



**T. R.
MARDIN ARTUKLU UNIVERSITY
INSTITUTE OF LIVING LANGUAGES IN TURKEY
SYRIAC LANGUAGE AND CULTURE**

Master Thesis

**A Suggestion of Braille Alphabet for Syriac
Language:**

Unified Syriac Braille Alphabet

Prepared By
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Advisor
Assoc. Dr. Mehmet Sait TOPRAK

Mardin 2019

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ASSUMPTION

TO THE DIRECTOR OF INSTITUTE OF LIVING LANGUAGES IN TURKEY

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ACCEPTANCE AND APPROVAL

The named as “*A Suggestion of Braille Alphabet for Syriac Language: Unified Syriac Braille Alphabet*” thesis which was prepared by Ferhat Demiralp, was accepted unanimously by our jury as a MASTER THESIS in the Department of Syriac Language and Culture.

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ABSTRACT

Over the past 20 years, there has been a widespread debate on racial, ethnic and mother tongue education, while visually impaired individuals in non-representative nations have never come up with literacy learning in their mother tongue. But these discussions have never been prominent among non-governmental groups, the United Nations, UNESCO and the academic community, which are supposedly advocating mother tongue rights.

In this study, the Syriac Braille alphabet of Assyrian language (Western and Eastern Dialects) which I have presented as a prototype is proposed. The Syriacs, who do not have a central policy and are scattered in many countries, have never developed a Syriac braille alphabet for their visually impaired. Thus, despite the recognition of Syriac as the official language of the Iraqi Kurdish regional government, Syriac linguists and private educators did not develop an educational policy for visually impaired Syriacs in their communities and eliminated the people in this group.

When we started this research, the basis of our starting point was the right to education of reading and writing in mother tongue which is one of the fundamental rights of visually impaired people in non-representative nations, leaving political discussions aside. This study was carried out at Mardin Artuklu University in 2016, the institute of living languages in Turkey, at the Syriac Language and Culture Department. In our study, we examined all the dialects of the Syriac language separately. We reached the Syriacs who talked about different dialects on the internet, and the Syriacs living in Mardin came face-to-face with sample audio recordings and analyzed phonetics and phonemes. In accordance with IPA Braille standards and UNESCO studies on visual impairments, Braille cells that correspond to the Syriac Braille alphabet were subsequently re-symbolized. In order to produce a prototype, a standard framework for all Syriac Braille dialects was developed. This standard prototype was developed, tested, and shown to be successful in terms of literacy when teaching a foreign language to visually impaired persons of Kurdish and Turkish ethnicity that live in Turkey.

Prototypes created with these standards, see the Kurds in Turkey and of Turkish origin have been tested on people with disabilities, it has achieved a success in literacy matters for teaching a foreign language. Thus, visual disabilities of different ethnic origins were successful in second language learning. In the light of all these studies, a software called viewing fingers was developed and a software was developed to convert the existing Syriac scripts into Syriac to Braille text.

Keywords: Syriac Language, Braille Alphabet, Syriac Braille Alphabet, Unrepresented Nations, Viewing Fingers Software,



TÜRKÇE ÖZET

Geçtiğimiz 20 yıl boyunca, ırksal, etnik ve anadilde eğitim konusunda geniş tartışmalar yaşanırken, temsili olmayan milletlerdeki görme engelli bireylerin kendi anadillerinde okuma-yazma öğrenmeleri hiç gündeme gelmemiştir. Oysaki sözde anadil hak savunuculuğunu yapan sivil toplum kuruluşları, Birleşmiş Milletler, UNESCO gibi kuruluşlar ve akademik camiada bu tartışmalar nedense hiç gündeme gelmemiştir.

Bu çalışmada prototip olarak sunmuş olduğum Süryanice Dilinin (Batı ve Doğu Lehçeleri) Birleşik Syriac Braille Alfabeti teklif edilmektedir. Merkezi bir politikaya sahip olmayan ve birçok ülkeye dağılmış olan Süryaniler de hiçbir zaman kendi görme engellileri için bir Süryani Braille Alfabeti geliştirmemişlerdir. Hal böyleyken Irak Kürt Bölgesel yönetimin de Süryanice'nin resmi dil olarak tanınmasına rağmen Süryani dilbilimcileri ve özel eğitimcileri yaşadıkları yerlerdeki görme engelli Süryaniler için bir eğitim politikası geliştirmeyerek bu gruptaki insanları yok saymışlardır.

Biz bu araştırmaya başladığımızda çıkış noktamızın temeli, politik tartışmaları bir kenara bırakarak, aslında temsili olmayan milletlerde ki görme engellilerin temel haklarından biri olan “anadilde okuma-yazmayı eğitim hakkı” olmuştur.

Bu çalışma 2016 yılında Mardin Artuklu Üniversitesi, Türkiye'de Yaşayan Diller Enstitüsü, Süryani Dili ve Kültürü Anabilim Dalında başlamıştır. Çalışmamızda Süryani Dili'nin tüm lehçelerini ayrı ayrı inceledik. Farklı diyalekleri konuşan Süryanilere internet üzerinden ulaştık ve Mardin şehrinde yaşayan süryanilerle de yüz yüze gelinerek örnek ses kayıtları alınarak, fonetik ve fonemler analiz edildi. Ardından IPA standartları çerçevesinde ve UNESCO'nun görme engelleriyle ilgili yapılan çalışmalar dikkate alınarak Süryanice Braille Alfabetine karşılık gelecek braille hücreleri yeniden sembolize edilmiştir. Böylelikle Süryanice Braille Alfabetinin tüm lehçeleri için standart bir çerçevenin oluşturulmasıyla bir

prototip oluşturulmuştur. Bu prototoip Süryanice dil bilimcileri ve özel eğitimcilerle sunularak geliştirilmesi için bir temel teşkil edilmesi arzulanmıştır.

Oluşturulan bu standart prototip ile, Türkiye’de yaşayan Kürt ve Türk kökenli görme engelli üzerinde test edilmiş olup, bir yabancı dil öğretimi konusunda okuryazarlık hususunda bir başarı sağlamıştır. Böylükle farklı etnik kökene sahip görme engellilere ikinci dil öğreniminde başarı elde edildi. Tüm bu çalışmalar ışığında Viewing Fingers adlı bir yazılım geliştirilerek var olan Süryanice yazıları Süryanice’den Braille Text’e hızlıca dönüştürmek içinde de bir yazılım geliştirilmiştir.

Keywords: Süryani Dili, Braille Alfabeti, Süryanice Braille Alfabeti, Temsili Olmayan Milletler, Viewing Fingers Yazılımı,

ACKNOWLEDGMENTS

This work, like any accomplishment, requires the effort of many people. So, in order for this work to be successful, I would also like to express my gratitude and appreciation to the various individuals who contributed in various ways.

Firstly, I would like to thank Dr. Mehmet Sait TOPRAK (Associate Professor), my supervisor, who shared his experience, invaluable guidance, constructive comments and feedback, and direction on how to carry out the task.

Next, my thanks go to Dr. Veysel BAŞÇI and Dr. Yusuf BALUKEN who shared his experience, guidance, and direction on how to run the work and continuous encouragement. Dr. Oksana KOVAL who has been in my side from the beginning to the end of my study really and truly I have appreciated everything she did for me, and I never and ever forget her favor throughout my life.

Habib SİNCAR, who is also visually impaired and braille trainer, has contributed greatly to my interest in the Braille alphabet and the world of blind people. I have had the opportunity to work with visually impaired children in non-representative nations. His contributions are unique and no word is enough to express my gratitude.

Finally, I would like to extend my thanks appreciation and helping make this work possible to Malfono Yusuf BEGDAS who is president of Assyrian Language-Culture and Literature Association and Mr. Abdülmecit YILMAZ who Is President of Federation of Unimpeded Components. They have supported me and helped me to find visually impaired students for testing this prototype alphabet. Visually impaired people working in my project will never and ever forget you.



DEDICATION

I dedicate this work to all visually impaired people in non-representative nations who wish to read and write in their mother language. I hope that in the globalizing world, advocates of the right to education in the mother tongue and non-disabled life rights advocates do similar studies for visually impaired individuals in other non-representative nationalities.

LIST OF ABBREVIATIONS

| | |
|-------------------|--|
| 1 st . | : First |
| 2 nd . | : Second |
| 3 rd . | : Third |
| Hex | : Hexcedecimal |
| adj. | : Adjective |
| adv. | : Adverb |
| ASCII | : American Standard Code For Information Interchange |
| BANA | : Braille Authority of North America |
| BMP | : Basic Multilingual Plane |
| C | : Consonant |
| Ca. | : Circa (Around, About, Roughly, Approximately) |
| CBFU | : Code Braille François Uniformisé |
| DEN. | : Denominative |
| e.g | : For Example |
| EFA | : Education for all |
| EI | : Education international |
| EWB. | : English Word Braille |
| Fem. | : Feminine |
| IEC | : The International Electrotechnical Commission |
| IPA | : The International Phonetic Alphabet |
| ISO | : International Standard Organization |
| Masc | : Masculine |
| n | : Noun |
| NEA | : National Education Association |
| NLB | : National Library For The Blind |
| NUM. | : Numeral |
| PA | : Participle Adjective |
| PAR. | : Particle |
| PN | : Proper Noun |
| PR. | : Pronoun |
| RBF | : Root Braille Word |
| SWB | : Syriac Word Braille |

SYRW : Syriac Word
U : Unicode Character Code Number
UC : Universal Code / Unicode
UCO : Unicode Consortium Organization
UCS : Universal Character Set
UN : United Nations
UNESCO : The United Nations Education, Scientific And Cultural Organization
UNPA : Unrepresented Nations And Peoples Organization
V : Vowel
vb. : Verb
VSBW : Vocalised Syriac Braille Word
VSW : Vocalised Syriac Word
WB : Word Braille

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CHAPTER ONE: INTRODUCTION

This chapter presents the background of the study, the statements of the problem, the purpose of the study, research objectives and questions, significance of the study, delimitation, and limitations of the study. It further presents the operationalized key terms, the basic assumptions, and concepts as well as the structure or the organizations of the thesis.

1.1. Background of the Study

Language and culture are the most important part of the life of all societies. Many languages and cultures in the world today are facing with the danger of extinction. Globalization and nation-state understandings threaten many peoples and their languages and cultures. While globalization is threatening the language and culture of nation-states, the conception of nation-state threatens the languages and cultures of minorities (unrepresented nations) within them, namely the non-representative nations. In this sense, intertwined threats and negativities follow each other. The only way to overcome all the adversities that are experienced and experienced is to go to multilingual and multicultural structuring and to eliminate all pressures on languages and cultures.

According to Wilhelm Von Humboldt, there is such a close relationship between the language of a society and the intellectual orientation of those living in that society, if you learn about one of them, you can make healthy comments about the other. Because language and intellectual activity are formed together, they are formed together. We see society in its language, we understand it in its language. The language of a society is the spirit and the language of the society. It is really difficult to think of two other things that are extremely identical. When we examine the languages of societies, their lifestyles, thoughts, strengths and weaknesses, their abilities in art and music, everything can be seen. Language is the mirror of society and its cultural accumulation. / It's true to claim that breaking the mirror would be unlucky (Çoban, 2005:4).

Every nation's culture and culture depends on all its qualities and way of life. Nations maintain their existence depending on their language. Their independence and freedom are also reflected in their language. The loss of liberty endangers the language and a long-term loss of freedom brings with its language deaths.

Language death is the inability to speak that language for many reasons (the most important factor in the press). While the language dies, tens of thousands of years of knowledge, culture, and way of thinking of that language also die. Together with the language, the cultural characteristics of that society are erased in order not to emerge from the scene of history. Globalization needs to be taken seriously at this point, and this new situation, which has changed all the national features and regional balances of the world, has deeply influenced many societies and will continue to influence it.

Language is not just a means of providing communication. The language also carries cultural elements within itself. Each language is a wealth. The loss of a language is associated to the loss of a plant by linguists. Just as the disappearance of a flower means the disappearance of a drug that will cure a disease, it disappears in the innumerable solutions it contains in the culture and communication that it brings when a language is lost. The central point of centralization in every respect is more than the loss of a plant species. If this danger brought about by the spread of the education in the dominant languages is not prevented, the majority of languages will be lost in the next century (Çoban, 2005:4)

In this context, considering that all languages in the world are rich, all minorities who speak different languages should have the right to teach and disseminate their own language without any obstacles.

Today, in all societies, it is one of the socially excluded groups and children with disabilities. It is estimated that 85 percent of disabled children under the age of 15 in the world live in developing countries (Helander, 1993). Subsequently, the short description provided by the World Bank (2003) suggests that the vast majority of these children are in developing countries and have not received any education, are not in school data sets, and live below the poverty line. They don't appear on the national policy agenda.

Education has been accepted and approved by various national and international organizations as a human right. On December 10, 1948, the international community adopted the universal declaration of human rights (universal declaration of human rights, 1948). They accepted the principle that everyone has the right to education. Training will be free at least in the first and basic stages. Primary education is compulsory. Parents have the right to choose the type of education to be given to their children (Article 26). Following this statement, many countries have accepted all children's feelings of education. Children's rights were also increased at the education for all in Jomtien (1990). After the education papers for all, many developing countries honoured the spirit and typically tried to increase access to education for developing children. Unfortunately, there is no equal priority for children with disabilities.

In 1994 representatives of 25. International organizations and 92 national governments therefore met in Spain under the support of UNESCO. From this conference, the Salamanca statement on principles, policy and practice in special needs education were formulated. The conference opened the way for inclusive education as a remedy for the issue of children with disabilities' lack of access / limitation of access for children with disabilities, equity, and inclusion in the school system. Regular schools with this inclusive orientation are most effective means of combating discriminatory attitudes, creating welcoming communities, building an inclusive society, and achieving education for all; moreover, they provide an effective educative education to the majority of children and improve the efficacy and ultimately the cost effectiveness of the entire education system (UNESCO, 1994) subsequent to the Salamanca conference in the year 1994, the movement of inclusive education became popular and gained significant international attention. The intention of the movement was to restructure schools in order to respond to the learning needs of all children (Ainscow, 2005). It acknowledged that the problem in learning does not necessarily originate from the deficit within the child (Mittler, 2005); it can arise from social, psychological, economic, linguistic, cultural consequences. Hence, it is important to remove all the barriers which obstruct learning. Furthermore, UNESCO (1994) acknowledges that all students have individual needs and states that it is essential these needs are addressed in inclusive schools. In an inclusive setting, all students have equal access to the curriculum, with the only difference being the manner in which information is obtained (American foundation for the blind, 2005a). Many researchers agree

that vision loss has a major impact on learning and this can in turn affects the way students can acquire information, some students with less severe impairments can normally learn with their sighted peers in inclusive classrooms and their needs could be better met than students with more severe or profound vision impairments (AFB, 2005a,). Another study by Pagliano (2005) states that unlike their sighted peers, who “learn incidentally through vision, students with vision impairment must be systematically and sequentially taught. They are unable to rely on visual signs and observation, and instead must utilize their other senses (AFB, 2005a, 2005b). And this can be possible only if teachers have positive attitude and perception towards those students with visual impairments and if they are openly welcoming those students into inclusive classrooms.

According to Alpers (2004), recent research on inclusion has indicated that most countries in the world have no clear and accurate data related to the children with disabilities and visual impairments. In the absence of relevant data it will not be possible to ensure that children with disabilities are fully included into inclusive schools. As a result of 1990s world conference on education for all: meeting basic learning needs, the challenge of exclusion from education has been put on political agenda in many countries including our country Ethiopia has embraced and taken inclusion as a mandate. This has helped to focus attention on a much broader range of children who may be excluded from or marginalized within education system because of their apparent difficulties.

Inclusion seeks to remove the distinction between special and regular education and to provide an appropriate education for all student, despite their level of disability, in their local schools. It involves complete restructuring of educational system so that all schools would have the responsibility of providing the facilities, resources, and appropriate curriculum for all students irrespective of disabilities. It is a philosophical move away from accommodations of students with special needs into a “normal” system towards a full inclusion model where everyone is considered normal, where the needs of all can be met. This trend is situated within a broad social justice agenda, which argue that equality for all must include access for all students to their local schools. This trend has been supported by united nations policies which affirm the right of children (the united nations convention on

the right of child, 1989; the united nations standard rules for the equalization of opportunities for person with disabilities (1995; the UNESCO Salamanca statement, 1994).

Despite the large figures of people and students with visual impairments, both the enrolment rate and transition of students with visual impairments to secondary school, is still low. It is estimated that, less than 10% of students with visual impairments have access to education in developing countries. As the result of 1990 conference on education for all many international as well as national initiatives have been taken so as to educate children with disabilities in general and visually impaired students in particular (UNESCO Salamanca statement, 1994). Tilehun (2000), as cited in Abate (2001), states that, in spite the measures that have been taken to educate children with disabilities still many children have been excluded because of apparent disabilities they have. Similarly, in Turkey Ethiopia disabled children and visually impaired children alike are found to exist out of the school settings for different reasons. Some of the reasons for this large number could be the attitudinal problem towards those students. Parents and teachers tend to hold unfavourable and negative attitude towards students with disabilities in general and visually impaired students in particular. One reason for this could be few inclusive schools in the country, and examination system, which is not good enough to enable students with visual impairments to proceed to secondary schools. Another reason for this can be due to lack of specific policies stating how inclusive education should be provided and implemented. For example, the national disability policy, introduced in 2004, failed to clearly state and provide guidelines on how inclusive education to children with disability should be implemented and monitored. Lack of guidelines and efforts to facilitate preparation of conducive environment, lead to poor implementation of inclusive education in the country. One of the area affected by the lack of effectiveness in provision of inclusive education, is the recruitment of adequate number of general teachers to teach in the secondary schools (Tilehun, 2000, as cited by abate). Previous studies of attitudes towards inclusion have given contradictory results. While some researchers reported uncertain and even negative attitudes towards inclusion on the part of general education teachers (Hammond, &Ingalls, 2003), most reports (e.g. Avramadis, et al., 2002), indicated positive attitudes, accompanied by a belief in the fundamental value of inclusion. On the other hand, a growing body of research, like (wood, 1992; as cited by abate 2001) invalidates claiming that perceptions and

attitudes of teachers are gradually improving in a positive direction in inclusive educational setting. Whatever the case may be, attitudes of teachers toward inclusive education must be given the due attention it deserves if inclusive education is to be favoured and practiced as educational modality.

One factor that accounts for individual disparities in teaching effectiveness, particularly in terms of student accomplishment, has been discovered as the teachers' perception of their own efficiency. As stated in Ashton (1984), teachers' sense of efficacy refers to teachers beliefs concerning their capabilities to help students learn. Similarly, teachers' belief in their capability towards teaching students with visual impairments in inclusive classroom can positively affect the performance of visually impaired students.

1.2. Statement of the Problem

Progress has been made, including education for all and The UN Millennium Development Goals, universal primary education, and gender parity at all levels of education, so that more attention is drawn to children who are still out of school and are at risk. To be excluded, marginalized, or otherwise disadvantaged due to significant difficulties.

What about the right to basic education in the mother tongue for all non-representative nations? What about the rights of visually impaired individuals to education in their mother tongue?

Unfortunately, the rights of people in this group to receive education in their mother tongue have almost never been of concern to this day. Including advocates who demand the right to education in the so-called mother tongue. Because the number of this group of minorities in the content of a small book in their mother tongue to read, or to read or write stories, tales have always been seen very much. And they are always excluded.

This is why a visually impaired Syriac or Kurdish man has not been able to read a poem, a tale, a story or a sacred text in his mother tongue.

Because in their mother tongue there is no Braille alphabet prepared for them.

In fact, it has become so difficult that even when they are passing through the education system of the official authority within their borders, they even forget to think in their native language. Therefore, they have never had any claims.

Since the United Nations Declaration on Education for All (UNESCO, 1995), inclusion practice and implementation has become the main challenge for many countries around the world.

Children with disabilities should be given the right to receive free and appropriate public education from the time of birth until their graduation. These discourses should be included in education in their mother tongue within the borders of the country of non-representative nations. This is the most basic human right.

The impact of the attitudes of civil society organizations and academic world is strong. Therefore, in this study, I expect the visually impaired individuals, unrepresented nations, to take their right to be educated in their mother tongue to their agendas. Thus, for the minorities in this group, a new field is opened for scientific and feminine studies and a standard of alphabet design for their dark world is realized and these standards are registered in the relevant units of UNESCO. And ultimately, he pioneered the production of the first literary works at UNESCO with various funding.

In 1990 at the World Conference on Education for All in Jomtien, Thailand, representatives of the international community from 155 countries, as well as representatives from 150 organizations agreed to "universalize primary education and massively reduce illiteracy by the end of the decade".

In 2000, with many countries being far from having reached this goal, the international community met again in the 2000 World Education Forum in Dakar, Senegal. They asserted their assurance to achieving Education for All (EFA) by the year 2015, and identified six key measurable education goals which aim to meet the learning needs of all children, youth and adults by 2015. NEA was a member of EI delegation in the meeting.

The six EFA goals can be summarized as follows:

- ✓ Expand early childhood care and education
- ✓ Provide free and compulsory primary education for all
- ✓ Promote learning and life skills for young people and adults

- ✓ Increase adult literacy by 50%
- ✓ Achieve gender parity by 2005 and gender equality by 2015
- ✓ Improve the quality of education

The United Nations education, scientific and cultural organization (UNESCO) have led the EFA global movement since 1990. The annual education for all global monitoring report first published in 2002, has played a vital role in reporting progress. However, unfortunately, non-representative nations have not been given the chance to receive education in their mother tongue.

1.3. The Importance and Objectives of the Study

1.3.1. General Importance and Objectives

The general aim of this study is to produce an alphabet in their first language for the visually impaired in the unrepresented nations and to give the visually impaired students the opportunity to read and write in their mother tongue. In addition, the study is to provide acceleration to create a braille alphabet for language defenders who will be teaching students with visual impairment in non-representative nations. Another concern of the study is that this visually impaired in non-representative nations, which cannot receive education in their first language, live their native language and pass on to their next generation.

1.3.2. Specific Importance and Objectives

One of the unrepresented nations is the Syriacs. Although the Syriac literature has been very rich and wide for thousands of years, there are no educational materials and no books to read in the historical process for visually impaired. In this study, we created the first Syriac Braille Alphabet and offered to the discussion of Syriac linguists and instructors and provided the aim of enriching this study to the future. Also, this study has the following specific objectives;

1. To create and to introduce the first Syriac Braille Alphabet.
2. In this Syriac Braille Alphabet was created, to communicate with each other by creating a common alphabet for all visually impaired survivors in every dialogue.

3. With the help of this research, instructors will receive the first "Syriac Braille Alphabet Educational Material" notes, along with instructions on how to utilize them when teaching the Braille Alphabet.
4. To create Matthew's first braille raid with this study and to enable visually impaired Syriacs to read their native language for the first time.
5. Visually impaired linguists, theologians, historians, etc. To create an opportunity for them to learn Syriac.
6. The visually impaired in the global world gives an opportunity for a rescuer to forget, live and pass on his or her mother tongue.
7. It is the first book for teachers to benefit from how visually impaired pupils can be taught in Syriac.
8. In visually impaired students, they can work abundantly in their mother tongue by working on the documents of the annexes of this study.

1.4. Organization of the Paper

In the first part of the thesis, general and specific aims of the study are given. In the second part, some literature definitions have been made. Information was given about the first visually impaired schools in Europe, especially in France and England. Information about Braille and similar writing system was given and Loise Braille and Charles Barbier who invented embossed writing were also informed and Braille Alphabet was introduced.

At the Chapter Two, described the situation of the visually impaired in Turkey, see the Ministry of Education focused on seeing policy on disabilities. In addition, information was given about the products and technological developments used in braille education and UNICODE braille code, Music Notation, Mathematical operations and Nemeth code system for scientific expressions were mentioned. Also, in this chapter, information about the IPA Braille System and World Braille Usage is given and English, French, Arabic, Hebrew, and Turkish Braille Alphabet is introduced.

In the third chapter, Syriac Language and Syriac Braille Writing System, the introduction of the Syriac alphabet, forms of spelling forms, information about Classical Syriac 'Eṣṭrangēlā, Eastern and Western Syriac spelling forms are given. The adaptation of

these systems to the braille alphabet and how to translate the consonant and vowel letters into UNIQUE equivalents are explained. In addition, some grammatical words in the Syriac meaning and the sample of the Syriac braille alphabet in the prototype sample study was made. Also in this section, it includes the proposed braille shape to adapt the Syriac punctuation marks to the braille alphabet. Finally, in this section, the examples of how each Syriac braille letter is taught to the students are given by giving individual examples.

The fourth and final section is an evaluation result with reference to the nature and importance of the study.



CHAPTER TWO: HISTORICAL BACKGROUND AND BRAILLE

ALPHABET

“Access to communication in the widest sense is access to knowledge, and that is vitally important for us if we are not to go on being despised or patronized by condescending sighted people. We do not need pity, nor do we need to be reminded that we are vulnerable. We must be treated as equals — and communication is the way we can bring this about.” –Louis Braille

2.1. Definitions

Blindness is the total lack of visual acuity or loss of vision. As is known, the vision process consists of the stages of the light coming into the eyes, the retina falling through the anterior segment, from here to the brain through the visual nerve or the optic nerve - the meaning in the brain. In one or more of the organs that perform these stages, blindness occurs in the event of damage or complete absence of the organ. In visual pathways, there may be a problem with injury or various diseases and may be completely innate. Legal blindness is defined as a visual field of less than 10 percent vision or less than 20 degrees, despite corrective eye contact or contact lens correction (WHO, 2019).

Visual impairment, also known as vision impairment or vision loss, is a decreased ability to see to a degree that causes problems not fixable by usual means, such as glasses (WHO, 2019). Some also include those who have a decreased ability to see because they do not have access to glasses or contact lenses (WHO, 2019). Visual impairment is often defined as a best corrected visual acuity of worse than either 20/40 or 20/60 (Maberley, et al., 2005). The term blindness is used for complete or nearly complete vision loss (Maberley, et al., 2005).

The international classification of diseases 11 (2018) classifies vision impairment into two groups, distance and near presenting vision impairment (WHO, 2019).

Distance vision impairment:

- ✓ **Mild** – presenting visual acuity worse than 6/12
- ✓ **Moderate** – presenting visual acuity worse than 6/18
- ✓ **Severe** – presenting visual acuity worse than 6/60
- ✓ **Blindness** – presenting visual acuity worse than 3/60

Near vision impairment:

- ✓ Presenting near visual acuity worse than n6 or m.08 with existing correction.

An experience of person of vision impairment depending upon many different factors. This includes, for example, the availability of prevention and treatment interventions, access to vision rehabilitation (including assistive products such as glasses or white canes), and whether the person experiences problems with inaccessible buildings, transport, and information.

The right to life is a fundamental human right and being healthy is a precondition. Health is not only the absence of disease and disability but also physical, mental and social well-being (Durduran, 2009:1). Hence, health is a fundamental right for each individual and some individuals are disabled because of some reasons they can be. According to who, there are about 1 billion total disabled people in the world. This corresponds to 7/1 of the world population (WHO, 2019).

Disability can be defined as a limitation or inability to perform an activity due to disability. Sociologically, people with disabilities, not because of their pathological problems, accessibility is the result of social pressures individuals greatly restricted.

2.2. First Blind School in France

In the early 19th century, the development of braille was a major breakthrough in education and consequently in the living prospects of blind people. The first school for the blind was founded in 1784 by Valentin Haüy¹. In this chapter I will try to explain an outline a summary of the contemporary situation in France and the development of the first established school for the blind.

The first educational institution for the blind was founded in 1784 by Valentin Haüy. Haüy was born in 1745 in Saint-Just En Chaussée, a small village about 35 km east of Paris. He graduated from the university of Paris with a degree in language. Haüy won his life by translating official documents to businessmen (PLAIN-JAPY, 1996).

Haüy, specializes in the deciphering of secret codes and old French and foreign manuscripts and was elected as a member of the Académie Des Ecritures (Plain-Japy, 1996). In addition, Haüy was familiar with the work of the French philosopher Diderot²

¹ Valentin Haüy is a French educator and human lover. Born in Saint-Just-En-Chaussée (France) in 1745. He was the founder and director of the school for the first blind. He invented embossed letters for the blind. Educator Valentin Haüy has devoted himself to dealing with the blind. He died in paris in 1822

² Denis Diderot (5 October 1713 - 31 July 1784), French writer and philosopher. One of the most important personalities of the age of enlightenment. He was the chief editor of the famous encyclopédie, designed to

(1713-1784), the first person to study the lives of blind people in detail. Trying to understand how the human brain works without the sense of sight, Diderot was most impressed by the work of Nicholas Saunderson, a blind professor of mathematics at Cambridge university who wrote extensively on algebra and on Newton's principia. In France, Diderot observed a blind man teaching his sighted son the alphabet with the help of raised letters (lorimer, 1996:11).

In 1771, another decisive event took place in Haüy's life. Haüy witnessed a humiliating exhibition of an 'orchestra' of blind beggars. Dressed up in ugly gowns, pointed hats, and cardboard spectacles without lenses, this group of beggars was Caterwaul for the amusement of the public (lorimer, 1996:11). Haüy was appalled by this acting and subsequently set out to argue against the contemporary belief that a blind person could not be educated. He decided that blind people needed a formal education to allow them to gain their livings in decency

Jean François De Lesueur, a 17-year-old blind beggar, was Haüy's first pupil. They incidentally met at the entrance to St. Germain des Prés. Haüy gave a coin to the youngster. Lesueur identified the coin by touch and not only named it correctly but he returned it to Haüy as he considered it of too high a value to be a donation (lorimer, 2000:21). He was very impressed by Lesueur's tactile dexterity and honesty, Haüy taught him in numeracy and reading and paid him to make up for the loss of his earnings from begging. Lesueur was very quick to learn and within six months he could decipher letters with the help of a "slotted board in which small wooden tiles could be fitted. The upper surface of the tiles were embossed with individual letters or numbers" (Lorimer, 2000:21)

Then, Haüy had to prove that his first student had not been an extraordinarily talented exception. He managed to secure funding for twelve blind youngsters. In February 1786 L'institut des Jeunes Aveugles was opened. It was first school which offered a general education to all blind children regardless of their gender, intelligence and class. In order to keep his funding at par with the steady rise of pupils, Haüy had to gain public recognition and thus arrange public demonstrations achievements of his students. He managed to get the support of the court in Versailles where his best pupils demonstrated their skills in reading,

educate and develop society. Under his leadership, although the rivalry between countries in western europe during the enlightenment period, the flow of information ensured that new intellectuals were brought to society. Encyclopaedia's 8-18 volumes, 1-7 volumes of the information received from the church on the illegally printed, philosopher thoughts his work was burned by the court decision.

numeracy, and music at Christmas 1786. In consequence of court's support this school became fashionable to donate to L'institut des Jeunes Aveugles.

The most difficult problem to be solved by haüy was to make his students read. He was not happy with the wooden block system he had used when he first taught lesueur. TThis approach demonstrates to the kids what reading is like for those who are visually impaired, but it also demonstrates how difficult it is for them to decode text. Lesueur discovered that he could distinguish vague letters of impression from the back of a funeral card he had received by chance. Haüy understood the potential of this observation immediately. As one of the sights to be seen, hauty assumed that visually impaired people were like visually impaired people. With regard to literacy, it has led to the invention of a reading method with relief roman letters. However, most of the letters of the alphabet he used were still too complex for tactile discrimination. An example of its font is given in the alphabet.

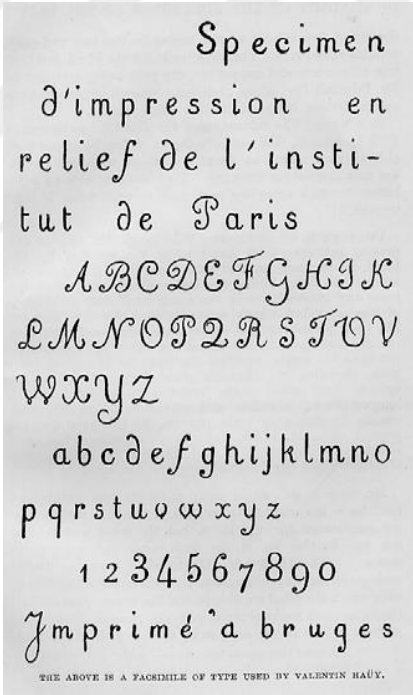


Figure 1. Haüy Scripts

Haüy's assumption was not proven until the early 20th century when the headmaster of the perkins school for the blind in watertown, massachusetts, Dr. Samuel Hayes applied a psychology test to his pupils. The hayes-test provided scientific proof that, contrary to the common belief, the intelligence of blind people did not differ significantly from that of the sighted.

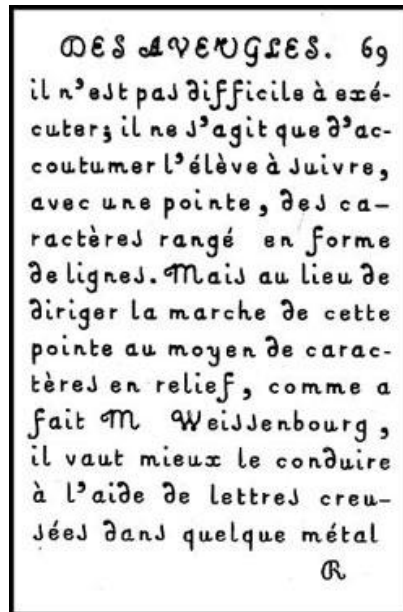


Figure2. The First Book for Blind People with Haüy Scripts

The age of enlightenment is a European intellectual movement of the 17th century in which initiated innovative developments in art, philosophy, and politics. The importance of reason was central as it enabled man to understand the outside world and improve his own condition. One result of this new school was that a sensory impairment was no longer regarded as having an automatic influence on the intelligence of the person affected. Consequently, blind children should be educated in order to earn their living by means of their education, or, if they were of lower intellectual abilities, by a manual trade (Lauenstein, 2007:16-17).

2.3. Status of Blind Studies in The UK During the Same Period

After having successfully completed the comprehensive education of visually impaired children, the rest of Europe quickly began to follow this school. Shortly after the opening of L'institut des Jeunes Aveugles in Paris, many visually impaired schools were opened in England. They were opened in 1791 in Liverpool, in 1793 in Bristol and Edinburgh, in 1799 in London and in 1806 in Glasgow schools of sight were opened. As a result, many code designs were considered and proposals were given in these schools to further improve students' access to literacy.

However, these searches continued until the beginning of the 19th century, before a systematic search for an appropriate literacy system was made in the UK. Literacy was desired for two reasons: independent access to the bible and personal 'destiny'. Most of the embossed publications, therefore, were mostly religious works that were part of the bible.

2.4. Louis Braille and Braille Alphabets

It was the Frenchman Valentin Haüy, who first used the embossing method on paper to make the blind read. The fact that Haüy had printed the normal letters as relief on the paper led others to find simpler forms. But only moon characters are still used. In England in 1845, William Moon of Brighton found these characters to some extent similar to Latin letters and easily learned by those who were blind in later ages. The books written with moon characters still exist in a limited way among the elderly, especially in England. The French educator Louis Braille (1809-1852) developed the method of oppression and writing commonly used in the education of the blind.

The discovery of braille has revolutionized the world of visually impaired people. Braille's name is Louise Braille. Louis Braille was born on 4 January 1809 in France. When she was born, she wasn't blind. However, at the age of three, he entered the shoe repair shop where his father worked, with the curiosity of childhood, and started cutting the skins with a knife he had used. In the meantime, the blade in his hand slipped into the left eye. Upon this incident, his father took the boy to a woman in the neighbourhood instead of taking him to a doctor. Because of the wrong medication and treatment applied by this woman, the inflammation in her left eye spread to her right eye instead of healing. This led to the closing of both eyes of Louis Braille. Later, though his father took Louis Braille to a doctor, the doctor said that he was going to see his eyes again and that there was nothing left to do.

When Louis Braille came to school, he was sent to Paris by a wealthy person, Valentin Haüy, to attend blind school in Paris in 1784. Education of the visually impaired at school was done only through ear and memorization. Valentin Haüy later attempted to create books that the visually impaired could read by turning the same text into relief lines that people saw. But the result was not successful. Because the writings written in this way were very slowly and with great difficulty by the visually impaired, and the written books occupied a lot of space. Louis Braille began working on a special writing system for the visually impaired during his studies. He made various experiments using the ropes, nails, rods and the bullets. A French army officer had developed a writing system at night to send secret orders unaware of the enemy. This system, called the night font, consisted of relief lines and dots. One day, an officer named Charles Barbier visited the school for the blind in Paris and showed this to his school principal. Because, he thought that this paper could be used by visually impaired people.

However, after studying the paper, the school principal decided that this paper is not suitable for visually impaired people. The system was very complex because it consisted of many points and lines. This letter was written in 12 different points and it was difficult to learn. This system was also rejected by the army. Meanwhile, Louis Braille dealt with the paper by Charles Barbier. He thought that this article is not suitable for the visually impaired. However, the thought he had seen in creating this system had given him an important tip for writing. Some concrete ideas have begun to appear in Louis Braille's mind about how the most appropriate writing system should be. He began to think that a text that visually impaired people could read most easily should consist of points, not lines. After that, it was time to make the right decision on the number of points to be used. Louis Braille made his six trials and a long time work in 1830, a six-point system of writing for the visually impaired. Later on, it formed the letters in the alphabet with this 6-point writing system.

Braille alphabet is a universal writing system developed for the blind. This alphabet, includes 63 characters consisting of 1 to 6 relief points placed on a matrix. By embossing, the characters arranged in rows on paper are read by lightly touching the fingers. Braille enumerated the points in the matrix as 1, 2, 3 and 4, 5, 6 at the top left, to enable easy identification of 63 different characters that could be placed on six-point matrices. Braille applied the method based on the use of six points in different combinations to the musical note. In 1829, he published a book on the method of writing. In 1837, the book further:



n.

Figure3. Braille 6 dot cells
Source:(*UNICODE, 2109A*)



Figure4. Braille 8 dot cells
Source:(UNICODE, 2109A)

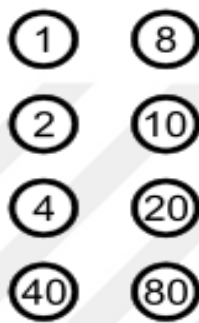


Figure 5. Hexadecimal value of Braille dots
Source:(UNICODE, 2109A)

The 6-dot Braille alphabet, the method for representing Braille numbers, and some Braille punctuation marks are used in all languages that share the roman alphabet. There are variations of 6 dot Braille in various roman alphabet languages. Representation of punctuation marks and differences in the meanings of other 6 dot Braille cells are commonly used to represent special characters and/or common letter combinations.

In the first of the grades of Braille, grade 1, each possible arrangement of dots within a cell represents only one letter, number, punctuation sign, or special braille composition sign - it is a one-to-one conversion. Individual cells cannot represent words or abbreviations in this grade of Braille. Because of this grade's inability to shorten words, books and other documents produced in grade 1 Braille are bulkier and larger than normal printed text. Grade 1 Braille is typically used only by those who are new to learning the grades of Braille, but as of the early 2000s, a new movement was in place among elementary school teachers of Braille to introduce children with sight difficulties to grade 2 Braille immediately after teaching the basics of grade 1 Braille.

Table 1. Braille letters with 6 dot cells

| | | | | | | | | | | | | |
|-----|------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| • | •• | ••• | •••• | ••••• | •••••• | •••••• | •••••• | •••••• | •••••• | •••••• | •••••• | •••••• |
| a | b | c | d | e | f | g | h | i | j | k | l | m |
| ••• | •••• | ••••• | •••••• | •••••• | •••••• | •••••• | •••••• | •••••• | •••••• | •••••• | •••••• | •••••• |
| n | o | p | q | r | s | t | u | v | w | x | y | z |

Source: (Brailleworks, 2019)

Table 2. Braille punctuation sign with 6 dots

| | | | | | | | | | | | |
|---|----|-----|------|-------|--------|--------|--------|--------|--------|---|----|
| • | •• | ••• | •••• | ••••• | •••••• | •••••• | •••••• | •••••• | •••••• | • | •• |
| , | ; | : | . | ! | () | ?“ | * | ” | , | - | |

Source: (Brailleworks, 2019)

Table 3. Braille numbers with 6 dots

| | | | | | | | | | |
|---|----|-----|------|-------|--------|--------|--------|--------|--------|
| • | •• | ••• | •••• | ••••• | •••••• | •••••• | •••••• | •••••• | •••••• |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 |

Source: (Brailleworks, 2019)

Table 4. Special braille composition with 6 dots

| | | | | | |
|-------------|--------------|--------------|----------------------|---------------|-------------|
| •• | • | ••• | • | •• | •• |
| letter sign | capital sign | numeral sign | numerical index sign | literal index | italic sign |

Source: (Brailleworks, 2019)

Louis Braille began to teach the writing system to his friends at the secret school. This article was embellished with dots on paper. At first, however, the teachers opposed the use of this paper in school. Teachers argued that the article was too complex and that the visually impaired would be different from other people. Louis Braille, despite all her struggles, could not see her article at her school prior to her death that she had invented for the visually impaired. Thanks to the invention of Braille writing, one of the important obstacles to the visually impaired has been eliminated and new horizons were opened for them. Thus, concepts such as school, library, newspaper and book became concrete and functional concepts for the visually impaired. It was not possible to accept the writing system that Louis Braille had invented for the visually impaired. For example; however, in 1854 in France, in 1860 in the United States, in 1868 in England Braille literature could be adopted in schools.

On a writing system for the visually impaired to read and write, there were people outside Louis Braille who also conducted research and study. For this reason, different writing systems were used in some countries at the same time. At that time, there were twenty types of writing systems developed for the visually impaired, and there was a huge competition among them. The competition between the embossed writing systems was called war of dots at that time. Numerous committees were set up, articles were written, papers were presented, speeches and discussions were held on which to accept the embossed writing systems for the visually impaired.

Finally, in 1918, Braille's invention, which was the invention of Louis Braille, reached a consensus and a common decision was made to abandon other writing systems. So the battle of the dots was over. Then, representatives of associations established in the United Kingdom and the United States met in London in 1932, accepting a system known as the grade-2 English Braille alphabet. British and American experts regrouped in London in 1957 and developed the alphabet.

Grade 2 Braille was introduced as a space-saving alternative to grade 1 Braille. In grade 2 Braille, a cell can represent a shortened form of a word. Many cell combinations have been created to represent common words, making this the most popular of the grades of Braille. There are part-word contractions, which often stand in for common suffixes or prefixes, and whole-word contractions, in which a single cell represents an entire commonly used word. Words may be abbreviated by using a single letter to represent the entire word, using a special symbol to precede either the first or last letter of the word while truncating the rest of the word, using a double-letter contraction such as "bb" or "cc", or removing most or all of the vowels in a word in order to shorten it. A complex system of styles, rules, and usage has been developed for this grade of Braille.

Table 5. Words and Abbreviations for English Braille Alphabet

| | | | | | | | | | | | | |
|--------|--------|---------|----------|-----------|------------|-------------|-------------|-------------|--------------|---------------|--------------|----------------|
| • | •• | ••• | •••• | ••••• | •••••• | ••••••• | •••••••• | ••••••••• | •••••••••• | ••••••••••• | •••••••••••• | ••••••••••••• |
| a | but | can | do | every | from | go | have | just | knowledge | like | more | not |
| ••• | •••• | ••••• | •••••• | ••••••• | •••••••• | ••••••••• | •••••••••• | ••••••••••• | •••••••••••• | ••••••••••••• | ••••••••••~ | •••••••••••••• |
| people | quite | rather | so | that | us | very | will | it | you | as | and | for |
| •••• | ••••• | •••••• | ••••••• | •••••••• | ••••••••• | •••••••••• | ••••••••••• | ••••••••••~ | •••••••••••• | ••••••••••••• | ••••••••••~ | •••••••••••••• |
| of | the | with | child/ch | gh | shall/sh | this/th | which/wh | ed | er | out/ou | ow | bb |
| ••••• | •••••• | ••••••• | •••••••• | ••••••••• | •••••••••• | ••••••••••• | ••••••••••~ | | | | | |
| cc | dd | en | gg; were | in | st | ing | ar | | | | | |

Source: (Brailleworks, 2019)

2.5. Charles Barbier

The history of Braille goes all the way back to the early 1800's. A man named Charles Barbier who served in Napoleon Bonaparte's French army developed a unique system known as "night writing" so soldiers could communicate safely during the night. Being a military veteran, Barbier had seen several soldiers killed because they used lamps after dark to read combat messages. The light shining from the lamps told enemy combatants where the French soldiers were and inevitably led to the loss of many men (BRAILLEWORKS, 2019).

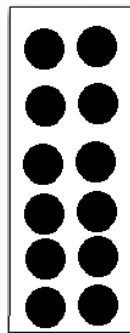


Figure6. The Maximum Size Barbier Cell

Barbier's system was related to the Polybius square, in which a two-digit code represents a letter. In Barbier's variant, a 6x6 square includes most of the letters of the French Alphabet, as well as several digraphs and trigraphs:

Table 6. Charles Barbiers's Night Writing Alphabet

| | | | | | |
|--|--|--|--|--|--|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

Source: (Brailleworks, 2019)

2.6. Zayn Al-Din 'Ali B. Ahmad Al-Amidi

Another author is Salah Al-Din Al-Safadi [d. 1362] in his book *nakt Al-Himyan Fi Nukat Al-'Umyan* (Emptying The Pockets for Anecdotes About Blind People). About al-safadi's book, al-samira'i reports the story of one successful blind man, Zayn Al-Din "Ali B. Ahmad Al-Amidi (d.712 h), who is a Kurdish Scholar, and invented a method by which Fruit stones are made into reading means for the blind, as reported by dr. 'Abd Al-Sattar Abu Ghuda. Al-Safadi says, in respect to the originality of Al-Amidi: "m addition to his Knowledge, he used to trade in books. He could pick out the desired volume, touch The book and determine the number of its pages; he would touch the page and determine How many lines it had, the type of script and its color, and he knew the prices of The books" (Chaim, 2007:134)

2.7. Visually Impaired and Their Education in Turkey

The visually impaired person is not an apathetic, the desperate person in need of protection. He is not a miraculous creature that is very different from other people, has extraordinary abilities and hears voices that others cannot hear. He has all the positive and negative features of other people. Visually impaired people may also be successful, unsuccessful, selfish, or interested in the interests of society. In essenc a visually impaired person is a human like everyone else.

They reads the same books using a different writing system. It receives the same information and the same training with different methods. He shares the same schools, the same workplaces, the same streets, the same entertainment places with other people. In summary, being visually impaired does not mean having a different personality from other people.

In Turkey, there are 16 Blind Schools for visually impaired children in Adana, Ankara (2), Çanakkale, Denizli, Erzurum, Gaziantep, Istanbul (2), Izmir, Kayseri, Kahramanmaraş, Konya, Niğde, Tokat, and Diyarbakir. In addition, there are rehabilitation centers that provide basic and vocational training to visually impaired people aged 15 and over. There are two rehabilitation centers in Ankara and one in Istanbul. In these centers, the necessary skills for daily life, reading-writing, using a cane and independent movement, typewriter, telephone exchange, masseur, computer, macrame pieces of training are given such as education and employment of the visually impaired in the state or private sector or by establishing an independent business community, producer individuals.

There are 16 visually impaired primary schools in Turkey, all of which are boarding and daytime.

In order to register visually impaired students in these schools, according to article 7 of the special education services regulation; national education directorate, guidance and research centre directorate, nearest visually impaired primary schools or the nearest school can apply directly. Those wishing to enrol in one of these schools should do the following.

- Apply to the governorship of your province or the district governor's office with a petition.
- Your petition is referred to the directorate of national education and then to the nearest guidance and research center.
- The directorate of national education will advise you to prepare a file and the documents that should be included in this file.
- If there is a problem in reporting the required documents, you should prepare the following documents
- Certified identity card (for student)
- Parent or guardian's residence certificate
- Medical board report from a fully-formed hospital. (this report will include the child's disability, degree of disability and whether he has any other illness.)

- Child identification voucher to be completed by the guidance and research center.
 - The inspection report from guidance and research centers.
 - Two new passport photos.
 - Envelope affixed to a postage stamp with two-parent addresses.
 - Document indicating the economic situation. This document can be filled in at the directorate of national education in accordance with the sample.
 - A letter indicating that the parent or guardian will take the child with him during the half-year and summer holidays. (this document is then prepared by the school directorate to be read by the child and signed by the parent.)
 - Provincial education board decision. (prepared and given by the directorate of national education.)
 - The dossier of these documents is delivered to the directorate of national education with a petition stating that the student will be boarding and daytime.
 - Visually impaired students are placed in primary schools with the decision of the provincial educational identification, monitoring and appraisal team to decide whether they want to attend daytime or boarding education.
- Those wishing to enrol in one of these schools should do the following.
- Visually impaired students who have completed primary school, who wish to continue their secondary education, apply to the school directorate at the end of the 8th grade.
 - Students who are educated in primary and secondary schools and who know Braille (relief) can request the Braille textbooks free of charge from the visually impaired printing house and evening art school Altındağ-Ankara.

Rehabilitation centers in Ankara and Istanbul offer vocational and skill training courses for the visually impaired children aged 15 and over. Those wishing to benefit from these courses should apply to the provincial directorates of the social services and child protection agency. The documents requested from the applicant are as follows: a report of a delegation from the state hospital with a visually impaired, diploma, sample of identity card, residence certificate, six photos, and petition. Diplomas are not required for those who do not graduate from any school.

According to our Constitution, the right to primary education, which is compulsory and free for all, is also valid for disabled people. People with disabilities who wish to

benefit from the right to primary education should apply to the Guidance and Research Centers or National Education Directorates of the Ministry of National Education.

2.7. Braille Writing Tools & Supplies

2.7.1. Writing Pen

Used in braille writing system and handles, different materials (wood, plastic, etc.) Is a tip-pointed writing tool.

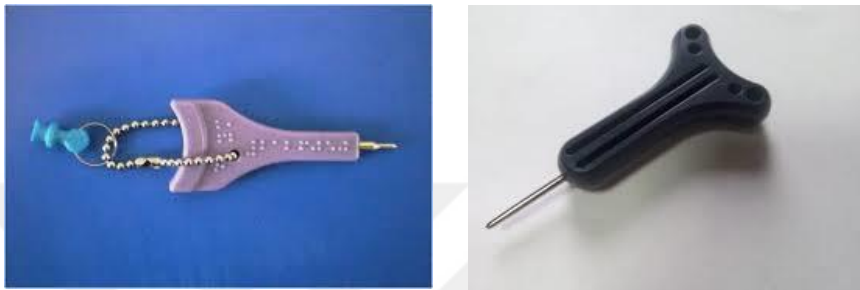


Figure 7. Braille Writing Pens

2.7.2. Braille Typewriters

A Braille typewriter is a typewriter with six keys. Each of the keys works for typing one of the six points. If there are many points in the typed letter, it is necessary to press the necessary keys together to write the points.



Figure 8. Braille Typewriters

2.7.3. Writing Tablets

The tablet is a writing frame with six-point cells. The paper is conveniently compressed between the writing tablet and the codes between the tablet and the codes are punched with the special pen. The pen is a nail-like tool with a plastic handle.



Figure 10. 14 Line Braille Tablets



Figure 9. 27 Line Braille Tablets



2.7.3. First Reading Board

It is the tool used to read the locations and sounds of points in the initial phase of reading.



Figure 11. First Reading Tablet for Braille Alphabet Practise

2.7.4. Braille Writing Paper

A4 paper size in different thicknesses (180, 200, 220 g) is used as writing paper, Bristol paper.



Figure 12. Braille Writing Paper

2.7.5. Wedge

It is a tool that is prepared the students to prepare for reading and writing in order to learn six dots. The pits of the wedge refer to six dots. Letters are created with small balls placed in pits.



Figure 13. Wedge For Learning Braille Alphabet

2.8. Technological Vehicles Used in Reading

2.8.1. Book Reading Tool with Sensor

Used for reading printed materials. Black and white or colour documents and books can be saved as audio or text to the desired storage units by reading them after transferring them to the computer environment. Documents can be saved in wav, xml, rtf, txt and other formats. This tool is an innovative wearable technology for visually impaired peoples.

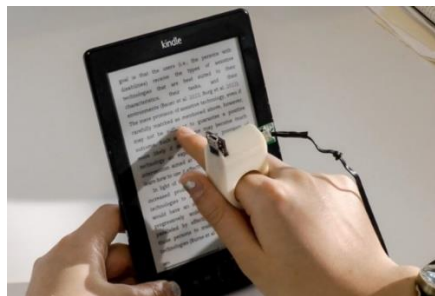


Figure14. Finger-Mounted Reading Device for The Blind

2.8.2. Braille Printer

Returns the text in the computer as Braille. The text in the word format can be printed in the printer program and printed in Braille form. When the program settings are made, whether the document to be printed with or without an abbreviation, will be in the form of one-sided or two-sided and how the indentation will be.



Figure15. Braille printer

2.8.4. Embossed Printer

The map is used to convert sketches, graphics, paintings and similar visual materials into tactile shapes that can be understood by the visually impaired. The shape or images that are prepared sketchy on the computer. Then they are printed out on the same printer. However, the outputs are printed on a special paper.

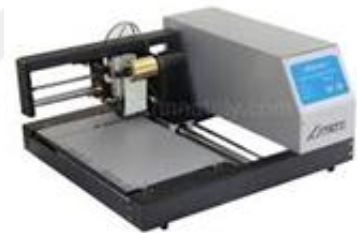


Figure 16. Embossed Printer

2.8.5. Screen Reading Program

This program allows the visually impaired to read books by vocalizing the texts in the computer. With the help of computer keyboard, visually impaired people, computer parts, can write text in writing programs. In addition, the program with the help of the text, letter, letter, word, sentence, sentence, or read as a whole text.

2.8.6. Embossed Screen

It is used in conjunction with the computer and the audio screen reading program. The text on the screen takes the form of Braille. With the up and down arrows, the display is read as Braille.



Figure17. Embossed Screen

2.8.7. Tactile Tablet for Blind

This tactile tablet is for blind and visually impaired people. It is a next curve braille device for braille reading and writing that displays one whole page braille text at once, without any mechanical elements. It is like an e-book which instead of using a screen displays small physical bubbles. For the first time our users can have an overview of a whole document.



Figure18. Tactile Tablet for Blind

2.9. Braille Patterns with Official Unicode Consortium Code Chart

Universal code (UC or Unicode) is a standard developed by the Unicode consortium organization (UCO) that assigns a number value to each character. The aim of the system is to ensure that the different character coding systems work together and that all the writing systems in the world can be represented under a single standard in the computer environment (UNICODE, 2109A).

Unicode is a standard developed by the uco that assigns a number value to each character. The ISO / IEC 10646 standard, known as the Universal Character Set (UCS), has the same numerical responses as the collaboration of both organizations. This set,

- It aims to assign a number value to all characters on earth.

- New characters can be added over time, but the number values of older characters remain the same.
- The number values are given over the 31-bit set, ucs-4. The first 7 bits “group”, the second 8 bits “plane”, the third next 8 bits “row”, and the last 8 bit “cell” are grouped. The first “plane” (group = 0, plane = 0) is called the basic multilingual plane (bmp). The bmp corresponds to a 16-bit set called ucs-2.
- Character code points on the UCS are usually shown as numbers in the hexadecimal system in the format u 0a31.
- Codes between U0021 and U007e the codes between ASCII and U00a0 - U00ff are kept the same as iso-8859-9.

Various character encodings have been developed to efficiently store the strings (texts) of Unicode coding on the computer.

Table 7. Braille Pattern Official Unicode Consortium Code Chart, Version. 12.1

| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|-------|------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| U280x | ⠠ | ⠡ | ⠢ | ⠣ | ⠤ | ⠥ | ⠦ | ⠧ | ⠨ | ⠩ | ⠪ | ⠫ | ⠬ | ⠭ | ⠮ | ⠯ |
| U281x | ⠠ | ⠡ | ⠢ | ⠣ | ⠤ | ⠥ | ⠦ | ⠧ | ⠨ | ⠩ | ⠪ | ⠫ | ⠬ | ⠭ | ⠮ | ⠯ |
| U282x | ⠠ | ⠡ | ⠢ | ⠣ | ⠤ | ⠥ | ⠦ | ⠧ | ⠨ | ⠩ | ⠪ | ⠫ | ⠬ | ⠭ | ⠮ | ⠯ |
| U283x | ⠠ | ⠡ | ⠢ | ⠣ | ⠤ | ⠥ | ⠦ | ⠧ | ⠨ | ⠩ | ⠪ | ⠫ | ⠬ | ⠭ | ⠮ | ⠯ |
| | (end of 6-dot cell patterns) | | | | | | | | | | | | | | | |
| U284x | ⠠ | ⠡ | ⠢ | ⠣ | ⠤ | ⠥ | ⠦ | ⠧ | ⠨ | ⠩ | ⠪ | ⠫ | ⠬ | ⠭ | ⠮ | ⠯ |
| U285x | ⠠ | ⠡ | ⠢ | ⠣ | ⠤ | ⠥ | ⠦ | ⠧ | ⠨ | ⠩ | ⠪ | ⠫ | ⠬ | ⠭ | ⠮ | ⠯ |
| U286x | ⠠ | ⠡ | ⠢ | ⠣ | ⠤ | ⠥ | ⠦ | ⠧ | ⠨ | ⠩ | ⠪ | ⠫ | ⠬ | ⠭ | ⠮ | ⠯ |
| U287x | ⠠ | ⠡ | ⠢ | ⠣ | ⠤ | ⠥ | ⠦ | ⠧ | ⠨ | ⠩ | ⠪ | ⠫ | ⠬ | ⠭ | ⠮ | ⠯ |
| U288x | ⠠ | ⠡ | ⠢ | ⠣ | ⠤ | ⠥ | ⠦ | ⠧ | ⠨ | ⠩ | ⠪ | ⠫ | ⠬ | ⠭ | ⠮ | ⠯ |
| U289x | ⠠ | ⠡ | ⠢ | ⠣ | ⠤ | ⠥ | ⠦ | ⠧ | ⠨ | ⠩ | ⠪ | ⠫ | ⠬ | ⠭ | ⠮ | ⠯ |
| U28ax | ⠠ | ⠡ | ⠢ | ⠣ | ⠤ | ⠥ | ⠦ | ⠧ | ⠨ | ⠩ | ⠪ | ⠫ | ⠬ | ⠭ | ⠮ | ⠯ |
| U28bx | ⠠ | ⠡ | ⠢ | ⠣ | ⠤ | ⠥ | ⠦ | ⠧ | ⠨ | ⠩ | ⠪ | ⠫ | ⠬ | ⠭ | ⠮ | ⠯ |
| U28cx | ⠠ | ⠡ | ⠢ | ⠣ | ⠤ | ⠥ | ⠦ | ⠧ | ⠨ | ⠩ | ⠪ | ⠫ | ⠬ | ⠭ | ⠮ | ⠯ |
| U28dx | ⠠ | ⠡ | ⠢ | ⠣ | ⠤ | ⠥ | ⠦ | ⠧ | ⠨ | ⠩ | ⠪ | ⠫ | ⠬ | ⠭ | ⠮ | ⠯ |
| U28ex | ⠠ | ⠡ | ⠢ | ⠣ | ⠤ | ⠥ | ⠦ | ⠧ | ⠨ | ⠩ | ⠪ | ⠫ | ⠬ | ⠭ | ⠮ | ⠯ |
| U28fx | ⠠ | ⠡ | ⠢ | ⠣ | ⠤ | ⠥ | ⠦ | ⠧ | ⠨ | ⠩ | ⠪ | ⠫ | ⠬ | ⠭ | ⠮ | ⠯ |
| | (end of 8-dot cell patterns) | | | | | | | | | | | | | | | |

Source:(UNICODE, 2109B)³

³You can download theUnicodestandard,version12.1, directly from this link, <https://www.unicode.org/charts/pdf/u2800.pdf>

You can see the braille dots number for all Unicode CAR below ((UNICODE, 2109A).

| | | | | | |
|------|---|---|------|----|-----------------------------|
| 2800 | ⠠ | braille pattern blank | 282f | ⠠⠠ | braille pattern dots-12346 |
| • | | while this character is imaged as a fixed-width Blank in many fonts, it does not act as a space | 2830 | ⠠ | braille pattern dots-56 |
| 2801 | ⠠ | braille pattern dots-1 | 2831 | ⠠ | braille pattern dots-156 |
| 2802 | ⠠ | braille pattern dots-2 | 2832 | ⠠⠠ | braille pattern dots-256 |
| 2803 | ⠠ | braille pattern dots-12 | 2833 | ⠠⠠ | braille pattern dots-1256 |
| 2804 | ⠠ | braille pattern dots-3 | 2834 | ⠠⠠ | braille pattern dots-356 |
| 2805 | ⠠ | braille pattern dots-13 | 2835 | ⠠⠠ | braille pattern dots-1356 |
| 2806 | ⠠ | braille pattern dots-23 | 2836 | ⠠⠠ | braille pattern dots-2356 |
| 2807 | ⠠ | braille pattern dots-123 | 2837 | ⠠⠠ | braille pattern dots-12356 |
| 2808 | ⠠ | braille pattern dots-4 | 2838 | ⠠ | braille pattern dots-456 |
| 2809 | ⠠ | braille pattern dots-14 | 2839 | ⠠ | braille pattern dots-1456 |
| 280a | ⠠ | braille pattern dots-24 | 283a | ⠠ | braille pattern dots-2456 |
| 280b | ⠠ | braille pattern dots-124 | 283b | ⠠ | braille pattern dots-12456 |
| 280c | ⠠ | braille pattern dots-34 | 283c | ⠠ | braille pattern dots-3456 |
| 280d | ⠠ | braille pattern dots-134 | 283d | ⠠ | braille pattern dots-13456 |
| 280e | ⠠ | braille pattern dots-234 | 283e | ⠠ | braille pattern dots-23456 |
| 280f | ⠠ | braille pattern dots-1234 | 283f | ⠠ | braille pattern dots-123456 |
| 2810 | ⠠ | braille pattern dots-5 | 2840 | ⠠ | braille pattern dots-7 |
| 2811 | ⠠ | braille pattern dots-15 | 2841 | ⠠ | braille pattern dots-17 |
| 2812 | ⠠ | braille pattern dots-25 | 2842 | ⠠ | braille pattern dots-27 |
| 2813 | ⠠ | braille pattern dots-125 | 2843 | ⠠ | braille pattern dots-127 |
| 2814 | ⠠ | braille pattern dots-35 | 2844 | ⠠ | braille pattern dots-37 |
| 2815 | ⠠ | braille pattern dots-135 | 2845 | ⠠ | braille pattern dots-137 |
| 2816 | ⠠ | braille pattern dots-235 | 2846 | ⠠ | braille pattern dots-237 |
| 2817 | ⠠ | braille pattern dots-1235 | 2847 | ⠠ | braille pattern dots-1237 |
| 2818 | ⠠ | braille pattern dots-45 | 2848 | ⠠ | braille pattern dots-47 |
| 2819 | ⠠ | braille pattern dots-145 | 2849 | ⠠ | braille pattern dots-147 |
| 281a | ⠠ | braille pattern dots-245 | 284a | ⠠ | braille pattern dots-247 |
| 281b | ⠠ | braille pattern dots-1245 | 284b | ⠠ | braille pattern dots-1247 |
| 281c | ⠠ | braille pattern dots-345 | 284c | ⠠ | braille pattern dots-347 |
| 281d | ⠠ | braille pattern dots-1345 | 284d | ⠠ | braille pattern dots-1347 |
| 281e | ⠠ | braille pattern dots-2345 | 284e | ⠠ | braille pattern dots-2347 |
| 281f | ⠠ | braille pattern dots-12345 | 284f | ⠠ | braille pattern dots-12347 |
| 2820 | ⠠ | braille pattern dots-6 | 2850 | ⠠ | braille pattern dots-57 |
| 2821 | ⠠ | braille pattern dots-16 | 2851 | ⠠ | braille pattern dots-157 |
| 2822 | ⠠ | braille pattern dots-26 | 2852 | ⠠ | braille pattern dots-257 |
| 2823 | ⠠ | braille pattern dots-126 | 2853 | ⠠ | braille pattern dots-1257 |
| 2824 | ⠠ | braille pattern dots-36 | 2854 | ⠠ | braille pattern dots-357 |
| 2825 | ⠠ | braille pattern dots-136 | 2855 | ⠠ | braille pattern dots-1357 |
| 2826 | ⠠ | braille pattern dots-236 | 2856 | ⠠ | braille pattern dots-2357 |
| 2827 | ⠠ | braille pattern dots-1236 | 2857 | ⠠ | braille pattern dots-12357 |
| 2828 | ⠠ | braille pattern dots-46 | 2858 | ⠠ | braille pattern dots-457 |
| 2829 | ⠠ | braille pattern dots-146 | 2859 | ⠠ | braille pattern dots-1457 |
| 282a | ⠠ | braille pattern dots-246 | 285a | ⠠ | braille pattern dots-2457 |
| 282b | ⠠ | braille pattern dots-1246 | 285b | ⠠ | braille pattern dots-12457 |
| 282c | ⠠ | braille pattern dots-346 | 285c | ⠠ | braille pattern dots-3457 |
| 282d | ⠠ | braille pattern dots-1346 | 285d | ⠠ | braille pattern dots-13457 |
| 282e | ⠠ | braille pattern dots-2346 | 285e | ⠠ | braille pattern dots-23457 |

285f ⠫ braille pattern dots-123457
2860 ⠠ braille pattern dots-67
2861 ⠡ braille pattern dots-167
2862 ⠣ braille pattern dots-267
2863 ⠤ braille pattern dots-1267
2864 ⠥ braille pattern dots-367
2865 ⠦ braille pattern dots-1367
2866 ⠧ braille pattern dots-2367
2867 ⠨ braille pattern dots-12367
2868 ⠩ braille pattern dots-467
2869 ⠪ braille pattern dots-1467
286a ⠫ braille pattern dots-2467
286b ⠬ braille pattern dots-12467
286c ⠭ braille pattern dots-3467
286d ⠮ braille pattern dots-13467
286e ⠯ braille pattern dots-23467
286f ⠰ braille pattern dots-123467
2870 ⠱ braille pattern dots-567
2871 ⠲ braille pattern dots-1567
2872 ⠳ braille pattern dots-2567
2873 ⠴ braille pattern dots-12567
2874 ⠵ braille pattern dots-3567
2875 ⠶ braille pattern dots-13567
2876 ⠷ braille pattern dots-23567
2877 ⠸ braille pattern dots-123567
2878 ⠹ braille pattern dots-4567
2879 ⠺ braille pattern dots-14567
287a ⠻ braille pattern dots-24567
287b ⠼ braille pattern dots-124567
287c ⠽ braille pattern dots-34567
287d ⠾ braille pattern dots-134567
287e ⠿ braille pattern dots-234567
287f ⠰ braille pattern dots-1234567
2880 ⠠ braille pattern dots-8
2881 ⠡ braille pattern dots-18
2882 ⠣ braille pattern dots-28
2883 ⠤ braille pattern dots-128
2884 ⠥ braille pattern dots-38
2885 ⠦ braille pattern dots-138
2886 ⠧ braille pattern dots-238
2887 ⠨ braille pattern dots-1238
2888 ⠩ braille pattern dots-48
2889 ⠪ braille pattern dots-148
288a ⠫ braille pattern dots-248
288b ⠬ braille pattern dots-1248
288c ⠭ braille pattern dots-348
288d ⠮ braille pattern dots-1348
288e ⠯ braille pattern dots-2348
288f ⠰ braille pattern dots-12348
2890 ⠱ braille pattern dots-58
2891 ⠲ braille pattern dots-158
2892 ⠳ braille pattern dots-258

2893 ⠴ braille pattern dots-1258
2894 ⠵ braille pattern dots-358
2895 ⠶ braille pattern dots-1358
2896 ⠷ braille pattern dots-2358
2897 ⠸ braille pattern dots-12358
2898 ⠹ braille pattern dots-458
2899 ⠺ braille pattern dots-1458
289a ⠻ braille pattern dots-2458
289b ⠼ braille pattern dots-12458
289c ⠽ braille pattern dots-3458
289d ⠾ braille pattern dots-13458
289e ⠿ braille pattern dots-23458
289f ⠰ braille pattern dots-123458
28a0 ⠠ braille pattern dots-68
28a1 ⠡ braille pattern dots-168
28a2 ⠣ braille pattern dots-268
28a3 ⠤ braille pattern dots-1268
28a4 ⠥ braille pattern dots-368
28a5 ⠦ braille pattern dots-1368
28a6 ⠧ braille pattern dots-2368
28a7 ⠨ braille pattern dots-12368
28a8 ⠩ braille pattern dots-468
28a9 ⠪ braille pattern dots-1468
28aa ⠫ braille pattern dots-2468
28ab ⠬ braille pattern dots-12468
28ac ⠭ braille pattern dots-3468
28ad ⠮ braille pattern dots-13468
28ae ⠯ braille pattern dots-23468
28af ⠰ braille pattern dots-123468
28b0 ⠱ braille pattern dots-568
28b1 ⠲ braille pattern dots-1568
28b2 ⠳ braille pattern dots-2568
28b3 ⠴ braille pattern dots-12568
28b4 ⠵ braille pattern dots-3568
28b5 ⠶ braille pattern dots-13568
28b6 ⠷ braille pattern dots-23568
28b7 ⠸ braille pattern dots-123568
28b8 ⠹ braille pattern dots-4568
28b9 ⠺ braille pattern dots-14568
28ba ⠻ braille pattern dots-24568
28bb ⠼ braille pattern dots-124568
28bc ⠽ braille pattern dots-34568
28bd ⠾ braille pattern dots-134568
28be ⠿ braille pattern dots-234568
28bf ⠰ braille pattern dots-1234568
28c0 ⠠ braille pattern dots-78
28c1 ⠡ braille pattern dots-178
28c2 ⠣ braille pattern dots-278
28c3 ⠤ braille pattern dots-1278
28c4 ⠥ braille pattern dots-378
28c5 ⠦ braille pattern dots-1378
28c6 ⠧ braille pattern dots-2378

| | | | | | |
|------|--------|-------------------------------|------|--------|------------------------------|
| 28c7 | ⠠⠠⠠⠠⠠⠠ | braille pattern dots-12378 | 28e4 | ⠠⠠⠠⠠⠠⠠ | braille pattern dots-3678 |
| 28c8 | ⠠⠠⠠⠠⠠⠠ | braille pattern dots-478 | 28e5 | ⠠⠠⠠⠠⠠⠠ | braille pattern dots-13678 |
| 28c9 | ⠠⠠⠠⠠⠠⠠ | braille pattern dots-1478 | 28e6 | ⠠⠠⠠⠠⠠⠠ | braille pattern dots-23678 |
| 28ca | ⠠⠠⠠⠠⠠⠠ | braille pattern dots-2478 | 28e7 | ⠠⠠⠠⠠⠠⠠ | braille pattern dots-123678 |
| 28cb | ⠠⠠⠠⠠⠠⠠ | braille pattern dots-12478 | 28e8 | ⠠⠠⠠⠠⠠⠠ | braille pattern dots-4678 |
| 28cc | ⠠⠠⠠⠠⠠⠠ | braille pattern dots-3478 | 28e9 | ⠠⠠⠠⠠⠠⠠ | braille pattern dots-14678 |
| 28cd | ⠠⠠⠠⠠⠠⠠ | braille pattern dots-13478 | 28ea | ⠠⠠⠠⠠⠠⠠ | braille pattern dots-24678 |
| 28ce | ⠠⠠⠠⠠⠠⠠ | braille pattern dots-23478 | 28eb | ⠠⠠⠠⠠⠠⠠ | braille pattern dots-124678 |
| 28cf | ⠠⠠⠠⠠⠠⠠ | braille pattern dots-123478 | 28ec | ⠠⠠⠠⠠⠠⠠ | braille pattern dots-34678 |
| 28d0 | ⠠⠠⠠⠠⠠⠠ | braille pattern dots-578 | 28ed | ⠠⠠⠠⠠⠠⠠ | braille pattern dots-134678 |
| 28d1 | ⠠⠠⠠⠠⠠⠠ | braille pattern dots-1578 | 28ee | ⠠⠠⠠⠠⠠⠠ | braille pattern dots-234678 |
| 28d2 | ⠠⠠⠠⠠⠠⠠ | braille pattern dots-2578 | 28ef | ⠠⠠⠠⠠⠠⠠ | braille pattern dots-1234678 |
| 28d3 | ⠠⠠⠠⠠⠠⠠ | braille pattern dots-12578 | 28f0 | ⠠⠠⠠⠠⠠⠠ | braille pattern dots-5678 |
| 28d4 | ⠠⠠⠠⠠⠠⠠ | braille pattern dots-3578 | 28f1 | ⠠⠠⠠⠠⠠⠠ | braille pattern dots-15678 |
| 28d5 | ⠠⠠⠠⠠⠠⠠ | braille pattern dots-13578 | 28f2 | ⠠⠠⠠⠠⠠⠠ | braille pattern dots-25678 |
| 28d6 | ⠠⠠⠠⠠⠠⠠ | braille pattern dots-23578 | 28f3 | ⠠⠠⠠⠠⠠⠠ | braille pattern dots-125678 |
| 28d7 | ⠠⠠⠠⠠⠠⠠ | braille pattern dots-123578 | 28f4 | ⠠⠠⠠⠠⠠⠠ | braille pattern dots-35678 |
| 28d8 | ⠠⠠⠠⠠⠠⠠ | braille pattern dots-4578 | 28f5 | ⠠⠠⠠⠠⠠⠠ | braille pattern dots-135678 |
| 28d9 | ⠠⠠⠠⠠⠠⠠ | braille pattern dots-14578 | 28f6 | ⠠⠠⠠⠠⠠⠠ | braille pattern dots-235678 |
| 28da | ⠠⠠⠠⠠⠠⠠ | braille pattern dots-24578 | 28f7 | ⠠⠠⠠⠠⠠⠠ | braille pattern dots-1235678 |
| 28db | ⠠⠠⠠⠠⠠⠠ | braille pattern dots-124578 | 28f8 | ⠠⠠⠠⠠⠠⠠ | braille pattern dots-45678 |
| 28dc | ⠠⠠⠠⠠⠠⠠ | braille pattern dots-34578 | 28f9 | ⠠⠠⠠⠠⠠⠠ | braille pattern dots-145678 |
| 28dd | ⠠⠠⠠⠠⠠⠠ | braille pattern dots-134578 | 28fa | ⠠⠠⠠⠠⠠⠠ | braille pattern dots-245678 |
| 28de | ⠠⠠⠠⠠⠠⠠ | braille pattern dots-234578 | 28fb | ⠠⠠⠠⠠⠠⠠ | braille pattern dots-1245678 |
| 28df | ⠠⠠⠠⠠⠠⠠ | braille pattern dots-1234578 | 28fc | ⠠⠠⠠⠠⠠⠠ | braille pattern dots-345678 |
| 28e0 | ⠠⠠⠠⠠⠠⠠ | braille pattern dots-678 | 28fd | ⠠⠠⠠⠠⠠⠠ | braille pattern dots-1345678 |
| 28e1 | ⠠⠠⠠⠠⠠⠠ | braille pattern dots-1678 | 28fe | ⠠⠠⠠⠠⠠⠠ | braille pattern dots-2345678 |
| 28e2 | ⠠⠠⠠⠠⠠⠠ | braille pattern dots-2678 | | | |
| 28e3 | ⠠⠠⠠⠠⠠⠠ | braille pattern dots-12678 | | | |
| 28ff | ⠠⠠⠠⠠⠠⠠ | braille pattern dots-12345678 | | | |

2.10. Music Notions

Braille music is a braille code that allows music to be notated using braille cells so music can be read by visually impaired musicians. The braille music system was originally developed by louis braille(BANA, 2015).⁴ braille music uses the same six-position braille cell as literary braille. However, braille music assigns a separate meaning to each braille symbol or group of symbols different from literary braille and has its own syntax and abbreviations. Almost anything that can be written in print music notation can be written in braille music notation. However, braille music notation is an independent and well-developed system with its own conventions. The world's largest collection of braille music is located at the national library for the blind (NLB) in Stockport, UK⁵.

⁴ BANA music technical committee has developed for more information and resources, you can visit and check documentation of music Braille code documents,

http://www.brailleauthority.org/music/music_braille_code_2015.pdf

⁵You can access the largest collection of Braille music from <http://nlb-online.org>

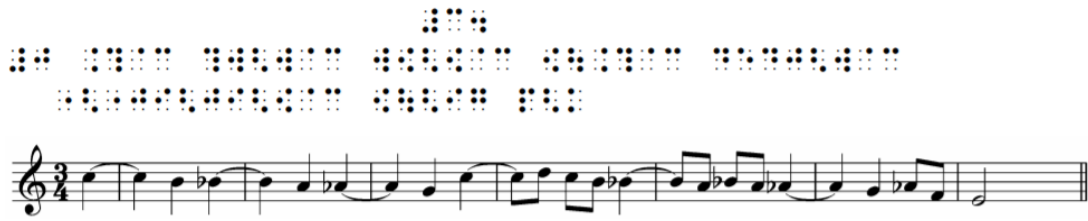


Figure19. An Example for Braille Music
Source: (BANA, 2015)

2.11. Nemeth Code for Mathematics & Science Notations

The Nemeth Braille code for mathematics is a Braille code for encoding mathematical and scientific notation linearly using standard six-dot Braille cells for tactile reading by the visually impaired. The code was developed by Abraham Nemeth. The Nemeth code was first written up in 1952. It was revised in 1956, 1965, and 1972 (NAVY, 2019), and beginning in 1992 was integrated into unified English Braille. It is an example of a compact human-readable mark-up language.

2.12. IPA Braille System

The International Phonetic Alphabet (IPA) is a standardized representation of the Sounds of spoken language. The general principle of the IPA is to provide one symbol for each distinctive speech sound: consonants, vowels, diacritics that slightly modify the pronunciation of those sounds, and suprasegmental, which indicate such qualities as length, tone, stress, and intonation. It is used by linguists, speech pathologists and therapists, foreign language teachers and students, singers, actors, lexicographers, and translators.

So, how do we represent the IPA in braille so that blind professionals and students in the language sciences can have full access to this critical system of phonetics? The answer is held in the pages of this publication. With the dedicated work and collaboration of several individuals, most notably the editor of this body of work, Dr. Robert Englebretson, currently Assistant Professor of Linguistics at Rice University, Houston, Texas, I am delighted to present the IPA Braille Code. Heartfelt thanks to Dr. Englebretson for his thoughtfulness and determination in unifying the disparate braille IPA codes previously used in the member countries of the International Council on English Braille (ICEB), and for presenting an up-to-date and consistent system which not only remains true to the print IPA, but also provides flexibility for current and future technologies. These are no small tasks to accomplish, and ICEB is grateful for his commitment to the project (CNIB, 2008:7).

The official printed IPA chart is available online from the web site of the international Phonetic association <http://www.arts.gla.ac.uk/ipa/ipachart.html> and is

reprinted in Numerous textbooks and reference works. It is divided into seven sections: consonants (Pulmonic), consonants (Non-Pulmonic), other symbols, vowels, diacritics, suprasegmentals, and tones & word accents. The layout of each section presumes a basic familiarity with articulatory phonetics and is formatted accordingly. This Braille version does not aim to capture the visual layout of the official inkprint IPA chart, which would be challenging to accurately format in Braille, and opaque to users with little to no background in phonetics. Instead, this publication maintains the sections as specified in the official chart, but presents the data of each section in a linear-table format. This method enables the presentation of all of the data on the inkprint chart in verbal rather than spatial terms, and allows for the addition of typographic descriptions and Unicode values for each symbol—features that are not present in the official inkprint chart. Each table contains the inkprint IPA glyph (print version only—tactile drawings of these glyphs are found in the Braille Supplement volume), the IPA Braille symbol, the dot numbers of the Braille symbol, the Unicode value for the print IPA glyph, the typographic description of the inkprint glyph, the official IPA number for the glyph, and the meaning or articulatory description of the sound represented by the IPA symbol. For diacritics and some other modifiers, an additional field in the table entry shows an example of the diacritic combined with a base glyph, in order to illustrate the position of the diacritic in inkprint along with its representation in Braille(CNIB, 2008:15).

2.12.1. Consonants (Pulmonic)

Pulmonic consonants are speech sounds that use air flowing out of the lungs (a Pulmonic aggressive airstream), which is then partially or fully blocked by the articulatory organs of the oral and nasal cavities. Pulmonic consonants are described in terms of three features:

1. Voice—whether the vocal folds of the larynx are vibrating (voiced) or not vibrating (voiceless);
2. Place of articulation—the point in the vocal tract where the airstream is blocked; and
3. Manner of articulation—the degree of airstream blockage.

From the front of The mouth to the back, the eleven places of articulation that form the column headings in the standard inkprint IPA consonant chart are as follows:

- Bilabial (both lips),
- Labiodental (the upper teeth and lower lip),
- Dental (the tip of the tongue and the upper teeth),
- Alveolar (the tip or blade of the tongue and the alveolar ridge),
- Postalveolar (the tip or Blade of the tongue and the region immediately behind the alveolar ridge),
- Retroflex (tongue-tip curled back),
- Palatal (the body of the tongue and the hard palate),
- Velar (the back of the tongue and the velum),
- Uvular (the back of the tongue and the uvula),
- Pharyngeal (the root of the tongue and the pharynx wall), and
- Glottal (the vocal folds in the larynx).

The eight manners of articulation for pulmonic consonants that comprise the rows of the standard IPA chart are as follows:

- Plosive (complete blockage of the pulmonic airflow),
- Nasal (complete oral blockage of the airflow, but with a lowered velum to allow air to escape through the nose),
- Trill (a rapid, repeated closure of the articulators),
- Tap or Flap (a quick closure and release of the articulators—essentially one beat of a trill),
- Fricative (articulators are in close approximation so as to produce a sustained, turbulent airflow),
- Lateral Fricative (a fricative in which air escapes from the sides of the tongue),
- Approximant (articulators are positioned close enough to modulate the airflow, but not close enough to cause turbulence), and
- Lateral Approximant (an approximant in which airescapes from the sides of the tongue).

Syriac shares with Aramaic a set of lightly-contrasted stop/fricative pairs. In different variations of a certain lexical root, a root consonant might exist in stop form in one variation and fricative form in another. In the Syriac alphabet, a single letter is used for each pair. Sometimes a dot is placed above the letter (Quššāyā "strengthening"; equivalent

to a dagesh in Hebrew) to mark that the stop pronunciation is required, and a dot is placed below the letter (Rukkākā "softening") to mark that the fricative pronunciation is required.

The pairs are:

- Voiced labial pair – /b/ and /v/
- Voiced velar pair – /g/ and /ɣ/
- Voiced dental pair – /d/ and /ð/
- Voiceless labial pair – /p/ and /f/
- Voiceless velar pair – /k/ and /x/
- Voiceless dental pair – /t/ and /θ/

As with some Semitic languages, Syriac has a set of three emphatic consonants. These are consonants that have a coarticulation in the pharynx or slightly higher. The set consists of:

- Pharyngealized voiceless dental stop – /tˤ/
- Pharyngealized voiceless alveolar fricative – /sˤ/
- Voiceless uvular stop – /q/ (historically emphatic variant of /k/)

There are two pharyngeal fricatives, another class of consonants typically found in Semitic languages.

- Voiceless pharyngeal fricative – /ħ/
- Voiced pharyngeal fricative – /ʕ/

Syriac also has a rich array of sibilants:

- Voiced alveolar fricative – /z/
- Voiceless alveolar fricative – /s/
- Pharyngealized voiceless alveolar fricative – /sˤ/
- Voiceless postalveolar sibilant – /ʃ/

Table 8. Consonants (Pulmonic) The International Phonetic Alphabet (Revised 2005)

| | Bilabial | Labiodental | Dental | Alveolar | Postalveolar | Retroflex | Palatal | Velar | Uvular | Pharyngeal | Glottal |
|---------------------|----------|-------------|--------|----------|--------------|-----------|---------|-------|--------|------------|---------|
| Plosive | p b | | | t d | | ʈ ɖ | c ɟ | k ɡ | q ɢ | | ʔ |
| Nasal | m | ɱ | | n | | ɳ | ɲ | ŋ | ɴ | | |
| Trill | ʙ | | | r | | | | | ʀ | | |
| Tap or Flap | | ⱱ | | ɾ | | ɽ | | | | | |
| Fricative | ɸ β | f v | θ ð | s z | ʃ ʒ | ʂ ʐ | ç ʝ | x ɣ | χ ʁ | ħ ʕ | h ɦ |
| Lateral fricative | | | | ɬ ɮ | | | | | | | |
| Approximant | | ʋ | | ɹ | | ɻ | j | ɰ | | | |
| Lateral approximant | | | | l | | ɭ | ʎ | ʟ | | | |

Table 9. Consonants (Pulmonic) IPA Braille Charts (Revised 2005)

| | Bilabial | Labiodental | Dental | Alveolar | Postalveolar | Retroflex | Palatal | Velar | Uvular | Pharyngeal | Glottal |
|---------------------|----------|-------------|--------|----------|--------------|-----------|---------|-------|--------|------------|---------|
| Plosive | ⠠⠠ | | | ⠠⠠ | | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠ | ⠠⠠⠠ | | ⠠⠠ |
| Nasal | | ⠠⠠ | | ⠠⠠ | | ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠⠠ | | |
| Trill | ⠠⠠ | | | ⠠⠠ | | | | | ⠠⠠ | | |
| Tap or Flap | | ⠠⠠ | | ⠠⠠ | | ⠠⠠ | | | | | |
| Fricative | ⠠⠠⠠ | ⠠⠠ | ⠠⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ |
| Lateral fricative | | | | ⠠⠠⠠ | | | | | | | |
| Approximant | | ⠠⠠ | | ⠠⠠ | | ⠠⠠ | ⠠⠠ | ⠠⠠ | | | |
| Lateral approximant | | | | ⠠⠠ | | ⠠⠠ | ⠠⠠ | ⠠⠠ | | | |

2.12.2. Non-Pulmonic Consonants

Non-pulmonic consonants are speech sounds with an airflow mechanism other than the lungs—i.e. they are produced by using the glottis or vellum to create differentials in air pressure (Englebretson, 2009).

All English sounds are created by the initiating action of air from the lungs going outward. These are categorized as pulmonic sounds. In contrast, many other languages have sounds that use additional kinds of airstream mechanisms. These are called non-pulmonic sounds. Non-pulmonic sounds include clicks, ejectives, and implosives. They are all types of stop consonants, but they differ in the source and the direction of their airstreams.

Table 10. Chart of Basic Non-Pulmonic Consonants

| Clicks | Voiced implosives | Ejectives |
|--------------------|-------------------|----------------------|
| ⠠ Bilabial | ⠠ Bilabial | ⠠ Examples: |
| ⠠ Dental | ⠠ Dental/alveolar | ⠠ Bilabial |
| ⠠ (Post)alveolar | ⠠ Palatal | ⠠ Dental/alveolar |
| ⠠ Palatoalveolar | ⠠ Velar | ⠠ Velar |
| ⠠ Alveolar lateral | ⠠ Uvular | ⠠ Alveolar fricative |

Source: (CNIB, 2008)

In creating clicks and implosives, the air direction is ingressive – that is, going into the vocal tract. The initiation of the airstream occurs at the velum for clicks, and at the glottis for implosives. Thus, clicks are velaric ingressive sounds, while implosives are glottalic ingressive sounds.

Ejectives are glottalic aggressive sounds – that is, the air flows out from the vocal tract. Therefore, ejectives share the direction of the air with pulmonic sounds and share their airstream mechanism with implosives.

Table 11. Chart of IPA Braille Basic Non-Pulmonic Consonants

| Clicks | | Voiced implosives | | Ejectives | |
|--------|------------------|-------------------|-----------------|-----------|--------------------|
| ⠠⠠ | Bilabial | ⠠⠠ | Bilabial | ⠠⠠ | Examples: |
| ⠠⠡ | Dental | ⠠⠡ | Dental/alveolar | ⠠⠠⠠ | Bilabial |
| ⠠⠢ | (Post)alveolar | ⠠⠢ | Palatal | ⠠⠠⠠ | Dental/alveolar |
| ⠠⠣ | Palatoalveolar | ⠠⠣ | Velar | ⠠⠠⠠ | Velar |
| ⠠⠤ | Alveolar lateral | ⠠⠤ | Uvular | ⠠⠠⠠ | Alveolar fricative |

Source: (ENGLEBRETSON, 2009)

Just as in the inkprint IPA, ejectives in IPA Braille do not have unique glyphs, but are notated by placing the IPA apostrophe diacritic (dots 5-3) immediately after the homologous pulmonic consonant.

2.12.3. Vowels

As with most Semitic languages, the vowels of Syriac are mostly subordinated to consonants. Especially in the presence of an emphatic consonant, vowels tend to become mid-centralised.

Classical Syriac had the following set of distinguishable vowels:

- Close front unrounded vowel – /i/
- Close-mid front unrounded vowel – /e/
- Open-mid front unrounded vowel – /ɛ/
- Open front unrounded vowel – /a/
- Open back unrounded vowel – /ɑ/
- Close-mid back rounded vowel – /o/
- Close back rounded vowel – /u/

In the western dialect, /ɑ/ has become /o/, and the original /o/ has merged with /u/. In eastern dialects there is more fluidity in the pronunciation of front vowels, with some speakers distinguishing five qualities of such vowels, and others only distinguishing three. Vowel length is generally not important: close vowels tend to be longer than open vowels (Maclean, 1895:7).

The open vowels form diphthongs with the approximants /j/ and /w/. In almost all dialects, the full sets of possible diphthongs collapse into two or three actual pronunciations:

- /aj/ usually becomes /aj/, but the western dialect has /oj/

- /aj/, further, sometimes monophthongized to /e/
- /aw/ usually becomes /aw/
- /aw/, further, sometimes monophthongized to /o/

2.13. World Braille Usage

UNESCO supports and detailed its world Braille usage has been made possible by hundreds of people who use and produce Braille throughout the world. As a result, it captures a new perspective on the global use of Braille. Unlike previous editions, this one includes links to electronic media, and a digital copy can be found online on the Perkins website: www.perkins.org/worldbraille.

How this book is organized:

- 1) The 142 countries represented in this book are listed in alphabetical order.
- 2) This book includes 133 languages that have been transcribed into 137 different Braille alphabet and punctuation codes. [Nepal, Tamil, and Urdu are transcribed in two countries, but each has different Braille codes, and there are two codes for Greek]
- 3) In countries where multiple languages have been transcribed into Braille, the languages are listed in order of predominance of use.
- 4) The Braille alphabet and punctuation codes for languages that are used in a single country appear only once, on the page for that country.
- 5) The Braille alphabets for languages that are used in two or more countries are cross-referenced on country pages, e.g. Spanish alphabet: see Spanish, page 201. These alphabets and punctuation codes are contained in the section titled, Braille alphabets used in multiple countries, which follows the country pages.
- 6) The braille and alphabet and punctuation code for Esperanto, a language that is not associated with a country can be found in braille alphabets used in multiple countries.
- 7) The index by language name contains the names all of the languages represented in this book.

The majority of the data collected to create the contents of this book came from two primary sources: a questionnaire sent to representatives of Braille-related organizations in 197 countries between April 2012 and April 2013; and the 1990 edition of World Braille

Usage. Additionally, some of the data for this book was sourced with the support provided by Duxbury systems.

Data sourced from the questionnaire; the information provided by the various participating countries may vary. Although every effort was made to ensure that the information presented in this book was verified as correct, the content of this book is based upon the information provided by the returned questionnaires and follow-up communications prior to publication. Not all countries were able to verify their respective information prior to publication.

Data sourced from World Braille Usage, 1990: a number of countries that appeared in the 1990 edition did not respond to the questionnaire during the information data gathering phase. The source of information given for these countries, and the languages they use, is cited as: World Braille Usage, 1990. A number of countries that didn't respond were formally part of the Soviet Union or Yugoslavia, or changed names, and this information is also indicated by sourcing World Braille Usage, 1990.

2.13.1. English Braille Writing System

The English Braille Alphabet has letters that correspond directly to the 26 letters of the English print alphabet, but also ligatures⁶ that are equivalent to digraphs and sequences in print. English Braille, normally refers to grade 2. The more basic grade 1 Braille, which is only used by learners, is specified as "English Braille, grade 1 normally refers to grade 2. The more basic grade 1 Braille, which is only used by learners, is specified as "English Braille, grade 1. It is the Braille alphabet used for English. Some English Braille letters, such as ⠠ (ch) child, ⠠ (sh) shall.

⁶In writing and typography, a ligature occurs where two or more graphemes or letters are joined as a single glyph. An example is the character *æ* as used in English, in which the letters *a* and *e* are joined. The common ampersand (&) developed from a ligature in which the handwritten Latin letters *e* and *t* (spelling *et*, from the Latin for "and") were combined.

Table 12. Unified English Braille Alphabet Letters, Numbers and Abbreviation Marks

| | Main Sequence | | | | | | | | | Shifted Right | | |
|------------|---------------|----------|------------------------|-----------------------|-------|----------------------------|-----------|--------|-------|----------------------|-------------------------------|----------------------------|
| 1st decade | | | | | | | | | | | | |
| | 1 · a | 2 · b | 3 · c | 4 · d | 5 · e | 6 · f | 7 · g | 8 · h | 9 · i | 0 · j | (accent)* | (abbrev.) [§] |
| 2nd decade | | | | | | | | | | | | |
| | k | l | m | n | o | p | q | r | s | t | st · / | ar |
| 3rd decade | | | | | | | | | | | | |
| | u | v | x | y | z | and | for | of | the | with | -ing | (num)* · -ble [†] |
| 4th decade | | | | | | | | | | | | |
| | ch | gh | sh | th | wh | ed | er | ou | ow | w | (disp) · (emph) ^{*§} | (abbrev.) [§] |
| 5th decade | | | | | | | | | | | | |
| | , · -ea- | ; · -bb- | : · -cc- | . · -dd- [†] | en | ! · -ff- · to [†] | () · -gg- | ? · -“ | in | ” · -by [†] | (abbrev.) [§] | (letter) ^{*§} |
| bottom row | | | | | | | | | | | | |
| | · | | - · -com- [†] | | | | | | | | (caps) ^{*§} | (space) |

Source: (BIA, 2019)

Table 13. English Braille Punction Dots

| | | | | | | | | | | | |
|-----------|---|---|-----|---|-----|-----|---|---------|---|--|---------|
| | | | | | | | | | | | |
| , | ; | : | . | ! | () | ? “ | ” | * † ‡ ¶ | / | | |
| | | | | | | | | | | | |
| # (ditto) | | | [] | | | | | ‘ ’ | | | |
| | | | | | | | | | | | |
| - | — | | ... | | | | — | | | | (space) |

Source: (BIA, 2019)

Table 14. Some Contractions from Unified English Braille System

| | | | | | | | | | | |
|-----------|---------|-------|------|----------------|-----------------|-------|--------|---------|---------------------------------------|-------------------|
| | | | | | | | | | | |
| a | but | can | do | every | from, -self | go | have | I | just | |
| | | | | | | | | | | |
| knowledge | like | more | not | | people | quite | rather | so | that | still |
| | | | | | | | | | | |
| us | very | it | you | as | | | | | | com- [†] |
| | | | | | | | | | | |
| child | | shall | this | which | | | out | | will | |
| | | | | | | | | | | |
| | be, be- | con- | dis- | enough, en- | to ⁺ | were | his | in, in- | by ⁺ , was [†] | into ⁺ |

Source: (BIA, 2019)

Table 15. Other Symbols for English Braille

| | | | | | | |
|---|---|----|---|---|---|---|
| | | | | | | |
| & | @ | \$ | ¢ | € | æ | œ |

Source: (BIA, 2019)

Sample text for English Braille from human right declarations, article 1; “All human beings are born free and equal in dignity and rights. They are endowed with reason and conscience and should act towards one another in a spirit of brotherhood.”

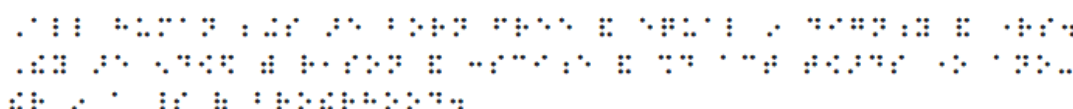


Figure 20. Article 1 From Human Right Declarations,

2.13.2. French braille writing system

An international expert group worked from 2002 to 2008 on the *Code Braille François Uniformisé* (CBFU). It was created according to an international agreement signed at Casablanca, Morocco on 7th June 2001 by representatives from French-speaking Africa, Belgium, France, Switzerland, and Quebec. The Quebecer edition of the CBFU is quite similar according to the tables and rules, but there are differences in the examples to take the local differences into account. The CBFU was adopted by the international expert group in 2006. This code was completed with new symbols and a 2nd edition was issued in

September, 2008. It is a standard project signed and applied by all French-speaking countries (Perkinson, 2013:196)

Primary language transcribed: Cameroon, Canada (Quebec), Democratic Republic of the Congo, France, Haiti

Secondary language transcribed: Belgium, Iceland, Kenya, Luxembourg, Madagascar, Mauritania, Mauritius, Switzerland.

Table 16. French Braille Alphabet Letters

| | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

Table 17. French Braille Alphabet Punctuation Signs

Source (Brailleworks, 2019)

| | | | | | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| | | | | | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|--|--|--|--|

Table 18. French Braille Alphabet Formatting and Mode-Changing Signs

| | | | | | | | | |
|--|--|--|--|--|--|--|--|--|
| | | | | | | | | |
|--|--|--|--|--|--|--|--|--|

Source (Brailleworks, 2019)

2.13.3. Arabic Braille Writing System

The conference of developing and unifying Arabic Braille characters met in Saudi Arabia in October 2002. There has been confirmation from several countries that they are using this unified code, and other countries are not.

Primary language transcribed; Algeria, Bahrain, Egypt, Jordan, Kuwait, Lebanon, Libya, Mauritania, Morocco, Oman, Qatar, Saudi Arabia, Syria, Tunisia, United Arab Emirates, Yemen

Secondary language transcribed: Indonesia, Iran, Israel, Malaysia, Pakistan

Table 19. Alphabet: Unified Arabic (Qatar, United Arab Emirates)

| | | | | | | | | | |
|---|-------|----|---------|---|---|-------|----|----------|---|
| ا | alef | a | (1) | ⋮ | ض | dad | d | (1246) | ⋮ |
| ب | beh | b | (12) | ⋮ | ط | tah | t | (23456) | ⋮ |
| ت | teh | t | (2345) | ⋮ | ظ | zah | z | (123456) | ⋮ |
| ث | theh | th | (1456) | ⋮ | ع | ain | ʿ | (12356) | ⋮ |
| ج | jeem | j | (245) | ⋮ | غ | ghain | gh | (126) | ⋮ |
| ح | hah | h | (156) | ⋮ | ف | feh | f | (124) | ⋮ |
| خ | khah | kh | (1346) | ⋮ | ق | qaf | q | (12345) | ⋮ |
| د | dal | d | (145) | ⋮ | ك | kaf | k | (13) | ⋮ |
| ذ | thal | dh | (2346) | ⋮ | ل | lam | l | (123) | ⋮ |
| ر | reh | r | (1235) | ⋮ | م | meem | m | (134) | ⋮ |
| ز | zain | z | (1356) | ⋮ | ن | noon | n | (1345) | ⋮ |
| س | seen | s | (234) | ⋮ | ه | heh | h | (125) | ⋮ |
| ش | sheen | sh | (146) | ⋮ | و | waw | w | (2456) | ⋮ |
| ص | sad | ṣ | (12346) | ⋮ | ي | yeh | y | (24) | ⋮ |

Source: (Perkinson, 2013:182)

Table 20. Ligatures

| | | | | | | | | | | | |
|----|----|--------|---|---|----|-------|---|---|-----|---------|---|
| لا | La | (1236) | ⋮ | إ | E | (46) | ⋮ | ؤ | Waw | (1256) | ⋮ |
| ى | - | (135) | ⋮ | أ | Aa | (345) | ⋮ | ئ | ya | (13456) | ⋮ |
| أ | A | (34) | ⋮ | ء | a | (3) | ⋮ | ة | - | (16) | ⋮ |

Source: (Perkinson, 2013:182)

2.13.4. Hebrew Braille Writing System

This is standard made by The Central Library for The Blind, and literary notations; writing and editing in 1998

Table 21. Hebrew, Consonants Braille Letters

| | | | | | | | |
|---|-------|------------|---|------|-------|---------|---|
| א | alef | (1) | ⠠ | ך, כ | khaf | (16) | ⠠ |
| ב | bet | (12) | ⠠ | ל | lamed | (123) | ⠠ |
| ב | vet | (1236) | ⠠ | מ, ם | mem | (134) | ⠠ |
| ג | gimel | (45, 1245) | ⠠ | ן, ן | nun | (1345) | ⠠ |
| ג | gimel | (1245) | ⠠ | ס | sameh | (234) | ⠠ |
| ד | dalet | (45, 145) | ⠠ | ע | ayin | (1246) | ⠠ |
| ד | dalet | (145) | ⠠ | פ | pe | (1234) | ⠠ |
| ה | he | (45, 125) | ⠠ | ף, פ | fe | (124) | ⠠ |
| ה | he | (125) | ⠠ | צ, ץ | tsadi | (2346) | ⠠ |
| ו | vav | (2456) | ⠠ | ק | qof | (12345) | ⠠ |
| ז | zayin | (1356) | ⠠ | ר | resh | (1235) | ⠠ |
| ח | het | (1346) | ⠠ | ש | shin | (146) | ⠠ |
| ט | tet | (2345) | ⠠ | ש | sin | (156) | ⠠ |
| י | yod | (245) | ⠠ | ת | tav | (1256) | ⠠ |
| כ | kaf | (13) | ⠠ | ת | tav | (1456) | ⠠ |

Source: (Perkinson, 2013:74)

Table 22. Vowels and Pronunciation Codes for Hebrew Braille

| | | | | | | | |
|---|-------------|------|---|---|--------------|-------|---|
| א | pataḥ | (14) | ⠠ | ו | ḥolam male | (135) | ⠠ |
| א | ḥataf pataḥ | (25) | ⠠ | א | ḥolam ḥaser | (246) | ⠠ |
| א | tsere | (34) | ⠠ | א | qamats | (126) | ⠠ |
| א | segol | (15) | ⠠ | א | ḥataf qamats | (345) | ⠠ |
| א | ḥataf segol | (26) | ⠠ | א | qubuts | (136) | ⠠ |
| א | ḥiriq ḥaser | (24) | ⠠ | ו | shuruq | (346) | ⠠ |
| א | ḥiriq male | (35) | ⠠ | א | sh'va | (6) | ⠠ |

Source: (Perkinson, 2013:75)

Table 23. Punctuation Codes for Hebrew Braille Alphabet

| | | |
|---------------------|---------------------|-----------|
| , comma | (2) | ⠠ |
| ; semicolon | (23) | ⠠⠨ |
| : colon | (25) | ⠠⠨⠨ |
| . period, full stop | (256) | ⠠⠨⠨⠨ |
| ? question mark | (236) | ⠠⠨⠨⠨⠨ |
| ! exclamation | (235) | ⠠⠨⠨⠨⠨ |
| ' apostrophe | (3) | ⠠⠨ |
| “...” quote | (236...356) | ⠠⠨⠨⠨⠨⠨⠨ |
| (...) parentheses | (2356...2356) | ⠠⠨⠨⠨⠨⠨⠨ |
| [...] brackets | (6, 2356...2356, 3) | ⠠⠨⠨⠨⠨⠨⠨⠨⠨ |
| - hyphen | (36) | ⠠⠨ |
| — dash | (36, 36) | ⠠⠨⠨ |
| / slash | (34) | ⠠⠨⠨ |
| * asterisk | (35, 35) | ⠠⠨⠨ |
| capital | (6) | ⠠ |
| number sign | (3456) | ⠠⠨⠨⠨ |

Source: (Perkinson, 2013:75)

2.13.5. Turkish Braille Writing System

Turkish Braille alphabet follows international usage. The vowels with diacritics, ö, and ü have in French and German codes, whereas the consonants with diacritics, ç, ğ, and ş, have the forms of the nearest English closeness, ch, gh, and sh. Dotless *i* is derived by dislocating down.

Table 24. Turkish Consonant and Vowel Braille Letters

| | | | | | | | |
|----------|------|---------|------|----------|------|-----------|-------|
| a (1) | ⠠ | ğ (126) | ⠠⠨⠨ | n (1345) | ⠠⠨⠨⠨ | u (136) | ⠠⠨⠨ |
| b (12) | ⠠⠨ | h (125) | ⠠⠨⠨ | o (135) | ⠠⠨⠨ | ü (1256) | ⠠⠨⠨⠨ |
| c (14) | ⠠⠨⠨ | ı (35) | ⠠⠨⠨ | ö (246) | ⠠⠨⠨⠨ | v (1236) | ⠠⠨⠨⠨ |
| ç (16) | ⠠⠨⠨⠨ | i (24) | ⠠⠨⠨ | p (1234) | ⠠⠨⠨⠨ | y (13456) | ⠠⠨⠨⠨⠨ |
| d (145) | ⠠⠨⠨⠨ | j (245) | ⠠⠨⠨⠨ | r (1235) | ⠠⠨⠨⠨ | z (1356) | ⠠⠨⠨⠨ |
| e (15) | ⠠⠨⠨ | k (13) | ⠠⠨⠨ | s (234) | ⠠⠨⠨ | | |
| f (124) | ⠠⠨⠨ | l (123) | ⠠⠨⠨ | ş (146) | ⠠⠨⠨ | | |
| g (1245) | ⠠⠨⠨⠨ | m (134) | ⠠⠨⠨ | t (2345) | ⠠⠨⠨⠨ | | |

Source: (Perkinson, 2013:204)

Table 25. Punction Codes İn Turkish Braille

| | | |
|---------------------|---------------------|---------|
| , comma | (2) | ⠠ |
| ; semicolon | (23) | ⠠⠨ |
| : colon | (25) | ⠠⠨ |
| . period, full stop | (256) | ⠠⠨⠨ |
| ? question mark | (236) | ⠠⠨⠨ |
| ! exclamation | (235) | ⠠⠨⠨ |
| “...” quote | (236...356) | ⠠⠨⠨⠨⠨ |
| ‘...’ single quote | (3...3) | ⠠⠨⠨⠨ |
| (...) parentheses | (2356...2356) | ⠠⠨⠨⠨⠨ |
| [...] brackets | (6, 2356...2356, 3) | ⠠⠨⠨⠨⠨⠨⠨ |
| ... ellipsis | (256, 256, 256) | ⠠⠨⠨⠨⠨ |
| - hyphen | (36) | ⠠⠨ |
| * asterisk | (35, 35) | ⠠⠨⠨ |
| capital | (6) | ⠠ |
| number sign | (3456) | ⠠⠨⠨⠨ |
| <i>italics</i> | (46) | ⠠⠨ |

Source: (Perkinson, 2013:75)

CHAPTER THREE: SYRIAC LANGUAGE AND SYRIAC BRAILLE WRITING SYSTEM

3.1. Syriac Language, Writing System and Orthography

The Syriac alphabet (ܐܠܦ ܒܝܬ ܣܘܪܝܝܐ 'āleḫ bêt sūryāyā) is a writing system primarily used to write the Syriac language since the 1st century ad (BRITANNICA). It is one of the Semitic abjads descending from the Aramaic alphabet through the Palmyrene alphabet (Ackroyd & Evans, 2004:26), and shares similarities with the Phoenician, Hebrew, Arabic and the traditional Mongolian scripts.

Syriac is written from right to left in horizontal lines. It is a cursive script⁷ where most--but not all--letters connect within a word. There is no letter case distinction between upper- and lower-case letters, though some letters change their form depending on their position within a word. Spaces separate individual words.

All letters are 22 consonants, although there are optional diacritic marks to indicate vowels and other features. In addition to the sounds of the language, the letters of the Syriac alphabet can be used to represent numbers in a system similar to Hebrew and Greek numerals (Coakley, 2003:4).

Apart from classical Syriac Aramaic, the alphabet has been used to write other dialects and languages. Several Christian Neo-Aramaic languages from Turoyo⁸ to the North-Eastern neo-Aramaic⁹ dialects of Assyrian¹⁰ and Chaldean¹¹, once vernaculars, primarily began to be written in the 19th century. The Sertā variant specifically has recently been adapted to write western neo-Aramaic¹², traditionally written in a square Aramaic script closely related to the Hebrew alphabet. Besides Aramaic, when Arabic began to be the dominant spoken

⁷The cursive script, rapid handwriting in which letters are set down in full and are cursorily connected within words without lifting the writing implement from the paper.

⁸Turoyo (also is as called ܣܘܪܝܐ Surayt) is a central neo-Aramaic language traditionally spoken in south-eastern Turkey and north-eastern Syria by Assyrians. Most speakers use the classical Syriac language for literature and worship.

⁹north-eastern neo-Aramaic (often abbreviated NENA) is a variety of modern Aramaic languages once spoken in a large region stretching from the plain of Urmia, in north-western Iran, to the plain of Mosul, in northern Iraq, as well as bordering regions in south east turkey and north east Syria.

¹⁰Assyrian (ܣܘܪܝܐ ܕܝܘܢܝܐ, Sūret), also known as eastern Syriac, is a neo-Aramaic language within the Semitic branch of the Afro-Asiatic language family that is largely spoken by Assyrian people.

¹¹Chaldean neo-Aramaic, or simply Chaldean, is a north-eastern neo-Aramaic language spoken throughout a large region stretching from the plain of Urmia, in north-western Iran, to the Nineveh plains, in northern Iraq, together with parts of south-eastern turkey.

¹²Western neo-Aramaic is a modern Aramaic language. Today, it is spoken in three villages in the eastern mountains of Lebanon of western Syria. Western neo-Aramaic is the only living language among the western Aramaic languages. All other neo-Aramaic languages are of the eastern Aramaic branch.

language in the fertile crescent¹³ after the Islamic conquest, texts were often written in Arabic using the Syriac script as knowledge of the Arabic alphabet was not yet widespread; such writings are usually called Karshuni or Garshuni(ܩܪܫܘܢܝܐ) (Kiraz, 2012:297). The largest collection of Garshuniis found in Mardin, ca. 10,000 documents. These were digitized and are archived at the Beth Mardutho research library (kiraz, 2012:227). In addition to Semitic languages, Malayalam¹⁴ was also written with Syriac script and was called “Suriyani Malayalam”, as well as Sogdiana.

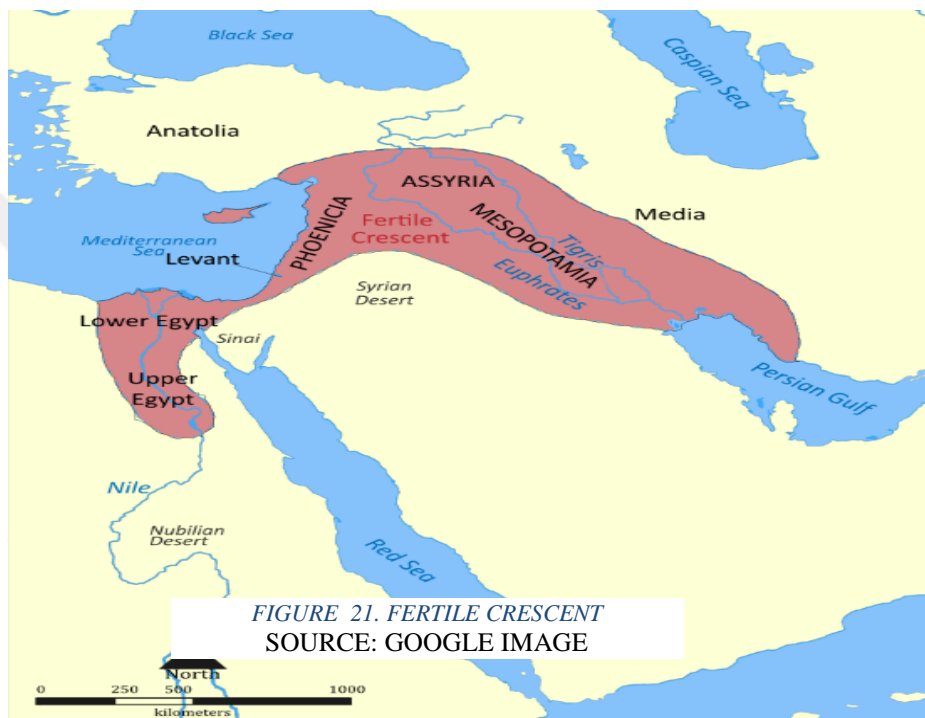


Table 26. Palmyrene Alphabet

¹³The fertile crescent is a crescent-shaped region in the middle east, spanning modern-day Iraq, Israel, Palestinian territories, Syria, Lebanon, Egypt, Cyprus, and Jordan as well as the south-eastern fringe of turkey and the western fringes of Iran.

¹⁴Malayalam is a Dravidian language spoken in the Indian state of Kerala and the union territories of Lakshadweep and Puducherry (Mahé) by the Malayali people, and it is one of 22 scheduled languages of India. Malayalam has official language status in the state of Kerala and in the union territories of Lakshadweep and Puducherry (Mahé) and is spoken by 38 million people worldwide. Malayalam is also spoken by linguistic minorities in the neighbouring states; with the significant number of speakers in the Nilgiris, Kanyakumari, and Coimbatore districts of Tamil Nadu, and Kodagu and Dakshin Kannada districts of Karnataka. Due to Malayali expatriates in the Persian Gulf, the language is also widely spoken in gulf countries.

| | 1086 | 1087 |
|---|------------|------------|
| 0 | 𐤀 10860 | 𐤁 10870 |
| 1 | 𐤂 10861 | 𐤃 10871 |
| 2 | 𐤄 10862 | 𐤅 10872 |
| 3 | 𐤆 10863 | 𐤇 10873 |
| 4 | 𐤈 10864 | 𐤉 10874 |
| 5 | 𐤊 10865 | 𐤋 10875 |
| 6 | 𐤌 10866 | 𐤍 10876 |
| 7 | 𐤎 10867 | 𐤏 10877 |
| 8 | 𐤐 10868 | 𐤑 10878 |
| 9 | 𐤒 10869 | 𐤓 10879 |
| A | 𐤔 1086A | 𐤕 1087A |
| B | 𐤖 1086B | 𐤗 1087B |
| C | 𐤙 1086C | 𐤚 1087C |
| D | 𐤛 1086D | 𐤜 1087D |
| E | 𐤞 1086E | 𐤟 1087E |
| F | 𐤠 1086F | 𐤡 1087F |

- 10860 - Palmyrene Letter Aleph
10861 - Palmyrene Letter Beth
10862 - Palmyrene Letter Gimel
10863 - Palmyrene Letter Daleth
10864 - Palmyrene Letter He
10865 - Palmyrene Letter Waw
10866 - Palmyrene Letter Zayin
10867 - Palmyrene Letter Heth
10868 - Palmyrene Letter Teth
10869 - Palmyrene Letter Yodh
1086a - Palmyrene Letter Kaph
1086b - Palmyrene Letter Lamedh
1086c - Palmyrene Letter Mem
1086d - Palmyrene Letter Final Nun
1086e - Palmyrene Letter Nun
1086f - Palmyrene Letter Samekh
10870 - Palmyrene Letter Ayin
10871 - Palmyrene Letter Pe
10872 - Palmyrene Letter Sadhe
10873 - Palmyrene Letter Qoph
10874 - Palmyrene Letter Resh
10875 - Palmyrene Letter Shin
10876 - Palmyrene Letter Taw
- Symbols**
10877 - Palmyrene Left-Pointing Fleuron
10878 - Palmyrene Right-Pointing Fleuron
- Numbers**
10879 - Palmyrene Number One
1087a - Palmyrene Number Two
1087b - Palmyrene Number Three
1087c - Palmyrene Number Four
1087d - Palmyrene Number Five
1087e - Palmyrene Number Ten
• Also Used For Hundreds
1087f - Palmyrene Number Twenty

Source:(UNICODE, 2109a)

3.1.1. Syriac Alphabet Forms

The Syriac alphabet developed from the Aramaic alphabet and was used mainly to write the Syriac language from about the 2nd century BC. There are three major variants of the Syriac alphabet: 'Estrangēlā (ܐܘܨܬܪܢܓܠܐ), Serṭā (ܣܪܬܐ) and Maḏnhāyā (ܡܕܢܗܝܐ).

'Estrangēlā, meaning 'rounded', is the oldest form and is considered the classical version of the Syriac alphabet. It was revived during the 10th century, and is now used mainly in scholarly publications, titles and inscriptions.

West Syriac is generally written with Serṭā, meaning 'line', which is also known as the Pšīṭā (ܦܨܝܬܐ, 'simple'), Maronite or Jacobite. It was modelled on 'Estrangēlā but with simpler, more flowing lines. A version of Serṭā appeared in the earliest Syriac manuscripts, and it became popular during the 8th century.

ES is usually written in the Maḏnhāyā (ܡܕܢܗܝܐ, 'eastern') form of the alphabet, which is also known as Swādāyā (ܣܘܘܕܝܐ, 'conversational/contemporary'), Assyrian, Chaldean and Nestorian. Maḏnhāyā is closer to 'Estrangēlā than Serṭā.

Table 27. Syriac Alphabet Forms

| | | | | | | | | | | | | | | | | | | | |
|-------------|---|---|---|---|-----|------|-------|--------|---------|----------|-----------|------------|-------------|--------------|---------------|----------------|-----------------|------------------|-------------------|
| 'Estrangēlā | ܐ | ܒ | ܘ | ܓ | ܘܘܘ | ܘܘܘܘ | ܘܘܘܘܘ | ܘܘܘܘܘܘ | ܘܘܘܘܘܘܘ | ܘܘܘܘܘܘܘܘ | ܘܘܘܘܘܘܘܘܘ | ܘܘܘܘܘܘܘܘܘܘ | ܘܘܘܘܘܘܘܘܘܘܘ | ܘܘܘܘܘܘܘܘܘܘܘܘ | ܘܘܘܘܘܘܘܘܘܘܘܘܘ | ܘܘܘܘܘܘܘܘܘܘܘܘܘܘ | ܘܘܘܘܘܘܘܘܘܘܘܘܘܘܘ | ܘܘܘܘܘܘܘܘܘܘܘܘܘܘܘܘ | ܘܘܘܘܘܘܘܘܘܘܘܘܘܘܘܘܘ |
| Serṭā | ܐ | ܒ | ܘ | ܓ | ܘܘܘ | ܘܘܘܘ | ܘܘܘܘܘ | ܘܘܘܘܘܘ | ܘܘܘܘܘܘܘ | ܘܘܘܘܘܘܘܘ | ܘܘܘܘܘܘܘܘܘ | ܘܘܘܘܘܘܘܘܘܘ | ܘܘܘܘܘܘܘܘܘܘܘ | ܘܘܘܘܘܘܘܘܘܘܘܘ | ܘܘܘܘܘܘܘܘܘܘܘܘܘ | ܘܘܘܘܘܘܘܘܘܘܘܘܘܘ | ܘܘܘܘܘܘܘܘܘܘܘܘܘܘܘ | ܘܘܘܘܘܘܘܘܘܘܘܘܘܘܘܘ | ܘܘܘܘܘܘܘܘܘܘܘܘܘܘܘܘܘ |
| Maḏnhāyā | ܐ | ܒ | ܘ | ܓ | ܘܘܘ | ܘܘܘܘ | ܘܘܘܘܘ | ܘܘܘܘܘܘ | ܘܘܘܘܘܘܘ | ܘܘܘܘܘܘܘܘ | ܘܘܘܘܘܘܘܘܘ | ܘܘܘܘܘܘܘܘܘܘ | ܘܘܘܘܘܘܘܘܘܘܘ | ܘܘܘܘܘܘܘܘܘܘܘܘ | ܘܘܘܘܘܘܘܘܘܘܘܘܘ | ܘܘܘܘܘܘܘܘܘܘܘܘܘܘ | ܘܘܘܘܘܘܘܘܘܘܘܘܘܘܘ | ܘܘܘܘܘܘܘܘܘܘܘܘܘܘܘܘ | ܘܘܘܘܘܘܘܘܘܘܘܘܘܘܘܘܘ |

Syriac is written from right to left in horizontal lines. It is a cursive script where most, but not all, letters connect within a word. There is no letter case distinction between upper and lower case letters, though some letters change their form depending on their position within a word. Spaces separate individual words (Coakley, 2003:4)

Serṭā alphabet is used by Syriac ancient, Syriac protestant, Syriac catholic and Maronite churches. In the Syriac world, there is an alphabet developed by the Melkit from 'Estrangēlā, which is called Melkoyto. It is used by two Greek orthodox and catholic churches around Antakya and Damascus. The letter f is written backwards and is interpreted as p in this alphabet, which is what distinguishes it from Ser in terms of softness and tenderness.

In XIII. Century, this format, which is extremely similar to "Esrangl" of the Nestorians and Chaldeans in the century, has been utilized by the Nestorian and Chaldean churches from the thirteenth century.

In addition to these four main formats, there are also alphabet formats which have been used in certain regions during the historical process and some works have been written with them but are not used today. Some of these are (Çelik & Toprak 2011:12);

- ✓ Gergeroya,
- ✓ Eskuloyo,
- ✓ Giglonoyo / kanyo d-varke,
- ✓ Kanyo dakiko,
- ✓ Mifisko / ogaroya,
- ✓ Ifho / mtanyo, gumrumroyo

But we will give more information about Syriac scripts which are called 'Eṣṙangēlā, Serṙāand Maḏnḥāyā in this thesis.

3.1.2. Classical 'Eṣṙangēlā Script

The oldest and classical form of the alphabet is 'Eṣṙangēlā (ܐܘܨܪܝܢܐ; the name is thought to derive from the Greek adjective *στρογγύλη* [strongýlē, 'rounded'] (william, 1946:24), though it has also been suggested to derive from *ܣܪܬܐ* Serṙā 'Ewwangēlāyā, 'gospel character') (Nestle, 1889:5).



MS 574
 Syriac estrangela book script. Mt. Sinai, Egypt, 9th c.
 Figure 22. Sample of Syriac 'Estrangēlā Book Script¹⁵

¹⁵9th Century 'Estrangēlā manuscript of John Chrysostom's homily on the Gospel of John.

3.1.3. West Syriac “Sertā” Script

The West Syriac dialect is commonly written in the Sertā or Serṭā (سَرتَا, 'line') form of the alphabet, also known as the Pšīṭā (پشيطَا, 'simple'), 'Maronite' or the 'Jacobite' script (although the term Jacobite is considered derogatory). Most of the letters are clearly derived from 'Estrangēlā, but are simplified, flowing lines. A cursive chancery hand is evidenced in the earliest Syriac manuscripts, but important works were written in 'Estrangēlā. From the 8th century, the simpler Serṭā style came into popular, perhaps because of its more economical use of parchment (Howlingpixel, 2019).

3.1.4. East Syriac “Maḏnhāyā” Script

The East Syriac dialect is usually written in the Maḏnhāyā (مذھبتَا, 'eastern') form of the alphabet. Other names for the script include Swādāyā (سهادَا, 'conversational' or 'vernacular', often translated as 'contemporary', reflecting its use in writing modern neo-Aramaic), 'āṭūrāyā (اٲٲرَا, 'Assyrian', not to be confused with the traditional name for the Hebrew alphabet), kaldāyā (كلدَانَا, 'Chaldean'), and, inaccurately, Nestorian¹⁶. Maḏnhāyā is closer to 'Estrangēlā script than Serṭā script.

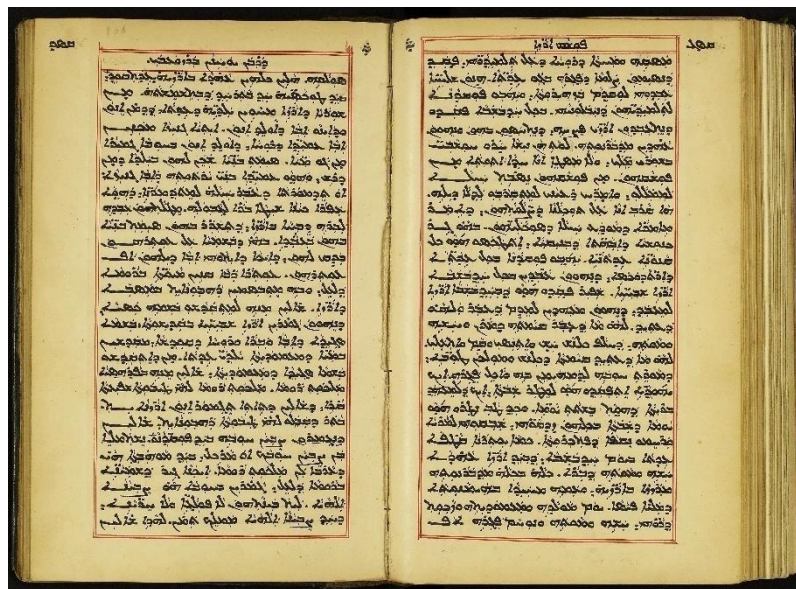


Figure 23. Sample of Syriac Maḏnhāyā book script¹⁷

¹⁶A term that was originally used to refer to the church of the east in the Sasanian empire

¹⁷An East Syrian manuscript from the eighteenth century contains texts relating to the liturgy and doctrines of the east Syrian church and other matters.

3.3. Unified Syriac Braille Alphabet

3.3.1. Syriac Braille Alphabet

Syriac is a language connected to the Aramaic branch of the Sami family. As it was mentioned at the beginning of the third chapter of this study, it can be seen that this language goes back to the early times of Christianity when the written form of the inscriptions is taken into consideration. It appears to have been born in Urfa and surrounding areas.

Syriac, from the third through the seventh centuries, Syriac literature flourished and developed in a variety of literary genres. Rare works had been written in this language for centuries. Syriac-speaking scientists have become the protectors and carriers of classical science. With the beginning of early Islam, Syriacs have relatively lost their effectiveness. The church, which was the Syriac worship language in the 5th century, was divided into two groups: Persian Diophysite Eastern Assyrians (Nasturians) and roman monophysite western Assyrians (Jacobites). This development in the Christian church led to the differentiation of the alphabet and phonetics of Syriac language. Phonologically, like the other northwest Semitic languages, Syriac has 22 consonantal phonemes; e, appear in

Table 28. Syriac Consonantal Phonemes

| Transliteration | Letter | IPA Pronunciation |
|-----------------|--------|-------------------|
| | ܐ | [ʔ] |
| b | ܒ | [b], [v] |
| g | ܓ | [g], [ɣ] |
| d | ܕ | [d], [ð] |
| h | ܗ | [h] |
| w | ܘ | [w] |
| z | ܙ | [z] |
| ħ | ܫ | [ħ] |
| t | ܬ | [tʰ] |
| y | ܝ | [j] |
| k | ܟ | [k], [x] |
| l | ܠ | [l] |
| m | ܡ | [m] |
| n | ܢ | [n] |
| s | ܣ | [s] |
| ʕ | ܥ | [ʕ] |
| p | ܦ | [p], [f] |
| ʂ | ܦ | [ʂʰ] |
| q | ܩ | [q] |
| r | ܪ | [r] |
| ʃ | ܦ | [ʃ] |
| t | ܬ | [t], [θ] |

All letters are designed to form a single sound unit. In the first inscriptions, some letters, such as [⦿] wau o and u, [⦿] yodh letter used to give the sounds for -i and -e. Likewise, the letter [ʔ] alaf is used to create some sounds and to help with pronunciation.

In our project, for creating a braille alphabet for Syriac language, we have followed these ways;

- I. Finding Unicode code for syr. Letters,
- II. Finding Unicode code for braille

3.3.2. Syriac Braille Consonants

For creating braille c letters, firstly we have examined Unicode Syriac table and Unicode braille table. And we have found for each letter hexadecimal code.

Table 29. Syriac Consonantal Phonemes With Braille Codes

| Transliteration | Letter | Braille Letter for Syriac | IPA Pronunciation |
|-----------------|--------|---------------------------|-------------------|
| | Ⲁ | ⠠ | [ʔ] |
| B | Ⲃ | ⠠ | [b], [v] |
| G | Ⲅ | ⠠ | [g], [ɣ] |
| D | Ⲇ | ⠠ | [d], [ð] |
| H | Ⲉ | ⠠ | [h] |
| W | Ⲋ | ⠠ | [w] |
| Z | Ⲍ | ⠠ | [z] |
| Ḥ | Ⲏ | ⠠ | [ḥ] |
| Ṭ | Ⲑ | ⠠ | [ṭ] |
| Y | Ⲓ | ⠠ | [j] |
| K | Ⲕ | ⠠ | [k], [x] |
| L | Ⲗ | ⠠ | [l] |
| M | Ⲙ | ⠠ | [m] |
| N | Ⲛ | ⠠ | [n] |
| S | Ⲝ | ⠠ | [s] |
| | Ⲟ | ⠠ | [ʃ] |
| P | Ⲡ | ⠠ | [p], [f] |
| Ṣ | Ⲣ | ⠠ | [sʰ] |
| Q | Ⲥ | ⠠ | [q] |
| R | ⲧ | ⠠ | [r] |
| Ṣ | ⲩ | ⠠ | [ʃ] |
| T | ⲫ | ⠠ | [t], [θ] |

Table 30. Syriac Consonants

| | Bilabial | | Labio dental | Dental | | Alveolar | | Post alveolar | Palatal | Velar | Uvular | Pharyngeal | | Glottal | | | |
|--------------------|----------|---|--------------|--------|---|----------|-------|---------------|----------------|-------|--------|------------|---|---------|---|----------------|---|
| | p | b | f | v | θ | ð | Plain | | | | | Emphatic | s | | z | s ^c | ʃ |
| Nasal | m | | | | | | n | | | | | | | | | | |
| Stop | p | b | | | | | t | d | t ^c | | | k | g | q | | | ʔ |
| Fricative | | | f | v | θ | ð | s | z | s ^c | ʃ | | x | ɣ | | h | ħ | h |
| Approximant | w | | | | | | l | | | j | | | | | | | |
| Trill | | | | | | | r | | | | | | | | | | |

(Englebretson, 2009)

Table 31. Consonants Codes for Syriac Braille Alphabet with BEGADKEPHAT Letters

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| ܐ | ܐ | ܐ | ܐ | ܐ | ܐ | ܐ | ܐ | ܐ | ܐ | ܐ |
| ܐ | ܐ | ܐ | ܐ | ܐ | ܐ | ܐ | ܐ | ܐ | ܐ | ܐ |
| ܐ | ܐ | ܐ | ܐ | ܐ | ܐ | ܐ | ܐ | ܐ | ܐ | ܐ |
| ܐ | ܐ | ܐ | ܐ | ܐ | ܐ | ܐ | ܐ | ܐ | ܐ | ܐ |
| ܐ | ܐ | ܐ | ܐ | ܐ | ܐ | ܐ | ܐ | ܐ | ܐ | ܐ |
| ܐ | ܐ | ܐ | ܐ | ܐ | ܐ | ܐ | ܐ | ܐ | ܐ | ܐ |
| ܐ | ܐ | ܐ | ܐ | ܐ | ܐ | ܐ | ܐ | ܐ | ܐ | ܐ |
| ܐ | ܐ | ܐ | ܐ | ܐ | ܐ | ܐ | ܐ | ܐ | ܐ | ܐ |

3.3.3. Syriac Braille Vowels

Normally, in Syriac manuscripts, texts are written without using vocalisation. Vocalisation is done either by using dots or by using special symbols derived from Greek letters.

In this study, both methods were used and they were made by assigning a braille cell corresponding to their Unicode counterpart.

When a visually impaired individual begins to read the text, whether the text belongs to the eastern dialect or western dialect is distinguished by a braille signal assigned to the text before the first word. The following table shows all the Syriac vocalisations with braille signs.

Table 32. Syriac Braille Vowels with Braille Signs

| | | | | | | | | | | | | | | | | | |
|----------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Syriac Vowels Signs | | ܐ | ܐ | ܐ | ܐ | ܐ | ܐ | ܐ | ܐ | ܐ | ܐ | ܐ | ܐ | ܐ | ܐ | ܐ | ܐ |
| Latin Transcript | u | i | ū | i | o | e | a | | | | | | | | | | |
| Braille Transcript | ⠠ | ⠠ | ⠠ | ⠠ | ⠠ | ⠠ | ⠠ | ⠠ | ⠠ | ⠠ | ⠠ | ⠠ | ⠠ | ⠠ | ⠠ | ⠠ | ⠠ |

3.3.3.1. Western Syriac Vowels

The vowels marked by dots placed above or below the consonants, as shown by the following table.

Table 33. Western Syriac Vowels with Braille Dots

| Wovel Sign | Vowel Names | Braille Dots | IPA Transliteration | Unicode Hex. |
|------------|---------------------|--------------|---------------------|--------------|
| ⠠⠠ | Syriac pthaha above | ⠠⠠ | a | 0730 |
| ⠠⠡ | Syriac pthaha below | | | 0731 |
| ⠠⠢ | Syriac zqapha above | ⠠⠢ | ā | 0733 |
| ⠠⠣ | Syriac zqapha below | | | 0734 |
| ⠠⠤ | Syriac rbasa above | ⠠⠤ | e | 0736 |
| ⠠⠥ | Syriac rbasa below | | | 0737 |
| ⠠⠦ | Syriac hbasā above | ⠠⠦ | ī | 073a |
| ⠠⠧ | Syriac hbasā below | | | 073b |
| ⠠⠨ | Syriac esasa above | ⠠⠨ | ū | 073d |

3.3.3.2. East Syriac Vowels

The vowels marked by dots placed above or below the consonants, as shown by the following table.

Table 34. Eastern Syriac Vowels with Braille Dots

| Wovel Sign | Vowel Names | Braille Dots | IPA Transliteration | Unicode Hex. |
|------------|--------------------------------|--------------|---------------------|--------------|
| ⠠⠠ | Syriac pthaha dotted | ⠠⠠ | a | 0732 |
| ⠠⠡ | Syriac zqapha dotted | ⠠⠡ | ā | 0735 |
| ⠠⠢ | Syriac dotted zlama horizontal | ⠠⠢ | e | 0738 |
| ⠠⠣ | Syriac dotted zlama angular | | | 0739 |
| ⠠⠤ | Syriac hbasā-esasa dotted | ⠠⠤ | ī | 073c |
| ⠠⠥ | Syriac rwaha | ⠠⠥ | ū | 073f |

3.3.5. Letter Alterations

3.3.5.1. Matres Lectionis

Three letters act as matres lectionis: rather than being a consonant, they indicate a vowel. ʾāleḫ (א - ⠠), the first letter, represents a glottal stop, but it can also indicate a vowel, especially at the beginning or the end of a word. The letter waw (ו - ⠠) is the consonant w, but can also represent the vowels o (⠠) and u (⠠). Likewise, the letter yōd (י - ⠠) represents the consonant y (⠠), but it also stands for the vowels i (⠠) and e (⠠).

3.3.5.2. Modifiable Letters Begadkephat (Rūkkākā And Qūššāyā)

In both vernacular and scholastic Aramaic, there are six modifiable letters; that is, six letters whose sounds change when a mark is added beneath them. They are:

Table 35. Modifiable Letters (Rūkkākā And Qūššāyā)

| Name | Stop | Latin translit. | Braille cells | IPA | Name | Fricative | Translit. | Braille cells | IPA |
|-----------------|------|-----------------|---------------|-----|---------------|----------------------|-----------|---------------|-----------------------------|
| Bēṭ (Qūššāyā) | ⠠ | b | ⠠ | [b] | Bēṭ Rūkkākā | ⠠ | b | ⠠ | [v] ¹⁸ or [w] |
| Gāmal (Qūššāyā) | ⠠ | g | ⠠ | [g] | Gāmal Rūkkākā | ⠠ | ḡ | ⠠ | [ɣ] |
| Dālaṭ (Qūššāyā) | ⠠ | d ¹⁹ | ⠠ | [d] | Dālaṭ Rūkkākā | ⠠ | ḏ | ⠠ | [ð] |
| Kāp (Qūššāyā) | ⠠ | k | ⠠ | [k] | Kāp Rūkkākā | ⠠ | k | ⠠ | [x] |
| Pē (Qūššāyā) | ⠠ | p | ⠠ | [p] | Pē Rūkkākā | ⠠ ²⁰ or ⠠ | p̄ | ⠠ | [f] or [w] |
| Taw (Qūššāyā) | ⠠ | t ²¹ | ⠠ | [t] | Taw Rūkkākā | ⠠ | t̄ | ⠠ | [θ] |

Begadkephat (and also begadkefat) is the name given to a phenomenon of lenition affecting the non-emphatic stop consonants of biblical Hebrew and Aramaic when they are preceded by a vowel and not germinated. The name is also given to similar cases of spirantization of post-vocalic plosives in other languages; for instance, in the Berber Language of Djerba (Werner, 1975). Celtic languages have a similar system.

¹⁸ “⠠ / v” has become “w” in most modern dialects.

¹⁹ “⠠/d” is left unspirantized in some modern eastern dialects.

²⁰ “⠠/f” is not found in most modern eastern dialects. Instead, it either is left unspirantized or sometimes appears as “w”. Pē is the only letter in the eastern variant of the alphabet that is spirantized by the addition of a semicircle instead of a single dot.

²¹ “⠠/t” is left unspirantized in some modern eastern dialects.

3.3.5.3. The Plural Marker Syāmē

The plural is marked with a two-point supralinear grapheme called syāmē (متممات) literally 'placings', also known by the Hebrew name “ribbui” in some grammars) to indicate that the word is plural. These dots, having no sound value in themselves, arose before both eastern and western vowel systems as it became necessary to mark plural forms of words, which are indistinguishable from their singular counterparts in regularly inflected nouns. For instance, the word malkā (ملك, 'king') is consonantly identical to its plural malkē (ملكا, 'kings'); the syāmē above the word malkē (مملكا) clarifies its grammatical number. Irregular plurals also receive syāmē even though their forms are clearly plural: e.g. Baytā (بيت, 'house') and its irregular plural bātē (بيوت, 'houses'). Because of redundancy, some modern usage forgoes syāmē points when vowel markings are present.

There are no firm rules for which letter receives syāmē; the writer has full discretion to place them over any letter. Typically, if a word has at least one rēš, then syāmē are placed over the rēš that is nearest the end of a word (and also replace the single dot above it: ˙). Other letters that often receive syāmē are low-rising letters—such as yōḏ and nūn—or letters that appear near the middle or end of a word.

Besides plural nouns, syāmē are also placed on:

- ✓ Plural adjectives, including participles (except masculine plural adjectives/participles in the absolute state);
- ✓ The cardinal numbers 'two' and the feminine forms of 11-19, though inconsistently;
- ✓ Certain feminine plural verbs: the 3rd person feminine plural perfect and the 2nd and 3rd person feminine plural imperfect.

3.3.5.4. Mṭalqānā

Syriac uses a line, called mṭalqānā (محلل, literally 'concealer', also known by the Latin term *Linea Occultans* in some grammars), to indicate a silent letter that can occur at the beginning or middle of a word. In eastern Syriac, this line is diagonal and only occurs above the silent letter (e.g. مدينتا, 'city', pronounced mḏittā, not mḏintā, with the mṭalqānā over the nūn, assimilating with the tau). In western Syriac, this line is horizontal

and can be placed above or below the letter (e.g. ܡܕܝܬܐ, 'city', pronounced mḏīto, not mḏīnto).

Classically, mṭalqānā was not used for silent letters that occurred at the end of a word (e.g. ܡܪܝܡܐ, '[my] lord'). In modern Turoyo, however, this is not always the case (e.g. ܡܪܝܡܐ, '[my] lord').

3.3.6. Majlīyānā

In modern usage, some alterations can be made to represent phonemes not represented in classical phonology. A mark similar in appearance to a tilde (~), called majlīyānā (ܡܝܠܝܢܐ), is placed above or below a letter in the Maḏnḥāyā variant of the alphabet to change its phonetic value:

- Added below Gāmal: [g/ḡ] to [dʒ] (voiced palato-alveolar affricate)
- Added below Kāp: [k/ḱ] to [tʃ] (voiceless palato-alveolar affricate)
- Added above or below Zayn: [z/ẓ] to [ʒ] (voiced palato-alveolar sibilant)
- Added above Šīn: [ʃ] to [ʒ]

3.3.7. Syriac Braille Punctuations and Signs

I have chosen punctuation and sign were chosen for Syriac languages So this will be easy for visually impaired Syriac people when they learn other languages.

Table 36. Syriac Braille Punctuation and Signs

| | | |
|-----------------------|----|----------|
| Apostrophe | ' | ⠠⠨ |
| Asterisk | * | ⠠⠨⠠⠨ |
| Bar (oblique stroke) | / | ⠠⠨ |
| Opening bracket/brace | [| ⠠⠨⠠⠨ |
| Closing bracket/brace |] | ⠠⠨⠠⠨ |
| Colon | : | ⠠⠨⠠⠨ |
| Comma | , | ⠠⠨ |
| Dash | — | ⠠⠨⠠⠨ |
| Double dash | — | ⠠⠨⠠⠨⠠⠨⠠⠨ |
| Decimal point | . | ⠠⠨ |
| Ditto | " | ⠠⠨⠠⠨ |
| Dollar sign | \$ | ⠠⠨⠠⠨ |

| | | |
|-------------------------------|--------|------|
| Ellipsis | ... | ⠠⠠⠠ |
| Exclamation point | ! | ⠠⠠ |
| Fraction line | / or — | ⠠⠠ |
| Hyphen | - | ⠠⠠ |
| Number sign | # | ⠠⠠ |
| Opening parenthesis | (| ⠠⠠ |
| Closing parenthesis |) | ⠠⠠ |
| Pence (sterling coinage) | D | ⠠⠠ |
| Percent | % | ⠠⠠⠠⠠ |
| Period | . | ⠠⠠ |
| Question mark | ? | ⠠⠠ |
| Double opening quotation mark | " | ⠠⠠ |
| Double closing quotation mark | " | ⠠⠠ |
| Single opening quotation mark | ' | ⠠⠠⠠ |
| Single closing quotation mark | ' | ⠠⠠⠠ |
| Section sign | § | ⠠⠠⠠ |
| Semicolon | ; | ⠠⠠ |

3.3.7. Upper and Under Line

Mbatlono (stopper, silencing letter) and Manqsono (reducer), is used upper or under a letter in order to silence/reduce its sound. Mbatlono is only used when the sound of the letter disappears in one form but reappears in another. Example: ܚܐܢܐ (ha = one) the sound of “d/,” disappears in this form. I have showed this sign " _ " in my study as ⠠⠠.

3.3.8. Other Syriac Dots for Syriac Braille Equivalent

3.3.8.1. Syriac Feminine Dot

⠠ feminine marker used with the tau feminine suffix, and I have showed in my study as ⠠⠠ where feminine marker is placed after word.

3.3.8.2. Syriac Two Vertical Dots Above

⠠ accent mark used in ancient manuscripts, and I have showed in my study as ⠠⠠ where feminine marker is placed after word.

3.3.8.3.Syriac Two Vertical Dots Below

◌̣◌̣ accent mark used in ancient manuscripts, and I have showed in my study as ⠠⠠ where feminine marker is placed after word.

3.3.8.4.Syriac Three Dots Above

◌̣◌̣◌̣ diacritic used in Turoyo for letters not found in Syriac, and I have showed in my study as ⠠⠠⠠ where feminine marker is placed after word.

3.3.8.5. Syriac Three Dots Below

◌̣◌̣◌̣ diacritic used in Turoyo for letters not found in Syriac, and I have showed in my study as ⠠⠠⠠ where feminine marker is placed after word.

3.4. Reading with Braille Writing System

3.4.1. Teaching of “ʾ” /a/ Voice (⠠)

Benefit from hearing skills to create auditory awareness and to facilitate learning the sound of ʾ. Try to draw a song about the sound of in ʾ, the rhyme or the tale to the students and draw the attention of the students to the points that are the voices and voices of the students.

Table 37. ʾAleḫ with Vowels Derivates

| | | | | | | | | | | | | | | |
|----|-----|------|------|-------|--------|---------|----------|-----------|------------|-------------|--------------|---------------|----------------|-----------------|
| ʾ | ʾ̣ | ʾ̣̣ | ʾ̣̣̣ | ʾ̣̣̣̣ | ʾ̣̣̣̣̣ | ʾ̣̣̣̣̣̣ | ʾ̣̣̣̣̣̣̣ | ʾ̣̣̣̣̣̣̣̣ | ʾ̣̣̣̣̣̣̣̣̣ | ʾ̣̣̣̣̣̣̣̣̣̣ | ʾ̣̣̣̣̣̣̣̣̣̣̣ | ʾ̣̣̣̣̣̣̣̣̣̣̣̣ | ʾ̣̣̣̣̣̣̣̣̣̣̣̣̣ | ʾ̣̣̣̣̣̣̣̣̣̣̣̣̣̣ |
| 'ū | 'ụ̄ | 'ụ̣̄ | 'i | 'ị | 'ị̣ | 'e | 'ẹ | 'ẹ̣ | 'o | 'ọ | 'ọ̣ | 'a | 'ạ | 'ạ̣ |
| ⠠ | ⠠̣ | ⠠̣̣ | ⠠ | ⠠̣ | ⠠̣̣ | ⠠ | ⠠̣ | ⠠̣̣ | ⠠ | ⠠̣ | ⠠̣̣ | ⠠ | ⠠̣ | ⠠̣̣ |

Exercises 1: In our daily lives, the words "ʾ" begin with and the words that do not begin are determined. For example, the words **ܐܘܪܝܢܐ, ܐܘܪܝܢܐ, ܐܘܪܝܢܐ** are determined. These words work on how to remove the tone is done.

Exercises 2: Writing of the sound "ʾ" is performed. The sound "ʾ" is said to be point 1. The students will be prompted to enter "ʾ". This work is ensured until the students write the letter independently. Each "ʾ" sound is called "ʾ" is required to be spoken. After the writing work is finished, the paper should be removed from the tablet and turned away from left to right. The position of the letter during the reading operation must be as follows;

: :

Exercises 3: using the 1st and 3rd lines in the typing tablet, a "ب" sound is written to the braille points, leaving a box space between them, and the study material is prepared. it is desirable to remove the paper from the tablet. The student is asked to follow the line from left to right. When the line is followed, it is requested to say "ب" when it finds "ب" between the six points. After the 1st line is finished, the same operation is done for the 3rd line.

3.4.2. Teaching of “ب” /b/ Voice (ب)

Benefit from hearing skills to create auditory awareness and to facilitate learning the sound of ب. Try to draw a song about the sound of ب, the rhyme or the tale to the students and draw the attention of the students to the points that are the voices and voices of the students.

Table 38. Bēt with Vowels Derivates

| | | | | | | | | | | | | | | |
|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| بُ | بُ | بُ | بِ | بِ | بِ | بِ | بِ | بِ | بِ | بِ | بِ | بِ | بِ | بِ |
| bū | bū | bū | bi | bi | bi | be | be | be | bo | bo | bo | ba | ba | ba |
| : | : | : | : | : | : | : | : | : | : | : | : | : | : | : |

Exercises 1: In our daily lives, the words "ب" begin with and the words that do not begin are determined. For example, the words كَب، كَبْ، كَبْ، كَبْ are determined. These words work on how to remove the tone is done.

Exercises 2: writing of the sound "ب" is performed. The sound "ب" is said to be points 1 and 2. The students will be prompted to enter "ب". This work is ensured until the students write the letter independently. Each "ب" sound is called "ب" is required to be spoken. After the writing work is finished, the paper should be removed from the tablet and turned away from left to right. The position of the letter during the reading operation must be as follows;

: :

Exercises 3: Using the 1st and 3rd lines in the typing tablet, a "ب" sound is written to the braille points, leaving a box space between them, and the study material is prepared. it is desirable to remove the paper from the tablet. The student is asked to follow the line from left to right. When the line is followed, it is requested to say "ب" when it finds "ب" between the six points. After the 1st line is finished, the same operation is done for the 3rd line.

3.4.3. Teaching of “” /g/ Voice (∴)


























Benefit from hearing skills to create auditory awareness and to facilitate learning the sound of . Try to draw a song about the sound of , the rhyme or the tale to the students and draw the attention of the students to the points that are the voices and voices of the students.




Table 39. Gāmal with Vowels Derivates

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  |  |  |  |  |  |  |  |  |  |  | | |
| gū | gū | gū | gi | gi | gi | ge | ge | ge | go | go | go | ga | ga | ga |
| ∴ | ∴ | ∴ | ∴ | ∴ | ∴ | ∴ | ∴ | ∴ | ∴ | ∴ | ∴ | ∴ | ∴ | ∴ |

Exercises 1: In our daily lives, the words "" begin with and the words that do not begin are determined. For example, the words     are determined. These words work on how to remove the tone is done.

Exercises 2: writing of the sound "" is performed. The sound "" is said to be points 1 - 2 - 4 - 5. The students will be prompted to enter "". This work is ensured until the students write the letter independently. Each "" sound is called "" is required to be spoken. After the writing work is finished, the paper should be removed from the tablet and turned away from left to right. The position of the letter during the reading operation must be as follows;

∴ ∴ ∴ ∴ ∴ ∴ ∴ ∴ ∴ ∴ ∴ ∴ ∴ ∴ ∴ ∴ ∴ ∴ ∴ ∴

Exercises 3: using the 1st and 3rd lines in the typing tablet, a "" sound is written to the braille points, leaving a box space between them, and the study material is prepared. it is desirable to remove the paper from the tablet. The student is asked to follow the line from left to right. When the line is followed, it is requested to say "" when it finds "" between the six points. After the 1st line is finished, the same operation is done for the 3rd line.

3.4.4. Teaching of “” /d/ Voice (∴)



Benefit from hearing skills to create auditory awareness and to facilitate learning the sound of . Try to draw a song about the sound of , the rhyme or the tale to the students and draw the attention of the students to the points that are the voices and voices of the students.

Table 40. Dālaṭ with vowels derivates

| | | | | | | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| د | د | د | د | د | د | د | د | د | د | د | د | د | د | د |
| dū | dū | dū | di | di | di | de | de | de | do | do | do | da | da | da |
| ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ |

Exercises 1: in our daily lives, the words “د” begin with and the words that do not begin are determined. For example, the words د, د, د, د, د, د, د, د, د, د, د, د, د, د, د are determined. These words work on how to remove the tone is done.

Exercises 2: writing of the sound “د” is performed. The sound “د” is said to be points 1 - 2 - 4 - 5. The students will be prompted to enter “د”. This work is ensured until the students write the letter independently. Each “د” sound is called “د” is required to be spoken. After the writing work is finished, the paper should be removed from the tablet and turned away from left to right. The position of the letter during the reading operation must be as follows;



Exercises 3 : using the 1st and 3rd lines in the typing tablet, a “د” sound is written to the braille points, leaving a box space between them, and the study material is prepared. it is desirable to remove the paper from the tablet. The student is asked to follow the line from left to right. When the line is followed, it is requested to say “د” when it finds “د” between the six points. After the 1st line is finished, the same operation is done for the 3rd line.

3.4.5. Teaching of “د” / h/ Voice (::)

Benefit from hearing skills to create auditory awareness and to facilitate learning the sound of د. Try to draw a song about the sound of د, the rhyme or the tale to the students and draw the attention of the students to the points that are the voices and voices of the students.

Table 41. Hē with Vowels Derivates

| | | | | | | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| ه | ه | ه | ه | ه | ه | ه | ه | ه | ه | ه | ه | ه | ه | ه |
| hi | hū | hū | hi | hi | hi | he | he | he | ho | ho | ho | ha | ha | ha |
| ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ |

Exercises 1: In our daily lives, the words “و” begin with and the words that do not begin are determined. For example, the words وَدَّوْ، وَوْ، وَوْ، وَوْ are determined. These words work on how to remove the tone is done.

Exercises 2: Writing of the sound “و” is performed. The sound “و” is said to be points 1 - 3 - 4 - 6. The students will be prompted to enter “و” . This work is ensured until the students write the letter independently. Each “و” sound is called “و” is required to be spoken. After the writing work is finished, the paper should be removed from the tablet and turned away from left to right. The position of the letter during the reading operation must be as follows;



Exercises 3: Using the 1st and 3rd lines in the typing tablet, a “و” sound is written to the braille points, leaving a box space between them, and the study material is prepared. it is desirable to remove the paper from the tablet. The student is asked to follow the line from left to right. When the line is followed, it is requested to say “و” when it finds “و” between the six points. After the 1st line is finished, the same operation is done for the 3rd line.

3.4.6. Teaching of “و” /w / Voice (:)

Benefit from hearing skills to create auditory awareness and to facilitate learning the sound of و. Try to draw a song about the sound of و, the rhyme or the tale to the students and draw the attention of the students to the points that are the voices and voices of the students.

Table 42. Waw with Vowels Derivates

| | | | | | | | | | | | | | | |
|----|-----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| و | وْ | و̇ | و̈ | و̉ | و̊ | و̋ | و̌ | و̍ | و̎ | و̏ | و̐ | و̑ | و̒ | و̓ |
| wi | wū | ū | wi | wi | wi | we | we | we | wo | wo | wo | wa | wa | wa |
| ⠠⠠ | ⠠⠠⠠ | ⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ |

Exercises 1: In our daily lives, the words “و” begin with and the words that do not begin are determined. For example, the words وْوْ، وْوْ، وْوْ، وْوْ are determined. These words work on how to remove the tone is done.

Exercises 2: Writing of the sound “و” is performed. The sound “و” is said to be points 2- 4 - 5- 6. The students will be prompted to enter ”و”. This work is ensured until the students write the letter independently. Each “و” sound is called “و” is required to be spoken. After

the writing work is finished, the paper should be removed from the tablet and turned away from left to right. The position of the letter during the reading operation must be as follows;



Exercises 3: Using the 1st and 3rd lines in the typing tablet, a “o” sound is written to the braille points, leaving a box space between them, and the study material is prepared. it is desirable to remove the paper from the tablet. The student is asked to follow the line from left to right. When the line is followed, it is requested to say “o” when it finds “o” between the six points. After the 1st line is finished, the same operation is done for the 3rd line.

3.4.7. Teaching of “z” / z / Voice (:)

Benefit from hearing skills to create auditory awareness and to facilitate learning the sound of z. Try to draw a song about the sound of z, the rhyme or the tale to the students and draw the attention of the students to the points that are the voices and voices of the students.

Table 43. Zayn with vowels derivates

| | | | | | | | | | | | | | | |
|-----|-----|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| z̄ | z̄ | z̄ | zi | zi | zi | ze | ze | ze | zo | zo | ze | za | za | za |
| ⠠⠵⠠ | ⠠⠵⠠ | ⠠⠵⠠ | ⠠⠵⠠⠠⠠ | ⠠⠵⠠⠠⠠ | ⠠⠵⠠⠠⠠ | ⠠⠵⠠⠠⠠ | ⠠⠵⠠⠠⠠ | ⠠⠵⠠⠠⠠ | ⠠⠵⠠⠠⠠ | ⠠⠵⠠⠠⠠ | ⠠⠵⠠⠠⠠ | ⠠⠵⠠⠠⠠ | ⠠⠵⠠⠠⠠ | ⠠⠵⠠⠠⠠ |

Exercises 1: In our daily lives, the words “z” begin with and the words that do not begin are determined. For example, the words زج, زو, زج are determined. These words work on how to remove the tone is done.

Exercises 2: Writing of the sound “z” is performed. The sound “z” is said to be points 1- 3 - 5- 6. The students will be prompted to enter “z”. This work is ensured until the students write the letter independently. Each “z” sound is called “z” is required to be spoken. After the writing work is finished, the paper should be removed from the tablet and turned away from left to right. The position of the letter during the reading operation must be as follows;



Exercises 3: Using the 1st and 3rd lines in the typing tablet, a “z” sound is written to the braille points, leaving a box space between them, and the study material is prepared. it is desirable to remove the paper from the tablet. The student is asked to follow the line from left

to right. When the line is followed, it is requested to say "ا" when it finds "ا" between the six points. After the 1st line is finished, the same operation is done for the 3rd line.

3.4.8. Teaching of “ا” / ḥ / Voice (:::)

Benefit from hearing skills to create auditory awareness and to facilitate learning the sound of ا. Try to draw a song about the sound of ا, the rhyme or the tale to the students and draw the attention of the students to the points that are the voices and voices of the students.

Table 44. Ḥēt with vowels derivatives

| | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| ا | ا | ا | ا | ا | ا | ا | ا | ا | ا | ا | ا | ا | ا | ا |
| ḥū | ḥū | ḥū | ḥi | ḥi | ḥi | ḥe | ḥe | ḥe | ḥo | ḥo | ḥo | ḥa | ḥa | ḥa |
| ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ |

Exercises 1: In our daily lives, the words “ا” begin with and the words that do not begin are determined. For example, the words سَأَلًا, سَأَلًا, سَأَلًا are determined. These words work on how to remove the tone is done.

Exercises 2: Writing of the sound “ا” is performed. The sound “ا” is said to be points 4-5 and 1-2-5. The students will be prompted to enter “ا”. This work is ensured until the students write the letter independently. Each “ا” sound is called "ا" is required to be spoken. After the writing work is finished, the paper should be removed from the tablet and turned away from left to right. The position of the letter during the reading operation must be as follows;

⠠⠠⠠ ⠠⠠⠠ ⠠⠠⠠ ⠠⠠⠠ ⠠⠠⠠ ⠠⠠⠠ ⠠⠠⠠ ⠠⠠⠠ ⠠⠠⠠ ⠠⠠⠠ ⠠⠠⠠ ⠠⠠⠠ ⠠⠠⠠ ⠠⠠⠠ ⠠⠠⠠

Exercises 3: Using the 1st and 3rd lines in the typing tablet, a “ا” sound is written to the braille points, leaving a box space between them, and the study material is prepared. It is desirable to remove the paper from the tablet. The student is asked to follow the line from left to right. When the line is followed, it is requested to say “ا” when it finds “ا” between the six points. After the 1st line is finished, the same operation is done for the 3rd line.

3.4.9. Teaching of “ᵑ” / ʈ / Voice (:)

Benefit from hearing skills to create auditory awareness and to facilitate learning the sound of ᵑ. Try to draw a song about the sound of ᵑ, the rhyme or the tale to the students and draw the attention of the students to the points that are the voices and voices of the students.

Table 45. ᵑ with Vowels Derivates

| | | | | | | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| ᵑ | ᵑ | ᵑ | ᵑ | ᵑ | ᵑ | ᵑ | ᵑ | ᵑ | ᵑ | ᵑ | ᵑ | ᵑ | ᵑ | ᵑ |
| tū | tū | tū | tī | tī | tī | te | te | te | to | to | to | ta | ta | ta |
| ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ |

Exercises 1: In our daily lives, the words “ᵑ” begin with and the words that do not begin are determined. For example, the words **ᵑᵑ, ᵑᵑᵑ, ᵑᵑᵑᵑ, ᵑᵑᵑᵑᵑ** are determined. These words work on how to remove the tone is done.

Exercises 2: Writing of the sound ”ᵑ” is performed. The sound ”ᵑ” is said to be points 2 – 3 – 5 - 6. The students will be prompted to enter ”ᵑ”. This work is ensured until the students write the letter independently. Each ”ᵑ” sound is called ”ᵑ” is required to be spoken. After the writing work is finished, the paper should be removed from the tablet and turned away from left to right. The position of the letter during the reading operation must be as follows;

⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠

Exercises 3: Using the 1st and 3rd lines in the typing tablet, a ”ᵑ” sound is written to the braille points, leaving a box space between them, and the study material is prepared. It is desirable to remove the paper from the tablet. The student is asked to follow the line from left to right. When the line is followed, it is requested to say ”ᵑ” when it finds ”ᵑ” between the six points. After the 1st line is finished, the same operation is done for the 3rd line.

3.4.10. Teaching of “و” / y/ Voice (١٢)

Benefit from hearing skills to create auditory awareness and to facilitate learning the sound of و. Try to draw a song about the sound of و, the rhyme or the tale to the students and draw the attention of the students to the points that are the voices and voices of the students.

Table 46. Yōd with vowels derivates

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| و | و | و | و | و | و | و | و | و | و | و | و | و | و | و | و |
| ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ |
| yū | yū | yū | yi | yi | ī | ye | ye | ye | yo | yo | yo | ya | ya | ya | ya |

Exercises 1: In our daily lives, the words “و” begin with and the words that do not begin are determined. For example, the words ل, ل, ل, ل, ل are determined. These words work on how to remove the tone is done.

Exercises 2: Writing of the sound “و” is performed. The sound “و” is said to be points 2 – 4 - 5. The students will be prompted to enter “و”. This work is ensured until the students write the letter independently. Each “و” sound is called “و” is required to be spoken. After the writing work is finished, the paper should be removed from the tablet and turned away from left to right. The position of the letter during the reading operation must be as follows;

⠠⠠⠠ ⠠⠠⠠ ⠠⠠⠠ ⠠⠠⠠ ⠠⠠⠠ ⠠⠠⠠ ⠠⠠⠠ ⠠⠠⠠ ⠠⠠⠠ ⠠⠠⠠ ⠠⠠⠠ ⠠⠠⠠ ⠠⠠⠠ ⠠⠠⠠ ⠠⠠⠠ ⠠⠠⠠ ⠠⠠⠠

Exercises 3: Using the 1st and 3rd lines in the typing tablet, a ”و” sound is written to the braille points, leaving a box space between them, and the study material is prepared. it is desirable to remove the paper from the tablet. The student is asked to follow the line from left to right. When the line is followed, it is requested to say "و" when it finds "و" between the six points. After the 1st line is finished, the same operation is done for the 3rd line.

3.4.11. Teaching of “ك” / k / Voice (١٣)

Benefit from hearing skills to create auditory awareness and to facilitate learning the sound of ك. Try to draw a song about the sound of ك, the rhyme or the tale to the students and draw the attention of the students to the points that are the voices and voices of the students.

Table 47. Lāmaḍ kāp with vowels derivates

| | | | | | | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| ك̣ | ك̣ | ك̣ | ك̣ | ك̣ | ك̣ | ك̣ | ك̣ | ك̣ | ك̣ | ك̣ | ك̣ | ك̣ | ك̣ | ك̣ |
| Kū | Kū | Kū | Ki | Ki | Ki | Ke | Ke | Ke | Ko | Ko | Ko | Ka | Ka | Ka |
| ⠠⠪ | ⠠⠪ | ⠠⠪ | ⠠⠪ | ⠠⠪ | ⠠⠪ | ⠠⠪ | ⠠⠪ | ⠠⠪ | ⠠⠪ | ⠠⠪ | ⠠⠪ | ⠠⠪ | ⠠⠪ | ⠠⠪ |

Exercises 1: In our daily lives, the words “ك̣” begin with and the words that do not begin are determined. For example, the words ك̣ا، ك̣ي، ك̣و، ك̣ا are determined. These words work on how to remove the tone is done.

Exercises 2: Writing of the sound “ك̣” is performed. The sound “ك̣” is said to be points 1 - 6. The students will be prompted to enter “ك̣”. This work is ensured until the students write the letter independently. Each “ك̣” sound is called “ك̣” is required to be spoken. After the writing work is finished, the paper should be removed from the tablet and turned away from left to right. The position of the letter during the reading operation must be as follows;



Exercises 3 : Using the 1st and 3rd lines in the typing tablet, a “ك̣” sound is written to the braille points, leaving a box space between them, and the study material is prepared. It is desirable to remove the paper from the tablet. The student is asked to follow the line from left to right. When the line is followed, it is requested to say “ك̣” when it finds “ك̣” between the six points. After the 1st line is finished, the same operation is done for the 3rd line.

3.4.12. Teaching of “ل” / l / Voice (⠠⠪)

Benefit from hearing skills to create auditory awareness and to facilitate learning the sound of ل. Try to draw a song about the sound of ل, the rhyme or the tale to the students and draw the attention of the students to the points that are the voices and voices of the students.

Table 48. Mīm with vowels derivates

| | | | | | | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| ل̣ | ل̣ | ل̣ | ل̣ | ل̣ | ل̣ | ل̣ | ل̣ | ل̣ | ل̣ | ل̣ | ل̣ | ل̣ | ل̣ | ل̣ |
| Lū | Lū | Lū | Li | Li | Li | Le | Le | Le | Lo | Lo | Lo | La | La | La |
| ⠠⠪ | ⠠⠪ | ⠠⠪ | ⠠⠪ | ⠠⠪ | ⠠⠪ | ⠠⠪ | ⠠⠪ | ⠠⠪ | ⠠⠪ | ⠠⠪ | ⠠⠪ | ⠠⠪ | ⠠⠪ | ⠠⠪ |

Exercises 1: In our daily lives, the words “\” begin with and the words that do not begin are determined. For example, the words **لَا**, **لَا حُرَّاءَ**, **لَا مَجَّاءَ**, **لَا كَبَّ** are determined. These words work on how to remove the tone is done.

Exercises 2: Writing of the sound ”\” is performed. The sound ”\” is said to be points 1 – 2 – 3. The students will be prompted to enter ”\”. This work is ensured until the students write the letter independently. Each ”\” sound is called ”\” is required to be spoken. After the writing work is finished, the paper should be removed from the tablet and turned away from left to right. The position of the letter during the reading operation must be as follows;



Exercises 3 : Using the 1st and 3rd lines in the typing tablet, a ”\” sound is written to the braille points, leaving a box space between them, and the study material is prepared. it is desirable to remove the paper from the tablet. The student is asked to follow the line from left to right. When the line is followed, it is requested to say ”\” when it finds ”\” between the six points. After the 1st line is finished, the same operation is done for the 3rd line.

3.4.13. Teaching of “م” /M/Voice (:))

Benefit from hearing skills to create auditory awareness and to facilitate learning the sound of م. Try to draw a song about the sound of م, the rhyme or the tale to the students and draw the attention of the students to the points that are the voices and voices of the students.

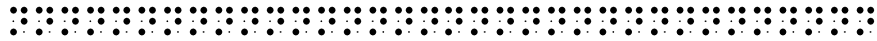
Table 49. Nūn with vowels derivates

| | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| مَ | مُ | مِ | مِ | مِ | مِ | مِ | مِ | مِ | مِ | مِ | مِ | مِ | مِ | مِ |
| mū | mū | mū | mi | mi | mi | me | me | me | me | me | me | ma | ma | ma |
| ⠠⠍⠠ | ⠠⠍⠠ | ⠠⠍⠠ | ⠠⠍⠠ | ⠠⠍⠠ | ⠠⠍⠠ | ⠠⠍⠠ | ⠠⠍⠠ | ⠠⠍⠠ | ⠠⠍⠠ | ⠠⠍⠠ | ⠠⠍⠠ | ⠠⠍⠠ | ⠠⠍⠠ | ⠠⠍⠠ |

Exercises 1: In our daily lives, the words “م” begin with and the words that do not begin are determined. For example, the words **مُكَّ**, **مُجَّ**, **مُكَّ**, **مُكَّ** are determined. These words work on how to remove the tone is done.

Exercises 2: Writing of the sound ”م” is performed. The sound ”م” is said to be points 1 – 3 – 4 - 5. The students will be prompted to enter ”م”. This work is ensured until

the students write the letter independently. Each ”ڨ” sound is called ”ڨ” is required to be spoken. After the writing work is finished, the paper should be removed from the tablet and turned away from left to right. The position of the letter during the reading operation must be as follows;



Exercises 3 : Using the 1st and 3rd lines in the typing tablet, a ”ڨ” sound is written to the braille points, leaving a box space between them, and the study material is prepared. it is desirable to remove the paper from the tablet. The student is asked to follow the line from left to right. When the line is followed, it is requested to say ”ڨ” when it finds ”ڨ” between the six points. After the 1st line is finished, the same operation is done for the 3rd line.

3.4.14. Teaching of “ڨ” / n / Voice (ڨ)

Benefit from hearing skills to create auditory awareness and to facilitate learning the sound of ڨ. Try to draw a song about the sound of ڨ, the rhyme or the tale to the students and draw the attention of the students to the points that are the voices and voices of the students.

Table 50. Semkaṭ with vowels derivates

| ڨ | ڨ | ڨ | ڨ | ڨ | ڨ | ڨ | ڨ | ڨ | ڨ | ڨ | ڨ | ڨ | ڨ | ڨ |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Nū | Nū | Nū | Ni | Ni | Ni | Ne | Ne | Ne | No | No | No | Na | Na | Na |
| ڨ | ڨ | ڨ | ڨ | ڨ | ڨ | ڨ | ڨ | ڨ | ڨ | ڨ | ڨ | ڨ | ڨ | ڨ |

Exercises 1: In our daily lives, the words “ڨ” begin with and the words that do not begin are determined. For example, the words ڨ, ڨ, ڨ, ڨ are determined. These words work on how to remove the tone is done.

Exercises 2: Writing of the sound “ڨ” is performed. The sound “ڨ” is said to be points 1 – 2 – 3 - 4. The students will be prompted to enter ”ڨ”. This work is ensured until the students write the letter independently. Each “ڨ” sound is called ”ڨ” is required to be spoken. After the writing work is finished, the paper should be removed from the tablet and turned away from left to right. The position of the letter during the reading operation must be as follows;



Exercises 3: Using the 1st and 3rd lines in the typing tablet, a “س” sound is written to the braille points, leaving a box space between them, and the study material is prepared. It is desirable to remove the paper from the tablet. The student is asked to follow the line from left to right. When the line is followed, it is requested to say “س” when it finds “س” between the six points. After the 1st line is finished, the same operation is done for the 3rd line.

3.4.15. Teaching of “س” / S / Voice (:)

Benefit from hearing skills to create auditory awareness and to facilitate learning the sound of س. Try to draw a song about the sound of س, the rhyme or the tale to the students and draw the attention of the students to the points that are the voices and voices of the students.

Table 51. Semkat with vowels derivatives

| | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| س | س | س | س | س | س | س | س | س | س | س | س | س | س | س |
| Sū | Sū | Sū | Si | Si | Si | Se | Se | Se | So | So | So | Sa | Sa | Sa |
| ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ |

Exercises 1: In our daily lives, the words “س” begin with and the words that do not begin are determined. For example, the words س، س، س، س، س are determined. These words work on how to remove the tone is done.

Exercises 2: Writing of the sound “س” is performed. The sound “س” is said to be points 2 - 3 4 - 6. The students will be prompted to enter “س”. This work is ensured until the students write the letter independently. Each “س” sound is called “س” is required to be spoken. After the writing work is finished, the paper should be removed from the tablet and turned away from left to right. The position of the letter during the reading operation must be as follows;



Exercises 3: Using the 1st and 3rd lines in the typing tablet, a “س” sound is written to the braille points, leaving a box space between them, and the study material is prepared. It is desirable to remove the paper from the tablet. The student is asked to follow the line from left to right. When the line is followed, it is requested to say “س” when it finds “س” between the six points. After the 1st line is finished, the same operation is done for the 3rd line.

3.4.16. Teaching of “ع” / ‘ / Voice (⠠⠠⠠)

Benefit from hearing skills to create auditory awareness and to facilitate learning the sound of ع. Try to draw a song about the sound of ع, the rhyme or the tale to the students and draw the attention of the students to the points that are the voices and voices of the students.

Table 52. ‘ē with vowels derivates

| | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| ع | ع | ع | ع | ع | ع | ع | ع | ع | ع | ع | ع | ع | ع | ع |
| عū | عū | عū | عi | عi | عi | عه | عه | عه | عo | عo | عo | عا | عا | عا |
| ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ |

Exercises 1: In our daily lives, the words “ع” begin with and the words that do not begin are determined. For example, the words ع, ع, ع, ع, ع are determined. These words work on how to remove the tone is done.

Exercises 2: Writing of the sound ”ع” is performed. The sound ”ع” is said to be points 2-3-5 and 2-3. The students will be prompted to enter”ع”. This work is ensured until the students write the letter independently. Each ”ع” sound is called ”ع” is required to be spoken. After the writing work is finished, the paper should be removed from the tablet and turned away from left to right. The position of the letter during the reading operation must be as follows;



Exercises 3: Using the 1st and 3rd lines in the typing tablet, a ”ع” sound is written to the braille points, leaving a box space between them, and the study material is prepared. It is desirable to remove the paper from the tablet. The student is asked to follow the line from left to right. When the line is followed, it is requested to say ”ع” when it finds ”ع” between the six points. After the 1st line is finished, the same operation is done for the 3rd line.

3.4.17. Teaching of “ظ” /P/Voice (⠠⠠⠠)

Benefit from hearing skills to create auditory awareness and to facilitate learning the sound of ظ. Try to draw a song about the sound of ظ, the rhyme or the tale to the students and draw the attention of the students to the points that are the voices and voices of the students.

Table 53. Pē with vowels derivates

| | | | | | | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| ᐅ | ᐅ | ᐅ | ᐅ | ᐅ | ᐅ | ᐅ | ᐅ | ᐅ | ᐅ | ᐅ | ᐅ | ᐅ | ᐅ | ᐅ |
| Pū | Pū | Pū | Pi | Pi | Pi | Pe | Pe | Pe | Po | Po | Po | Pa | Pa | Pa |
| ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ |

Exercises 1: In our daily lives, the words “ᐅ” begin with and the words that do not begin are determined. For example, the words ᐅᐅ, ᐅᐅ, ᐅᐅ, ᐅᐅ, ᐅᐅ are determined. These words work on how to remove the tone is done.

Exercises 2: Writing of the sound ”ᐅ” is performed. The sound ”ᐅ” is said to be points 1 –2 – 3-4. The students will be prompted to enter”ᐅ”. This work is ensured until the students write the letter independently. Each ”ᐅ” sound is called ”ᐅ” is required to be spoken. After the writing work is finished, the paper should be removed from the tablet and turned away from left to right. The position of the letter during the reading operation must be as follows;



Exercises 3: Using the 1st and 3rd lines in the typing tablet, a “ᐅ” sound is written to the braille points, leaving a box space between them, and the study material is prepared.it is desirable to remove the paper from the tablet. The student is asked to follow the line from left to right. When the line is followed, it is requested to say “ᐅ” when it finds “ᐅ” between the six points. After the 1st line is finished, the same operation is done for the 3rd line.

3.4.18. Teaching of “ᐅ” /ᐅ/ Voice (ᐅ)

Benefit from hearing skills to create auditory awareness and to facilitate learning the sound of ᐅ. Try to draw a song about the sound of ᐅ, the rhyme or the tale to the students and draw the attention of the students to the points that are the voices and voices of the students.

Table 54. ᐅᐅ with vowels derivates

| | | | | | | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| ᐅ | ᐅ | ᐅ | ᐅ | ᐅ | ᐅ | ᐅ | ᐅ | ᐅ | ᐅ | ᐅ | ᐅ | ᐅ | ᐅ | ᐅ |
| ᐅᐅ | ᐅᐅ | ᐅᐅ | ᐅᐅ | ᐅᐅ | ᐅᐅ | ᐅᐅ | ᐅᐅ | ᐅᐅ | ᐅᐅ | ᐅᐅ | ᐅᐅ | ᐅᐅ | ᐅᐅ | ᐅᐅ |
| ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ | ⠠⠠ |

Exercises 1: In our daily lives, the words “س” begin with and the words that do not begin are determined. For example, the words سُبْحًا، سُبْحًا، سُبْحًا، سُبْحًا، سُبْحًا are determined. These words work on how to remove the tone is done.

Exercises 2: Writing of the sound “س” is performed. The sound “س” is said to be points 1 – 4 - 6. The students will be prompted to enter “س”. This work is ensured until the students write the letter independently. Each “س” sound is called “س” is required to be spoken. After the writing work is finished, the paper should be removed from the tablet and turned away from left to right. The position of the letter during the reading operation must be as follows;



Exercises 3: Using the 1st and 3rd lines in the typing tablet, a “س” sound is written to the braille points, leaving a box space between them, and the study material is prepared. It is desirable to remove the paper from the tablet. The student is asked to follow the line from left to right. When the line is followed, it is requested to say “س” when it finds “س” between the six points. After the 1st line is finished, the same operation is done for the 3rd line.

3.4.19. Teaching of “ق” / q / Voice (ق)

Benefit from hearing skills to create auditory awareness and to facilitate learning the sound of ق. Try to draw a song about the sound of ق, the rhyme or the tale to the students and draw the attention of the students to the points that are the voices and voices of the students.

Table 55. Qōp with Vowels Derivates

| | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| ق | ق | ق | ق | ق | ق | ق | ق | ق | ق | ق | ق | ق | ق | ق |
| Qū | Qū | Qū | Qi | Qi | Qi | Qe | Qe | Qe | Qo | Qo | Qo | Qa | Qa | Qa |
| ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ |

Exercises 1: In our daily lives, the words “ق” begin with and the words that do not begin are determined. For example, the words قُلُوبًا، قُلُوبًا، قُلُوبًا، قُلُوبًا are determined. These words work on how to remove the tone is done.

Exercises 2: Writing of the sound ”و” is performed. The sound ”و” is said to be points 1 – 2 – 3 – 4 - 5. The students will be prompted to enter ”و”. This work is ensured until the students write the letter independently. Each ”و” sound is called ”و” is required to be spoken. After the writing work is finished, the paper should be removed from the tablet and turned away from left to right. The position of the letter during the reading operation must be as follows;



Exercises 3: Using the 1st and 3rd lines in the typing tablet, a ”و” sound is written to the braille points, leaving a box space between them, and the study material is prepared. It is desirable to remove the paper from the tablet. The student is asked to follow the line from left to right. When the line is followed, it is requested to say ”و” when it finds ”و” between the six points. After the 1st line is finished, the same operation is done for the 3rd line.

3.4.20. Teaching of “;” / r / Voice (⠨)

Benefit from hearing skills to create auditory awareness and to facilitate learning the sound of ;. Try to draw a song about the sound of ;, the rhyme or the tale to the students and draw the attention of the students to the points that are the voices and voices of the students.

Table 56. Rēš with Vowels Derivates

| | | | | | | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| ⠨ | ⠨ | ⠨ | ⠨ | ⠨ | ⠨ | ⠨ | ⠨ | ⠨ | ⠨ | ⠨ | ⠨ | ⠨ | ⠨ | ⠨ |
| rū | rū | rū | ri | ri | ri | re | re | re | ro | ro | ro | ra | ra | ra |
| ⠨ | ⠨ | ⠨ | ⠨ | ⠨ | ⠨ | ⠨ | ⠨ | ⠨ | ⠨ | ⠨ | ⠨ | ⠨ | ⠨ | ⠨ |

Exercises 1: In our daily lives, the words “;” begin with and the words that do not begin are determined. For example, the words ⠨, ⠨, ⠨, ⠨, ⠨ are determined. These words work on how to remove the tone is done.

Exercises 2: Writing of the sound ”;” is performed. The sound ”;” is said to be points 1 - 2 – 3 – 5. The students will be prompted to enter”;”. This work is ensured until the students write the letter independently. Each ”;” sound is called ”;” is required to be spoken. After the writing work is finished, the paper should be removed from the tablet and turned

away from left to right. The position of the letter during the reading operation must be as follows;



Exercises 3: Using the 1st and 3rd lines in the typing tablet, a “;” sound is written to the braille points, leaving a box space between them, and the study material is prepared. It is desirable to remove the paper from the tablet. The student is asked to follow the line from left to right. When the line is followed, it is requested to say “;” when it finds “;” between the six points. After the 1st line is finished, the same operation is done for the 3rd line.

3.4.21. Teaching of “š” / š / Voice (š)

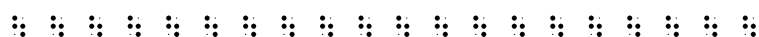
Benefit from hearing skills to create auditory awareness and to facilitate learning the sound of š. Try to draw a song about the sound of š, the rhyme or the tale to the students and draw the attention of the students to the points that are the voices and voices of the students.

Table 57. Šm with vowels derivatives

| | | | | | | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| š | š | š | š | š | š | š | š | š | š | š | š | š | š | š |
| šū | šū | šū | ši | ši | ši | še | še | še | šo | šo | šo | ša | ša | ša |
| ⠠ | ⠠ | ⠠ | ⠠ | ⠠ | ⠠ | ⠠ | ⠠ | ⠠ | ⠠ | ⠠ | ⠠ | ⠠ | ⠠ | ⠠ |

Exercises 1: In our daily lives, the words “š” begin with and the words that do not begin are determined. For example, the words **šū, ši, še, šo, ša** are determined. These words work on how to remove the tone is done.

Exercises 2: Writing of the sound “š” is performed. The sound “š” is said to be points 1 – 1 – 5 - 6. The students will be prompted to enter “š”. This work is ensured until the students write the letter independently. Each “š” sound is called “š” is required to be spoken. After the writing work is finished, the paper should be removed from the tablet and turned away from left to right. The position of the letter during the reading operation must be as follows;



Exercises 3: Using the 1st and 3rd lines in the typing tablet, a "ا" sound is written to the braille points, leaving a box space between them, and the study material is prepared. It is desirable to remove the paper from the tablet. The student is asked to follow the line from left to right. When the line is followed, it is requested to say "ا" when it finds "ا" between the six points. After the 1st line is finished, the same operation is done for the 3rd line.

3.4.22. Teaching of "ا" / t / Voice (:)

Benefit from hearing skills to create auditory awareness and to facilitate learning the sound of ا. Try to draw a song about the sound of ا, the rhyme or the tale to the students and draw the attention of the students to the points that are the voices and voices of the students.

Table 58. Taw with Vowels Derivates

| | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| ا̇ | ا̇ | ا̇ | ا̇ | ا̇ | ا̇ | ا̇ | ا̇ | ا̇ | ا̇ | ا̇ | ا̇ | ا̇ | ا̇ | ا̇ |
| tū | tū | tū | ti | ti | ti | te | te | te | to | to | to | ta | ta | ta |
| ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ | ⠠⠠⠠ |

Exercises 1: In our daily lives, the words "ا" begin with and the words that do not begin are determined. For example, the words اء, اء, اء, اء, اء, اء are determined. These words work on how to remove the tone is done.

Exercises 2: Writing of the sound "ا" is performed. The sound "ا" is said to be points 1- 4 - 5 - 6. The students will be prompted to enter "ا". This work is ensured until the students write the letter independently. Each "ا" sound is called "ا" is required to be spoken. After the writing work is finished, the paper should be removed from the tablet and turned away from left to right. The position of the letter during the reading operation must be as follows;



Exercises 3: Using the 1st and 3rd lines in the typing tablet, a "ا" sound is written to the braille points, leaving a box space between them, and the study material is prepared. It is desirable to remove the paper from the tablet. The student is asked to follow the line from left to right. When the line is followed, it is requested to say "ا" when it finds "ا" between the six points. After the 1st line is finished, the same operation is done for the 3rd line.

CHAPTER FOUR: CONCLUSIONS AND RECOMMENDATIONS

This study presents an example of a prototype for the first Syriac Braille alphabet developed for the learning of literacy in Syriacs' living in Turkey and in other countries.

Thus, the Syriac field is a subject that has not been mentioned until today, and it is thought to make a contribution to the scientific world as it is the first study on behalf of our country.

Within the scope of the research, the following ways were followed. The historical process of the Braille alphabet has been examined and the structure of Braille cells consisting of 6 points has been analyzed.

Louise Braille's first French alphabet was examined. In parallel, the English Braille alphabet was examined. The structure of the braille alphabet in Hebrew and Arabic was examined since it is from a Syriac Semitic language family.

The Turkish Braille alphabet, which is used by visually impaired individuals who are educated in Turkey where there are multilingualism and multiculturalism, is also examined in detail.

In this alphabet designed for Syriacs, the difficulties in the Turkish Braille alphabet were interviewed with visually impaired students and the letters that affect the reading speed were identified.

This alphabet's design is remarkably close to that of Semitic, the family of Indian European languages, and the Turkish Braille alphabet. Therefore, visually impaired Syriacs or visually impaired people who want to learn a foreign language will be able to learn to read and write using the Syriac Braille alphabet.

This alphabet, designed in this way, is very similar to both the Semitic, the Indian European languages family, and the Turkish Braille alphabet.

Therefore, visually impaired Syriacs or visually impaired people who want to learn a foreign language will be able to learn to read and write using the Syriac braille alphabet.

This section will summarize briefly in light of the research questions and explain the outputs one by one for the general and specific purposes of the study. Subsequently, suggestions will be made to improve the current situation.

4.1. Conclusions

The Syriac alphabet was examined first to create the Syriac Braille Alphabet. As a result of these examinations, the following findings were obtained.

The Syriac alphabet is used to make the language known as Syriac written. This alphabet began to be used from the 2nd century BC onwards. The Syriac alphabet is one of the alphabets derived from the Aramaic alphabet. Therefore, it is an alphabet which is connected with Hebrew alphabet and Arabic alphabet. It is also associated with the Phoenician alphabet, which is no longer used but inspires many of the alphabets used in the Mediterranean and all over the world. The first texts belonging to the Assyrian alphabet were found in the Nestorian churches belonging to the Nestorian sect.

Syriac alphabet is a writing system that is written from right to left like the Arabic alphabet. There are 22 letters in the alphabet and they do not contain famous letters. These voices are completed by the person who reads the text, or the correct reading of the word or text is indicated by signs named as vowels.

There are also 3 letters in the Assyrian alphabet which can be used to perform the famous task. When the “ʿ” letter is found at the beginning or end of the words, it can also act as the famous letter. The letter “ܘ” meets both -y and -i or -e. The third letter “ܐ”, similar to these, can also be used to express -v and -o vowels as well as -v consonants.

Another feature of the Assyrian alphabet is the existence of different varieties and the use of different Assyrian alphabet types belonging to different periods or regions. There are basically three types of this alphabet. Three different types of Assyrian alphabet can be given as follows:

1. **ʿEstrangēlā**: it is the oldest variant of the alphabet. This classic variety, which was no longer used for Syriac writings, revived from time to time after the 10th century. It can be seen in some inscriptions, in the designation of titles or in scientific publications of some universities.
2. **pšīṭā**: this type of writing is more simple and soft-looking than ʿEstrangēlā. This type, in which the western Syriac dialect is written, is also known as Serṭā, Maronite or Yakubi. This type of script used in movement can also be described as a handwriting. Already it is thought that using parchment has become widespread with the fact that it becomes cheaper and economical. It seems to be widespread since the 8th century.

2. **Pšīṭā**: this writing is more simple and soft-looking than 'Eṣṭrangēlā. This type, in which the western Syriac dialect is written, is also known as Serṭā, Maronite or Yakubi. This type of script used in movement can also be described as a handwriting. Already it is thought that using parchment has become widespread with the fact that it becomes cheaper and economical. It seems to be widespread since the 8th century.
3. **Maḏnḥāyā**: it is known as the kind in which the eastern Syriac dialect (in general) is written. This type of writing can be shown as a mixture of the first two varieties. A system that uses punctuation marks above or below the letters used to indicate vowels. The eastern type of scripture, also known as Swādāyā, Assyrian, Chaldean or Nesturi, is thought to be the pioneer of the punctuation marks Nikkud used in the Hebrew writing system. In addition to these types of writing, there are also less commonly used forms such as Melki, which is considered to be derived from the western Syriac script, used by the Melkids and referred to as Pšīṭā, Yakubi, Maruni, Serṭā.

In fact, all of these alphabets are working on 'Eṣṭrangēlā coding on the computer base. 'Eṣṭrangēlā coding is also coded by the UNICODE consortium The Unicode range of the Syriac characters is U 0700 ... U 074F. So, the Unicode computer code of the letter Alef is the same in both 'Eṣṭrangēlā, Serṭā, and Maḏnḥāyā.

Table 59. Syriac Alphabet with Unicode

| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|-----|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 700 | Ⲁ | ⲁ | Ⲃ | ⲃ | Ⲅ | ⲅ | Ⲇ | ⲇ | Ⲉ | ⲉ | Ⲇ | Ⲋ | ⲋ | Ⲍ | ⲍ | Ⲏ |
| 710 | ⲏ | Ⲑ | ⲑ | Ⲓ | ⲓ | Ⲕ | ⲕ | Ⲍ | ⲍ | Ⲏ | ⲏ | Ⲑ | ⲑ | Ⲓ | ⲓ | Ⲕ |
| 720 | ⲕ | Ⲍ | ⲍ | Ⲏ | ⲏ | Ⲑ | ⲑ | Ⲓ | ⲓ | Ⲕ | ⲕ | Ⲍ | ⲍ | Ⲏ | ⲏ | Ⲑ |
| 730 | ⲑ | Ⲓ | ⲓ | Ⲕ | ⲕ | Ⲍ | ⲍ | Ⲏ | ⲏ | Ⲑ | ⲑ | Ⲓ | ⲓ | Ⲕ | ⲕ | Ⲍ |
| 740 | ⲑ | Ⲓ | ⲓ | Ⲕ | ⲕ | Ⲍ | ⲍ | Ⲏ | ⲏ | Ⲑ | ⲑ | Ⲓ | ⲓ | Ⲕ | ⲕ | Ⲍ |

Source : (UNICODE, 2109A)

Abbreviations used in Syriac scripts can be indicated by a special control character, Syriac abbreviation mark (U 070f).

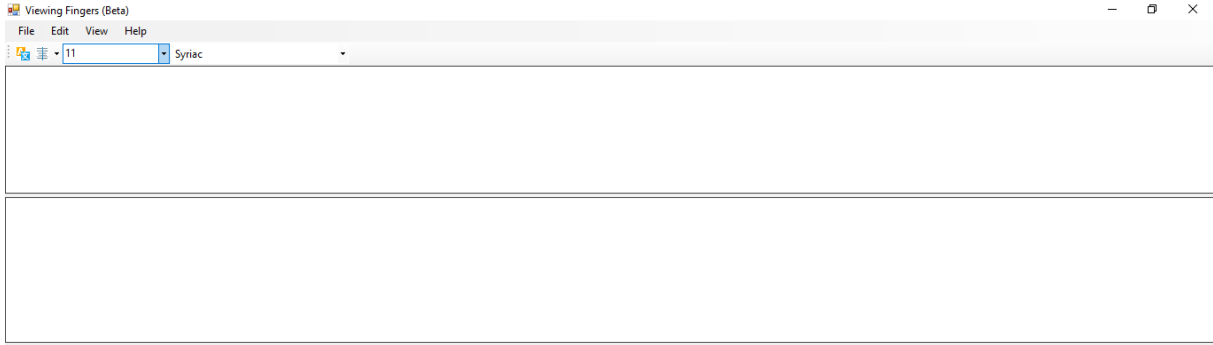
Knowing all these technical events, we have developed a program to support our work. We call it *Viewing Fingers* in this program. This tool was created via Microsoft Visual C#. And now it is only working under x86 and x64 systems with Microsoft Operation Systems.

With this program, we have defined all Syriac alphabet letters, numeric characters, punctuation marks, and other marks as a database. However, in order to make our program work more properly, we have provided some information about the Syriac grammar and spelling rules. Viewing Fingers Software is a simple way to convert text to Braille notation. Please consider that a 100% correct Braille translation can only be done by a human, as this requires an understanding of the text content.

Then we examined some Braille alphabets belonging to both eastern and western languages. Taking into account the geographies where the Syriacs lived, we have identified the braille points corresponding to the Syriac Braille Alphabet.

Thus, when we take any existing text and put it in the program we develop, our software instantly converts the current Syriac text to Braille format. This provides a facility to produce fast material for the visually impaired.

Table 60. Viewing Fingers Program



We put any Syriac text into Input screen then we press convert button. After that, our program gives us 1. Output Screen Braille format, 2. Output Screen gives us IPA transliteration, and 3. Output Screen gives us Latin transcript.

Table 61. Syriac Letters with Viewing Fingers Program

Input Secren

1. Output Secren

2. Output Secren

3. Output Secren

In this are we put just Syriac vowels, and when we press convert button it gives us Syriac Braille transcriptions. This small application will give us comfortable for pre-writing texts to convert Syriac Braille.

Table 62. Syriac Vowels With Viewing Fingers Program

aaa āāā eeee īīī ūūū

aaa ooo eeee īīī uuu

Syriac Language has been introduced with the database of Viewing Fingers software which is developed for the visually impaired in non-representative nations and now supports Kurmanji, Zazaki and Arabic languages.

In the literature review and training activities on the visually impaired volunteers;

1. In the process of education of the visually impaired in Turkey cannot take advantage of all the possibilities,
2. In Turkey, despite the legal regulations, there are big disruptions in the education of the visually impaired,
3. Students in Turkey, particularly those studying inclusive education, are given almost no Braille help when learning other languages.
4. Those whose native language is not Turkish cannot receive any training with braille in their native language,
5. It was also understood that none of the non-governmental organizations that are advocating for the rights of mother tongue have ever mentioned the issue of advocacy of education in mother tongue.
6. However, it is understood that linguists and trainers of ethnic minorities such as Kurdish (Zazakî and Kurmanji dialects, Syriac, Laz, Circassian have not done any studies so far to enable them to learn how to read and write in their native language.
7. As a result of our research, it is understood that this problem is not only the problem of visually impaired people in non-representative nations. For example, a visually impaired born in Turkey, Arab, Iranian, French, German, British or Israeli, even a visually impaired in Turkey shows they cannot find an instructor to provide training in their native language.
8. Despite the fact that there are several Turkish institutions with language and literature departments that do not provide any Braille reading basic education courses or seminars.
9. No religious institution makes any effort for the visually impaired to read the scriptures in their mother tongue.

4.2. Recommendations

When teaching visually impaired students the first language or the secondary language, the following should be considered:

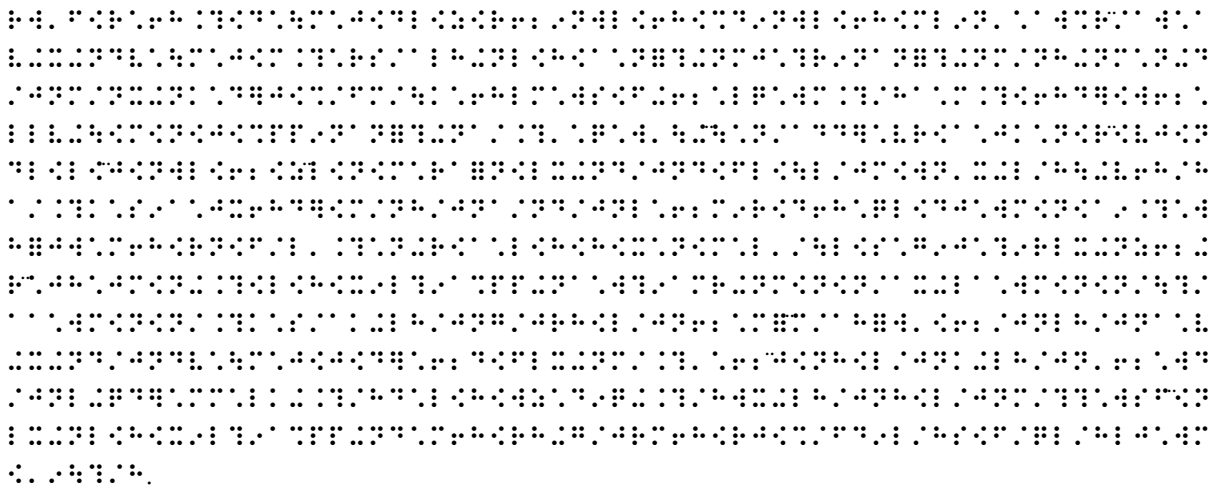
1. Foreign language instruction in schools for the visually impaired should be provided by qualified instructors who can read and write Braille.
2. written materials and exam questions to be used in courses or courses must be printed in braille writing and distributed to visually impaired students. For this purpose, a special system consisting of computer, scanner and braille printer must be installed.
3. In general schools and private courses, the teacher, while using the blackboard, thinking that there are visually impaired students in the classroom, written on the board constantly loud, slow and understandable way to repeat, the new words should be written for the student to say letters.
4. In order to make up for the lack of visual materials, it should focus on verbal expression and touch-based methods, while teaching new words and sentences, bringing things or models to the classroom and making students see them by touch.
5. When teaching words, he should resort to methods such as imitation or dramatization. For example, to imitate sleep while teaching the word (sleep). It's like pretending to laugh when you teach (laugh).
6. The visually impaired student should be placed in the most appropriate place where the teacher can hear easily and the teacher should speak with a suitable tone according to the width and the crowd of the class.
7. The teacher should be able to read and evaluate the student's exam and homework papers.
8. The teacher should be assisted by the teacher himself or his classmates so that the student can complete the subjects that he / she cannot write or understand during the course.
9. If the exam questions cannot be given to the student in writing, a suitable reader with a proper pronunciation, fluent reading skills should be provided to read the questions. The exam should be conducted in a separate room and in a quiet environment.
10. There should be a special section in the schools or classrooms that includes brackets and audio materials, and visually impaired students should be able to improve themselves outside the class.

11. Teachers who will teach foreign language to visually impaired people should first undergo special training in methods and techniques, materials, and writing.
12. The teacher should focus on listening-comprehension, reading-writing, translation, and create exercises to ensure the active participation of each student.
13. In order to improve the students' practical speaking skills, the students should communicate with foreigners whose native language is Syriac or other unrepresented nation languages.
14. Students should be taught how to use the dictionary via computer.
15. In the language and literature departments of the universities, elective braille alphabet courses should be given for at least one semester. Thus, language and literature students will have more or less insight into the education of visually impaired individuals.
16. Non-governmental organizations should take active roles in the learning of mother tongue or foreign language for visually impaired people. Projects must be performed by NGOs.
17. The Ministry of National Education should provide technological support for visually impaired students for learning their first language and foreign languages.
18. Local governments should contribute to mother tongue and foreign language issues in their own regions. They should realize the necessary projects and implement them as soon as possible.

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Matthew Chapter 7

لا تاتوا مني لئلا تؤذوا منكم
 بل اطلبوا وجهي فاصحوا لي لئلا اؤذيكم
 فاذبحوا ذبيحة السلام
 لا قتل ولا غضب ولا غش ولا ظلم
 بل اطلبوا هذه الاشياء فاصحوا لكم
 فان اطلبتموه فانه يسمع من السموات ويصلي عليكم
 فاصحوا لكم
 لا تعلمون اني قد جئت ليخلص السموات والارض
 بل ليخلص الذين هم
 فليس لئلا ياتي احدكم
 ليخلص جسمه ويهلك نفسه
 بل لئلا ياتي احدكم
 ليخلص جسمه ويهلك نفسه
 بل لئلا ياتي احدكم
 ليخلص جسمه ويهلك نفسه
 بل لئلا ياتي احدكم
 ليخلص جسمه ويهلك نفسه

وَجَاءَ كَذِبًا لَّا تُلَا سَبِّ فَعَلُوا لِيَوْمَئِذٍ أَلْفًا عَشْرًا
وَأُولَئِكَ كَفَرُوا لَعْنَةُ اللَّهِ عَلَيْهِمْ أَصْحَابُ الْأَنْبِيَاءِ
مَنْ جَاءَهُمْ بِالْبَيِّنَاتِ فَرَدُّوا عَلَيْهَا كَذِبًا كَمَا كَفَرُوا
أَوَّلَ مَرَّةٍ فَسَوْفَ يَأْتِيهِمْ يَوْمَئِذٍ آيَاتُ اللَّهِ مُخَوِّضَةً
لِالَّذِينَ كَفَرُوا فَسَوْفَ يَسْتَكْبِرُونَ
فَلْيَرْجِعْ بَصِيرَتَهُ إِلَى اللَّهِ يُحَدِّثُ رُوحَهُ
مَنْ يَشَاءُ لِيَوْمَئِذٍ الْمُنْتَهَى

وَجَاءَ كَذِبًا لَّا تُلَا سَبِّ فَعَلُوا لِيَوْمَئِذٍ أَلْفًا عَشْرًا
وَأُولَئِكَ كَفَرُوا لَعْنَةُ اللَّهِ عَلَيْهِمْ أَصْحَابُ الْأَنْبِيَاءِ
مَنْ جَاءَهُمْ بِالْبَيِّنَاتِ فَرَدُّوا عَلَيْهَا كَذِبًا كَمَا كَفَرُوا
أَوَّلَ مَرَّةٍ فَسَوْفَ يَأْتِيهِمْ يَوْمَئِذٍ آيَاتُ اللَّهِ مُخَوِّضَةً
لِالَّذِينَ كَفَرُوا فَسَوْفَ يَسْتَكْبِرُونَ
فَلْيَرْجِعْ بَصِيرَتَهُ إِلَى اللَّهِ يُحَدِّثُ رُوحَهُ
مَنْ يَشَاءُ لِيَوْمَئِذٍ الْمُنْتَهَى

1. 2023年12月31日，公司总资产为100000000元，其中流动资产为60000000元，非流动资产为40000000元。2024年1月1日，公司总资产为105000000元，其中流动资产为65000000元，非流动资产为40000000元。

2. 2023年12月31日，公司所有者权益总额为30000000元，其中实收资本为10000000元，资本公积为10000000元，盈余公积为10000000元，未分配利润为0元。2024年1月1日，公司所有者权益总额为35000000元，其中实收资本为10000000元，资本公积为10000000元，盈余公积为15000000元，未分配利润为0元。

3. 2023年12月31日，公司负债总额为70000000元，其中流动负债为60000000元，非流动负债为10000000元。2024年1月1日，公司负债总额为70000000元，其中流动负债为60000000元，非流动负债为10000000元。

4. 2023年12月31日，公司营业收入为100000000元，营业成本为60000000元，营业利润为40000000元。2024年1月1日，公司营业收入为105000000元，营业成本为65000000元，营业利润为40000000元。

5. 2023年12月31日，公司净利润为40000000元。2024年1月1日，公司净利润为40000000元。

لِيُؤَكِّدَ نَصْرَهُمْ، كَمَا يُؤَكِّدُ قَوْمَهُمْ وَيُجْعَلُ لَهُمْ نَصْرًا مِنْكَ وَلَا تُبَدِّلْ لَهُمُ مَقْرَبًا وَلَا تُؤَيِّدْ لَهُمْ جَيْشًا
حَسْبُهُمْ أَهْلَهُمْ وَأَهْلُكُمْ وَأَهْلُكُمْ حَتَّىٰ يَمُوتُوا مِنْكُمْ وَأَنْتُمْ كَالْجِبَالِ الثَّابِتَةِ لَا تُبَدِّلُهَا
مَنْ أَمْسَكَ بِمَنْ يَلْمِ الْبَطِيلَ قِيَامًا وَتَبَعًا وَمَنْ يَلْمِ الْغَائِبَ بِمَنْ لَمْ يَلْمِ الْغَائِبَ وَمَنْ يَلْمِ الْغَائِبَ
بِمَنْ يَلْمِ الْغَائِبَ قِيَامًا وَتَبَعًا وَمَنْ يَلْمِ الْغَائِبَ بِمَنْ لَمْ يَلْمِ الْغَائِبَ وَمَنْ يَلْمِ الْغَائِبَ بِمَنْ لَمْ يَلْمِ الْغَائِبَ
لَا يُجْعَلُ عَلَيْهَا مَثَلًا وَلَا يُجْعَلُ عَلَيْهَا مَثَلًا وَلَا يُجْعَلُ عَلَيْهَا مَثَلًا وَلَا يُجْعَلُ عَلَيْهَا مَثَلًا
مَثَلًا لِلرَّجُلِ الَّذِي يَلْمِ الْغَائِبَ بِمَنْ لَمْ يَلْمِ الْغَائِبَ وَمَنْ يَلْمِ الْغَائِبَ بِمَنْ لَمْ يَلْمِ الْغَائِبَ
وَيُجْعَلُ عَلَيْهَا مَثَلًا وَلَا يُجْعَلُ عَلَيْهَا مَثَلًا وَلَا يُجْعَلُ عَلَيْهَا مَثَلًا وَلَا يُجْعَلُ عَلَيْهَا مَثَلًا
وَيُجْعَلُ عَلَيْهَا مَثَلًا وَلَا يُجْعَلُ عَلَيْهَا مَثَلًا وَلَا يُجْعَلُ عَلَيْهَا مَثَلًا وَلَا يُجْعَلُ عَلَيْهَا مَثَلًا
وَيُجْعَلُ عَلَيْهَا مَثَلًا وَلَا يُجْعَلُ عَلَيْهَا مَثَلًا وَلَا يُجْعَلُ عَلَيْهَا مَثَلًا وَلَا يُجْعَلُ عَلَيْهَا مَثَلًا
وَيُجْعَلُ عَلَيْهَا مَثَلًا وَلَا يُجْعَلُ عَلَيْهَا مَثَلًا وَلَا يُجْعَلُ عَلَيْهَا مَثَلًا وَلَا يُجْعَلُ عَلَيْهَا مَثَلًا
وَيُجْعَلُ عَلَيْهَا مَثَلًا وَلَا يُجْعَلُ عَلَيْهَا مَثَلًا وَلَا يُجْعَلُ عَلَيْهَا مَثَلًا وَلَا يُجْعَلُ عَلَيْهَا مَثَلًا
وَيُجْعَلُ عَلَيْهَا مَثَلًا وَلَا يُجْعَلُ عَلَيْهَا مَثَلًا وَلَا يُجْعَلُ عَلَيْهَا مَثَلًا وَلَا يُجْعَلُ عَلَيْهَا مَثَلًا

[Decorative section consisting of multiple lines of stylized, repetitive patterns and symbols, possibly representing a specific dialect or a form of calligraphy.]

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Matthew chapter 11

1 وَأَمَّا جَوْنَانُ وَجَبَّ حَلَمٌ نَعَمٌ كَصَفْمِيهِ كَأُورُشَلَيْمَ: أَلَمْ تَقْبَلِيهِ يَوْمَ بَعَثْنَا فِي نَجْمِكَ لِيُخَلِّصَهُ لِمَنْ يَجْعَلُهُ
2 كَمَا يَشَاءُ؟ كَيْفَ سَمِعْتِ وَأَنْتِ كَرِيحٌ تَنْفِثُ فِي جُذُوعِهِ يَوْمَ بَعَثْنَا فِي نَجْمِكَ لِيُخَلِّصَهُ يَوْمَ أَوْسَدَ
3 لَهُ أَيْدِي يَوْمَ هُوَ يُؤَابَا أَوْ لَأَسَاءَ يَوْمَ مَصَعْتِ سَائِسٍ حِينَا نَعَمٌ هُوَ لَمْ يَكُنْ رِجْلُهُ أَعْدَاهُ
4 كَيْفَ سَمِعْتِ أَيْدِي وَبَعَثْتِ أَيْدِيهِمْ فِي مَفْعَلِ مَنٍّ هَسْبِيئَا مَدِينَةٍ هَكَذَا كَمَا وَكُنْتِ هَسْبِيئَا
5 مُعْتَبِرٍ هَمْتِيئَا أَسْقِي هَمْتِيئَا مُصْعَلَاتِي هُوَ جَمْعُ يَوْمٍ لَأَسَا وَلَا تَبْتَعَا كَيْفَ يَوْمَ أُرْلَهُ
6 عَنْ نَعَمٍ لِقَامًا لَجْتَا حَلَا كَيْفَ سَمِعْتِ حِينَا بِرَمَلَةِ حَسْبِيئَا لِحَسْرَا مَنَا وَبَعْدِيئَا حَلَا لَأَسَا
7 هُوَ لَأَسَا حِينَا بِرَمَلَةِ لِحَسْرَا لَجْتَا وَتَبْتَا لَجْتَا حَسْبِيئَا حَسْبِيئَا حَسْبِيئَا حَسْبِيئَا
8 أَيْدِي هُوَ لَأَسَا حِينَا بِرَمَلَةِ لِحَسْرَا لَجْتَا أَيْدِي لَأَسَا حَسْبِيئَا مَدِينَةٍ هُوَ يَوْمَ يَوْمَ
9 تَبْتَا يَوْمَ لَأَسَا حَسْبِيئَا لِحَسْرَا مِيئَا قَبْرِيئَا قَبْرِيئَا مِيئَا مِيئَا حَسْبِيئَا أَيْدِي لَأَسَا لِحَسْبِيئَا وَلَا مُمْرٍ
10 تَسْبِيئَا نَعَا وَوَتِ كَيْفَ سَمِعْتِ مَصْعَلِيئَا رَحْمَةً وَأَيْدِي حَسْبِيئَا لِحَسْبِيئَا وَتِ يَوْمَ حَسْبِيئَا كَيْفَ سَمِعْتِ
11 كَيْفَ سَمِعْتِ يَوْمَ مَصْعَلِيئَا حَسْبِيئَا لِحَسْبِيئَا حَسْبِيئَا حَسْبِيئَا حَسْبِيئَا حَسْبِيئَا حَسْبِيئَا حَسْبِيئَا



Matthew chapter 12

دَهْه رَاجِنَا مَهْجَبْ يَهْ هُوَا مَعْمَه نَعَحْدَا كُدْ رَوْدَا هَلْحَقِيَهْ يَهْ تَجْفِه هَمَمَه مَلْحَجِبْ مَعْظَلَا
 هُؤَجَكِبْ فَيْتَعَا رُوبْ كَيِّ سَاهْ اُنَّيْ اَمَدَبْ دَاهْ هُوَا لَحَقِيَهْ يَنْجَبْتِبْ مَجْمَرْ وَلَا مَعْتَلْ لَحَقِيَجِبْ
 نَعَحْدَا يَهْ رُوبْ اَمَدَبْ دَاهْ هُوَا لُ مَنَلَّهْ مَعْنَا حَجَبْ وَوَهَبْ كَبْ تَجْفِي هَا لَسَكِبْ وَتَمْفِهْ اَمْعَلَا نَلَا
 حَجَبْنَا يَلَلَاهْ هَا كَسَمَلَا يَرِدُوْهْ وَوَدُنَا اُجَلَا يَهْ وَلَا مَعْتَلْ يَهْ هُوَا دَاهْ لَحَقِيَجَلَا هَلَا لَالَسَكِبْ
 وَتَمْفِهْ اُلَا اُنَّيْ حَجَبْنَا كَلَسَهْ اَهْ لُ مَنَلَّهْ نَاهْ وَاَمَدَبْلَا حُؤَهْنَا دَهْ مَطْلَا مَسَلَسَدُنْ لَعَحْدَا هُوَلَا
 جِيْجَكِبْ اُنَّيْ اَمَدَبْ اُنَا حَجَبْ رُوبْ وَوَتْ مَجْ هَوَطْلَا اَمَدَبْ وَوَدُنَا دَهْ مَطْلَا مَسَلَسَدُنْ لَعَحْدَا هُوَلَا
 رُجَا اُنَا هَلَا رُجَسِدَا اُحَسَجَبْ يَهْ مَلَّهْ لَالَسَكِبْ وَوَلَا جِيْجَكِبْ اُنَّيْ مَدُنْ رَنَنْبْ وَنَعَحْدَا اَمَدَبْ يَهْ
 دَهْ يَرِنْعَا مَعْتَبْ مَجْ اَمَدَبْ نَعْمَه هُوَا لُ جَبْتِهْ مَلَّهْ هُوَا رَجَبْلَا سِيْ اَمَدَبْ يَهْ اَمَدَبْ وَنَعْسَعَا اَمَدَبْ
 هَمَعَلَكَبْ يَهْ هُوَا دَاهْ هُوَا مَدَبْ رُوبْ مَعْتَلْ نَعَحْدَا لَحَقِيَجَلَا اَمَدَبْ وَوَجَلَكَبْ مَتَرُوْهْ يَهْ رُوبْ اَمَدَبْ
 دَاهْ مَدُنْ مَسْجَبْ رَجَبْلَا اَمَدَبْ دَاهْ دُنَا سِيْ هُوَا رُوبْ نَحَسْنَا نَحْمَا وَنَعَحْدَا لُ اُنَّيْ
 هَمَقْمَه دَاهْ مَطْلَا رُوبْ مَلَّهْ دُنْعَا مَجْ دُنَا مِيْجَبْ مَعْتَلْ يَهْ نَعَحْدَا لَحَقِيَجِبْ وَنَعْمَه
 هُوَا يَسَلَا مَدُنْ رَجَبْلَا فَعْمَلْ اَمَدَبْ هُوَا فَعْمَلْ اَمَدَبْ هُوَا مَدَبْلَا اَمَدَبْ سَجَلَا مَدُنْ هُوَا مَقْمَه فَيْتَعَا هَمَطْلَا
 مَعْمَه دَاهْ يَهْ اَمَدَبْ وَنَعَسَجِبْ هُوَا مَعْمَه رُوبْ يَبْرَدْ مَعْتَبْ دَاهْ مَطْلَا مَجْ هُوَا اَمَدَبْ كُدْ وَوَهْ تَنْعَا
 مَعْمَلَا هُوَا مَقْمَه حَجَبْلَهْ هُوَا دَاهْ وَوَلَا يَكْهْ سُوْهْ وَوَدُنَا مَدَبْرْ رُوبْ اَمَدَبْ كَيِّ اَمَدَبْ رَجَبْلَا
 رُوبْ هُوَا حَجَبْلَا رَجَبْلَا دَهْ مَسْجَبْ وَنَعْمَه دَاهْ تَجْفِي وَوَسْ اَمَقْمَه دَاهْ يَهْ هُوَا
 لَحَقِيَجَلَا رَجَبْلَا لُ اُنَّيْ هُوَا اَمَدَبْ هَلَا اَمَدَبْ هُوَا اَمَدَبْ وَوَدُنَا مَدُنْ مَطْلَا لُ اَمَدَبْ وَنَعْمَه
 وَنَعْمَه جِيْجَكِبْ لُ اَمَدَبْ دَاهْ وَوَلَا رَجَبْلَا اَمَدَبْ وَوَدُنَا اَمَدَبْ وَوَدُنَا مَدُنْ مَطْلَا لُ اَمَدَبْ وَنَعْمَه
 سِيْ وَوَسْ هَمَمَه هُوَا مَدُنْ اَمَدَبْ وَوَدُنَا مَدُنْ هُوَا مَدُنْ وَوَدُنَا مَدُنْ هُوَا مَدُنْ وَوَدُنَا مَدُنْ
 هُوَا مَدُنْ وَوَدُنَا مَدُنْ هُوَا مَدُنْ وَوَدُنَا مَدُنْ هُوَا مَدُنْ وَوَدُنَا مَدُنْ هُوَا مَدُنْ وَوَدُنَا مَدُنْ

1. 2023年12月31日，公司总资产为1,234,567,890.12元，较年初增加12.34%。其中，流动资产为890,123,456.78元，非流动资产为344,444,433.34元。

2. 2023年12月31日，公司净资产为567,890,123.45元，较年初增加8.90%。其中，实收资本为345,678,901.23元，未分配利润为222,211,222.22元。

3. 2023年12月31日，公司负债总额为666,677,766.67元，较年初增加10.12%。其中，流动负债为456,789,012.34元，非流动负债为210,888,754.33元。

4. 2023年12月31日，公司营业收入为1,234,567,890.12元，较年初增加15.67%。其中，主营业务收入为987,654,321.09元，其他业务收入为246,913,569.03元。

5. 2023年12月31日，公司净利润为123,456,789.01元，较年初增加20.34%。其中，营业利润为100,123,456.78元，营业外收入为23,333,332.23元。

6. 2023年12月31日，公司经营活动产生的现金流量净额为56,789,012.34元，较年初增加5.67%。其中，销售商品、提供劳务收到的现金为1,234,567,890.12元。

7. 2023年12月31日，公司研发投入为12,345,678.90元，较年初增加10.12%。其中，研发费用为12,345,678.90元。

8. 2023年12月31日，公司总资产周转率为1.2345，较年初提高0.1234。其中，流动资产周转率为1.5678。

הממשלה תבטיח שהתוכנית תהיה יעילה ומתאמת עם המטרות הכלכליות והחברתיות של ישראל.

הממשלה תבטיח שהתוכנית תהיה שקופה ותבטיח שהתוכנית תהיה מתאמת עם המטרות הכלכליות והחברתיות של ישראל.

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הממשלה תבטיח שהתוכנית תהיה שקופה ותבטיח שהתוכנית תהיה מתאמת עם המטרות הכלכליות והחברתיות של ישראל.

1. 2019年12月31日，本公司合并财务报表中应收账款账面余额为1,234,567,890.12元，坏账准备余额为123,456,789.01元，应收账款净额为1,111,111,101.11元。2020年12月31日，本公司合并财务报表中应收账款账面余额为1,345,678,901.23元，坏账准备余额为134,567,890.12元，应收账款净额为1,211,111,011.11元。

2. 2019年12月31日，本公司合并财务报表中预付款项账面余额为567,890.12元，坏账准备余额为56,789.01元，预付款项净额为511,101.11元。2020年12月31日，本公司合并财务报表中预付款项账面余额为678,901.23元，坏账准备余额为67,890.12元，预付款项净额为611,011.11元。

3. 2019年12月31日，本公司合并财务报表中其他应收款账面余额为901,234,567.89元，坏账准备余额为90,123,456.78元，其他应收款净额为811,111,111.11元。2020年12月31日，本公司合并财务报表中其他应收款账面余额为1,012,345,678.90元，坏账准备余额为101,234,567.89元，其他应收款净额为911,111,111.01元。

4. 2019年12月31日，本公司合并财务报表中应收票据账面余额为234,567,890.12元，坏账准备余额为23,456,789.01元，应收票据净额为211,111,101.11元。2020年12月31日，本公司合并财务报表中应收票据账面余额为345,678,901.23元，坏账准备余额为34,567,890.12元，应收票据净额为311,111,011.11元。

5. 2019年12月31日，本公司合并财务报表中合同资产账面余额为1,123,456,789.01元，坏账准备余额为112,345,678.90元，合同资产净额为1,011,111,110.11元。2020年12月31日，本公司合并财务报表中合同资产账面余额为1,234,567,890.12元，坏账准备余额为123,456,789.01元，合同资产净额为1,111,111,101.11元。

6. 2019年12月31日，本公司合并财务报表中其他流动资产账面余额为123,456,789.01元，坏账准备余额为12,345,678.90元，其他流动资产净额为111,111,110.11元。2020年12月31日，本公司合并财务报表中其他流动资产账面余额为234,567,890.12元，坏账准备余额为23,456,789.01元，其他流动资产净额为211,111,101.11元。

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صَلَا كَسَقِنَ اَمْبِدْ لِحْمِ اُصْبَحَ لِهٖ عَجْدَاهُ مَكَّلَا تَهْتَا وَ مَبْتَمَا هَجْمَبِ اَحْتَا وَ اَصْلَا مَحْتَمِ
مَلَا وَ اْمَا هَعمَلَا اِدْ اَحْبِ عَجْدَا كَسَقِنَ هَلْكَتَا هَعَكَّسَ هَمْرَا هَءِوَجِ اَحْبَقِيَهٗ يَءِوَجِ هَا اَحْتَبَا
تِوَجِهَ اَحْتَا هَا اَحْلَهٗ هَلْكَتَا هَمَّجِهَ هَعمَلَهٗ اِهْ اَوْا وَ قَرْبَا مَلَّا عَجْدَا اُصْبَحْتِيَهٗ هِءِ هَبْ
وَ اَحْلَهٗ هِءِ هِءِ وَ اَحْا اَحْتَبِ اَحْتَبَا هِءِ هِءِ هِءِ اَحْتَبَا هِءِ هِءِ هِءِ اَحْتَبَا هِءِ هِءِ هِءِ
اَحْتَبَا هِءِ هِءِ هِءِ اَحْتَبَا هِءِ هِءِ هِءِ اَحْتَبَا هِءِ هِءِ هِءِ اَحْتَبَا هِءِ هِءِ هِءِ



هَلْ تَدْرِي جَبَّارًا إِلَّا كَيْفَ حُجِّمَتْهُ وَبِئْسَ مَا مَدَّلْنَا لِيَدِكَ وَلَا مَدْرِيًّا أَيْدِيكَ وَيَلَاؤُهُ إِلَّا وَتَدْرِي
أَلَيْسَ هُوَ يُبْهِرُكَ نَعْمَ مَدْرِيًّا لِحَقِّيهِ يَوْمَ مَكِّي وَبُرْجَا وَتَبَابًا خُدَّ وَبِحَقِّهِ خُدَّ وَبِعَمَلِهِ نَعْمَ مَا رَمَى
هَتَابًا خُدَّ وَبِئْسَ مَا مَدَّرْنَا لِيَدِكَ وَيَلَاؤُهُ نَعْمَ نَبِيًّا نَعْمَ نَبِيًّا نَعْمَ نَبِيًّا نَعْمَ نَبِيًّا نَعْمَ نَبِيًّا
مَدَّرْنَا كَيْفَ كَيْفَ كَيْفَ كَيْفَ كَيْفَ كَيْفَ كَيْفَ كَيْفَ كَيْفَ كَيْفَ كَيْفَ كَيْفَ كَيْفَ كَيْفَ كَيْفَ كَيْفَ كَيْفَ كَيْفَ
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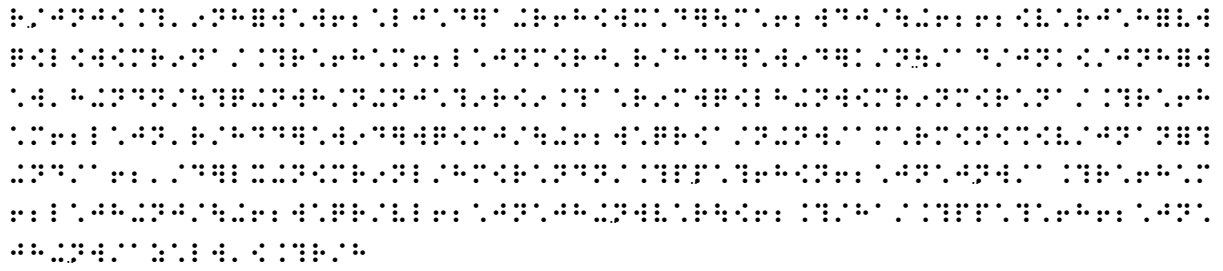
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يَوْمَ هُجِرَ هَالِكًا مَكَانَهُ كَمَا كُنْتَ فِيهِ وَمِنَ النَّاسِ مَن ذَرَاهُ يَوْمَئِذٍ لَّعَنَ لَعْنَةً كَلِمَاتٍ يُؤْتِيهَا
وَمَعْتَلًا لَهَا لَكُنَّ تُكَلِّمَ مَعْتَلًا مَّا تَأْتِي مِنَ الْغَايِبِ ذُو الْأَرْسَالِ إِذِ اسْتَسْعِمُ تَكَلِّمَ
وَالْبَابُ مُخْلَدٌ لَهَا كَذَّبَ بَعْثَ الْوَحْيِ وَقَالَ رَبِّي لَوْلَا دُعَاؤُكَ لَافْتَدَى لَكَ
لَا يُصَلِّي: كَذَّبَتْ ثَمُودُ بِطَغْوَاهُمْ إِذِ اسْتَأْذَنُوا زَيْدَ بْنَ كَلْبَةَ وَكَانَ غَنِيًّا فِي الْيَمِينِ لَوَّاهُ
أَجْرًا أَوْ لَمَّا أُوذِيَ لَوْلَا إِذْ سَأَلُوا زَيْدَ بْنَ كَلْبَةَ إِذْ سَأَلُوا أَن يُبَدِّلَ لَهُمْ لُحُومَهُمْ فَذَكَرَ
فَعَلَّمَا أَنَّهُمْ لَا يَسْمَعُونَ وَهُمْ لَا يَفْقَهُونَ



وَلِيْعًا لِّلْاِبْرٰهِيْمِ الَّذِيْ هُوَ عِنْدَ رَبِّكَ عَلِيمٌ ۗ
وَلِيْعًا لِّلْاِسْرٰهِيْمِ الَّذِيْ هُوَ عِنْدَ رَبِّكَ عَلِيمٌ ۗ
وَلِيْعًا لِّلْاِسْرٰهِيْمِ الَّذِيْ هُوَ عِنْدَ رَبِّكَ عَلِيمٌ ۗ
وَلِيْعًا لِّلْاِسْرٰهِيْمِ الَّذِيْ هُوَ عِنْدَ رَبِّكَ عَلِيمٌ ۗ
وَلِيْعًا لِّلْاِسْرٰهِيْمِ الَّذِيْ هُوَ عِنْدَ رَبِّكَ عَلِيمٌ ۗ





Matthew chapter 21

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Matthew chapter 23

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Matthew chapter 24

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1. 2023年12月31日，公司总资产为1,234,567,890.12元，较年初增加12.34%，主要系应收账款增加所致。其中：流动资产为987,654,321.09元，非流动资产为246,913,568.03元。

2. 2023年12月31日，公司净资产为567,890,123.45元，较年初增加8.76%，主要系留存收益增加所致。其中：实收资本为345,678,901.23元，资本公积为123,456,789.01元，盈余公积为45,678,901.23元，未分配利润为53,675,441.98元。

3. 2023年度，公司实现营业收入1,567,890,123.45元，较年初增加15.67%，主要系销售规模扩大所致。其中：主营业务收入为1,234,567,890.12元，其他业务收入为333,322,233.33元。

4. 2023年度，公司利润总额为234,567,890.12元，较年初增加23.45%，主要系营业利润增加所致。其中：营业利润为212,345,678.90元，营业外收入为22,222,211.22元。

5. 2023年度，公司净利润为189,012,345.67元，较年初增加18.90%，主要系净利润增加所致。其中：归属于母公司所有者的净利润为189,012,345.67元。

6. 2023年度，公司经营活动产生的现金流量净额为123,456,789.01元，较年初增加12.34%，主要系经营活动现金流量增加所致。

7. 2023年度，公司投资活动产生的现金流量净额为-45,678,901.23元，较年初减少45.67%，主要系投资活动现金流量减少所致。

8. 2023年度，公司筹资活动产生的现金流量净额为-34,567,890.12元，较年初减少34.56%，主要系筹资活动现金流量减少所致。

9. 2023年度，公司期末应收账款余额为456,789,012.34元，较年初增加45.67%，主要系应收账款增加所致。

10. 2023年度，公司期末存货余额为234,567,890.12元，较年初增加23.45%，主要系存货增加所致。

11. 2023年度，公司期末应付账款余额为345,678,901.23元，较年初增加34.56%，主要系应付账款增加所致。

12. 2023年度，公司期末预收账款余额为123,456,789.01元，较年初增加12.34%，主要系预收账款增加所致。

13. 2023年度，公司期末其他应收款余额为56,789,012.34元，较年初增加5.67%，主要系其他应收款增加所致。

14. 2023年度，公司期末其他应付款余额为67,890,123.45元，较年初增加6.78%，主要系其他应付款增加所致。

15. 2023年度，公司期末其他流动资产余额为12,345,678.90元，较年初增加1.23%，主要系其他流动资产增加所致。

16. 2023年度，公司期末其他非流动资产余额为12,345,678.90元，较年初增加1.23%，主要系其他非流动资产增加所致。

17. 2023年度，公司期末其他权益工具余额为12,345,678.90元，较年初增加1.23%，主要系其他权益工具增加所致。

18. 2023年度，公司期末其他综合收益余额为12,345,678.90元，较年初增加1.23%，主要系其他综合收益增加所致。

19. 2023年度，公司期末其他非流动负债余额为12,345,678.90元，较年初增加1.23%，主要系其他非流动负债增加所致。

20. 2023年度，公司期末其他流动负债余额为12,345,678.90元，较年初增加1.23%，主要系其他流动负债增加所致。

1. 2023年12月31日，公司总资产为1,234,567,890.12元，净资产为567,890,123.45元。

2. 2023年度，公司实现营业收入1,567,890,123.45元，利润总额为234,567,890.12元，净利润为123,456,789.01元。

3. 截至2023年12月31日，公司应收账款余额为345,678,901.23元，应付账款余额为234,567,890.12元。

4. 2023年度，公司经营活动产生的现金流量净额为123,456,789.01元。

5. 2023年度，公司研发投入为123,456,789.01元。

1. Introduction
2. Methodology
3. Results
4. Discussion
5. Conclusion

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Matthew chapter 28

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