



RESEARCH ARTICLE

OPEN ACCESS

## AVALUATIONS OF FREE ACCESS APPLICATIONS OF MOBILE PHONES FOR HEARING IMPAIRED PEOPLE

\*<sup>1</sup>Lais B. Gôngora Darzi, <sup>1,2</sup>Josivaldo G. Silva, <sup>2</sup>Isabella Fenner Rondon

<sup>1</sup>Faculty of Engineering, Architecture and Geography, Federal University of Mato Grosso of Sul, State of Mato Grosso of Sul- UFMS, BRA

<sup>2</sup>Post-Graduation Health Center-West, Faculty of Medicine – FAMED, Federal University of Mato Grosso of Sul, State of Mato Grosso of Sul - UFMS, BRA

### ARTICLE INFO

#### Article History:

Received 08<sup>th</sup> March, 2019  
Received in revised form  
27<sup>th</sup> April, 2019  
Accepted 03<sup>rd</sup> May, 2019  
Published online 30<sup>th</sup> June, 2019

#### Key Words:

Hand Talk; App; Hearing Impaired;  
Mobile Phones.

### ABSTRACT

Assistive technology is an interdisciplinary area contemplated by health, engineering and computer science, aiming to generate means that allow social insertion and improvement of the quality of life of people with disabilities. Disability can be defined as any loss or abnormality of a structure or psychological, physiological or anatomical function that generates inability to perform activity, within the standard considered normal for humans. In the specific case of hearing impairment, this represents a bilateral loss, partial or total, of forty-one decibels (dB) or more, calibrated by audiogram in the frequencies of 500 Hz, 1000 Hz, 2000 Hz e 3000 Hz, being one of the most common disabilities in Brazil, affecting about 5.2% of the population. The advances promoted by assistive technology has been decreasing the difficulties faced by this part of the population due to the emergence of technologies embedded in cell phones that provide mobility and communication with other people. This article aims to present the importance and functioning of an application (app) created by the company Hand Talk, founded in 2012, to enable communication between people with severe hearing loss or between these people with other hearing people. This app is easy to use and works as a text and voice translator for Libras (the Brazilian sign language), through a 3D interpreter, and can be used even inside the classroom, facilitating learning and communication between student and teacher, thus reducing the barriers imposed by hearing impairment. In an evaluation ranging from 0 to 5, the app has 4.6 stars in the Play Store platform and may also be useful for older people who already have significant hearing loss and are familiar with sign language.

Copyright © 2019, Lais B. Gôngora Darzi et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Citation: Lais B. Gôngora Darzi, Josivaldo G. Silva, Isabella Fenner Rondon. 2019. "Avaluations of free access applications of mobile phones for hearing impaired people", *International Journal of Development Research*, 09, (06), 28380-28382.

## INTRODUCTION

Almost 24% of the Brazilian population is composed of people who have some kind of disability according to information from the Brazilian Institute of Geography and Statistics (IBGE), of which the largest share (5.2%) are hearing impaired, for a population of 200 million Brazilians. These hearing impaired are made up of 2.2 million people who suffer severe loss, that is, between 70 and 90 decibels (IBGE, 2010). Among the hearing impaired, a significant portion is deaf or has severe disability, and therefore do not adequately

understand the spoken and written Portuguese language, depending exclusively on the learning of the Brazilian sign language called Libras in order to communicate. However, the insufficiency of teachers and instructors fluent in Libras causes great problems that hinder learning and consequently prevent social inclusion and improvement of the quality of life of those with disabilities in the country. Among the difficulties faced by the hearing impaired, the following can be highlighted: shopping and banking, going to the doctor alone, communicating with family and friends, having a relationship with their children to follow development at school, in addition to several other common activities (ROCHA, 2018). Another major difficulty faced by the severe hearing impaired or deaf refers to their inclusion in the school during the infantile phase, since most schools do not have qualified employees and

\*Corresponding author: Lais B. Gôngora Darzi,  
Faculty of Engineering, Architecture and Geography, Federal University of Mato Grosso of Sul, State of Mato Grosso of Sul- UFMS, BRA

adequate physical structure to guarantee effective literacy (GOVERNO DO BRASIL, 2016). The problems faced by the hearing impaired extend to universities, making much more difficult their learning, the insertion into groups of individuals and the attainment of a profession (G1, 2017). However, assistive technology, that is an interdisciplinary area related to health, engineering and computer science, has been playing an important role in the lives of the physically disabled as it can propose technology and service solutions that allow greater social inclusion and increase of the quality of life (GAROFALO, 2018). In the specific case of the moderate, severe and deaf hearing impaired, among the several solutions presents by the assistive technology are the apps embedded in mobile phones. These apps generate alternative forms and facilitate communication, learning and social inclusion. They also aid in various daily activities, performing the most varied functions, including text and voice translation for Libras, sound amplifiers, Libras digital dictionaries, music apps that adapt the usage experience according to the degree of the hearing loss of the user, banking agency apps that allow the user to perform different banking operations and access their account information, transport apps that offer taxi-like service, etc. In view of the importance of embedded apps in mobile phones, this research sought to study them and define the one that would bring the best benefits to the hearing impaired.

## METHODOLOGY AND MATERIALS

The research was conducted through several tests conducted with different cellular apps aimed at the hearing impaired. It was developed in the Laboratory of Biomedical Engineering and Assistive Technology (ENGEBIO) of Post-Graduation in Health of the Faculty of Medicine of UFMS. The following tests were performed:

- Battery consumption (within 20 minutes of use);
- Consumption of RAM memory (within 20 minutes of use);
- App startup time;
- Ease of use of the app.

All the tests above were performed using the same mobile phone (brand: Xiaomi, model: Mi A1) only with apps that were compatible with the Android operating system, and which were freely available. These tests have allowed to define the most important apps for mobile phones. The Android operating system was chosen to be utilized in this research because it is the most common among the population.

The option for the free apps is due to the fact of facilitating the localization and the use by the user.

In addition to these tests, some criteria were also taken into account in app evaluation. Among them are:

- Evaluation of users in the Play Store;
- Memory required for installation;
- Total number of downloads;
- Need to connect or not to the internet;
- Presence or not of ads.

An Excel spreadsheet was written to record the results obtained with the tested and analyzed apps.

In the process of conducting this research, the results found were compared to several articles, websites, reports and texts.

## DISCUSSION

After a series of tests performed and criteria analyzed, the mobile app that stood out most in this survey was Hand Talk, created in 2012, this app does the mobile automatic translation of text and speech to the sign language (Libras), through a 3D virtual interpreter nicknamed Hugo, also functioning as a dictionary (HAND TALK, ?). The Figure (1) below shows an example of Hugo on the mobile phone.



Figure 1. Hugo. Source: Hand Talk site

The user can choose between entering the text to be translated and using the voice transcription service, which after transforming the captured audio into text, automatically translates it into sign language. The app also has a section of educational videos separated by themes (computer science, home objects, musical instruments, school objects, etc.) that teach several words that are related to this particular subject. In addition, are app tools: change of translation speed, access to word history and option to share the translated content (HAND TALK, ?). By enabling hearing and hearing impaired people to communicate more easily this app becomes extremely useful in school and social settings. Inside the classroom, it enables the exchange of knowledge between students and teachers; on conversation circles between friends or acquaintances, enables everyone to expose their thoughts and be understood; in supermarkets, banks and doctors' offices allows the hearing impaired to exchange information with the professionals and attendants who work in the place. The Hand Talk app is therefore a very useful tool for the Brazilian hearing impaired community, having being chosen, in 2013, as the best in the World Summit Award (WSA) - Mobile Social Inclusion category in a United Nations (UN) -sponsored contest in Abu Dhabi, in the United Arab Emirates. In addition to this, the company and the app have already won countless other awards in Brazil and Latin America (HAND TALK, ?). Of the apps specially created for the hearing impaired, Hand Talk is the one with the largest number of installations in mobile phones, being one of the best known in this area. Extremely simple and easy to use, it is ideal for anyone, and the user does not need to learn how to use the app, since all the functions are already well visible. Therefore, it was one of the most outstanding, both for its practicality and for its great utility in daily life.

Table 1. Comparison of information obtained with each app

	Rating	Download size	Installations	Ads	Battery consumption	RAM consumption	Boot time	Ease of use	Internet
Hand Talk	4.6	36 MB	1.000.000	Yes	4%	90 MB	5.2 sec	10	Yes
Vlibras	4.2	24 MB	50.000	No	5%	45 MB	6 sec	10	Yes
Rybená	4.2	29 MB	10.000	No	6%	36 MB	3.3 sec	10	Yes
Giulia	4.4	39 MB	5.000	No	5%	29 MB	1.9 sec	8	Yes
Spread Signs	4.3	26 MB	100.000	No	4%	23 MB	2.8 sec	9.5	Yes
Primeira Mão	4.6	10 MB	1.000	No	3%	24 MB	13.3 sec	10	Yes
Librario	4.8	45 MB	10.000	No	3%	20 MB	6.6 sec	10	No
Sinalário Disciplinar em Li	4.6	12 MB	10.000	No	3%	40 MB	7.7 sec	10	Yes
Petralax Aparelho Auditiv	3.9	5 MB	100.000	No	3%	21 MB	1.3 sec	9	No
Ler e Contar	4.5	40 MB	1.000.000	Yes	3%	65 MB	7 sec	9.5	No
uSound	3.7	7.8 MB	100.000	No	2%	12 MB	3.1 sec	9	No
LetMe Talk	4.4	77 MB	100.000	No	3%	62 MB	3.3 sec	10	No
Mimi Music - Clear Sound	4.0	21 MB	100.000	No	4%	21 MB	3.8 sec	9	No
Glide - Messenger de Víde	4.3	32 MB	10.000.000	Yes	4%	20 MB	1.4 sec	7	Yes
Khan Academy	4.6	18.23 MB	5.000.000	No	2%	38 MB	4.2 sec	10	Yes

Source: author.

## RESULTS

In this research, several apps were studied. The table below shows the information collected from each app and the results obtained with the tests performed.

**Rating:** refers to the evaluation of the app in the Play Store platform, made by users and corresponds to the number of stars, ranging from 0 to 5;

**Download Size:** refers to the memory required to install the app on the mobile phone;

**Installations:** refers to the total number of downloads of the app, that is, how many times it has already been downloaded;

**Ads:** indicates whether or not the app has ads;

**Battery consumption:** indicates the battery percentage of the phone spent during 20 minutes of use of the app;

**RAM consumption:** indicates the consumption of the RAM of the mobile phone during 20 minutes of use of the app;

**Boot time:** refers to the time, in seconds, of app initialization, that is, how long it takes to open;

**Ease of use:** refers to how easy the app is to use, on a scale of 0 to 10;

**Internet:** indicates whether or not the app needs the phone to be connected to the internet to work with all its functions.

## Conclusion

The Hand Talk app is therefore an easy-to-use app that allows people, especially students and seniors, to communicate with each other and with those around them, facilitating learning and social integration. In addition to this, among the apps exclusive for the severe hearing impaired, it is the most known. The recurrence of the thematic of the lack of accessibility of the environments for the hearing impaired in Brazil shows that this is still one of the great challenges present in the country, and was also the subject of the essay of the National High School Examination (ENEM) of 2017 (TENENTE, 2017).

To help transform this scenario, the development of apps for smartphones has been extremely useful. The breakdown of the communication barrier between the hearing impaired and listeners who do not dominate sign language, provided by tools such as the app highlighted in this article, opens up many possibilities and allows this portion of the population to be more socially included every day and also to have higher quality of life. Therefore, the investment in assistive technology is extremely important and necessary nowadays. If research in this area is prioritized, the quality of life of the hearing impaired in Brazil will improve greatly, thereby reducing the prejudice and social exclusion suffered by a large part of this population.

**Acknowledgements:** The postgraduate Health Center West - UFMS, Brazil.

## REFERENCES

- Apesar de avanços, surdos ainda enfrentam barreiras de acessibilidade. Governo do Brasil, 2016. Available at: <<http://www.brasil.gov.br/cidadania-e-justica/2016/09/apesar-de-avancos-surdos-ainda-enfrentam-barreiras-de-acessibilidade>>. Access in: June 3rd, 2019.
- Bom dia Rio. Estudante deficiente auditiva desistiu da faculdade no RJ por não ter intérprete na sala de aula. G1, 2017. Available at: <<https://g1.globo.com/rio-de-janeiro/noticia/estudante-deficiente-auditiva-desistiu-da-faculdade-no-rj-por-nao-ter-interprete-na-sala-de-aula.ghtml>>. Access in: June 3rd, 2019.
- GAROFALO, Débora. Inclusão: você já ouviu falar nas tecnologias assistivas? NovaEscola, 2018. Available at: <<https://novaescola.org.br/conteudo/12858/inclusao-voce-ja-ouviu-falar-em-tecnologias-assistivas>>. Access in: June 3rd, 2019.
- HAND TALK. Hand Talk, [s.d.]. About page. Available at: <<https://www.handtalk.me/sobre>>. Access in: June 2nd, 2019.
- Hearing Impairment Statistics. IBGE, 2010. Available at: <<https://www.ibge.gov.br/apps/snig/v1/?loc=0&cat=-1,-2,-3,128&ind=4643>>. Access in: June 3rd, 2019.
- HUGO. Available at <<https://www.handtalk.me/sites>>. Access in: June 3rd, 2019.
- ROCHA, Renata. Quantos surdos há no mundo? E no nosso Brasil? Saiba mais! Signum Web, 2018. Available at: <<http://blog.signumweb.com.br/curiosidades/quantos-surdos-no-mundo-e-brasil/>>. Access in: June 3rd, 2019.
- TENENTE, Luiza. Redação do Enem: especialistas em educação de surdos sugerem argumentos para o texto. G1, 2017. Available at: <<https://g1.globo.com/educacao/enem/2017/noticia/redacao-do-enem-especialistas-em-educacao-de-surdos-sugerem-argumentos-para-o-texto.ghtml>>. Access in: June 3rd, 2019.