2018). This could cause the children who are DHH to be culturally deprived since they do not have access to effective communication and lack deaf adults to inform them of the Deaf culture (Okombo & Akach, 1997). Arguably, a successful teacher for the DHH is one with a repertoire of different teaching strategies applicable as needed (Kluwin & Lindsay, 1984).

### 10.1.9 Educational approach

Visual language and bilingualism are the approaches to the education of the DHH used in the Units as per the results from BADE. What was consistently evident was that the majority of teachers in the Units do not use oral/aural and auditory verbal approaches. The findings were congruent with structured classroom observations that showed that teachers use KSL to teach students who are DHH. In addition, it was found that the teachers also use SEE and simultaneous communication (SimCom) to teach the students in the Units. These outcomes corroborate previous findings which report that teachers of the DHH used both spoken and signed English, and KSL in the classrooms (Adoyo & Maina, 2019; Ogada et al., 2014). Findings from the FGD revealed that the teachers were not unanimous in the approach they undertook to educate the students and that controversy of the right approach was still rife amongst them. Debates surrounding the best educational approach to use in schools for the DHH has been documented previously (Adoyo & Maina, 2019). The predominant debate was around the use of KSL and SEE whereby some teachers opined that KSL was detrimental to the acquisition of English. Similar to present findings, it has been observed that the language situation for students who were DHH in Kenya was complicated since the people in this sector have significant disagreements as to whether KSL or SEE is the best language for

instruction and assessment (Piper et al., 2019). A study conducted on written compositions by students who were DHH concluded that the students lacked mastery of English grammar; the students wrote using the word order of KSL instead of English; and that none of the students used English sentence structure (Adera et al., 2016). These findings seem to corroborate the FGD findings in the present study. However, there are no experimental studies conducted in Kenya to establish an actual causal relationship between the use of KSL and English therefore, one should be cautious of such conclusions. Actually, some authors have dismissed such conclusions deeming them myths and undue negativity towards KSL and signed bilingualism (Mweri, 2014). Opponents of SEE regard it as an artificial language that is set to undermine the indigenous and naturally developing KLS (Okombo & Akach, 1997). The proponents of KSL argue that it is a crucial mode of communication that would provide access to opportunities for people who are DHH therefore, should be used to teach students who are DHH (Mweri, 2014). This continued controversy and debate as to whether teachers should use KSL or SEE in the classrooms has repercussions on the teaching of students and on conduction of research in schools for the DHH (Piper et al., 2019). This discord has led to the teachers using a rather eclectic approach which some previous authors have classified as the use of total communication approach (Awori, 2010). Based on the findings, the present study concluded that teachers of the DHH in Units use Total Communication approach with a proclivity to visual languages (KSL), sign systems (SEE and SimCom) and signed bilingualism (KSL and English). It was observed that none of the approaches were used in their pure forms hence the conclusion that the teachers use a Total Communication approach, which is the use of elements from all forms of communication available to meet the needs of the individual who is DHH (Moores, 2010). The observation that the teachers utilized an eclectic approach to their teaching is not peculiar to the present study. Previous findings have shown that most classroom instructions that are based on manual communication incorporate sign systems based on spoken languages (Moores, 2010).

Results from BADE also showed that the teachers overwhelmingly support the need for parents of students who are DHH to learn KSL. These findings were similar to findings from the FGD where some teachers explained that they had made efforts to teach KSL to parents of students in their Units. This clarion call for parents to learn KSL is not novel to the present findings; it has been documented by previous authors (Mweri, 2014; Mwoma, 2017). Such efforts by the teachers should be applauded since research suggests that deaf children of hearing parents often have a

language acquisition trajectory that is much slower compared to that of deaf children of deaf parents who use sign language and that of children with typical hearing (Paul & Lee, 2010). Therefore, if the parents acquired a language modality to communicate with their children at an early age, it could help reduce the language deficits observed in children who are DHH compared to their age-matched peers.

Further, findings from the FGD indicate that some parents were still grappling with their children's hearing loss and were opposed to their children learning KSL. Similar to findings in the present study, it has been observed that even though parents' acceptance of their child's hearing loss is one of the most important decisions the parents can make, they neither arrive at this point of acceptance quickly nor easily (Marschark et al., 2006). The position of the present study is that Kenya needs to offer a wider range of services to parents of children who are DHH. This position is informed by the present findings that show that the dominant educational approach used in the Units is rather skewed towards sign language. The findings from the present study showed that majority of the teachers do not teach the students how to listen and speak. These findings are similar to those of a previous study on the use of verbal communication among children who are DHH in Kenya, whose authors record that the teachers never encouraged their students to use speech (Lawal et al., 2016). The thesis submitted in the present study is based upon the fact that children who are DHH are on a communication continuum that ranges from listening and spoken language to the use of sign language. Arguably, the best education systems are those that try to ensure that they provide the best possible instruction for every child (Malinen et al., 2013). Knoors (2016, p. 241) sums it cogently by stating that "one size fits none". This implies that no single educational approach, school placement, intervention program, or hearing devices can apply to all students who are DHH (Knoors et al., 2019). Therefore, Kenya needs to provide a continuum of special education services, programs and educational settings to cater for the varying needs of students who are DHH. This continuum should range from services and an array of educational placements for students who are fully immersed in inclusion settings and use oral/aural approaches to services for those who are in special schools for the DHH who use sign language approaches. Findings from a study conducted on verbal communication of children who are DHH in Kenya reported that all teachers involved in that study expressed an interest for speech to be incorporated to the curriculum for students who are DHH (Lawal et al., 2016). This indicates that there is a gap

when it comes to the use of oral/aural approach as most teachers use the total approach but with a proclivity to sign bilingual approach.

A provision of a wide range of services would provide an opportunity for students who are DHH to received appropriate school placements based on their degree of hearing loss. The present study supports the argument that it is unethical to force students who are DHH to fit into one mold disregarding their educational and communication strengths and needs (Marschark et al., 2006). The present study is in support of the argument to switch focus from educational approaches to actual pedagogy that is intended to meet the needs of the diverse students who are DHH, who do not necessarily fit into one educational approach (Swanwick, 2019). This can be achieved through early identification, diagnosis, and intervention services procured from EARCs across the country. There is need for thorough assessment of children who are DHH to ascertain their type, degree and severity of hearing loss which could inform their appropriate placement and intervention that is focused on their strengths. This would ensure that students who are DHH receive services based on their individual educational strengths and needs, rather than ad hoc placement. This kind of informed placement would be in line with previous studies that show that the child's degree of hearing loss is the most powerful predictor of whether a child will be taken to a special school or a different school placement (Mitchell & Karchmer, 2004). Various studies have established that students who had a hearing loss ranging from severe to profound were more likely to be placed in special schools than students with less than severe hearing loss (Geers & Brenner, 2003; Mitchell & Karchmer, 2004; Shaver et al., 2014). This would also inform the type of intervention prescribed whereby it would be recommended to some parents to learn oral/aural, and auditory verbal approaches to support their children who could benefit from hearing devices, while it would be recommended to other parents to learn KSL to support their children who would primarily benefit from sign language, sign systems, and sign bilingual approaches.

Lastly, it was apparent that majority of the teachers who taught at the Kenyan Units for the DHH were predominantly individuals with typical hearing. This reflects a previously established assertion that most decision makers in the field of the education of the DHH have typical hearing (Moores, 2018). There is need for more diversity of teachers in the education of the DHH that includes adults who are DHH who could be language models for students and teachers as well as reference points for Deaf culture. These sentiments are echoed by previous findings that showed

that teachers who are DHH were a source of inspiration and a good resource to students who are DHH and the entire school community (Johnstone & Corce, 2010). This is especially important in the educational approach of using signed bilingualism in the classrooms.

### 10.1.10 Teachers' experience in the use of evidence-based practices

It was established from the structured classroom observations that the Units in Nairobi and Kiambu Counties all have infrastructure such as permanent buildings that housed the classrooms for the DHH, electricity and water. Previous studies had reported that special schools that are in close proximity to Kenya's capital, Nairobi, have better facilities compared to schools in marginalized localities (Emmy, 2020) and schools in the rural areas (Elder, 2016; Elder & Kuja, 2019). Findings from the present study, which was conducted in Units for the DHH in Nairobi County and Kiambu County, which is in the environs of Nairobi, corroborate these reports.

The experience of teachers using evidence-based pedagogy in their Units were encapsulated into four themes after qualitative analysis. These themes were derived from factors that could hinder deaf education practitioners from making use of evidence-based practices (Swanwick & Marschark, 2010). The predominant theme was the fact that the teachers found it a challenge to implement the evidence-based strategies in their context, in Units. Even though the teachers were familiar with and agreed that the evidence-based strategies were suitable for students who are DHH, they unanimously agreed that it was quite difficult to implement them in their current situation. The present study established that teachers of the DHH in Units faced numerous challenges. A number of these challenges have been reported in previous studies: authors persistently report that schools for the DHH in Kenya lack learning materials such as subject text books (Awori, 2010; Makokha, 2012); that the schools did not have enough personnel (Makokha, 2012); they had inadequate resources (Elder et al., 2015); that the parents were not involved in the education of their children (Adoyo & Maina, 2019), and that teachers were overworked due the large number of student in the classrooms thereby could not attend to the students effectively (Makokha, 2012). The present study documented additional constraints that teachers faced such as lack of classrooms whereby students of different grade levels all learned in one or two classrooms in the Unit.

Further, the teachers in the FGD explained that the students' characteristics posed a challenge at the Units. Although the scope of the present study was limited to the teachers of the DHH and not

the students themselves, structured classroom observations and information gathered from the FGD revealed that a number of students who were DHH had an overlay of other disabilities. Information gathered from the teachers revealed that some of the students had a myriad of disabilities including, but not limited to: learning disabilities, ADHD, mild intellectual disabilities, autism spectrum disorder, and cerebral palsy. This observation is in line with reports from previous studies that indicate that teachers, administrators, and policy makers are presently faced with the complexities of educating students who are DHH with concomitant and confounding conditions (Clark, 2019). There were no statistics on children who are DHH with a disability (DwD) in Kenya as at the writing of this report. Additionally, evidence-based strategies for children who are DwD, at the writing of this report, were none existent, an observation reiterated by other authors (Cannon & Guardino, 2012; Guardino & Cannon, 2015). Consequently, the majority of teachers of students who are DHH have limited knowledge, skills or experience to work with such students who have additional disabilities (Luckner & Carter, 2001) which necessitates evidence-based strategies for effective intervention and instruction of this population of students (Clark, 2019). It is recommended that preservice and experienced teachers of students who are DHH should develop the attitude, knowledge and skills required to work with students who are DHH and have additional disabilities (Luckner & Carter, 2001). Some of the teachers revealed that they lacked support from the school administration and they were regarded as auxiliary members of staff who supported teachers in the regular classrooms. If anything, the school administrators need recruit auxiliary staff to support teachers of the DHH who are faced with the task of teaching students who have additional disabilities.

Research shows that there are a number of factors that aggravate teacher turnover such as an increase in workload, excessive paperwork, inadequate facilities (Hughes, 2012), lack of administrative support (Pas et al., 2012), and work under conditions that stifle their efforts to teach (Soodak & Podell, 1996). The numerous challenges encountered by teachers at the Units could lead to teacher attrition. The Units do not seem to serve their intended purpose, which was to provide an inclusive setting for students who are DHH. Previous studies have reported that students who are taught in separate classrooms all of the time, or part of the time, reported that their primary interactions in and out of school, were with peers who were DHH (Stinson & Kluwin, 2012). This suggests that these Units are not adequate inclusion settings for students who are DHH since the students take all their classes separately from students with typical hearing and do not interact with

the students with typical hearing in any meaningful manner. Previous studies conclude that school placement, especially a comparison between mainstream and special schools for students who are DHH, does not account to much variability in academic outcomes (Marschark & Knoors, 2019). However, the findings from the present study seem to challenge such conclusions, at least in regards to Units for the DHH in Kenya. Findings from the present study, arrive at the conclusion that the Units are unconducive teaching environments for the teachers ergo, unconducive learning environments for students who are DHH. These conclusions are in line with those of Mweri (2014) who strongly castigates the Units for the DHH and deemed them pathetic and those of Piper et al. (2019) who concluded that special Units in Kenya were not known for their high-quality education services. The teachers in the present study acknowledged that teaching in such settings was denying students who are DHH with equitable opportunities for learning as no much learning was taking place in the Units. The conditions at the Units preclude the effective implementation of evidence-based practices for students who are DHH.

### 10.1.11 Teacher efficacy

Teacher efficacy has to do with the teacher's own feelings of competence as a teacher (Tschannen-Moran et al., 1998). Results from the TSES indicated that teachers in the present study reported generally high ratings concerning their overall perceptions of self-efficacy. Teachers in the present study demonstrated strong confidence in their capabilities to teach students who are DHH. It is important to note that people may overestimate or underestimate their abilities and these estimations could have consequences on their actions such as the activities they choose to pursue and the effort they expend in those activities (Tschannen-Moran et al., 1998). Having said that, the findings from the present study were rather unexpected considering that qualitative findings indicated that the teachers considered Units an unconducive learning and teaching environment. Further, the present findings were incongruent with the findings from previous studies which seem to suggest that aspects such as school settings with support from the administration (Tschannen-Moran & Hoy, 2001a), availability of teaching resources, and the quality of teaching facilities (Bandura, 1997) could have an impact on the teacher's assessment of their efficacy. Additionally, the findings in the present study are contrary to the model proposed of teacher efficacy that seems to suggest that teachers consider factors related to the teaching task, such as the physical conditions of their teaching space as they assess their levels of efficacy (Tschannen-Moran et al., 1998). In the present study, it seems that such factors did not necessarily have an impact on the teachers'

perceived efficacy. This could be due to the fact that self-efficacy has to do with self-perception of competence rather than actual competence (Tschannen-Moran et al., 1998; Tschannen-Moran & Hoy, 2007). It is plausible that the teachers have a high regard of their competence as teachers of the DHH in spite of their working conditions. This scenario is not necessarily negative because self-assurance determines whether a person will make good or poor use of their capabilities when faced with difficult tasks (Hoy & Spero, 2005). Further, it has been established that teachers with high self-efficacy are those who believe that they can make a difference (Chu, 2013) which is in line with the sentiments expressed by the participants in the present study. In fact, it is argued that it is more productive for the teachers to slightly overestimate their actual teaching skills since their motivation to exert effort and persist in times of setbacks will enable them make the most use of their skills and capabilities (Tschannen-Moran & Hoy, 2007). Researchers actually caution against insidious self-doubts as they are said to potentially overrule the teacher's skills (Bandura, 1997). Therefore, the present findings could be a reflection of the teacher's motivation and persistence in teaching students who are DHH notwithstanding the myriad of challenges they experience in Units. This is because self-efficacy beliefs become self-fulfilling prophesies which validate the teacher's perceptions either of their capability or incapability (Tschannen-Moran & Hoy, 2007). Additionally, it is plausible that the teachers have found ways to adapt to their teaching environment, which is an attribute of individuals with high levels of efficacy (Bandura, 2002). Tschannen-Moran and Hoy (2001a) concur and explain that efficacy beliefs have been found to influence the teachers to be more persistent when situations do not run smoothly and to be resilient when they face setbacks. Findings from the present study indicate that the working conditions at the Units for the DHH are far from ideal, therefore, the students at the Units stand to benefit from teachers with high efficacy who can persevere in such conditions.

Conversely, doubts regarding self-efficacy could sometimes be beneficial (Wheatley, 2002). For instance, such doubts could be the catalyst that makes teachers see the need to learn new teaching strategies, could foster teacher reflection on their teaching, and the knowledge that they have less efficacy could motivate the teachers to learn (Wheatley, 2002). Outcomes of the TSES indicate that, compared to the other subscales, the teachers in the present study received the lowest scores on instructional strategies. Ideally, the relatively low scores should catalyze the teachers to learn evidence-based strategies for teaching students who are DHH and seek ways to implement them in their classrooms. The concern from research is that teachers who have a strong sense of efficacy

may not feel the need for new strategies and might not implement what they have learnt in in-service trainings (Tschannen-Moran et al., 1998). However, one of the themes generated from the FGD, "the research did not tell the practitioners what to do" already captures the aspirations of the teachers to learn how to implement evidence-based strategies in their classrooms; therefore, this concern could be unwarranted with the participants in the present study.

### 10.1.12 Association between implementation of evidence-based strategies and efficacy

The present study did not confirm an association between gender and teachers' efficacy levels. Few studies have been conducted to establish whether there is a relationship between gender and teacher efficacy and even fewer studies have established such a link between the two variables due to few male teachers in the study samples (Pas et al., 2012). Additionally, Tschannen-Moran and Hoy (2007) did not establish a relationship between teachers' efficacy and demographic variables such as gender, race, and age. Similarly, the presents study reported a very small number of male participants and the lack of an association between gender and teachers' efficacy is consistent with findings from previous studies.

Results from the present study seem to suggest that teachers with higher educational levels, a Masters in Special Needs Education, evaluated themselves more competently that those with lower educational levels. Similarly, Pas et al. (2012) postulate that teachers with more advanced education training are more likely to report high levels of efficacy since they feel more prepared to handle work demands. Such findings have also been reported by previous authors (Hoy & Spero, 2005; Woolfolk et al., 1990). Further, results from the present study also seem to suggest that teachers who had more experience teaching in schools for the DHH reported higher levels of efficacy than those who had extensive experience in general education settings. The converse results, that teachers who had the least experience in general education settings appeared to be more efficacious than those who had more experience in general education settings, were also obtained. These findings were congruent with previous studies that found that experience in teaching students with disabilities seemed to explained teacher self-efficacy (Malinen et al., 2013) and teachers with more experience in general seemed to report higher levels of efficacy (Hoy & Spero, 2005). It has been shown that teachers of the DHH, through their experience and or training, have acquired an awareness of the students' characteristics therefore, they are able to recognize and adjust their instruction according to the strengths and needs of the students (Marschark &

Knoors, 2019) which could be attributed to the observed increased efficacy. However, in the present study, the analysis indicated that the seeming associations were not statistically significant which could be attributed to the small sample size. Therefore, the present study did not provide conclusive findings on the association between experience and efficacy. A larger sample size could have provided stronger associations or more conclusive findings.

The present study did not find a significant relationship between the use of evidence-based strategies and level of efficacy of teachers of the DHH. A study to investigate the relationship between differentiated instruction and teacher efficacy could be the closest to the present study thematically and it found that differentiated instruction was associated with greater efficacy beliefs (Dixon et al., 2014). Though there is dearth research in the establishment of this association, findings as those of Dixon et al. (2014) suggest that there is likely a relationship between efficacy and certain evidence-based strategies. Therefore, the lack of statistical significance in the findings of the present study could be the consequence of a small sample size, and lack of a standardized instrument to measure the use of the evidence-based strategies. Not finding a statistically significant between the demographical variables and efficacy is important as this suggests that the nominal characteristics of the sample make no statistically significant difference in the use of strategies which means that the use of evidence-based strategies is consistent regardless of variables such as age, gender and teaching experience. However, caution should be used in the interpretation of these findings as this was a correlation study and correlation does not in any way mean causation. Further investigations should be conducted in this regard.

## 10.2 Limitations of the study

The present study recognized and acknowledged the limitations faced in making this inquiry. The present study made considerable efforts to sample teachers of the DHH in as many Sub-Counties of Nairobi and Kiambu as possible in a bid to include Units from varied socio-economic Sub-Counties. Despite the best efforts, the resultant sample size was rather small. The sample size prohibited the number and type of quantitative analyses applicable to generate findings in the present study. Since the size of the actual population was small to begin with, the present study could not increase the small sample size. However, nonparametric statistics were utilized to control for the challenge presented by the small sample size. The implication of this limitation is that the

findings from the present study cannot be replicated to teachers of the DHH in all the Units in Kenya.

Another limitation of the present study is that replication of the study would pose quite a challenge to future researchers. This is because as a mixed-methods study, it is considered inherently difficult to replicate. This is particularly applicable with the qualitative aspect of the present study where the observation schedule utilized to collect observational data was not standardized and the FGD involved a presentation to clarify the evidence-based strategies for the DHH under investigation in the present study. To mitigate this limitation, the present study provided an extensive elaboration of the data collection procedures utilized, which could inform future replication studies.

Lastly, the present study was correlational and the main challenge of correlational studies is that they do not adequately, in themselves, establish the causal relationships among variables. Therefore, the results generated from present study can only indicate the presence or absence of a relationship between variables without making any assumptions of a causal relationship. However, the aim of the present study was not to establish the causation, rather, the existence of a relationship between the implementation of evidence-based practices for teaching students who are DHH and the efficacy of teachers. Experimental and longitudinal research would be required to determine the causal relationship between the implementation of evidence-based strategies for teaching the DHH and the efficacy of teachers of the DHH.

## 10.3 Recommendations of the study

Based on the research findings, the present study makes a number of recommendations that could inform future research and future practice in the education of the DHH.

### 10.3.1 Recommendations for future research

In light of the findings of the present study, especially the constraints teachers experience in Units for the DHH, action research should be undertaken to ameliorate the learning and teaching conditions in the education of students who are DHH. Initial processes were already undertaken by the present researcher and some teachers at the Units who formed a team to advocate for a fully-fledged school for students who are DHH in Nairobi County. The action research team identified the focus of their study as the need to ameliorate the challenges teachers faced at the Units for the DHH. They concluded that the challenges would be addressed through the establishment of an inclusive school for students who are DHH. In such a school, the students would learn in separate

classrooms according to their grade levels and each classroom would at least have a teacher to manage it. The team collected supporting data from the different Units and took informed action by presenting their findings and recommendations to the Regional Director of Education in Nairobi. The Regional Director approved of the recommendation to establish a fully-fledged inclusive school for students who are DHH in Nairobi. As at the writing of the present report, consultative meetings had been made with relevant stakeholders and a site for the proposed schools identified awaiting quality assurance assessments by Ministry of Education officers. More concerted efforts are required to accomplish the goal of the action research.

Additional research is required with teachers in segregated and inclusive schools for the DHH. Such research would provide a comparison of the teachers' use of evidence-based practices and efficacy in the different settings. Findings from such studies could shed more light on the impact the school placement has on the implementation of evidence-based practices and self-efficacy of teachers of students who are DHH. Moreover, there is need for more data collection instruments specific to the education of the DHH to adequately capture the nuances of teaching such a unique population therefore, future studies should seek to develop such instruments suitable for the present context.

The present study made initial strides into the inquiry of the use of evidence-based practices in Kenyan institutions for students who are DHH. The present study recommends that more research should be conducted along a similar vein, especially to ascertain how evidence-based strategies can be adapted and/or modified to suit the present context. More research that offers practical recommendations on the implementation of the evidence-based strategies for students who are DHH is required. Further research should be conducted to enhance the practice guide developed in the present study and establish ways the strategies can be adapted and modified to suit the present context. Additionally, more research on evidence-based practices for students who are DHH and present with comorbid disabilities, deaf with disabilities (DwD) is greatly required. DwDs present teachers with unique needs therefore, teachers require evidence-based strategies to enhance their academic, social, and emotional development.

There is need for more studies on how to measure teacher efficacy. Future studies could investigate whether the TSES yields similar results in an African context through large sample sizes with bigger effect sizes. Due to sample size limitations, the present study did not establish whether the

TSES had psychometric properties comparable to those reported in previous studies conducted in various cultural contexts. as it Additionally, more studies could be conducted to establish practices in teacher-training curriculums that could enhance teacher efficacy.

Lastly, there is need for demographic information about students who are DHH in Kenya. The present study recommends frequent surveys in intervention and educational programs for the DHH in order to generate current statistics on the demographic information and educational status of students who are DHH in various educational settings. Such surveys would also provide an enumeration of students who are DHH and have additional disabilities in the school systems to inform proper planning and provision of adequate services.

### 10.3.2 Recommendations for future practice

It is recommended that preservice, early in-service and experienced teachers of students who are DHH should develop the attitude, knowledge and skills required to work with students who are DHH. The teachers of the DHH require training on evidence-based strategies for students who are DHH. Teacher training programs in colleges and universities should develop intensive teacher training programs that equip the trainee teachers with skills and knowledge steeped in research. These programs should allow for the novice teachers to practice in an apprenticeship program with mentors who coach them while they teach and provide them with feedback for introspection. In addition, the training for experienced teachers should be in the form of conferences, workshops, trainings, and other educational events to help bridge the gap between recommendations made in scientific studies and actual classroom practices. Further, such fora would provide settings for the teachers to collaborate among themselves on the development of lessons that utilize evidence-based strategies as well as practice how to implement the strategies in actual classrooms. The trainings should be geared towards the adaptation of strategies prescribed by research to suit their cultural context thereby making the strategies applicable to their classrooms. Related to training, the training programs at colleges and universities should equip teachers with knowledge and skills on various approaches to the education of students who are DHH. In addition to their training in KSL, the trainee teachers should also receive knowledge on oral/aural, and auditory verbal approaches. This will equip them with the necessary skills to cater for varied needs of students who are DHH. Lastly, the teachers of the DHH require training on how to harness ICT into their classroom practices.

Teacher training programs in colleges and universities play a crucial role on the efficacy of teachers for students who are DHH. This is because efficacy has been found most malleable early in learning therefore, the first years of training teachers could have implications on the long-term development of teacher efficacy. The recommendation hereby is that teacher training programs should be designed to give the trainee teachers more opportunities for actual experiences with teaching and managing classrooms of students who are DHH in different school settings and at different levels of complexity to provide them with mastery experience. The teaching programs should provide the trainee teachers with opportunities to engage in role playing and microteaching experiences and provided with specific corrective feedback.

It is necessary to creative a conducive environment for teaching and learning in institutions for students who are DHH. The Teachers Service Commission should supply these institutions with more trained personnel that includes teachers for the DHH and assistant teachers to cater for the needs of students who are DHH and have additional disabilities. Retrogressive practices, such as the assignment of teachers of the DHH to teach in regular schools, that deprived students who are DHH of talented teachers, should be banned. School administrations have the capability to meaningfully reduce the workload of teachers of students who are DHH through equitable distribution of tasks at the school. Further, TSC needs to review its staffing policies to allocate qualified teachers of the DHH in schools for the DHH and to employ ancillary personnel qualified in occupational therapy, physical therapy, and behavior assessment and management to cater for students who are DHH with multiple disabilities. In addition, the MoE should allocate more funds to institutions for students who are DHH for the acquisition of learning and teaching materials which include IT devices. Lastly, Quality Assurance and Standards Officers (QASOs) should inspect institutions for students who are DHH to ensure that the environments are conducive for teaching and learning. The QASOs should conduct frequent inspections and provide guidelines and recommendations on how to improve these institutions.

In conclusion, the present study recommends the enhanced capacity of EARCs in the country. This is because these centers are charged with the crucial role of early identification of children who are DHH, their diagnosis, intervention, and placement into suitable educational placements. Moreover, there is urgent need to strengthen the guidance and counselling programs for parents at EARCs. Parents for children who are DHH need to come to terms with their children's hearing

loss early enough to mitigate the adverse consequences of language deprivation that could arise from the delay between their acceptance of the diagnosis and enrolment of the children into appropriate intervention programs. Parents have the right to receive unbiased information concerning their children's hearing loss and guided to make informed decisions concerning the appropriate intervention and school placement. Further, the EARCs need to provide a varied number of educational options for students who are DHH in Kenya. From the findings in the present study, the tendency is towards programs that dominantly use sign language approaches which is a disregard of cultural mores and unique needs of students from diverse backgrounds. The provision of a wide range of services for students who are DHH could ensure that students who have less severe hearing losses are adequately supported to receive their educational services in regular schools. Those with more profound, unaided hearing losses, and those with debilitating additional disabilities could be adequately supported to receive their educational services in schools for the DHH.

### 10.4 Significance of the Study

Findings from the present study could contribute to the research efforts in the field of education for the DHH. The study could extend the literature in this area through its findings of the efficacy of teachers of the DHH in Units for the DHH. The present study was motivated by a need to fill the gap that exists between research and practice. In attempts to fill this gap, the present study will disseminate the evidence-based practices described herein to the participants in the study in the form of a practice guide. The practice guide will also be availed to other teachers of the DHH. Teachers could thereafter adapt the strategies suggested herein and incorporate them into their classrooms. The evidence-based strategies described could also be incorporated to enrich the curriculum used to train teachers for the DHH in teacher training colleges and teacher training programs in Kenyan universities. Additionally, the literature herein on evidence-based practices, could be used as training material for in-service workshops and seminars for teachers of the DHH to raise their awareness on current trends of education for the DHH. This use of evidence-based pedagogy in the classrooms for the DHH could have a ripple effect of positively impacting the academic performance of the students. Lastly, the recommendations from the study could inform the policy of the education of students who are DHH in Kenya. The recommendations made could catalyze a requirement for teachers of the DHH to utilize best-practices and strategies steeped in

scientific research in their classrooms. Findings from the present study could also inform policy on the national approach towards education of students who are DHH.

## 10.5 Conclusion

The present study made considerable efforts to fill the gap in the existing literature on the use of evidence-based practices by teachers of the DHH in Kenyan Units. The study also made enquiries into the efficacy of these teachers. Despite the restricting limitations, the results of the present study indicated that teachers of the DHH in Kenyan Units were familiar with most of the evidence-based practices recommended for the DHH but that they were not fully implemented. Findings illuminated the present situation of teaching in Units for the DHH and questioned the feasibility of Units as an appropriate setting for students who are DHH. Further, the findings demonstrated that in spite of the challenges the teachers faced in these Units, they reported high levels of teacher efficacy. The research findings from the present study are a modest first step towards the examination of the contribution of teacher efficacy in the utilization of evidence-based practices in the field of deaf education. The research efforts in the field of deaf education should continue to examine and recommend evidence-based strategies for teachers of the DHH and make these practices accessible to these teachers in order to reduce the gap between research and practice. Research efforts should also be directed towards teacher attributes, such as efficacy, that have the potential to make a positive impact on the education of students who are DHH.

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