

# Most rational writing system in the world: Universal Literacy Alphabet Against Poverty, Spread of AIDS (HIV), of Malaria, and of Tuberculosis, and Population Crisis

For more contents please read, <http://ccmg.cc.toin.ac.jp/tech/bmed/ft28/univalphen.pdf>

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## "Hangul" and Japanese writing system "Kana"

Korean Alphabet was created by scholar for literacy of common people in 1443 by the order of Great King Sejong.

It was developed by the knowledge of phonetics at that time and is recognized as the most rational writing system in the world <sup>(1)</sup>. Japanese writing system "Kana", on the other hand, is a complicated writing system and, to rationalize to some extent, has developed "Dakuten" which is added to voiceless consonant letters to create voiced consonant letters <sup>(2)</sup>. The "Dakuten" made "Kana" simpler. Universal Literacy Alphabet was developed the idea of Korean Alphabet to create vowel letters by joining basic vowel letters.

Universal Literacy Alphabet, in one word, is created to simplify learning letters by making the letter forms corresponding to pronunciation method by few simple rules. It simplifies the letter forms of International Phonetic Alphabet (IPA)<sup>(3)</sup>, which is notorious for its complicated letter forms, although IPA is claimed to approximately scribe every language world wide. Universal Literacy Alphabet, together with Computer Numerals (previously named as Abacus Numerals), and New Abacus Numerals, shortens the time required to learn basic education. They, therefore, make people free from ignorance and poverty (because of lack of basic education), and resultantly prevent people from AIDS (HIV) and tuberculosis <sup>(4-5)</sup>. It will also be useful to

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prevent population crisis.

Universal Literacy Alphabet will be used as new rationalized International Phonetic Alphabet to learn pronunciation of foreign languages and show foreign people the names of stations (Japanese, Latin, Chinese, and Korean scripts are used in Japan, to show people important messages as names of the stations). It can be used to protect nearly vanishing languages by offering it writing system. Development of sciences is forcing scientists to learn increased amount of knowledge. So it will become increasingly important to learn basic education (literacy and numeracy) as efficiently as possible so they can initiate to learn leading edge sciences as soon as possible (especially in mathematics, computer sciences and theoretical physics).

Key Words: Literacy, International Phonetic Alphabet, Linguistics, Basic Education.

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### **[Vowels]**

Vowels are classified into rounded (pronounced with rounded lip) and unrounded (pronounced with unrounded lip). These vowels are classified by the openness of the lip and the highest position of tongue during pronunciation (Table 1). Creation method of vowels of Korean Alphabet, medium vowel letters are created by joining basic vowel letters are employed in Universal Literacy Alphabet (Table 2). Unrounded vowels are made by straight lines, while a part of horizontal line of unrounded vowels are changed to a circle in the corresponding rounded vowels.

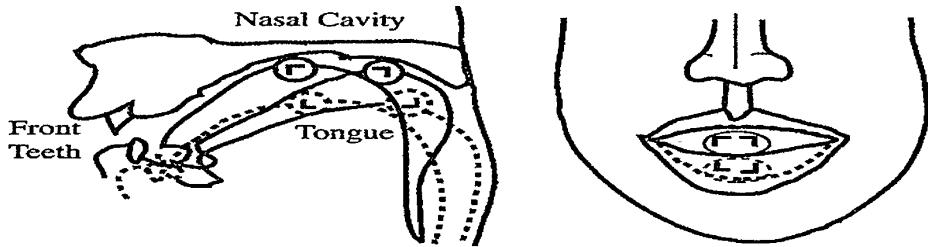


Figure 1 Basic vowels (unrounded vowels) and the method of their pronunciation.

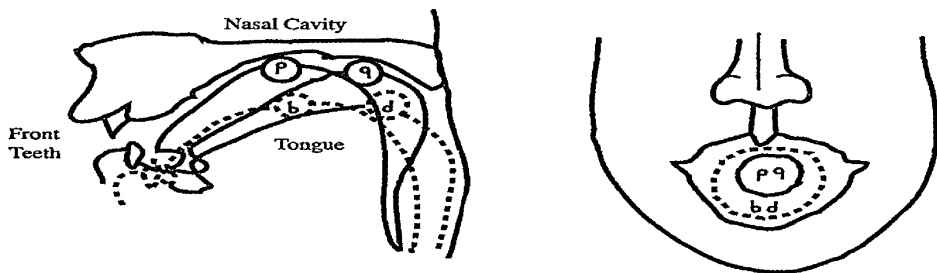


Figure 2 Rounded vowels corresponding to basic vowels and the method of their pronunciation

Front(highest tongue position)Back						Front(highest tongue position)Back				
ɪ	ʏ	ɨ	ɤ	ɯ	Close	ɸ	ɸ	ɶ	ɶ	
	ɛ	ɛ	ɛ	ɛ	Close-mid		ɸ	ɶ		ɔ
		ɛ	ɛ	ɛ	Open-mid		ɸ	ɶ		ɔ
	ɛ	ɛ	ɛ	ɛ	Open		ɸ	ɶ		ɔ
		ɛ	ɛ	ɛ			ɸ	ɶ		ɔ
□ Unrounded					Lip	○ Rounded				

Table 1 Vowels of Universal Literacy Alphabet (ULA)

Front(highest tongue position)Back						Front(highest tongue position)Back				
i	ɪ	ɨ	ɤ	ɯ	Close	y	Y	ɶ		u
	e	ɛ	ɛ	ɛ	Close-mid		ɸ	ɶ		o
		ɛ	ɛ	ɛ	Open-mid		ɸ	ɶ		o
	ɛ	ɛ	ɛ	ɛ	Open		ɸ	ɶ		o
		ɛ	ɛ	ɛ			ɸ	ɶ		o
□ Unrounded					Lip	○ Rounded				

Table 2 Vowels of International Phonetic Alphabet

Basic vowels of ULA are four unrounded vowels at each corner of Table 1, resembling the form of each corner. Those are, **ᄀ** (i of IPA), **ᄁ** ( u in IPA), **ᄂ** (o of 'pod' in Californian English, in IPA), and **ᄃ** (a of French 'sa', and **ᄄ** in IPA). All unrounded vowels are expressed by joining adjacent basic vowels. For example, **ᄅ** is the combination of **ᄀ** and **ᄁ** and its stands for a of 'bayed', and e in IPA), **ᄆ** is the combination of **ᄅ** and **ᄃ** (e of Californian 'bed', and **ᄇ** in IPA), **ᄇ** is also the combination of **ᄅ** and **ᄂ** (a of Californian 'bad', and **ᄈ** in IPA), **ᄉ** is the combination of **ᄀ**, **ᄁ**, **ᄂ**, **ᄃ**, and (a of Californian 'above', and **ᄊ** in IPA). Vowels pronounced with air out of nostril as well are expressed as, **ᄋ** where circle **ᄌ** shows the nostril (IPA **ẽ** ).

Rounded vowels are expressed by changing a part of horizontal line of unrounded vowels to a circle in the corresponding unrounded vowels.

For example, rounded vowel of Universal Literacy Alphabet (ULA) **ᄍ** (ou in French 'sous', and u in IPA) is corresponding to unrounded vowel **ᄁ** ( u in IPA) previously mentioned. ULA **ᄎ** is o of French 'sot', and o in IPA, and is corresponding to unrounded vowel **ᄂ** ( o in IPA). ULA **ᄏ** is u of Californian 'bud' and **ᄐ** in IPA, and is corresponding to unrounded vowel **ᄃ** ( u in IPA). ULA **ᄑ** is a of Hungarian 'hat' and is **ᄄ** in IPA, and is corresponding to unrounded vowel **ᄃ** ( a in IPA).

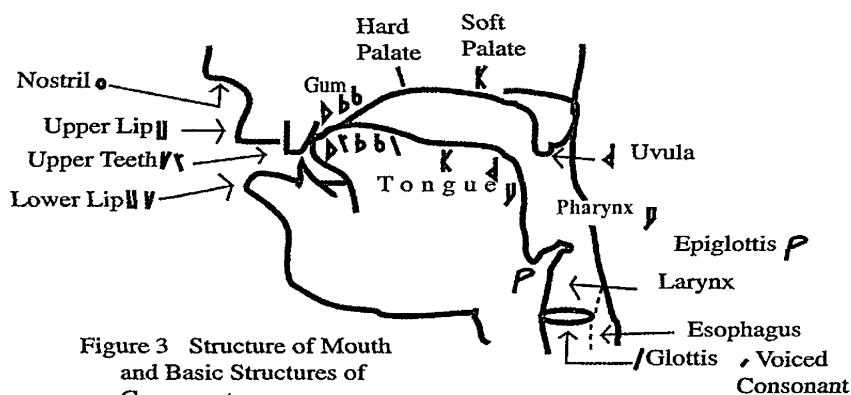
ULA **ᄒ** is ü of German 'h ü ten' and is y in IPA, and is corresponding to unrounded vowel **ᄀ** ( i in IPA). ULA **ᄓ** is ü of German 'H ü ten' and Y in IPA, and is corresponding to unrounded vowel **ᄁ** ( I in IPA).

### [Consonants]

Consonants are pronounced by making distance of upper and lower organs narrow. Upper and lower organs used for pronunciation are shown in Figure 3 and Figure 4. Korean Alphabet uses symbolically depicted structure of organs for basic structure of consonants.

Basic structure of consonants of ULA are shown in Figure 3 and Table 3. Additional Structures of ULA shows how these organs are used for pronunciation. On the other hand, consonants are classified into voiced and voiceless.

On pronunciation of voiced consonants the throat vibrates (vibration can be sensed by fingers

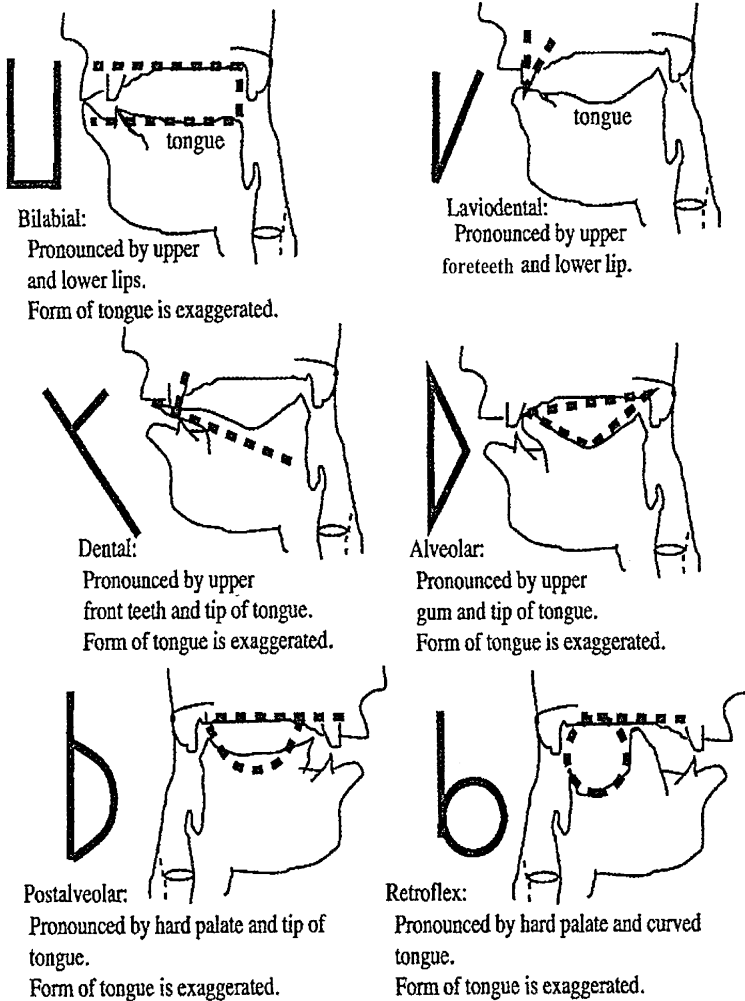


touching on throat ), while on pronunciation of voiceless consonants the throat dose not vibrates. In Japanese writing system "Kana", "Dakuten" is developed to indicate voiced consonants. For example, if "Dakuten" is introduced to Latin writing system, "B", "Z", "D", "G" etc., can be expressed by adding "Dakuten: ´ " to "P", "S", "T", "K" , as "P ´ ", "S ´ ", "T ´ ", "k ´ ". So it is not necessary to remember letter forms of "B", "Z", "D", "G" etc.. Universal Literacy Alphabet (ULA) utilizes this idea and additional structure of consonants **ʌ** is added to a voiceless consonant letter to show a voiced consonants (which is a miniaturized basic structure of glottis **ʌ**).

[Basic Structure of Consonant Letters of Universal Literacy Alphabet]

Consonant letters of Universal Literacy Alphabet (ULA) is created by joining basic structure and additional structure. Basic structures of consonants depict symbolically the cross section of major organs used for pronunciation (shown by dotted line in Figure 4. While, additional structures are determined by the method of moving upper and lower organs.

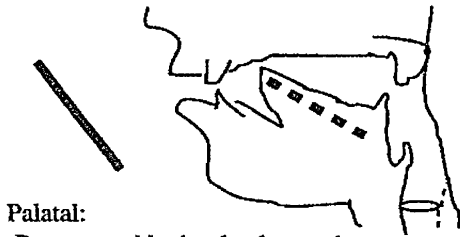
Figure 4-1 Basic structure of consonant letters



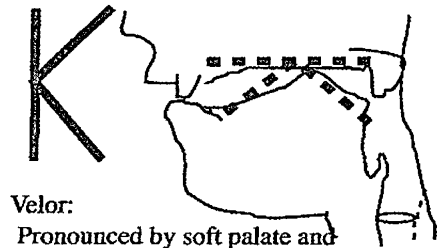
[Basic Structure of Consonant Letters of Universal Literacy Alphabet(continued)]

Consonant letters of Universal Alphabet for Literacy (UAL) is created by joining basic structure and additional structure. Basic structures of consonants depict symbolically the cross section of major organs used for pronunciation (shown by dotted line in Figure 4. While, additional structures are determined by the method of moving upper and lower organs.

Figure 4-2 Basic structure of consonant let

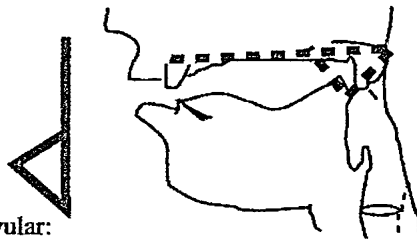


**Palatal:**  
Pronounced by hard palate and tongue.  
Form of tongue is exaggerated.

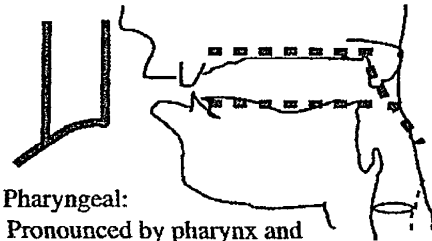


**Velar:**  
Pronounced by soft palate and tongue.

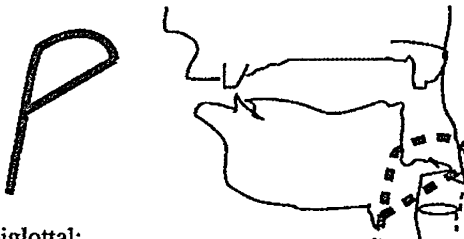
Additional structure for palatalized consonants Form of tongue is exaggerated.



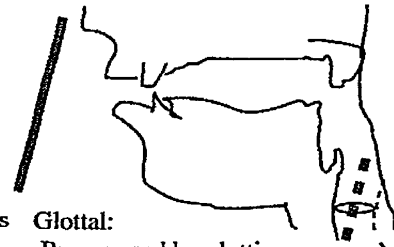
**Uvular:**  
Pronounced by uvula and back part of tongue.



**Pharyngeal:**  
Pronounced by pharynx and back part of tongue.



**Epiglottal:**  
Pronounced by epiglottis and pharynx.



**Glottal:**  
Pronounced by glottis.

Additional structure for voiced consonants

Table 3  
Basic Structure of Consonants of Universal Literacy Alphabet(ULA)

Names of Consonants	Upper and lower organs used for pronunciation	Basic Structure	Symbolized cross section of organ(s) for basic structure
Bilabial	Upper and lower lips	⌌	Upward open mouth
Labiodental	Lower lip and upper teeth	Ʒ	Crosssection of Upper Frontal teeth
Dental	Tongue and upper fore teeth	ƶ	Tongue and Upper Frontal teeth
Alveolar	Tip of tongue and upper gum	▷	Palate and right-angled tongue
Post alveolar	Blade of tongue and hard palate	ⓑ	Palate and half circular tongue
Retroflex	Hard palate and curved tongue	ⓑ	Palate and circular tongue
Palatal	Hard palate and tongue	∖	Linear tongue
Velar	Middle tongue and soft palate	Ʒ	Palate and right-angled tongue
Uvular	Back tongue and uvula	ⓑ	Palate and uvula(triangle)
Pharyngeal	Back tongue and pharynx	Ʒ	Mouth and its deep part
Epiglottal	Pharynx and epiglottis	Ʒ	Pharynx and epiglottis(triangle)
Glottal	Glottis	/	Trachea
Labial-palaral	⌌ = ⌌ + ∖	Postalveolo-velar	ⓑ = ⓑ + Ʒ
Alveolo-palata	▷ = ∖ + ▷		
Labial-velar	Ʒ = ⌌ + Ʒ		

[Additional Structure of Universal Literacy Alphabet]

Consonant letters of Universal Alphabet for Literacy (UAL) is created by joining basic structure and additional structure. Basic structures of consonants depict symbolically the cross section of major organs used for pronunciation (shown by dotted line in Figure 4. While, additional structures are determined by the method of moving upper and lower organs. Pronounce by the gas flow from the lung. The height of horizontal line is determined by the degree of contact of the upper and lower organs (This method rationalized the letter forms and later lead to invention of Abacus Numerals for Numeracy [later renamed as “Computer Numerals for Numeracy”]).

Figure 4-3 Additional Structure of Consonants

- 
- Organs are near: Basic Structure  $\begin{matrix} \text{---} \\ \text{---} \\ \text{---} \end{matrix}$  Throat does not vibrate : Voiceless  $\begin{matrix} \text{---} \\ \text{---} \\ \text{---} \end{matrix}$   
 Throat vibrates : Voiced  $\begin{matrix} \text{---} \\ \text{---} \\ \text{---} \end{matrix}$
- Organs touch and then separate wide: Add middle line : Voiceless  $\begin{matrix} \text{---} \\ \text{---} \\ \text{---} \\ \text{---} \end{matrix}$  Voiced  $\begin{matrix} \text{---} \\ \text{---} \\ \text{---} \\ \text{---} \end{matrix}$
- Organs distance is narrow (Add down most line):  $\begin{matrix} \text{---} \\ \text{---} \\ \text{---} \\ \text{---} \end{matrix}$  Throat does not vibrate : Voiceless  $\begin{matrix} \text{---} \\ \text{---} \\ \text{---} \\ \text{---} \end{matrix}$   
 Throat vibrates : Voiced  $\begin{matrix} \text{---} \\ \text{---} \\ \text{---} \\ \text{---} \end{matrix}$
- Organs touch, separate and remain in narrow position (Add middle and lowermost line):  $\begin{matrix} \text{---} \\ \text{---} \\ \text{---} \\ \text{---} \end{matrix}$   $\begin{matrix} \text{---} \\ \text{---} \\ \text{---} \\ \text{---} \end{matrix}$
- Organs touch continuously at the center and both sides are near (Add upper most line):  $\begin{matrix} \text{---} \\ \text{---} \\ \text{---} \\ \text{---} \end{matrix}$   $\begin{matrix} \text{---} \\ \text{---} \\ \text{---} \\ \text{---} \end{matrix}$
- Organs touch continuously at the center and both sides are narrow  
 (Add uppermost line and down most line):  $\begin{matrix} \text{---} \\ \text{---} \\ \text{---} \\ \text{---} \end{matrix}$   $\begin{matrix} \text{---} \\ \text{---} \\ \text{---} \\ \text{---} \end{matrix}$
- Organs touch continuously at the center and both sides touch in a moment and then appart wide  
 (Add upper most line and middle line):  $\begin{matrix} \text{---} \\ \text{---} \\ \text{---} \\ \text{---} \end{matrix}$   $\begin{matrix} \text{---} \\ \text{---} \\ \text{---} \\ \text{---} \end{matrix}$
- Organs touch continuously at the center and both sides touch in a moment and then appart wide  
 (Add upper most line and middle line):  $\begin{matrix} \text{---} \\ \text{---} \\ \text{---} \\ \text{---} \end{matrix}$   $\begin{matrix} \text{---} \\ \text{---} \\ \text{---} \\ \text{---} \end{matrix}$
- Organs touch continuously at the middle and both sides touch in a moment and then remain near  
 (Add upper most line, middle line and down most line):  $\begin{matrix} \text{---} \\ \text{---} \\ \text{---} \\ \text{---} \end{matrix}$   $\begin{matrix} \text{---} \\ \text{---} \\ \text{---} \\ \text{---} \end{matrix}$
- Tap or Flap (like Japanese r)  $\begin{matrix} \text{---} \\ \text{---} \\ \text{---} \end{matrix}$   $\begin{matrix} \text{---} \\ \text{---} \\ \text{---} \end{matrix}$
- Trill (like Russian p)  $\begin{matrix} \text{---} \\ \text{---} \\ \text{---} \end{matrix}$   $\begin{matrix} \text{---} \\ \text{---} \\ \text{---} \end{matrix}$
- Gas flows from nostril:  $\begin{matrix} \text{---} \\ \text{---} \\ \text{---} \end{matrix}$   $\begin{matrix} \text{---} \\ \text{---} \\ \text{---} \end{matrix}$  where  $\bullet$  schematically show nostril
- Palaterized:  $\begin{matrix} \text{---} \\ \text{---} \\ \text{---} \end{matrix}$
- Pronounced by gas flow not from the lung:
- Ejective  $\begin{matrix} \text{---} \\ \text{---} \\ \text{---} \end{matrix}$   $\begin{matrix} \text{---} \\ \text{---} \\ \text{---} \end{matrix}$  Where + denotes that air comes out.
- Clicks:  $\begin{matrix} \text{---} \\ \text{---} \\ \text{---} \end{matrix}$   $\begin{matrix} \text{---} \\ \text{---} \\ \text{---} \end{matrix}$
- Lateral clicks:  $\begin{matrix} \text{---} \\ \text{---} \\ \text{---} \end{matrix}$   $\begin{matrix} \text{---} \\ \text{---} \\ \text{---} \end{matrix}$  Organs touch continuously at the center and click sound is  
 created by the side of organs.
- Implosive:  $\begin{matrix} \text{---} \\ \text{---} \\ \text{---} \end{matrix}$   $\begin{matrix} \text{---} \\ \text{---} \\ \text{---} \end{matrix}$  Where - denotes that air comes in.
- No gas flow:
- Some kind of  $\begin{matrix} \text{---} \\ \text{---} \\ \text{---} \end{matrix}$   $\begin{matrix} \text{---} \\ \text{---} \\ \text{---} \end{matrix}$  No gas flows, where  $\bullet$  denotes flow of gas to be zero.  
 double consonants  $\bullet$
-



Table 5-1 Comparison of Consonants of IPA and Universal Literacy Alphabet (1)

Consonants(part 1)			Bilabial	Labio-dental	Dental	Alveolar	Post-Alveolar	Retroflex
Basic Structure of Consonant			ⱱ	ʋ	ʌ	ɹ	ɸ	ɠ
Pronunciation by gas flow from lung	Organs are near	Voiceless Voiced	ⱱ ⱱ'	ʋ ʋ'	ʌ ʌ'	ɹ ɹ'	ɸ ɸ'	ɠ ɠ'
	Organ distance is narrow	Voiceless Voiced	ɸ β	ʋ ʋ'	ʌ ʌ'	ɹ ɹ'	ɸ ɸ'	ɠ ɠ'
	Organs touch and then separate wide	Voiceless Voiced	ɸ β	ʋ ʋ'	ʌ ʌ'	ɹ ɹ'	ɸ ɸ'	ɠ ɠ'
	Organs touch, separate and remain in narrow position	Voiceless Voiced	ɸ β	ʋ ʋ'	ʌ ʌ'	ɹ ɹ'	ɸ ɸ'	ɠ ɠ'
	Organs touch continuously at the center and both sides are near	Voiceless Voiced	ⱱ ⱱ'	ʋ ʋ'	ʌ ʌ'	ɹ ɹ'	ɸ ɸ'	ɠ ɠ'
	Organs touch continuously at the center and both sides are narrow	Voiceless Voiced	ⱱ ⱱ'	ʋ ʋ'	ʌ ʌ'	ɹ ɹ'	ɸ ɸ'	ɠ ɠ'
	Organs touch continuously at the center, both sides touch in a moment and then apart wide	Voiceless Voiced	ⱱ ⱱ'	ʋ ʋ'	ʌ ʌ'	ɹ ɹ'	ɸ ɸ'	ɠ ɠ'
	Organs touch continuously at the middle and both sides touch in a moment and then remain near	Voiceless Voiced	ⱱ ⱱ'	ʋ ʋ'	ʌ ʌ'	ɹ ɹ'	ɸ ɸ'	ɠ ɠ'
	Tap or Flap	Voiceless Voiced	ⱱ ⱱ'	ʋ ʋ'	ʌ ʌ'	ɹ ɹ'	ɸ ɸ'	ɠ ɠ'
	Trill(like Russian p)	Voiceless Voiced	ⱱ ⱱ'	ʋ ʋ'	ʌ ʌ'	ɹ ɹ'	ɸ ɸ'	ɠ ɠ'
no gas flow not from lung	Ejective	Voiceless	ⱱ <sup>+</sup>	ʋ <sup>+</sup>	ʌ <sup>+</sup>	ɹ <sup>+</sup>	ɸ <sup>+</sup>	ɠ <sup>+</sup>
	Clicks	Voiceless	ⱱ <sup>&gt;</sup>	ʋ <sup>&gt;</sup>	ʌ <sup>&gt;</sup>	ɹ <sup>&gt;</sup>	ɸ <sup>&gt;</sup>	ɠ <sup>&gt;</sup>
	Lateral clicks	Voiceless	ⱱ <sup>&gt;</sup>	ʋ <sup>&gt;</sup>	ʌ <sup>&gt;</sup>	ɹ <sup>&gt;</sup>	ɸ <sup>&gt;</sup>	ɠ <sup>&gt;</sup>
	Implosive:	Voiceless Voiced	ⱱ <sup>-</sup> ⱱ <sup>-</sup>	ʋ <sup>-</sup> ʋ <sup>-</sup>	ʌ <sup>-</sup> ʌ <sup>-</sup>	ɹ <sup>-</sup> ɹ <sup>-</sup>	ɸ <sup>-</sup> ɸ <sup>-</sup>	ɠ <sup>-</sup> ɠ <sup>-</sup>
no gas flow	Some kind of double consonants	ⱱⱱ	ʋʋ	ʌʌ	ɹɹ	ɸɸ	ɠɠ	

**Table 5-2 Comparison of Consonants of IPA and Universal Literacy Alphabet(2)**

Consonants(part 2)			Palatal	Labial-palatal	Alveolo-palatal	Velar	Labial-velar	b with k
Basic Structure of Consonant			ʌ	lʌ	ʋ	k	lk	ɸ
Pronunciation by gas flow from lung	Organs are near	Voiceless Voiced	j ʌ j ʌ'	lʌ lʌ'		ɰk w k'		
	Organ distance is narrow	Voiceless Voiced	ɕ ʌ j ʌ'	lʌ lʌ'	ɕ ʋ z ʋ'	x k ɣ k'	ʌ lk lk'	ɸ ɸ
	Organs touch and then separate wide	Voiceless Voiced	c ʌ ɟ ʌ'	lʌ lʌ'		k k g k'	ɸ lk ɸ lk'	
	Organs touch, separate and remain in narrow position	Voiceless Voiced	c(ɕ) ʌ ɟ(ɟ) ʌ'	lʌ lʌ'		k(x) k g(ɣ) k'	lk lk'	
	Organs touch continuously at the center and both sides are near	Voiceless Voiced	ʌ ʌ ʌ ʌ'	lk lk'		l k' lk'	lk lk'	
	Organs touch continuously at the center and both sides are narrow	Voiceless Voiced						
	Organs touch continuously at the center, both sides touch in a moment and then apart wide	Voiceless Voiced						
	Organs touch continuously at the middle and both sides touch in a moment and then remain near	Voiceless Voiced						
	Tap or Flap	Voiced						
	Trill(like Russian p)	Voiced						
	Gas flows from nostril	Voiceless Voiced	ɰ ʌ ɰ ʌ'			ɰ k ɰ k'		
	gas flow not from lung	Ejective	Voiceless	c' ʌ'			k' k'	
Clicks		Voiceless	ɸ ʌ'					
Lateral clicks		Voiceless						
Implosive:		Voiceless Voiced	c ʌ ɟ ʌ'			ɰ k ɰ k'		
no gas flow	Some kind of double consonants		!		k			

**Table 5-3 Comparison of Consonants of IPA and Universal Literacy Alphabet(3)**

Consonants(part 3)			Uvular	Pharyngeal	Epiglottal	Glottal
Basic Structure of Consonant			↓	∩	P	I
Pronunciation by gas flow from lung	Organs are near	Voiceless Voiced		∩'	P'	I'
	Organ distance is narrow	Voiceless Voiced	X ↓ B ↓	h ∩ c ∩'	H P P'	h L L'
	Organs touch and then separate wide	Voiceless Voiced	q ↓ G ↓'	∩ ∩'	∩ P'	? t
	Organs touch, separate and remain in narrow position	Voiceless Voiced	∩ ∩'	∩ ∩'		
	Organs touch continuously at the center and both sides are near	Voiceless Voiced	∩ ∩'	∩ ∩'		
	Organs touch continuously at the center and both sides are narrow	Voiceless Voiced	∩ ∩'			
	Organs touch continuously at the center, both sides touch in a moment and then apart wide	Voiceless Voiced	∩ ∩'			
	Organs touch continuously at the middle and both sides touch in a moment and then remain near	Voiceless Voiced	∩ ∩'			
	Tap or Flap	Voiced	∩			
	Trill(like Russian p)	Voiced	∩	R ∩'		
Gas flows from nostril	Voiceless Voiced	∩ ∩'	Z ∩ z ∩'			
no gas flow	Ejective	Voiceless	∩ <sup>+</sup>			
	Clicks	Voiceless	∩			
	Lateral clicks	Voiceless	∩			
	Implosive:	Voiceless Voiced	∩ ∩'	∩ ∩'		
Some kind of double consonants			∩			





**Table 6 Comparison of Korean Alphabet, IPA and Universal Literacy Alphabet (ULA)**

**Table 6 (A) Simple Vowels of Korean Alphabet**

Korean Alphabet	ㅏ	ㅑ	ㅓ	ㅕ	ㅗ	ㅛ	ㅜ	ㅠ	ㅡ	ㅣ
IP A	a	ɨa	ə	ɨə	o	jɔ	u	jʊ	ɯ	i
ULA	ㄸ	ㄸ'ㄹ	ㅏ	ㄸ'ㅏ	ㄸ	ㄸ'ㄸ	ㅑ	ㄸ'ㅑ	ㅓ	ㄸ

**Table 6 (B) Joined Vowels of Korean Alphabet**

Korean Alphabet	ㅏㅓ = ㅝ	ㅓㅓ = ㅞ	ㅗㅓ = ㅜ	ㅓㅓ = ㅟ
IP A	æ	e	w a	w æ
ULA	ㄸ	ㅓ	ㄸ'ㄹ	ㄸ'ㄸ

Korean Alphabet	ㅗㅓ = ㅛ	ㅓㅓ = ㅜ	ㅓㅓ = ㅟ	ㅓㅓ = ㅠ
IP A	œ	w ə	w i	ɯ i
ULA	ㄸ	ㄸ'ㅓ	ㄸ'ㅓ	ㅓㅓ

**Table 6 (C) Consonants**

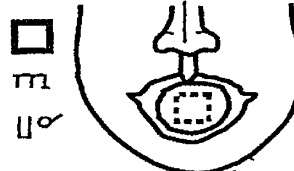
Korean Alphabet	ㄱ	ㄴ	ㄷ	ㄹ	ㅁ	ㅂ
IP A	g, k	n	d, t	l, ɭ	m	b, p
ULA	ㄸ', ㄸ	ㄸ'	ㄸ', ㄸ	ㄸ', ㄸ	ㄸ'	ㄸ', ㄸ

Korean Alphabet	ㅅ	ㅇ	ㅈ	ㅊ	ㅋ	ㆁ
IP A	s	ŋ	ɕ, tɕ	tɕʰ	kʰ	tʰ
ULA	ㄸ	ㄸ'	ㄸ', ㄸ	ㄸ'	ㄸ'	ㄸ'

Korean Alphabet	ㅍ	ㅎ	ㅌ
IP A	pʰ	h	tʰ
ULA	ㄸ'	ㄸ	ㄸ'

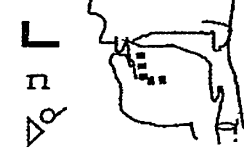
bilabial consonant



velar consonant



alveolar consonant



palatal consonant



laryngeal consonant



Above figures are taken from "The Principles of Making Hangul (in Korean:Hangul ul Mandun Wonri)" by Kim Yong-Ho, Hak Ko Je, Seoul, (2005), pp.112-116