



‘Typography, Sensitivity and Fineness’

www.typoday.in

Anatomy of the Sinhala Letter

Sumanthri Samarawickrama

Postgraduate studies Division, University of Moratuwa, Katubedda, Sri Lanka

Abstract : Anatomy of a letter can be defined as the vocabulary used to describe parts of a letter and its structural system that makes up the morphological characteristics of a certain typeface (Dalvi 2010: 61). This research studies the existing vocabulary and the non-existing vocabulary of the structural system of the Sinhala letter as the theory and literature on this area is rare. The term ‘Sinhala letter’ describes all Sinhala letters used today. The research is divided into two sections. First it examines the existing vocabulary through a literature survey and cross-examines it by three experts. Secondly, through a visual analysis a list of distinguished features unique to the Sinhala letter is identified to bridge the gap of the non-existing vocabulary.

The findings on this paper only discuss the first section; the existing vocabulary and the derivation of the terminology. This can be considered as an initial proposal to standardize a vocabulary for the subject of Sinhala typography.

Keywords: Sinhala Anatomy, terminology, typographic vocabulary, Sinhala letter

1.0 Introduction

Anatomy of typography is commonly spoken within the Latin alphabet due to its historical involvement of typographers, publishers, printers and type designers comparatively, the Sri Lankan printing industry comes to light only in the eighteenth century with scarce theory and literature on the anatomy of the Sinhala letter. Therefore, to advance the study on Sinhala typography, it is important to standardize a vocabulary. To observe the existing vocabulary that defines parts of the Sinhala letter and its structural system was conducted taking into account the works of three experts on epigraphy, language and standardization of language.

In linguistic studies there are two types of sound; vowels and consonants and the two sounds are given a visual approach in typographic studies. Therefore the present study divides the vowels and consonants into five sections according to its visual form. Vowels - as letters, medial vowel sign, and consonants - as letters, combined consonants and other special signs (Table 01). To understand the parts and the structural system of the Sinhala

While the focal visual form; ‘letters’ are discussed in section two and will be published by the author in an upcoming paper.

LINGUISTIC GROUPING	VISUAL GROUPING	VISUAL FORM SAMPLES	THE STUDY	
			SECTION ONE	SECTION TWO
Vowels	Letter : Vowels	ආ, ඇ, ඊ, උ, ඕ,	—	Non- existing vocabulary
	Medial Vowel signs	කා, කැ ටා, ටැ	Existing vocabulary	—
Consonants	Letter : Consonants	ක, ච, ජ, ධ, ඳ, ම,	—	Non- existing vocabulary
	Combined Consonants	(ක+ඡ) කඡ ටා, ටැ	Existing vocabulary	—
	• Combined Consonant signs	ඡ (ක+ඡ) ඡ ටා		
	Other Special signs	කළුර	ඡා, ඡැ	Existing vocabulary

Table 01: Parts of the Sinhala letter - present study on existing vocabulary

Current study approaches the three experts through a literature survey and a cross-examination. It is focused on the vocabulary used to describe the medial vowel signs, combined consonants, combined consonant signs and other special signs. The medial vowel signs are visual symbols that represent vowel sounds attached to a consonant. Combined consonant are when two or more pure consonants are written together, either by binding two or more letters while the combined consonant signs are referred as the *re:phaya*, *raka:ra:ηshya* and the *yanshaya*. Other special sign/s is identified as the *lu* sign.

Among several experts on the subject of epigraphy and language studies the most comprehensive authors’ were selected to cross examine with the third expert - the board of writers to the National Education Commission (NEC) on the standardization of the proportions of the Sinhala letter and the board of writers to the Ministry of National Language and Social Integration (MNLSI) on the application of ‘*pili*’ (*s.pilla*) to the Sinhala letter.

2.0 Selection of experts and objectives: Epigraphic and Language studies

Epigraphic and paleographic research by pioneer authors H.C.P. Bell, P.E.E. Fernando, S. Paranvitana and, D M. de Zilva Wickremasinghe was examined and Fernando was selected as the expert to represent the category of epigraphy. He illustrates each letter and its

visual development while the other authors speak of the letter within a broader area of grammar through phonology, morphology and syntax.

One of the most elaborate descriptions on the evolution of the Sinhala script is explained in Fernando's *Origin and the Development of the Sinhala Script* (2008). The expert explains the development of the visual formation of the Sinhala script until the 15th century ACE which can be recognized by anyone who can read it today. The visual development helps to identify what parts (structural system) make up the Sinhala letter and the author takes this as the main point of reference in order to examine the existing terminology that is used to describe the features of the Sinhala letter.

The objective of the literature survey on the first expert is as follows:

- What are the parts that make up the Sinhala letter?
- What are the parts that have an existing vocabulary?

The second expert's focus on language studies bridges the gap from where the first expert concludes (15th century ACE) to the present. Language studies use script in aspects such as language form, language meaning, and language in context and documents Sinhala script and its practices today.

The largest number of literature was found within the second expert of Language. Authors R. Arangala, V. Balagalle, A.V. Suraweera, T. Kariyawasam and J.B. Dissanayaka were referred to but none other than J. B. Dissanayake speaks on typology. Therefore his work; Three publications by the author, newspaper article included in the reference and a personal interview were referred to extend the current research.

Dissanayake express terminology in two stages. First he constructs the letter within five guidelines and divides them into ascenders, descender and baseline letters. He explains how the vowel signs are placed; either before, after, top and bottom. Second he gives a list of eight combined consonants defined as 'conjunct letters' (Dissanayake 2012:672-3) and five combined consonant signs described as 'consonant strokes' (Dissanayake 2012:491).

The objective of the literature survey on the second expert is as follows:

- What are the new additions to the script that make up the Sinhala letter
- What are the parts that have an existing vocabulary

2.1 Literature survey: Epigraphic and Language

Fernando speaks of the visual development of the Sinhala letter from a paleographic approach therefore the literature survey on the first expert focuses on visual development of the Sinhala letter to identify the parts of the Sinhala letter and the terminology used to define it. The author had grouped the Sinhala letter's visual form into five groups as 1). letters: vowels, 2). letters: consonants, 3). Combined consonants (cc) 4). Medial vowel sign (mvs), and 5). Other special signs(oss) which assists in the identification of the morphological characteristics that form the anatomy of the Sinhala letter.

Within the five groups; the vowels, consonants and CC are represented by its sound therefore there is no significant terminology, but the MVS, combined consonant signs (CCS) and OSS have a specific terminology used in the current study. The terminology used by Fernando is compiled in table 3 with the findings of the other experts for cross analysis.

Medial vowel signs

The visual development of the MVS explained by Fernando helps one to know where they were initially placed (located; top, bottom, before or after). The strokes that illustrated these signs took different shapes (circular, oblique) due to the structural development of the vowel bearer; consonants. During 8th -10th Century _{ACE} the script shows several structural changes and takes its current form by the 15th Century _{ACE}. A sample of this visual development is illustrated in figure 01.

Visual Development 8th -10th century						
The sign for 'pure' consonant			p(ඵ) b(ඵ)	u (ඊ)		pu(ඉ) ku(ඊ)
ā (ආ)				ü (උ)		vu(ඉ) hu(ඊ)
æ (ඈ)				e (ඌ)		se(ඉ) me(ඊ)
āe (ආ)			pae(ආ)	o(ඔ)		no(ඉ) ho(ඊ)
i (ඉ)			mi(ඊ) pi(ඊ)	ī (ඊ)		
ī (ඊ)			mi(ඊ) ri(ඊ)			

Figure 01 - Visual formation of selected medial vowel signs of 8th -10th century

Combined consonants

The combined consonants are documented as a separate section as the findings do not contribute to the existing vocabulary but the visual development. The findings contribute to the structural system that makes up the Sinhala letter. The combined consonant (CC) are listed in table 02 and are extended with findings of the other experts.

Expert one : Epigraphy		Expert two : Language		Expert Three: Standardization
8th Century	9th Century			
• කෂ රුහුණ	ඥ ෂඨ	• කෂ		• කෂ
• ඵල සා	ඊඊ ශ්‍ර	ශධ		• ඵල
• ඵඳ හල	ඊඨ සඵ	• ඵල		• ඵඳ
• ඵධ දුධ	ඵඨ •සඵ	• ඵඳ		• ඵධ
• ඵත ඵල	• ඵත •සඵ	• ඵධ		• ඨ
ච්‍රා මඛ	ච්‍ර	• ඨ		• ඨ
ච්‍රා දුඳ	• දුධ	• ඨ		• ඵ
ශ්‍රේ රුහුණ	ශ	• ඵ		
ශ්‍රේ ශුණ	ඳ			
• සඵ සඵ	• ඵත			
• සඵ දුඵ	• මඛ			
ඵත දුඳ	රුණ			

* Repeats

Table 02 - List of combined consonants by all three experts

Combined consonant signs

The combined consonant signs *re:phaya*, *raka:ra:nshya* and the *yanshaya* is grouped under combined consonants because of its visual construction is more specific to the consonants y(ය) and ra(ර). The *re:phaya* is a replacement of the hal ra(ර) before a consonant.

Raka:ra:nshya is placed when the hal ra(ර) is written after a consonant. This is visualized with the bottom half of the ra(ර) attached to the bottom right of a consonant. *Yanshaya* is also similar to the *raka:ra:nshya* but the half of the y(ය) is a horizontal split (figure 02).








Combined Consonant Signs					
	Represented Consonant		Placement	Consonant sound	
Yanshaya	ය y			කිය k-ya	කය kya
Raka:ra:nshya	ර r			කර k-ra	කර kra
Re:phaya	ර r			රක r-ka	රක rka

Figure 02 - Visual formation of the combined consonant signs

Other special sign/s

There are no diacritic symbols in Sinhala yet we identify *lu* as a special sign. Fernando illustrates the visual development of the consonant *la*() and its application of the *ū* vowel, which makes the sound *lu*. The *lu* appears as a letter yet it is a sign figure 03.


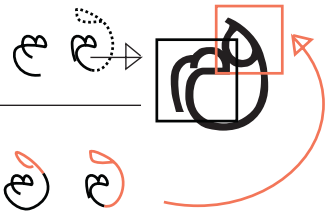
Special sign				Visual development
Visual development				
<i>la</i> 	Brāhmī	8th Cent.	9th- 10th	
	11th- 13th	14th- 15th	Today	
<i>lu</i>	11th- 13th	14th- 15th	Today	
	11th- 13th	14th- 15th	Today	
	11th- 13th	14th- 15th	Today	

Figure 03 - Visual formation special sign- *lu*

2.2 Bridging the literature gap and identifying the variables

The research concentrated on identifying the visual features of the Sinhala letter and the terminology in relation to it. The visual forms; MVS, CC, CCS and OSS dating up to the 15th century were extracted from the first expert and was noted down. Subsequently, the language research of the second expert facilitated in bridging the gap in the formation of Sinhala letters from the past to the contemporary times

At the conclusion of the literature survey, a summarized list of the parts that make up the Sinhala letter is distinguished. The list is compiled in table 03 as the selected variables and cross-examined with the third expert on standardization of language to identify other or similar terms used to describe them.

Two institutions; National Education Commission (NEC) and the Ministry of National Languages and Social Integration(MNLSI) is identified as the third expert . A publication from the NEC on the standardization of the proportions of the Sinhala letter in 2005 and a publication by the board of writers to the MNLSI on the application of '*pili*' (*s.pilla*) on the Sinhala letter in 2013 were selected. Both books are structured as a visual representation on how the Sinhala letter needs to be structured. The NEC publication illustrates all the letters in the alphabet and the medial vowel signs within five guidelines. The only

terminology used within the publication is the medial vowel signs and a few selected combine consonant signs included in table 03. The vowel signs for o, ō, ʀʀ, ai, and the CCS *re:phaya* is also not visually presented.

The missing MVS were introduced in the MNLSI publication under two sections; a). defines the MVS and 2). on the special Sinhala letters and strokes, and within this section we find selected MVS, a list of CC and CCS. The terms that defined these visuals extends to table 03 and gives a complete list of variables by all three experts.

3 Analysis on existing vocabulary

To standardize a vocabulary to describe the anatomy of the Sinhala letter, first the author analyses the variable in table 03 and divides the variables according to medial vowel signs, combine consonant signs and other special signs.

3.1 The medial vowel signs

All vowels are represented visually with one medial vowel or with a combination of signs. Taking this into consideration and the behavior of the *hal* sign (*virāma* sign) author discusses the use of terminology under three sub-groups as:

Group one : ā(ආ), æ(ඇ), ǣ(ඈ), i(ඉ), ī(ඊ), e(එ), u(උ), ū(ඌ), ʀ(ඹ), ʀʀ(ඹඹ), au(ඹඹ)

Group two : a(අ) and *hal* sign

Group three : ē(ඵ), o(ඹ), ō(ඹ)

3.1.1 Variables: medial vowel sign - group one : ā, æ, ǣ, i, ī, e, u, ū, ʀ, ʀʀ, au

Vowels are grouped as short and long according to its pronunciation. The MVS that represents these sounds too are termed accordingly, as *keti* (meaning short) and *deerga*, *degu*, and *dik*(meaning long, extended). In selected vowels, the visual expression of short and long vowel signs are termed according to its placement (location: side, top or bottom). ā(ආ), æ(ඇ), ǣ(ඈ)- *æla* (meaning slant, side), i(ඉ), ī(ඊ)- *is* (meaning head - symbolically top), u(උ), ū(ඌ)- *pa* (meaning foot, feet - symbolically bottom). Therefore the long vowel adopts its terminology from its expression of voice and visual; *degu ada pilla* (voice expression: *degu*; long and as visual expression: *æla*; side) and this practice is common to vowels ǣ(ඈ), ī(ඊ), ū(ඌ) (Figure 04). In the case of ʀ̄(ඹඹ) the long sound is expressed by repeating the sign (figure 05). Terminology that illustrates the voice expression for the long vowel is common within all three experts yet the first expert uses the expression language origin; Sanskrit term *deerga*, second and third experts uses Sinhala

terms *degu*, *dik*. The term *keti* (short) is only used by the third expert and not a collective expression to signify the short vowel sound.

Short and long Vowel	අඳු	අඳු	ඉ	ඊ	උ	උ
	කැ	කැ	කු	කු	කි	කි
VOICE EXPRESSION	<i>keṭi</i>	<i>dik</i>	<i>keṭi</i>	<i>dik</i>	<i>keṭi</i>	<i>dik</i>
VISUAL EXPRESSION	<i>āla</i> (side)		<i>pa</i> (bottom)		<i>is</i> (top)	

Figure 04 - voice and visual expression in terminology

Another form of visual expression is identified in vowels *e*(එ), *ɾ*(සෘ), *au*(ඔ). The vowel sign *e*(එ) is represented with a *kombuva* (*p.kombu*) (meaning horn: musical horn or instrument of that shape). The sign of *ɾ*(සෘ) is similar to the *æla pilla* but with a *gætaya* (*p.gæta*)(meaning knot) so it is termed as the *gæta pilla* (side sign with a knot) and practiced within the second and third experts. The visual expression of vowel sign *au*(ඔ) is represented with a *gayanukitta*. This sign illustrates a rotated *ga* (ග) and written next to a consonant. *Gayanukitta* (meaning, the pilla with form of the letter *ga*). The term *kitta* originates from the Sinhala term *Kruthya*- කෘත්‍ය (meaning function) yet due to semantic change in language it means form- *Svarupa*. There is no other term to define it except the term *au pilla* used by the second expert.

Vowel	එ	සෘ	ඔ
	ඊ	ඊ	ඊ
VISUAL EXPRESSION	<i>kombuva</i>	<i>gatapilla</i>	<i>gayanukitta</i>
	(horn: instrument of that shape) 	(side sign with a knot) 	(pilla shaped as the consonant ga)

Figure 05 -visual expression in terminology

The vowel signs of *u*(උ), *ū*(උඹ) have had two visual forms from its inception and the third expert uses additional terms as *kon* (meaning corner) and *vak* (meaning curve - deriving from the term *vakraya*) in describing its visual expression.





Vowel	උ උඹ	
	<i>vak</i> ඛ ඛ 	<i>kon</i> ඛ ඛ 
VISUAL EXPRESSION	 <i>Vakraya</i> (circle)	 <i>Konaya</i> (corner)

Figure 06 -visual expression in terminology

3.1.2 Variables: group two : *a*(අ) and *hal* sign

Sinhala language is classified as an abugida, and it means that all consonants have an inherent *a* sound to it. Therefore with the application of the *hal sign* or *virāma*(meaning stop, pause) the consonant stops the inherent *a* sound and achieves its pure consonant sound and is known as *hal kirima* (figure 09). Nevertheless there are two visual forms to signify the pure consonant sign or the ‘pause mark’ due to its placement of selected consonants. When the sign is attached to an ascending consonant it is illustrated as a *ræhæna* (meaning rope) and when placed on to a descending or a base consonant it is illustrated as a *kodiya* (meaning flag). The visual form derives out of space constrains and is illustrated in figure 05.

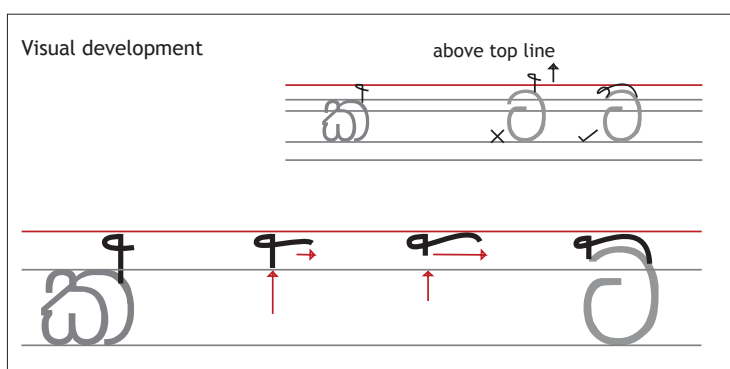


Figure 07 -visual development of the *hal* sign

When the same visual form of the *hal* or *virāma* sign is used in vowels ඵ, ඹ, this sign is known as a *hal lakuna* (meaning ‘lengthening mark’) as the vowel makes a long sound. In

the application of \bar{e} vowel, the sign takes two visual forms (*kodiya*, *ræhæna*) but when the \bar{o} vowel is applied it is placed on top of the *æla pilla* resulting in one visual form (*kodiya*).





<i>Virama sign</i>	<i>kodiya</i> (flag) ක ක 	<i>ræhæna</i> (rope) ඔ ඒ 
VISUAL EXPRESSION	flag 	rope 

Figure 08 - visual expression in terminology

The terms *ræhæna* and *kodiya* are visual expression of the sign used by the second and third expert, while the second expert uses another term *al lakuna* to express the language sound.

3.1.3 Variables: medial vowel sign - group three : \bar{e} (ඓ), o (ඔ), \bar{o} (ඒ)

The third group represents vowel signs that are made with a combination of signs. The common features within the three vowels are the *kombuva* before the consonant and the first expert uses another term *e karaya* (meaning doing act, that which makes the sound) for the vowels *e* and \bar{e} .

The signs on or after the consonants are named as *ā pilla* also known as *ākaranshaya*, *æla pilla*, *viramaya*, *hal kirima* in respective of each vowel. The term *dik æda pilla* is used by the third expert when the lengthening mark is on the *æda pilla*, as it is only practiced on the application of the vowel \bar{o} . The second expert breaks this combination and gives one term for each vowel sign as *ē pilla*, *o pilla*, *ō pilla*.

Another expression is identified when the second and the third expert introduces two terms; *us pilla* (*us* meaning high, elevated) and *udu pilla* (*udu* meaning upper part) to represent the *hal* sign for the vowel \bar{e} , visual expression by its terminology.

By analysing all the terms used by the three experts several expressions are noted. The first expert notes the existence of most vowel signs yet the publication does not give terms for the MVS කා, කෘ, ඕ and ඔඟ Therefore table 02 indicates it as 'no term'.










Virama sign			
Pause Mark	Lengthening Mark		
<i>Hal kirima</i>	<i>Hal lakuna</i>		
ක රී 	Vowel	එ 	ඊ 
	කෙ 	කේ  ← <i>Us pilla</i> (high, elevated)	කෙ 
	ඊ 	ඊ  ← <i>Udu pilla</i> (upper part)	ඊ 

Figure 09 - Virama sign- pause mark and lengthening mark

The common expression used for most vowel signs is the term *pilla* (meaning branch) since it branches out of the consonant and to signify this, the second expert uses the term *pilla* after every vowel sound as *a pilla*, *æ pilla*, *æ: pilla*, *ē pilla*, *o pilla*, *ō pilla* etc. Yet most terminology used by the second and the third expert are similar.

3.2 Combined consonant signs and other special signs

The identified combined consonant signs were the *re:phaya*, *raka:ra:ηshya* and the *yanshaya*. Yet the second expert introduces two more signs as *ṭaka:ra:ηshaya* and *Daka:ra:ηshaya*. *A:ηshaya* (meaning half) depicts the visual expression of half of the letter *ya* and *ra* (Figure 02). Meanwhile the signs for *ṭaka:ra:ηshaya* and *Daka:ra:ηshaya* introduced by the second expert does not contain half of *ṭ* and *d*.

The term *re:phaya* represents its voice sound *r* sound and the terminology of visual expression (half of the letter *ra*) is in *raka:ra:ηshya*. While the special sign *lu* is an expression of voice.

3.3. Observation and findings

At the conclusion of the study several aspects were achieved to establish the existing vocabulary that defines the anatomy of the Sinhala letter. The findings are as follows:

- **Identifying parts that make up the Sinhala letter**

The literature survey established all parts that make up the Sinhala letter with its five division on visual form. Vowels - as letters, medial vowel sign, and consonants - as letters, combined consonants and other signs. As a result all parts (figure 07) excluding the letter; vowels and consonants were identified as parts of the morphological characteristics of the Sinhala letter.

- **Documenting existing terminology**

A list of nomenclature that defines all medial vowel signs combined consonant signs and other special signs by three experts are documented, proving that there is no unified terminology needed to establish the anatomy of the Sinhala letter.

- **Derivation of the existing terminology**

The derivation of the existing terminology was identified as expressions of visual and sound. This finding can be used to describe the second part of the study on Sinhala letter: vowel and consonants, to develop new nomenclature for the identified features of the Sinhala letter.

- **List combined consonants and signs**

As an outcome, findings on the structural system of the Sinhala letter includes combined consonants. All the combined consonants used by the experts are documented for the benefit of the subject of Sinhala typography.

4 Conclusion

Literature on the Sinhala letter is limited to the selected experts area of specialization; epigraphy, language and standardization and not specific to the subject of Sinhala typography, therefore to advance the study on Sinhala typography the list of existing nomenclature becomes a pioneer study. This large pool of nomenclature is a result of the current practice of using several terms to describe a single variable and the variables are not unified to define the anatomy of the Sinhala letter. Each variable had derived out of three aspects as visual expression, voice expression and the expression of language origin which can be used to create new nomenclature and to establish a standardized vocabulary.

Existing vocabulary				
	Variables	Expert one : Epigraphy	Expert two : language	Expert three : Standardization of language
Medial vowel signs				
The sign for 'pure' consonant	<i>Hal kirima</i> - හල්කිරිම	y	-	y
	<i>Viramaya</i> - විරාමය	y	-	y
	<i>Kodiya</i> - කොඩිස	-	y	y
	<i>Hal Pilla</i> - හල් පිල්ල	-	y	-
	<i>Rahena</i> - රාහන	-	y	y
	<i>Al lakuna</i> - අල් ලකුණ	-	y	-
ā (ආ),	<i>ā pilla</i> - ආ පිල්ල	y	y	-
	<i>ā la pilla</i> - ආල පිල්ල	y	y	y
	<i>ā karanshaya</i> - ආකාරාංශය	y	-	-
æ (ඇ)	<i>æda pilla</i> - ඇද පිල්ල	y	y	y
	<i>Keti æda pilla</i> - කෙටි ඇද පිල්ල	-	-	y
	<i>ækaranshaya</i> - ඇකාරාංශය	y	-	-
	<i>ædaya</i> ඇදය	y	y	-
ǣ (ඈ)	<i>ǣ pilla</i> - ඇපිල්ල	-	y	-
	<i>deerga ǣda pilla</i> - දීර්ඝ ඇද පිල්ල	y	-	-
	<i>degu ǣda pilla</i> - දිගු ඇදපිල්ල	-	y	y
	<i>dik ǣda pilla</i> - දික් ඇදපිල්ල	-	-	y
ī (ඉ)	<i>ī pilla</i> - ඉපිල්ල	-	y	-
	<i>is pilla</i> - ඉස්පිල්ල	y	y	y
	<i>Keti is pilla</i> - කෙටි ඉස්පිල්ල	-	-	y
	<i>i pilla</i> - ඉපිල්ල	-	y	-
ī̄ (ඊ)	<i>deerge ī̄s pilla</i> - දීර්ඝ ඉස්පිල්ල	y	-	-
	<i>degu ī̄s pilla</i> - දිගු ඉස්පිල්ල	-	y	y
	<i>Dik ī̄s pilla</i> - දික් ඉස්පිල්ල	-	-	y
	<i>ī̄ pilla</i> - ඊපිල්ල	-	y	-
u (උ)	<i>Pa pilla</i> - පාපිල්ල	y	y	-
	<i>Keti pa pilla</i> - කෙටි පාපිල්ල	-	-	y
	<i>u pilla</i> - උ පාපිල්ල	-	y	-
	<i>Keti kon pa pilla</i> - කෙටි කොන් පාපිල්ල	-	-	y
	<i>Keti vak pa pilla</i> - කෙටි වක් පාපිල්ල	-	-	y
ü (ඌ)	<i>deerga pa pilla</i> - දීර්ඝ පාපිල්ල	y	-	-
	<i>degu pa pilla</i> - දිගු පාපිල්ල	-	y	y
	<i>ü pilla</i> - ඌ පාපිල්ල	-	y	-
	<i>Dik kon pa pilla</i> - දික් කොන් පාපිල්ල	-	-	y
	<i>Dik vak pa pilla</i> - දික් වක් පාපිල්ල	-	-	y
e (එ)	<i>e karaya</i> - එ කාරය	y	-	-
	<i>kombuwa</i> - කොම්බුව	y	-	y
	<i>e pilla</i> - එ පිල්ල	-	y	-
ē (ඒ)	<i>ē karaya</i> - ඒ කාරය	y	-	-
	<i>kombuva</i> - කොම්බුව	y	-	y
	+			
	<i>viramaya</i> - විරාමය	y	-	y
	<i>hal kirima</i> - හල්කිරිම	y	-	-
	<i>Us pilla</i> - උස් පිල්ල	-	y	y
	<i>Udu pilla</i> - උඩු පිල්ල	-	-	y
	<i>e pilla</i> - එ පිල්ල	-	y	-
o (ඔ)	<i>e karaya</i> - එ කාරය	y	-	-
	<i>kombuva</i> - කොම්බුව	y	-	y
	+			
	<i>ā pilla</i> - ආ පිල්ල	y	-	-
	<i>æla pilla</i> - ඇල පිල්ල	y	-	y

	<i>ākaranshaya</i> - ආකාරාංශය	y	-	-
	<i>o pilla</i> - ඔ පිල්ල	-	y	-
ō (ඔ)	NO TERM	y	-	-
	<i>kombuva</i> - කොම්බුව	y	y	y
	+			
	<i>dik ada pilla</i> - දික් ඇදපිල්ල	y	y	y
	<i>ō pilla</i> - ඔ පිල්ල	-	y	-
ṛ(ෂෘ)	NO TERM	y	-	-
	<i>Gata Pilla</i> - ගට පිල්ල	-	y	y
	<i>ṛ Pilla</i> - ෂෘ පිල්ල	-	y	-
	<i>keti gata Pilla</i> - කෙටි ගට පිල්ල	-	-	y
ṛ(ෂෘ)		none	-	-
	<i>Degu gata Pilla</i> - දිගු ගට පිල්ල	-	y	y
	<i>Degu ṛṛ Pilla</i> - දිගු ෂෘ පිල්ල	-	y	
	<i>Dik gata Pilla</i> - දික් ෂෘ පිල්ල	-	-	y
au (ඔඹ)		none	-	-
	<i>Gayanu kiththa</i> - ගයනුකිත්ත	-	y	y
	<i>au Pilla</i> - ඔඹ පිල්ල	-	y	-
ai (ඓ)		none	-	-
	<i>Kombu deka</i> - කොම්බුව දෙක	-	-	y
	<i>ai Pilla</i> - ඓ පිල්ල	-	y	-
Combined consonant signs				
	<i>Yansaya</i> - යංශය	y	y	y
	<i>Rakaranshaya</i> - රකාරාංශය	y	y	y
	<i>Repaya</i> - රෙපය	y	y	y
	<i>Takaranshaya</i> - ටකාරාංශය	-	y	-
	<i>Dakaranshaya</i> - දකාරාංශය	-	y	-

Table 03: Variable analysis - on existing vocabulary

Reference

- Arangala, R., (2004) Emergence of Modern Sinhala Literature, S. Godage and Brothers, Colombo.
- Dalvi, G., (2010) Conceptual model for Devanagari typefaces. PhD Thesis, Industrial Design Centre, Indian Institute of Technology Bombay.
- Dalvi, G., (2010)
- De Silva, H., (1972) Printing and publishing in Ceylon, Sri Lanka national Commission for UNESCO, Sri Lanka.
- Disanayaka, J. B., (2006) Sinhala Graphology, Sumathi Publications, Kalubovila.
- Disanayaka, J. B., (2012) Encyclopaedia of Sinhala Language and Culture, Sumathi Publications, Kalubovila.
- Disanayaka, J. B., (2012) Sumathi Publications, Kalubovila.
- Fernando, P. E. E., (2008) Origin and development of the Sinhalese script, Sri Lanka national book development council, Battaramulla.
- Gunasekera, B., (1999) The evolution of the Sinhalese script from the 6th to the 10th century, S. Godage and Brothers, Colombo.
- Hemapala, N., (1998) *Sinhala mudranaya ha puwathpath* (Sinhala printing and newspapers), Thisara Prakashakayo, Dehiwala.

- Kularatne, T., (2006) History of printing and publishing in Ceylon 1736-1912, Sridevi printers, Dehiwala.
- Kumar, U. D., (2010) Transformation of Tamil letterforms from Palm leaf manuscripts to early Letterpress printing, PhD Thesis, Industrial Design Centre, IIT, Bombay.
- Lankage, J., (1996) *Sinhala warna malawe wikashanaya* (Evolution of the Sinhala alphabet), S. Godage and Brothers, Colombo.
- Ministry of national language and social integration, Presidential task force for a trilingual Sri Lanka and Ministry of Public administration and home affairs, (2013) Sinhala Letter, Sri Lanka
- Mudiyanse, N., (1965) *Sinhala akuruwala ithihasaya* (History of the Sinhala letters), University of Kelaniya press, Kelaniya.
- National Education Council, (2005) *Sinhala akuru livima sandaha margapupdesha*(Guidelines for Sinhala letter writing), Sri Lanka
- Noordzij, Gerrit (2005) The stroke: theory of writing Hyphen Press, London
- Paranavitna, S., (1970) Inscription of Ceylon, (Vol.I), Department of Archeology, Moratuwa.
- Paranavitna, S., (1983) Inscription of Ceylon, (Vol.II), Department of Archeology, Moratuwa.
- Tracy, W., (1986) Letters of credit, David R. Godine, Boston.
- Wickrema, Keino, (1997) Metamorphosis of the Sinhala script, ARI Investments ltd. Nugegoda.