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**Enhancing Communication among Deaf and Hard of Hearing (DHH)  
Individuals with Language Learning Apps: Case of 15 DHH in Mostaganem**

*Research thesis submitted to the Department of English as a partial  
Fulfillment of the requirements for the Master's Degree in English  
Language and Communication*

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## **Abstract**

Auditory limitations and the lack of accessible communication channels present distinct obstacles for deaf and hard-of-hearing individuals in their daily activities, mainly in Algeria. Indeed, this issue necessitates exploring innovative solutions. Thus, this research investigates the potential of tailored language learning applications as it aims to explore how these apps can impact deaf people's communication and educational experiences. To conduct our study, our research utilized two primary research tools: online focused group discussions and a targeted questionnaire intended for people who are deaf or hard of hearing living in Mostaganem City, Algeria . The findings revealed that a well designed application can enhance the utility and approachability for the deaf community. Furthermore, the development and integration of tailored language learning applications specifically designed for deaf people has the potential to bridge the communication and social gap with hearing family members. These applications could foster stronger relationships by enhancing communication skills. Based on the key findings of this research, we will offer suggestions and recommendations for incorporating even more effective options, ultimately contributing to a deeper level of understanding.

**Keywords:** DHH/ Deaf education/ language learning app/ Sign language/ Deaf communication

## **Dedication**

*First I am extremely grateful to Allah for granting me the opportunity to experience this amazing day.*

I dedicate this work to my mother, " Bendenia Fouzia," who has always supported me and carried me from the beginning until her last day. I wish you were here to share with me this moment. May you find peace and happiness in paradise.

I want to thank the rest of my family; including my father, for his carefulness and kindness towards us.

Thank you, little sister Naziha, and my brother Rachid , for your emotional power

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**BENSLIMANE CHERI**

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## **List of Abbreviations**

**DHH:** Deaf and Hard of Hearing

**ASL:** American Sign Language

**BSL:**British Sign Language

**FL:** Foreign Language

**RNID:** Royal National Institute for the Deaf- RNID-

**SI:** sign language

**AUSLAN:** Australian Sign Language

**LSF:** French Sign Language

**JSL:** Japanese Sign Language

**FNSA:** The Federation Nationale Des Sourds d'Algérie .

**LSA:**Algerian sign language

**AJS:** Algerian Jewish Sign Language

## General introduction

Communication is a crucial aspect for every individual, regardless of their origin or spoken language, especially in today's globalized world. Consequently, learning different languages to interact with people from diverse cultures has become prevalent and necessary. However, mastering foreign languages is now considered more challenging due to the complexities posed by new technologies..

For people who are deaf or hard of hearing (DHH), there are several communication barriers exist. These barriers often stem from their inability to hear spoken language or receive necessary information orally, which can hinder their capacity to learn a new language. Learning a new language is already a challenging task that requires a thorough understanding of vocabulary, grammar, and cultural differences. However, DHH pupils face even greater challenges due to their unique communication needs. Fortunately, technological advancements, such as cochlear implants, now enable them to hear and communicate, enhancing their. language learning journey.

Thus, this research work addresses the social and communication barriers that people who are deaf or hard of hearing must overcome. It also seeks to unveil issues related to foreign language learning, notably English language learning, among deaf people. More specifically, our research focuses on designing a mobile application that can translate spoken language into sign language and vice versa, consequently bridging the communication gap within the deaf community. The study seeks to answer three main research questions:

1. What are the linguistic and cultural factors that should be taken into account when designing and developing such applications?
2. How can tailored and well-designed applications facilitate language acquisition and communication among deaf people?
3. How can using the English learning application affect communication between deaf

individuals and their hearing family members?

Based on these research questions, the study proposes three hypotheses:

1. Language and cultural aspects such as body language, facial expressions, and visual representations should be taken into account when developing language learning applications for the deaf community, as this can enhance usability and accessibility.
2. Apps for language learning can significantly enhance social interaction and communication among deaf people, and they can aid in language acquisition when compared to other standard methods.
3. English learning applications for deaf individuals can enhance relationships with their hearing family members by facilitating shared language skills and reducing communication barriers.

Our research aims to give a deeper understanding of the needs of DHH individuals in order to design an effective application that suits their demands. To do so, we have selected a targeted questionnaire and a focused group discussion with 15 DHH people living in Mostaganem city, Algeria as primary research tools. The present work is divided into three chapters. The first chapter provides our readers with a brief history of sign language. It explores the different types of deafness as well as the features of sign language, and it discusses communication methods and special education in Algeria for DHH individuals. The second chapter describes the research methodology used to collect valuable data. The third chapter illustrates the analysis and interpretation of the data obtained from the selected research tools in order to address the research question.

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## **1.1 Introduction**

Language can take many forms; it can be spoken, written, heard, or signed. The way information is communicated in Sign language and spoken language differs. Nowadays, around the globe, there are numerous spoken languages, while others are sign languages. In this chapter, we aim to provide a comprehensive overview of sign language and its vital role in human communication. From its rich history to the necessary components. We will also highlight the potential communication and educational barriers faced by deaf people, and will attempt to cover major language issues related to the deaf community in Algeria. Also, in this chapter, we will assess how different apps and contemporary technology may affect the deaf community's communication experiences in both positive and negative ways.

## **1.2 A Brief History of Deaf Education**

The deaf community, as any other community, has existed since before historical records began ; however, until now, historians have not found proofs that indicate exactly when it first emerged. Fischer (2010) asserts that sign languages are rather young, and their origins are not completely well-known". For centuries, deaf people have been denied many rights that all people should have. Despite discrimination, deaf individuals had to fight for their rights in order to be regarded as equals in society, establishing their own culture and language.

### **1.2.1 Ancient Greece and the Denial of Deaf Education**

Ancient Greek is regarded as the first ancient civilization to reject the deaf. Aristotle who was a quite known philosopher at that time, stated that deaf people were incapable of receiving education because of their inability to hear. He declared that deaf people cannot be educated without hearing people," and that "born deaf people become senseless and incapable of reason.( Stephens, D. [n.d.]).

A known fact is that not all philosophers agreed with the cogitation of Aristotle. A number of

them did realize the significance of communication and education for the deaf. In Plato's dialogue "Cratylus," which was written in the 5th century B.C, he discussed the notion of language as a natural phenomenon which correlated with human development. This belief indirectly called attention to the necessity of language accessibility for all individuals, and this included those who are deaf or hard of hearing. On another hand, Socrates mentioned the usage of hands and other body parts for communication regarding that the tongue and voice cannot be used.

In fact, deaf people were regarded as deformed members of society during ancient civilizations; this was due to the fact that they could not even communicate freely since any form of sign language or communication was rejected.

### **1.2.2 Signs of Respect: Deafness in Ancient Egyptian Society**

In contrast to Greek culture, deaf people were seen as chosen by gods in ancient Egypt. They may have used sign language and other non-verbal forms of communication, such as hieroglyphics, to communicate with each other. Eriksson, Per (1993), referred to this form of communication; he stated that one of the main distinctions was that they were shown respect and had an education provided, which was usually through reading hieroglyphics and the use of sign language.

### **1.2.3 The Renaissance of Sign Language: Advancements in the 16<sup>th</sup> Century**

During the 16<sup>th</sup> century, there were considerable advancements in the field of sign language and deaf education. “ This period also saw the spread of oral instruction, which involved teaching deaf children to speak and lip-read and was advocated by private tutors “ (Messing, 1997).According to Helen K. Warner (2006), the possibility of the first real reforms to provide disabilities to persons with special needs comes with the Renaissance through studies of anatomy, surgery, and medicine in the East (p. 17)

The well-known scholar Prince de Leon, who was regarded as one of the pioneers who gave great focus on the vital significance of sign language and Lip-reading in deaf education " focused

on helping deaf children learn how to speak language audibly, instructed them in writing and simple gestures, and developed a manual alphabet based on hand gestures used by monks " (Ponce De Leon: Florida & Fountain of Youth: History, n.d.).

The progression of deaf education was mainly framed by Abbé de l'Épée. In 1755, he established the first free school for deaf people. In there, he presented a different academic approach which put much focus on sign language, gestures, and finger-spelling. "The doors were opened to almost every deaf child born in Europe, and France in particular." claims Stokoe (2005) (p. 5). This showcased his devotion to ensuring that all deaf individuals have free access to education with no regard to their origin or background. In addition to his contribution to enhancing education for the deaf, he also aided in supporting deaf children, who were most of the time uncared off. As one could comprehend, Ponce de Leon brought recognition to deaf children, which was rather almost nonexistent beforehand.

### **1.3 Diversity within the Deaf Community**

According to the United Nations definitions (2006) , individuals with disabilities are those who have long-term physical, mental, intellectual, or sensory impairments which in interaction with various barriers, may hinder their full and effective participation in society on an equal basis with others. Deafness can be classified within this category as it affects communication and people's interactions.

#### **1.3.1 Definition of Deafness**

Based on Soemantri (2006: 93), "deafness specifically refers to a condition where an individual loses their hearing capacity, resulting in the inability to perceive auditory stimuli effectively, especially through the sense of hearing." Howbeit , the meaning of deafness may be altered depending on which context it is being used. According to some scholars (e.g. knight & Swanwick, 1999, p 22), the aspect of deafness can be considered as a medical modal or through a medical perspective or linguistically speaking, from a language perspective

In medical contexts, deafness is interpreted as a level of hearing loss that obstructs a person's capability to comprehend spoken language. The Canadian Association of the Deaf, or Association des Sourds du Canada, acknowledges the definition which was brought to light by Gallaudet University in the United States: "Anyone who cannot understand speech (with or without hearing aids or other devices) using sound alone (i.e., no visual cues such as lip-reading) is deaf."

In cultural contexts, the deaf community is defined as a group of people whose native language is sign and who share beliefs and attitudes that are distinct from those of the hearing community. Usually, they create their own campaign or deaf club where they can meet and share their ideas or organize their personal events. Some of the commonly used names include Hearing loss, Deaf-mute, Deaf and dumb, Hard of Hearing, Deaf, deaf, Hearing impaired and deafened (Stelmacovich, 2012).

### **1.3.2 Types of Deafness**

The Royal National Institute of the Deaf (2006) states that deafness can vary depending on whether it is required before or after speech development. People are therefore defined as being either pre- or post-lingually deaf. Royal National Institute for the Deaf (RNID) (February 8, 2002) A pre-lingual deaf is a person who is born deaf or becomes deaf before learning the spoken language. In Adam's Felman article, it was highlighted that generally this kind of deafness comes from families where there are hearing parents and siblings, and they are rarely introduced to SL sign language, so they tend to have slow language development. Aline Gomes Bittencourta (2015) gives a clear definition of the second type, 'postlingual deafness. He says: "it refers to individuals who acquire severe to profound hearing loss after developing language skills, typically after the age of 5." People who are post-lingually deaf rely on lip reading as their only way to understand spoken language.

Deafness can be classified into different levels based on the severity of their hearing loss and

how it affects their communication abilities. Hearing is measured in decibels (dB). It is important to keep in mind that the degree of hearing of a normal person is within 15 dB.

Category of deaf	Degree of loss (Decibel)	Effect on hearing
<i>Mild</i>	25 – 40	Difficulty in hearing in a noisy environment
<i>Moderate</i>	41 – 60	Inability to hear whisper
<i>Severe</i>	61 – 80	Inability to understand soft, moderate and loud speech
<i>Profound</i>	>81	Unable to understand even very loud speech

**Table.1: The different level of hearing loss**

Source: MYHEALTH MINISTRY OF HEALTH MALAYSIA from:

<http://www.myhealth.gov.myDegree>

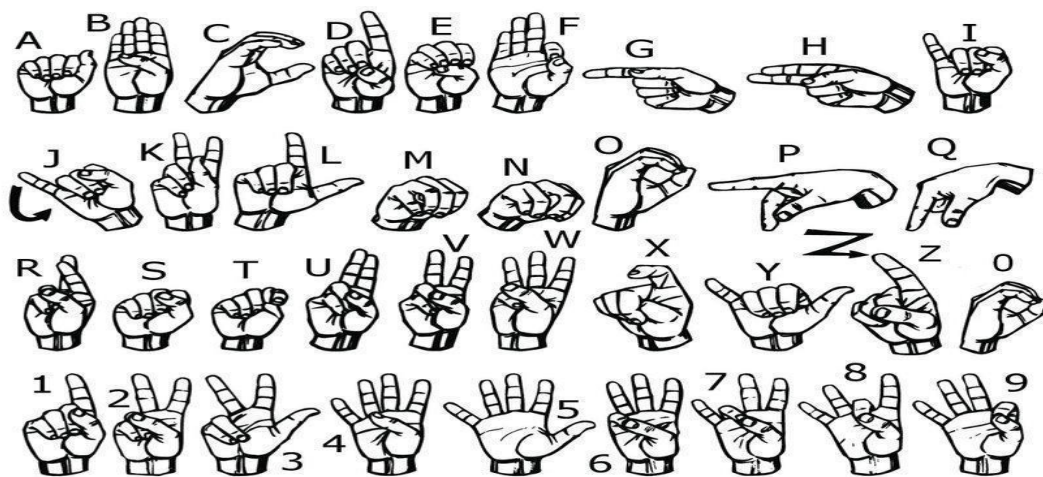
## 1.4 Deaf and Hard of Hearing Communication Methods

Communication is the way that people use to provide or receive information needed in daily situations. It can be either verbal or nonverbal communication. Verbal communication relies mainly on the spoken language, and on other elements, including speech, tone of voice, and pitch of voice. Normal hearing people can use both ways of communicating; on the other hand, hard hearing people rely only on nonverbal communication, like using sign language or body language rather than using spoken or written words. That is, the strategy used for communication depends on the individuals involved in the conversation, on their level of hearing loss, and personal preference. (Cherif & Mezada, 2018, p. 18)

Deaf and hard-of-hearing (DHH) individuals can utilize a number of different ways to

communicate. First, the major way to communicate clearly is through sign languages. The latter are visual-spatial languages that use facial expressions and arm, head, and body postures. It is a complete language with its own grammar and syntax, like any verbal language. Not all deaf people use the same sign language; it differs depending on where they are from. For example, British Sign Language (BSL) is used in the United Kingdom, and other sign languages are: Australian Sign Language (Auslan), French Sign Language (LSF), Japanese Sign Language (JSL).

Second, lip reading is a useful skill, but it is not a flawless form of communication; as Clark, J. (2022) claimed: "It is easy to say that people can simply read lips, but reading lips proves extremely difficult; in fact, it borders on impossible to read lips with complete accuracy. Even the most skilled lip readers might only understand a part of what is being said. In order to spell proper nouns, such as place names, people's names, or technical terms, for example, finger spelling is made up of twenty-six distinct hand shapes, or "signs," to represent each of the twenty-six letters of the English alphabet.



**Figure.1** The 26 letters of American Sign Language (ASL).

Finally, writing could be the main strategy that a person uses when they are not being understood

while using gestures or sign language. DHH can benefit from this method through pre-printed cards, having a small portable whiteboard and marker, sometimes even writing in the air with a finger, , also using email and texting.

## **1.5 Features of Sign Language**

Despite the fact that DHH people can not speak, they can communicate, build relationships, and also have their own families. Sign language could be the key to accomplishing these goals and to express themselves. It is more than simply signs; it's a complex system with its own grammar and syntax that differs from spoken languages. Each gesture in sign language may represent a word, a concept, or even a complicated phrase, allowing to connect with others in meaningful ways

### **5.1 Definition of Sign Language**

Sign language is a natural language as any other spoken language used by the deaf and hard of hearing to overcome communication barriers. It should be emphasized that gestures are not the same as signs in sign language. A gesture is a hand movement that simply follows what the speaker is saying; it has no primary meaning like hand movements in sign language. "Sign languages are not mere gestures or pantomimes, but are complete languages with their own syntax, morphology, and phonology" (Emmorey, 2002, 3). That is, sign language, for example, ASL (American Sign Language), is indeed a language with its own grammar and vocabulary. Hanafy and El-Saadoun (2014) mentioned that sign language is the alternative solution for them in light of spoken language's absence. It fits their needs to communicate and express themselves freely . That is why deaf people seem to be used to accept it, learn it and use it. Not only deaf people, but also hearing people may use sign language in some situations too (p.25).

The number of sign languages worldwide is not precisely known; the reason behind this, as Lucas (2001: 12) argues, is for two facts. On the one hand sign language has emerged recently;

they are still new languages. On the other hand, sign languages are nothing but new forms of spoken languages- the picture that people mistakenly always have. Each country generally has its own native sign language; some have more than one. According to the 2021 edition of *Ethnologue* there are 150 sign languages (Eberhard, Simons, & Fennig, 2021 )

The ten most popular sign languages and the number of native speakers are listed in the table below:

Sign languages	N° of Native Speakers
<i>Indo-Pakistani Sign Language</i>	6.300.000
<i>Indonesian Sign Language</i>	900.000
<i>Russian Sign Language</i>	715.000
<i>Brazilian Sign Language</i>	600.000
<i>Spanish Sign Language</i>	523.000
<i>Egyptian Sign Language</i>	474.000
<i>American Sign Language</i>	459.000
<i>Persian Sign Language</i>	325.000
<i>Turkish Sign Language</i>	300.000
<i>Japanese Sign Language</i> 126,000	126.000

**Table.2:** Sign Languages N° of Native Speakers

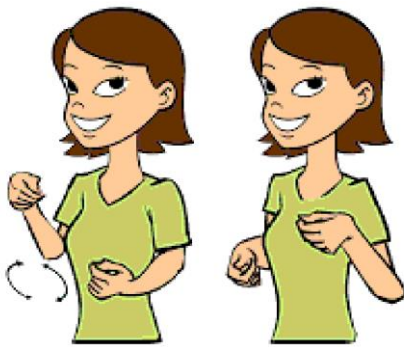
Source: adapted from Sign Station 2023 <https://signstation.org/how-many-sign-languages-are-there/>

### 1.5.2 Parameters of Sign Language

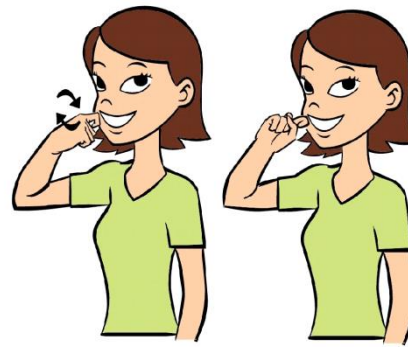
In sign language, there are some parameters that should be respected while transmitting the

message; Liddel (2003) mentioned the most important components, including the hand's shape, movement, location, and non manual markers. For ease of comprehension, each is described below and illustrated with a figure.

- *Hand shape*: refers to how the deaf is going to use his fingers and hand to convey a meaning. According to Valli and Lucas (2000), the hand form is the most crucial aspect of sign language and has the power to entirely modify the meaning of a sign. Furthermore, Donnelly asserts that "the shape of the hands when making signs can change the meaning of the word or expression." (2011; Donnelly; 1)

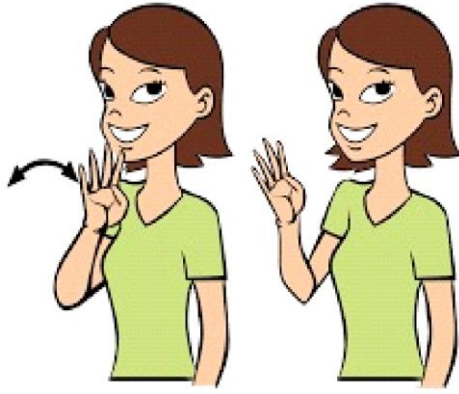


**Figure.2** The sign Car



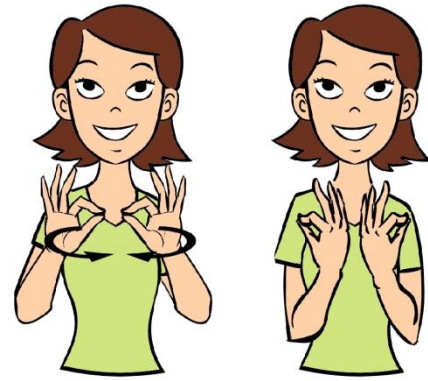
**Figure.3** The sign Apple

- *Movement*: hand movement is an important aspect in creating an effective sign; they can move up and down, forward, backward, and in circles. People should be aware of this since improper gestures may convey distinct meanings. As Sutton and Woll (1999) proved, this kind of parameter can indicate elements like the direction, speed, and intensity of the movement, to illustrate the message.



OBJ:OBJ

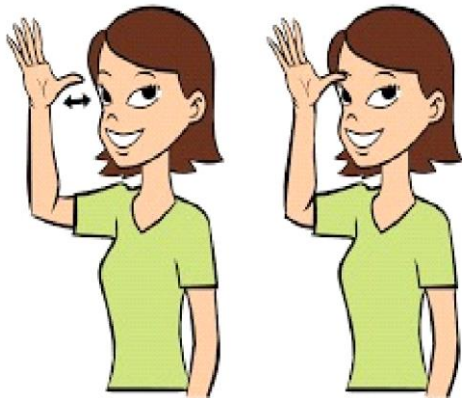
**Figure.4** The sign of Talk



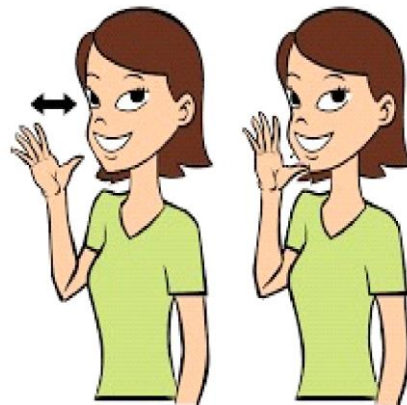
**Figure.5** The sign of Family

- *Location:* Different locations can be utilized to distinguish between signs with similar hand forms, according to Wilcox, S. (2000). Location is defined as the place where a sign is formed.

An individual can place his hands on the head or other body parts.



**Figure.6** The sign of Father



OBJ:OBJ

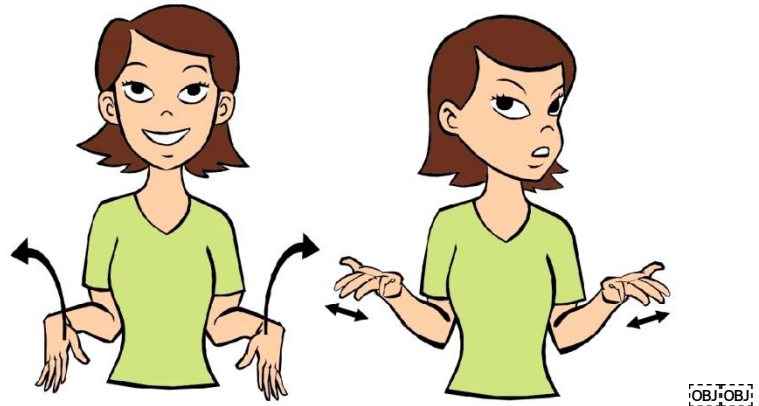
**Figure.7** The Sign of Mother

- *Non Manual* features serve a similar function to intonation in spoken languages .They include the use of facial expressions, body language, head movements, and eyes.They

facilitate the expression of feelings such as surprise, doubt, and denial. Rudge, Luke A. (2018-08-03) stated that: "Analyzing British sign language through the lens of systemic functional linguistics" many grammatical functions are produced non-manually



**Figure.8** The sign "Angry"



**Figure.9** The sign "What"

### 1.5.3 Spoken Language vs. Sign Language

Giles (2019) described spoken language as a primary means of communication for humans and described its importance for social interaction and building relationships with people. Moreover, according to Chomsky (2006), all-natural languages, in either spoken or written form, are languages in the sense of his definition; each natural language has a finite number of sounds in it, and although there may be infinitely many distinct sentences in the language, each sentence can represent as a finite sequence of these sounds:

Aspects	Sign language	Spoken language
<i>Grammar</i>	carries specific grammar rules for ordering words and verbs, and sentence structure.	Applies syntax, morphology, and grammatical rules.
<i>Phonology</i>	involves handshapes, movements,	Sounds produced by the vocal

	facial expressions	tracts
<i>Vocabulary</i>	Made up of signs	Made up of spoken words and phrases.
<i>Mode of communication</i>	Visual-spatial, using hands, face, body movements.	Auditory, based on vocal sounds and articulation.
<i>learning and acquisition</i>	Formal instruction or exposure within deaf communities.	starts with early exposure and immersion.
<i>Ambiguity</i>	Different signs may share similar handshapes or movements	Homophones and context can lead to ambiguity.
<i>Simultaneity</i>	Has the ability to communicate several ideas at once.	Spoken languages are more limited to a linear, sequential flow of information.

**Table.3:** The Difference between Spoken Language and Non- Spoken Language:

Spence and Woll's (1999) book titled "The Linguistics of British Sign Language: An Introduction" discusses how British Sign Language and sign language differ in terms of grammar and discourse and it points out how using hand-shapes, facial expressions, and movements can convey meaning. According to Newport's article (1981) "Constraints on structure: Evidence from American Sign Language and language learning", spoken and sign languages vary in particular linguistic features, such as simultaneous articulation and spatial grammar. The article explains the use of movement, space, and non-manual cues are used in ASL to convey grammatical and semantic information.

## 1.6 Challenges Faced by Deaf Individuals

Communication can be considered a process of interaction involving the use of signals that are observed and interpreted by the recipient to transfer meaning (Bjerkkan, 1996). However, for individuals with hearing impairments, communication can present significant challenges that can impact an individual's life, including difficulties in communication, social interactions, and academic and employment opportunities. According to Palmer and Mulla (2018) hearing impairment can result in social isolation, decreased quality of life, and increased risk for depression and cognitive decline. The communication limitations between people who are deaf and their hearing family members can often cause difficulties in family relationships, and affect the strength of relationships among individual family members. Singleton and Tittle (2000) shed light on the experiences of deaf parents and their hearing children, illustrating the complexities of communication within deaf-parented families. Young deaf people face difficulties in making friendships since the majority may not be familiar with sign language; thus, conversations can often be limited and short due to their differences in communication methods. The lack of effort put into communicating can result in anger, miscommunication, and unwillingness to build a strong relationship. (Foster S. 1996)

Education and employment are two fundamental rights of hearing impaired individuals. Comparing deaf kids to hearing pupils, deaf kids may have fewer opportunities to be exposed to the language, especially if they attend a school where the language is not widely spoken. If many schools are not equipped with the necessary resources for kids with hearing impairments, or instructors do not appreciate their particular needs and problems, deaf pupils may feel alone or misunderstood. Discrimination is another challenge that deaf individuals need to deal with while applying for jobs and making an interview, [Dana Manciangli](#) (2020) provided the following instance to demonstrate this point: "If you take two candidates with the exact same qualifications, and the only difference between them is that one of them is deaf, who do you think would most likely be hired? More often than not, the hearing person will be chosen."

## 1.7 Deaf Community and Education in Algeria

The deaf community in Algeria is represented by *the Federation Nationale Des Sourds d'Algerie* (FNSA). This national federation is responsible for defending the rights of deaf people and supporting them.

Algerian sign language (LSA) serves as the sign language in Algeria with several regional varieties including: Algerian Jewish Sign Language, AJSL or Ghardaia Sign Language, Algerian Sign Language of Laghouat, Algerian Sign Language of Oran, and Algerian Sign Language of Adrar. Abdelouafi's (2021) piece of work noted that it seems that almost every Algerian Deaf community living in a different province or village in Algeria is likely to develop its own dialect of Algerian Sign Language. Probably, different Algerian sign languages are being used as many Deaf communities are in Algeria, at least in some big cities, regardless of their similarities and/or differences.

In Algeria, there are about 220.000 deaf individuals; yet the Algerian sign language (LSA) has not been granted as an official language in the education system. Due to this lack of recognition, deaf people find it difficult to fully engage in various aspects of social life. Deaf children also struggle to acquire spoken languages since there are not enough Algerian Sign Language professionals in the community (such as qualified instructors and SL interpreters) either in a bilingual model (where deaf children are taught in both Arabic or Berber and Algerian Sign Language) or in a monolingual model (where Algerian Sign Language is the medium of instruction). More significantly, as the World Federation of the Deaf (2007) notes, deaf people suffer social exclusion since they are unable to communicate with other members of society. A study proved that deaf children in Algeria face difficulties even in written language acquisition (e.g., Arabic and French) and determined the causes of their failure (see Boutaleb, 1987). Additionally, there is no cultural educational activity between the deaf and ordinary children (Anissa, 2013, p. 49).

The issue of education for people with hearing disabilities in Algeria did not gain researchers' attention. The lack of attention has left significant gaps in understanding the challenges and needs of the deaf community.

## **1.8 Technology in Deaf Education**

Modern technology has completely changed the lives of the hard of hearing and deaf people through fostering learning, enhancing communication, and providing new opportunities. As universal screening programs advance and sensory aids like cochlear implants become more advanced, more DHH kids are attending mainstream schools (Kelman & Branco, 2009).

Many studies sought to support DHH students in learning sign language, targeting the improvement of communication between DHH students and their parents and teachers. To achieve this aim, several tools have been used, such as speech-to-text technology; Shadieva et al. (2014) found the latter to be a particularly effective tool for the inclusion of DHH students. Furthermore, inclusive applications have been developed, particularly to support DHH students, in learning sign language and helping students develop spelling and literacy skills. For example, Chuan and Guardino (2006) discussed a design called "SmartSignPlay," which is an interactive mobile application. The application supports learning and practicing American Sign Language (ASL) using signs through an animated avatar. Toro et al. (2014) designed another innovative app in which they used a 3D animated character to demonstrate finger-spelling. The application includes quizzes and practice lessons that allow the user to type in words that a 3D character can fingerspell, and connects to social media to help create a virtual community among DHH users. The application was found to support the development of literacy skills. In fact, other efforts focused on facilitating communication between DHH students and their teachers in the mainstream classroom. Magon et al (2010) aimed at the active participation of DHH students by activating feedback and evaluation of teachers via a mobile application. For instance, the so-called "What-Surdo" was a messaging application similar to WhatsApp for real-time

communication. The application was tested on four DHH students. The authors argued that Whatsurdo supported teachers who taught language to DHH students of different ages.

## **1.9 Conclusion**

To put it briefly, the current chapter presents a general view of sign language and the different types and degrees of hearing loss. Our introduction to sign language began with a history that extends from prehistoric times to the eighteenth century. To demonstrate that hearing loss is a challenge in one's life, we also gave a general review of the issues faced by deaf people in hearing society, with an emphasis on the deaf community in Algeria. Finally, we evaluated how social media and contemporary technology had a dual effect on the deaf community's communication experiences.

## Chapter Two

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## **2. Introduction**

The present chapter discusses the methodology used in our research study. It starts by outlining the methodology and research design, which combine qualitative and quantitative methods to produce a thorough analysis. We selected the questionnaires and focus group discussions with deaf and hard-of-hearing (DHH) individuals in Algeria, specifically in Mostaganem city, as data instruments to investigate deaf people's obstacles in learning a foreign language, communicating with hearing members, and examining their access to technology.

### **2.1. Research Design**

Methodologically speaking, there are two primary methods that can be used in collecting data; either qualitative or quantitative, or sometimes both. Researchers select a suitable approach depending on their case study. We employ Mixed methods in our case study, which involves collecting data quantitatively by designing a questionnaire for deaf individuals, and a qualitative method through group discussion with them to gather detailed information about their language learning process, social and communication barriers, and their specific needs related to the designed application. According to O'Donoghue and Punch (2003), mixed methodology is a technique for verifying data from several sources in order to produce consistent and accurate outcomes.

Quantitative research methods are based on collecting data that can be analyzed numerically. This includes gathering statistical data using a range of techniques, such as polls, questionnaires, and online surveys where the results are typically presented in the form of statistics, tables, and graphs. It seeks to find solutions that may be applied to a wider population by measuring the issue and determining its scope. On the other hand, qualitative research looks at the significance of people's experiences and their perspectives on a given problem or situation. Usually, this data comes from group discussions, interviews, and observations.

With these two approaches , we can address the specific barriers faced by the deaf community and their social and educational needs, so that we can develop an effective mobile application for language learning intended for deaf people in Algeria, specifically in Mostaganem city.

## **2.2The Sample Profile**

To guarantee the validity of the study outcomes, Researchers must gather information and data for analysis. According to Creswell (2014), a complete understanding of the sample is necessary in order to properly interpret the results and account for the needs and experiences of the participants.. Researchers can gain a better understanding of how the results of a study may be applied to a larger population by providing details about the study participants. In our research paper,, the population sample consists of 15 DHH pupils from Mostaganem city, they were selected based on their educational backgrounds and their access to technology devices:

### **2.2.1 Deaf Individual's Profile**

In this research, various demographic variables are included in the sample profile. These consist of age, gender, sign language proficiency, and educational background. Our study is built upon the responses of (15) deaf people from Mostaganem City representing different educational backgrounds and levels. Participants were selected from both genders to ensure gender diversity; their ages ranged from 20 to 50 years old. On top of that, their proficiency levels differ; some are fluent in sign language while others are not. The degree of hearing loss among participants also varies, encompassing mild, moderate, severe, and profound levels.

## **2.3 Data Collection Instruments**

As mentioned by Kothari (2004), there are a number of techniques to collect data, including methods of observation, interviews, and surveys. The most appropriate tool or technique for a given task will depend on the type of research design being employed in the study. In order to get accurate data and findings, the study adopted two research instruments. First, we selected the

questionnaire as the primary tool for gathering data from DHH. To further enhance comprehension of the topic, online group discussions were conducted with the assistance of a sign language interpreter as a secondary data collection method. The study gives a thorough and multifaceted view of the research topic by combining the questionnaire and group discussion, which enriches the analysis and improves the overall validity and reliability of the study's findings.

### **2.3.1 The Questionnaire**

When beginning a research project, one of the most crucial instruments that is taken into consideration for data collection is frequently the questionnaire. The latter is used to assess people's attitudes, behaviors, and motivations. The questionnaire has different formats based on the types of questions being asked, including closed questions which provide the response with statistics such as age and educational level. In this type of question, the respondents are required to answer yes or no, degree or disagree, or Likert scale questions. The second form of question is an open question, which is designed to allow the respondents to provide their own unique answer to express their opinions or attitudes, and it is frequently used to collect qualitative data.

Questionnaires are mailed out either via email, website, or in person. The questionnaire is widely accepted and used as a research tool in a variety of academic disciplines due to its ability to provide a standardized method of data collection.

In order to investigate this study the first instrument used is a questionnaire that has been handed deaf people to efficiently collect a large volume of standardized responses. It offered a structured format that allowed for consistency and ease of data analysis. The main purpose of this questionnaire is to figure out if the app can facilitate communication within the deaf community.

### **2.3.1.1 The Description of the Questionnaire**

To gather information for this research paper, a questionnaire was distributed to 15 deaf individuals living in Mostaganem City, They were asked to answer sixteen questions, including thirteen closed questions and three open questions.

The first five questions are designed to collect basic demographic data, such as age, gender, employment, level of hearing loss, and whether they wear hearing aids or not . The participants are then questioned on communication strategies and difficulties. Furthermore, the second part of the questionnaire is concerned with the participant's awareness of technology and, more specifically, on mobile applications designed for them. Finally, we included two open-ended questions to gather their opinions and thoughts on how well-designed applications can help deaf people learn and communicate more effectively. To completely understand the questionnaire, we added some visuals to help DHH students grasp some of the more difficult questions, and we also bring an interpreter of sign language to clarify some expressions.

### **2.3.2 Focus Group Discussions**

Another research instrument we used was an online focused group discussion in order to conduct a comprehensive investigation and accomplish this study. A focused group discussion is used to provide an opportunity for in-depth exploration of their preferences, opinions in order to take them into consideration while designing the app.

It is an effective qualitative data collection strategy to gather as many different ideas and perspectives as possible. Generally, the facilitator schedules a meeting with 3 to 6 people, either in person or virtually, to address concerns pertaining to the subject area. In order to better understand the research topic, participants discuss, exchange experiences, opinions, and insights, and sometimes they generate fresh viewpoints and ideas that might not have been found through surveys alone.

### **2.3.2.1 The Description of the Focus Group Discussions**

Since we are working on designing an application, we selected focused group discussion as an additional method to obtain a more nuanced understanding of the subject matter. It provides an opportunity for in-depth exploration and clarification of the necessary points that we should take into consideration while designing the application. The group consisted of five deaf individuals; three males and two females belonging to the same family. We sought the assistance of our two participants' daughters to lead the discussion and make it more comfortable for them rather than bringing in an unfamiliar facilitator. The discussion took place visually through a WhatsApp video call that lasted 45 minutes in which we could gather detailed feedback and exchange numerous ideas and suggestions, ensuring that the application will meet their needs. Additionally, note-taking during the discussion can capture important details and insights that might be missed otherwise.

### **2.4 Research Study Limitations**

During conducting this research, we faced several limitations that need to be acknowledged. First, the sample was small and restricted, and it was challenging to find deaf people in the city who met the requirements, which meant there were no opportunities to obtain additional information.

Second, interacting with individuals who are deaf or hard of hearing can also present additional challenges, like the need to find interpreters who can interpret sign language and clarify their responses while doing the focused group discussion. This issue affects the accuracy and reliability of the data gathered from DHH students. Third, the majority of participants could not express their thoughts and ideas while answering open ended questions, which may limit the scope of the data collected.

During the interview, there could have been misinterpretations or miscommunications due to the interpreter's inability to accurately convey certain sign language terms, such as the term

"application." Finally, the app is not fully developed due to the limited time and the high cost. The app designer we are collaborating with has only provided the design to illustrate the app' concept. so that the deaf can answer the questions related to the app.

## **2.5 Conclusion**

In conclusion, this chapter presents a brief description of the research methodology used to investigate the challenges faced by DHH individuals while interacting with their hearing members. It emphasizes the use of a mixed-methods approach, combining a qualitative method using focused group discussion and a quantitative method using a questionnaire for DHH pupils. It also describes the research instruments, population, and sampling strategy in detail to get a comprehensive understanding of the topic . The study's findings will help us comprehend the challenges that DHH individuals face on a daily basis and find out their opinions regarding the application.

## Chapter Three

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### 3.1 Introduction

This chapter focuses on an in-depth analysis of the data gathered through two primary research tools: a questionnaire and a targeted group discussion conducted with deaf individuals.

Furthermore, this chapter will address all the study questions and hypotheses of the research, explain the findings, and provide suggestions based on the results we reached.

### 3.2.Data Analysis

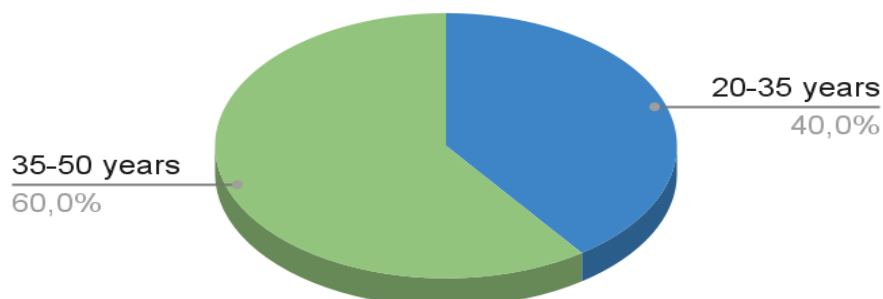
This section analyzes the data from a questionnaire and a group discussion designed for DHH individuals .

#### 3.2.1 Analysis of the Questionnaire with Deaf Participants

This questionnaire was distributed to a number of deaf people living in Mostaganem city; however, only fifteen deaf accepted to respond to it. The major goal of the deaf participants' questionnaire used in this study is to gain a better understanding of their social and communication barriers as well as their experiences learning a foreign language. It also aims to investigate and discover their views and awareness regarding the use of technology and different mobile applications designed for deaf people.

#### Question 01: Age.....

Age of participants

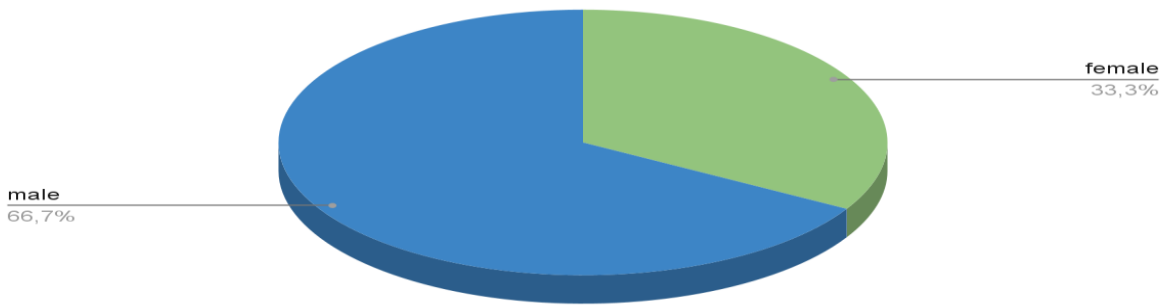


**Figure.10** Age variation

The results indicated in the above figure show that there is a range in age among the participants; 40% of them are between the ages of twenty and thirty five, and 60% are between the ages of thirty five and fifty.

**Question 02:** What is your gender?

Gender

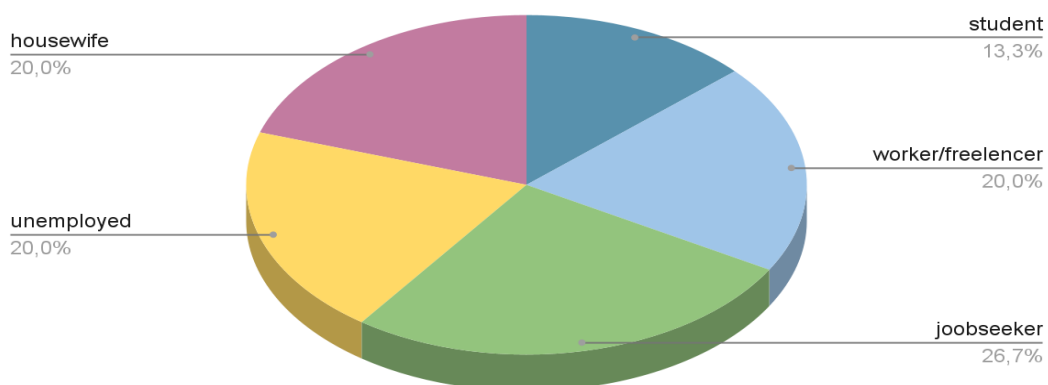


**Figure.11** Gender implication

This figure shows the gender diversity in the deaf community: of the seventeen participants, ten are female (59%), and seven are male (41%). The survey shows a greater representation of men, which may reflect gender-specific preferences or needs that should be taken into consideration.

**Question 03:** Grade/Occupation

Grade/ Occupation



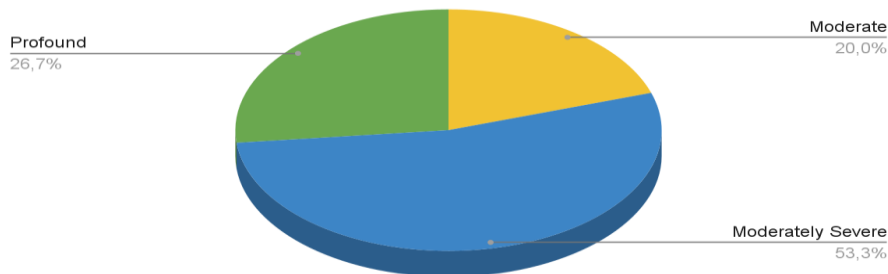
**Figure.12** Grade / occupation

As demonstrated in the figure above, only 13.3% are students attending formal education, whereas 20 % of people are either unemployed individuals or workers. With a share of 26.7%, the jobseeker category is the largest. Finally, housewives make up 20% of the sample.

The aim behind this question is to see how occupation influences their lifestyle and the learning process.

**Question 04:** What is your Degree of hearing loss?

The Degrees of Hearing Loss

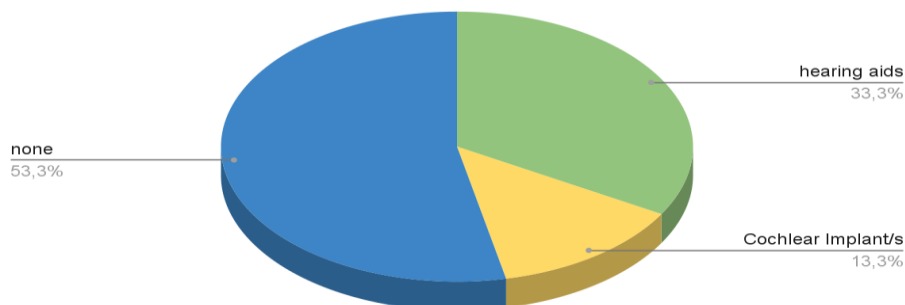


**Figure.13** The Degrees of Hearing Loss

Half of the pupils have moderately severe hearing loss 50.3%, while 20% of them have a moderate hearing loss, 26.7% who have profound hearing loss, and none of them have mild hearing loss.

**Question 06:** Do you use: • Hearing aids • Cochlear implant/s • Both • None

hearing devices

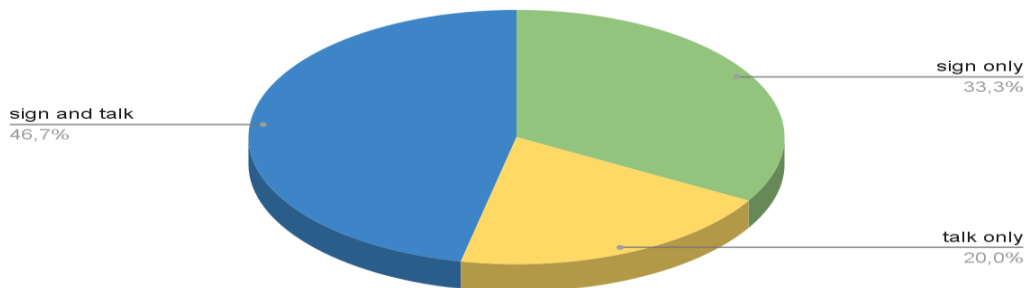


**Figure.14** Hearing devices

As it is mentioned ,half of the participants 55.3% do not use any assistive technology, compared to 33.3% who wear hearing aids and 13.3% who have cochlear implants.

**Question 07:** Which communication method do you use?

communication methods

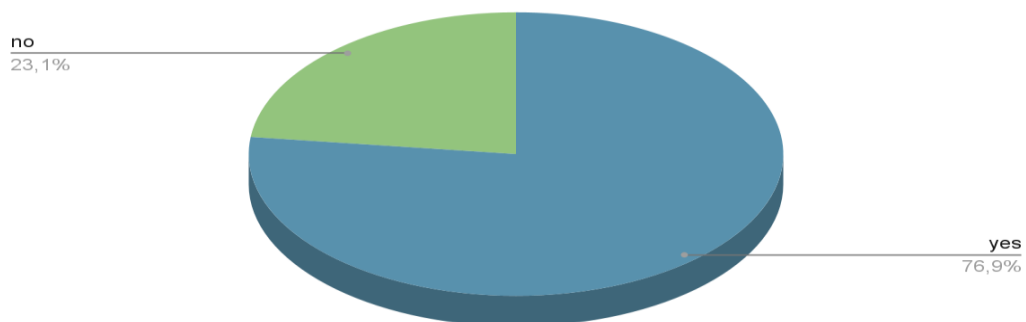


**Figure.15** Communication Methods

Most of the pupils (70%) use both signing and talking to communicate, while 30% of them use only sign language in communication. To know which method we should focus while designing the application.

**Question 08:** Do you use any other communication methods? If yes mention them

other communication methods

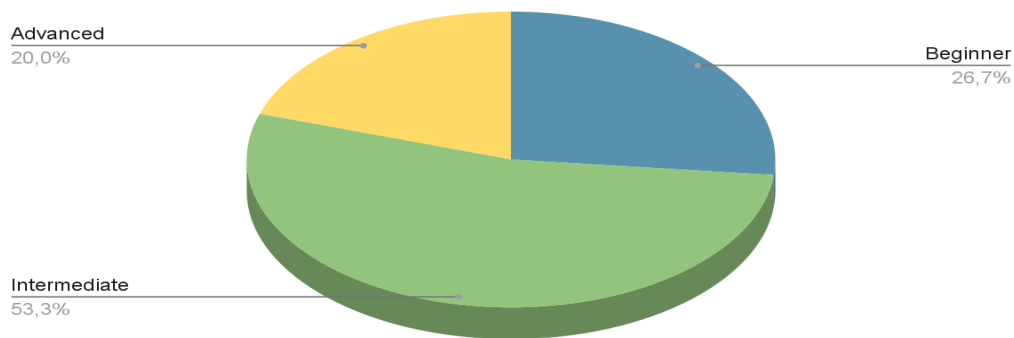


**Figure.16** other communication methods

As it is mentioned in figure, the majority of pupils 76.9% uses other communication methods including; Lip Reading, writing, facial expressions. while only 23.1% do not use any other form of communication

**Question 09:**Proficiency in Sign Language:a-Beginner/b-Intermediate/c-Advanced

Proficiency Level

**Figure.17** Proficiency Level

The figure reported participants' proficiency level in sign language as follows: 26.7% are beginners; 20% are considered advanced, and over the half 53.3% are identified as intermediate in sign language

**Question 10:**Does your degree of hearing loss has an effect on learning foreign languages?

1- Yes

2 - No

	Deaf's number	%
<b>Yes</b>	15	100%
<b>No</b>	0	0%

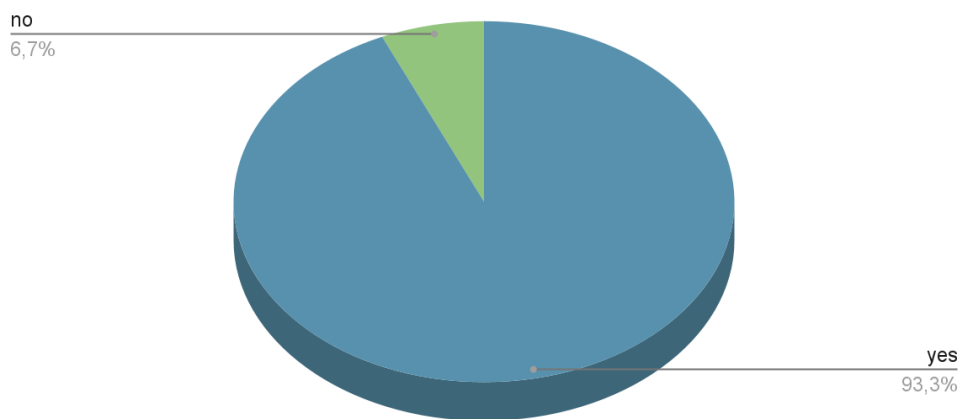
**Table.4** Hearing Loss Effect on Learning FL

All participants (100%) agreed that learning foreign languages is significantly impacted by hearing loss.

**Question 11:** Have you experienced any communication barriers when interacting with your hearing family members? 1-Yes 2-No

\*If yes, please describe the specific challenges or difficulties you have encountered.

communication challenges

**Figure.18** Communication challenges

Only one deaf answered that he does not have any problems in communication while the others agreed that they face obstacles while interacting with their hearing family members.

	Deaf's number	%
Emotional isolation	8	34.8%
Lack of understanding	12	44.4%
Dependency	7	31.8%

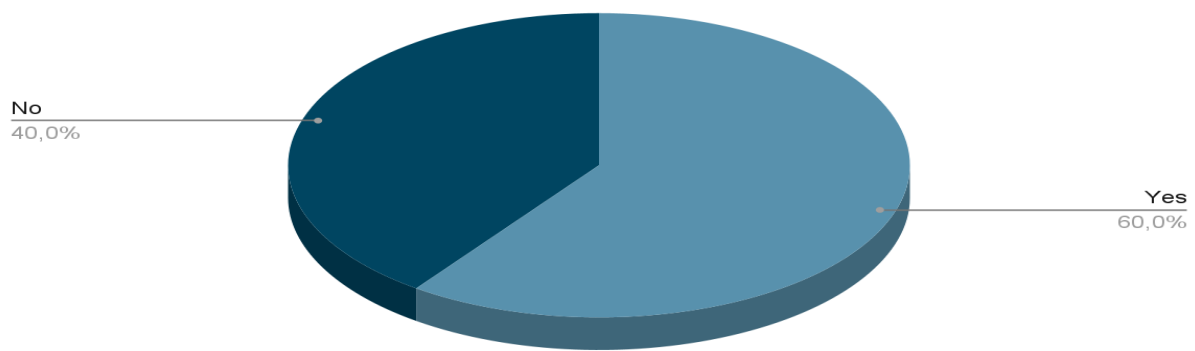
Limited access to information	10	40%
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**Table.5:** communication challenges

The two most common communication difficulties are lack of understanding and the limited access to information, and this often makes them experience emotional isolation. This lack of accessible formats also made them feel a sense of dependency on others.

**Question 12:** a-Do you have access to a smartphone or a similar mobile device? Yes/No

#### Access to Smartphones and Mobile Devices



**Figure.19** Access to smartphone and mobile devices

60% of participants have access to a smartphone or other comparable mobile device who may benefit from our app. However, the 40% without access indicates a major obstacle.

b- If yes, how frequently do you use your smart-phone or mobile device for language

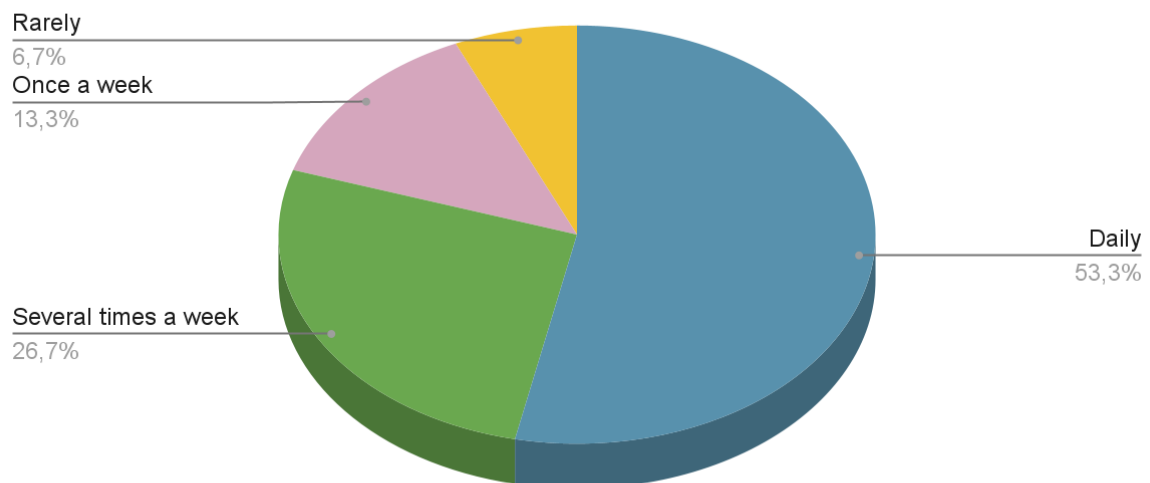
learning purposes? - Daily

- Several times a week

- Once a week

- Rarely

## Frequency of Smartphone or Mobile Device Usage



**Figure.20** Frequency of Smartphone or Mobile Device Usage

The frequency of smartphone and other mobile device use among participants was reported as follows: daily (53.3%), several times a week (26.7%), Once a week (13.3%), and Rarely (6.7%). This indicates that there is a big chance to use these devices to learn languages.

**Question 13:** Are you aware of any language learning applications designed specifically for deaf individuals?      1-Yes      2-No

	Deaf's number	%
Yes	0	0%
No	15	100%

**Table.6:** Awareness of Language Learning Applications for Deaf Individuals

100% of the participants stated they were unaware of any language learning apps created especially for the deaf.

**Question 14:** Do you believe language learning applications are beneficial for deaf individuals in acquiring and using sign language effectively?

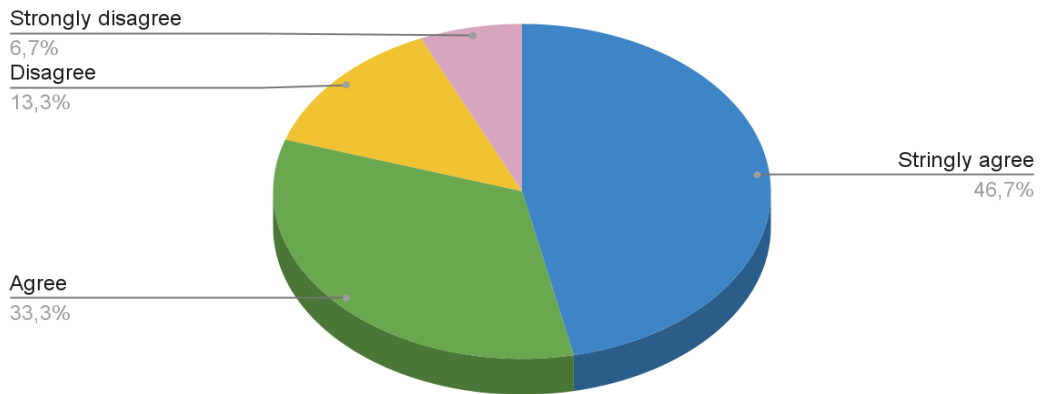
a- Strongly agree

b- Agree

c- Disagree

d - Strongly disagree

### Effectiveness of Language Learning Apps for Deaf Individuals



**Figure.21** Effectiveness of Language Learning Apps for Deaf Individuals

80% of the participants strongly agree or agree that language learning applications help deaf people learn and use sign language successfully. However, 20% of the respondents disagree, and this emphasizes the necessity of looking into potential issues further.

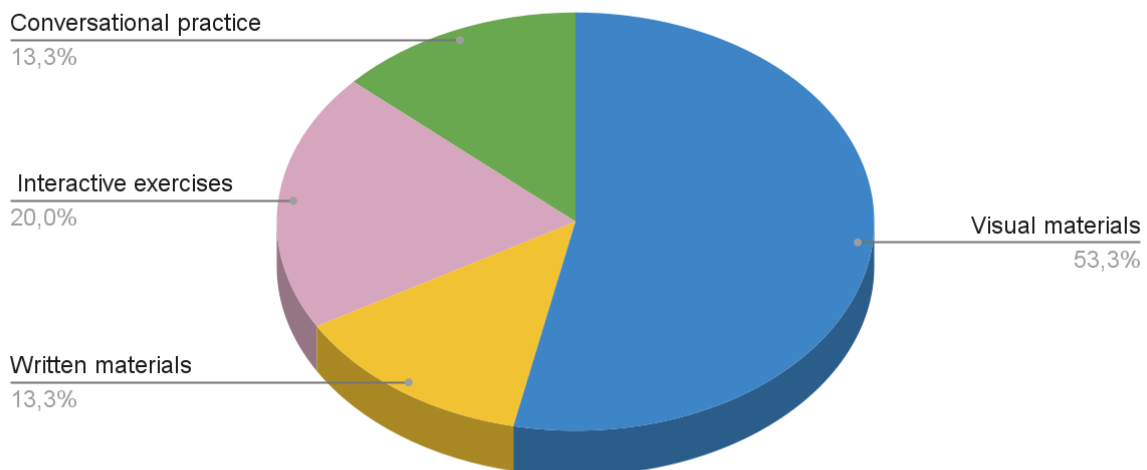
**Question 15:** How do you think tailored and well-designed applications can facilitate language acquisition and communication among deaf people?

Participants emphasized how the application might help deaf people manage everyday activities with more accessibility and autonomy, like facilitating independent doctor visits, streamlining paperwork-related administrative duties, and making shopping easier.

**Question 16:** What are your preferred learning methods for acquiring a new language?

a. Visual materials (videos, images)/b. Written materials (text, articles)/c. Interactive exercises and quizzes /d. Conversational practice./e- Other (please specify).

## Preferred Methods for Acquiring a New Language



**Figure.22** Preferred Methods for Acquiring a New Language

As mentioned in the figure above, participants had varying preferences for learning methods when learning a new language. The majority of participants (53.3%) selected visual resources. 20 % of our participants preferred interactive exercises and assessments. On another hand, 13.3% preferred both conversational practice and written resources (text, articles). Our app would be designed to accommodate various learning preferences and styles based on these preferences.

**Question 17:** Do you have any additional comments, suggestions, or feedback related to the design and development of language learning applications for deaf people in Algeria?

Participants stated the app was very helpful and were happy to have it available in Algeria. They recommended building community platforms within the app to facilitate communication and support among peers. Finally, they stressed the need to make sure the app would work offline so that everyone in the deaf community could use it at any time and from any location.

### 3.2.2 Interpretation of the Questionnaire

This questionnaire was given to the deaf and hard of hearing people in Mostaganem City., Algeria .Their ages ranged from 20 to 35 and from 35 to 50 years old. Therefore, it is essential to consider the participants' age and gender when designing the applications in order to highlight both their needs and their capacity for learning. The findings from the analysis of the collected data are as follows: 26.7% of the students have serious hearing loss, 20% have mild hearing loss, and 50.3% have moderately severe hearing loss. These results demonstrated that there are varied degrees of hearing impairment among the participants. As for hearing aids: 55.3% of the participants stated that they do not wear hearing aids, while 33.3% reported that they do, and only 13.3% wear cochlear implants. Therefore, the app should function properly with all levels of impairment whether they use implants or hearing aids. As far as how they communicate, most of the hearing impaired people use sign language. Nevertheless, DHH people use other strategies to interact with other people, including gestures, writing, lip-reading, and facial expressions so that it must implement all these techniques to ensure that its functions effectively

The app is designed for both beginners and advanced users, as half of the students think they are proficient in sign language, and the other half think they are not. All deaf participants agreed that their degree of hearing loss greatly impacts their ability to learn foreign languages, this underscores the need for additional support for DHH pupils in foreign language learning. Our app aims to address these communication difficulties that the deaf have reported experiencing: emotional isolation, limited information access, a lack of comprehension, and reliance when communicating with their hearing family members.

In terms of technology access,60% of participants have access to a smartphone or other comparable mobile device .However, the 40% without access points to a significant obstacle that needs to be addressed. There is variation in the frequency of smartphone usage for language

learning: 26.7% of users use their devices several times a week, 13.3% once a week, 6.7% rarely, and 53.3% daily. This demonstrates the need for additional research on ways to support everyone's consistent and efficient use of technology for language learning. None of the participants are unaware of any language learning applications specifically tailored for deaf individuals. Still, 80% of participants strongly agree or agree that language learning apps can support deaf people in learning and using sign language. They stated how the application may make it easier for them to accomplish everyday activities like shopping, managing administrative tasks, and going on independent doctor's appointments. This comment emphasizes how useful language learning apps are for improving deaf people's autonomy and quality of life.

Finally, over half of the deaf mentioned that using pictures and videos helps them understand foreign languages more effectively; interactive exercises and quizzes (20%), and both conversational practice and written materials (13.3% each). This highlights how crucial it is to accommodate various learning styles in the application by integrating a range of teaching techniques.

To sum up, the data gathered from this questionnaire helps to better understand the needs and challenges faced by the deaf community in Mostaganem City, Algeria. The app developers would take into consideration all the factors, such as age, gender, occupation, level of hearing loss, communication methods, and technological accessibility as well as the learning methods, so that we could design an effective application that will help deaf individuals communicate and learn languages more effectively, as well as improve their social interactions.

### 3.2.3 Analysis of Focused Group Discussion with Deaf Participants

The study conducted an online focused group conversation with five deaf participants via WhatsApp video call. The discussion intended to obtain valuable feedback so that we can guarantee that the application meets their demands.

**Question 01:** How do you currently access language learning resources, and what limitations do you encounter with these resources?

There are only two participants who comprehend a foreign language, and they primarily use text-based resources and online videos with subtitles. Unfortunately, a lot of websites do not support sign language, which makes it harder for them to understand everything.

**Question 02:** What are your initial impressions of the app's design and features?

They found the notion of employing an avatar as a translation tool to be rather clever, and they thought the features were carefully selected and well-integrated. Overall, they thought the app's design was visually appealing and tailored to meet the needs of deaf users.

**Question 03:** How comfortable are you with using avatars for sign language translation, and what improvements would you suggest for the avatar feature?

They feel very at ease with the concept of translating sign language with avatars. It would be crucial that the avatar sign with accuracy and great expressiveness by modifying it and adding fingers, and it is preferable to slow down the signing speed or replay parts for improved comprehension.

**Question 04:** Are there any specific features or tools you feel are missing from the app that would enhance your language learning experience?

In order to help people grasp new ideas and vocabulary, one participant proposed adding an additional option where they could find video tutorials with sign language interpreters.

Additionally, interactive features like games and quizzes created especially for practicing sign language would not only increase learning engagement but also serve as enjoyable reinforcement of the material. Last but not least, they all decided to have an offline mode that would allow them to access data without using the internet.

**Question 05:** How important is it for you to have community and social features within the app, such as forums, peer interactions, or group learning sessions?

Three out of five deaf people agreed that the app should include community and social features; they stated that doing so would help them feel less isolated and that they would have a community to belong to. Connecting with people who have gone through similar experiences would help them to learn and change ideas by asking questions, sharing experiences, and pick up knowledge from others. In that case, developing an online community platform is crucial for motivation and engagement.

**Question 06:** How do you think the app could better support your learning goals and personal preferences?

They were all impressed and found it useful, even though we do not have an application that supports Deaf people in Alegria .They claimed that an app that translates sign language with avatars will assist them in improving their sign language skills and overcoming any everyday communication obstacles. Two of them also mentioned how this application would improve their communication abilities while also increasing inclusivity and accessibility for deaf people in a variety of settings.

### 3.2.4 Interpretation of Focused Group Discussion Analysis

The comprehensive analysis of the data gathered during the focused group discussion offered numerous interesting insights into the participants' opinions and feedback regarding the application. Five deaf people participated in the visual discussion via a WhatsApp video chat with the assistant of one participant's daughter in order to provide detailed feedback on the app's features, appearance, and potential areas for improvement. After breaking the ice between them, it was revealed that only two deaf have learned a foreign language. Nevertheless, they encounter various difficulties when utilizing various websites and online movies since sign language is not provided. After that, they had a look at our app's design, and we explained its concepts and the different options it has. They found the use of an avatar as a great translation tool, and the features were well-selected. This positive impression indicates that the app is progressing well and has the potential to significantly benefit the deaf community. All of them were comfortable with the use of avatars for sign translation. Nevertheless, they also identified several aspects that require modifications, such as adding fingers to enhance understanding.

Moreover, one of the participants proposed adding video courses with sign language interpreters to help hearing users grasp new concepts. Some would rather include interactive games that provide a fun and engaging way for users to practice and advance their sign language abilities. We propose an additional feature, which is creating a community platform where people may engage with one another and establish learning groups. Three of them agreed with this idea, they believe that such a feature would provide them with a sense of belonging, help them to learn from each other, and foster their motivation and engagement. Therefore, the deaf participants expressed their feedback regarding the app, and they were enthusiastic to use it as soon as possible so that they could break down their communication barriers and enhance their sign language skills.

Overall, based on the results we reached after analyzing the data collected from both instruments, we confirm that the app can fulfill the demands of deaf people and overcome everyday obstacles by taking into consideration the recommended suggestions so that they can enhance their learning experience.

### **3.3 Suggestions and Recommendations**

Deaf individuals are frequently underrepresented in various domains, such as education and technology. This lack of representation can limit their learning opportunities and create communication barriers when interacting with hearing family members, particularly in the workplace. To address this challenge, we are developing an inclusive application to empower the deaf community in Mostaganem City and ensure equal access to opportunities. Eventually, and based on what has been said and discussed, we recommend the following:

- (1) We should make some modifications to the avatar for sign language translation to improve this feature. In order to help users perform complex signs with more accuracy, adding a choice for signing speed will permit users to go back or slow down passages for enhanced comprehension. By putting this option into practice, we can ensure that the application provides deaf people with equal opportunities in the workplace and beyond. Additionally, we can foster an environment that makes everyone feel appreciated and understood.
- (2) Because of the limited time, we were unable to provide the option of learning sign language, yet it would be beneficial to integrate online courses where they can find video tutorials of a sign language interpreter or interactive games to practice what they have learned. We can also make sure that deaf individuals have access to valuable educational resources outside of the traditional classroom, enabling them to keep improving their sign language abilities at their own place. By doing this, users can not only effectively

communicate through the avatar, but they can also further develop their communication skills and signing abilities.

### **3.4 Conclusion**

This chapter aimed to analyze and interpret the data collected from the questionnaire and a focused group discussion with deaf people from Mostaganem City. The results revealed that creating an inclusive application for people who are deaf is essential to improving the learning process. The use of an avatar to translate sign language reinforces the relationship between the deaf and their hearing family members. Additionally, the participants appreciated the concept of the app since it can effectively facilitate their daily life activities.

## General conclusion

In conclusion, the aim of this study was to identify the challenges and barriers encountered by deaf and hard-of-hearing individuals living in Mostaganem City. It also sought to create a smartphone app that would help DHH people communicate more easily by translating spoken words into text or sign language in real time. This study employed a mixed-methods approach to address the specific social and educational barriers faced by the deaf community, which helped develop an effective mobile application intended for deaf people.

Based on the results, analysis, and interpretation of the data, we can assert that the first research hypothesis was confirmed. Apps for language learning substantially enhance social interaction and communication among deaf people, and they can aid in language acquisition when compared to other standard methods. Moreover, the outcomes support the second research hypothesis, suggesting that the incorporation of linguistic and cultural elements, such as facial expressions, body language, and visual aids, can significantly improve the usability and accessibility of such applications. The last hypothesis turned out to be accurate, these applications for deaf individuals can enhance relationships with their hearing family members by facilitating shared language skills and reducing communication barriers. Overall, all hypotheses were confirmed. This study's findings could serve as a valuable resource for app designers and researchers seeking to create more accessible and user-friendly applications for the deaf community.

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# Appendices

## Deaf's Questionnaire

*We are designing an inclusive language learning mobile application for deaf individuals in Mostaganem City, Algeria. We would like to answer the following questions so that we can get a deeper understanding of your experiences in learning a foreign language , your social and communication barriers, and your opinions regarding the potential use of a mobile application designed for deaf people. Your responses will aid us in designing a useful app that is tailored to your requirements.*

*Thank you for taking the time.*

Questionnaire:

\*Please, put  on the suitable box:

1. Age: .....

2. Gender: female   / male  

3. Grade / occupation: .....

4. Degree of hearing loss:

a- Mild

b- Moderate

c- Moderately Severe

d- Severe d Profound

5.-Do you use:

a- Hearing aids



b- Cochlear Implant/s



c- Both



+



d- None



6. Which communication method do you use?

a- Sign only



b- Talk only



c- Sign and Talk



+



7. Do you use any other communication methods?

1- Yes

2- No

- If yes mention them.....

8. Proficiency in Sign Language:

a-Beginner

b-Intermediate

c-Advanced

9.Does your degree of hearing loss has an effect on learning foreign languages?

1- Yes

2 - No

10-Have you experienced any communication barriers when interacting with your hearing family members?

1-Yes

2-No

\*If yes, please describe the specific challenges or difficulties you have encountered.

.....  
 .....

11.Do you have access to a smartphone or a similar mobile device?

1-Yes



2- No



b. If yes, how frequently do you use your smartphone or mobile device for language learning purposes?

- Daily

- Several times a week



- Once a week

- Rarely

12.Are you aware of any language learning applications designed specifically for deaf individuals?

1-Yes

2-No

13.Do you  language learning applications are beneficial  deaf individuals in acquiring and using sign language effectively?

a- Strongly agree

b- Agree

c- Disagree

d - Strongly disagree

14.How do you think tailored and well-designed applications can facilitate language acquisition and communication among deaf people?

.....  
 .....

15-What are your preferred learning methods for acquiring a new language?



a. Visual materials (videos, images)

b. Written materials (text, articles)



c. Interactive exercises and quizzes



d. Conversational practice.



e- Other (please specify)

.....

16.-Do you have any additional comments, suggestions, or feedback related to the design and development of language learning applications for deaf people in Algeria?

.....

.....



THANK YOU

## استبيان للأفراد الصم و البكم

نحن نصمم تطبيقاً شاملاً لتعلم اللغة عبر الهاتف المحمول للأفراد الصم و البكم في مدينة مستغانم، الجزائر. نود منكم الإجابة على الأسئلة التالية حتى نتمكن من فهم تجاربكم في تعلم لغة أجنبية بشكل أعمق، وفهم الحواجز الاجتماعية والتواصلية التي تواجهكم، وآرائكم بخصوص استخدام تطبيق مصمم للأفراد الصم البكم. ستساعدنا إجاباتكم في تصميم تطبيق مفيد يلبي احتياجاتكم.

الاسئلة:

يرجى وضع علامة  ربع المناسب:

1. العمر: .....

2. الجنس:



3. المهنة: .....

4. درجة فقدان السمع:

خفيف

متوسط

متوسط إلى شديد

شديد إلى عميق

5. هل تستخدم:

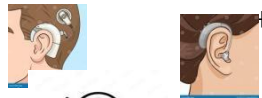
أجهزة السمع



غرفة القوقعة الصناعية

كلاهما

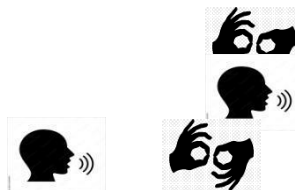
لا شيء



6. ما هي طريقة التواصل التي تستخدمها؟

لغة الإشارة فقط

الكلام فقط



+ لغة الإشارة والكلام

7. هل تستخدم أي طرق تواصل أخرى؟

نعم

لا

إذا كانت الإجابة نعم،

اذكرها: .....

8. الكفاءة في لغة الإشارة:

مبتدئ

متوسط

متقدم

9. هل تؤثر درجة فقدان السمع على تعلم اللغات الأجنبية؟

نعم

لا

10. هل واجهت أي حواجز تواصلية عند التفاعل مع أفراد عائلتك الذين يسمعون؟

نعم

لا

إذا كانت الإجابة نعم، يرجى وصف التحديات أو الصعوبات التي

واجهتها: .....

11. هل لديك هاتف ذكي أو جهاز محمول مشابه؟

نعم

لا



إذا كانت الإجابة نعم، كم مرة تستخدم هاتفك الذكي أو جهازك المحمول لأغراض تعلم اللغة؟

i. يوميًا

ii. عدة مرات في الأسبوع

iii. مرة في الأسبوع

iv. نادرًا

12. هل أنت على علم بأي تطبيقات لتعلم اللغة مصممة خصيصًا للأفراد الصم؟

لا

نعم



مفيدة للأفراد الصم في اكتساب واستخدام لغة الإشارة بفعالية؟



13. هل تعتقد أن تطبيقات

أوافق بشدة

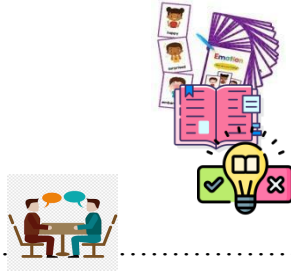
أوافق

لا أوافق

لا أوافق بشدة

14. كيف تعتقد أن التطبيقات المصممة بشكل خاص يمكن أن تسهل اكتساب اللغة والتواصل بين الأفراد الصم؟

15. ما هي طرق التعلم المفضلة لديك لاكتساب لغة جديدة؟



مواد بصرية (فيديوهات، صور)

مواد مكتوبة (نصوص، مقالات)

تمارين تفاعلية واختبارات

ممارسة المحادثة

أخرى (يرجى التحديد):

16. هل لديك أي تعليقات إضافية أو اقتراحات أو ملاحظات تتعلق بتصميم وتطوير تطبيقات تعلم اللغة للأفراد الصم في الجزائر؟



THANK YOU

## **Focused Group Discussion with Deaf Participants**

**Question 01:** How do you currently access language learning resources, and what limitations do you encounter with these resources?

**Question 02:** What are your initial impressions of the app's design and features?

**Question 03:** How comfortable are you with using avatars for sign language translation, and what improvements would you suggest for the avatar feature?

**Question 04:** Are there any specific features or tools you feel are missing from the app that would enhance your language learning experience?

**Question 05:** How important is it for you to have community and social features within the app, such as forums, peer interactions, or group learning sessions?

**Question 06:** How do you think the app could better support your learning goals and personal preferences?

### The App design

9:41



# CHERIFA



9:41



# CHERIFA

Seeing



Hello , I'm ilies ... 



9:41



# CHERIFA



- 
- 
- 



Hold the mic to talk !

9:41



# CHERIFA

Listening



Hello Cherifa , I'm ilies how are you ?



