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Contents

From Icons to Identities: Analysing Visual Cultural Elements in Emerging Scripts

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Abstract

The study explores the integration of visual cultural elements in emerging scripts and the motivations driving their development. By examining ten scripts from across the globe, the research identifies four main types of visual cultural elements: common cultural icons and images, influences from traditional art forms, elements from Indigenous knowledge systems, and traditional body art forms. The exploration suggests that integrating these elements may enhance script acceptance within communities, fostering a stronger connection with users. Additionally, the study explores five primary motivations for script development: resistance towards dominant groups, unification of marginalised groups, expression of cultural identity, language preservation, and recuperation of literacy. While visual cultural elements may impact script acceptance, the motivations behind script development also provide insights into historical and contemporary trends in global script innovation. The study suggests that incorporating visual cultural elements in script design could play a significant role in promoting cultural continuity and supporting language preservation.

Keywords

Writing systems
Emerging scripts
Indigenous languages
Cultural identity

1 Introduction

This paper is an exploratory study investigating the incorporation of various visual cultural elements within emerging scripts and the underlying motivations behind their development[1]. After describing ten recent scripts, I argue that integrating visual cultural elements in the design of a new script can enhance its acceptance within the community. Users may be likelier to establish a stronger connection with a script containing familiar cultural elements. Conversely, the analysis suggests that the motivations driving script design do not influence their acceptance. Identifying and examining these motivations remains crucial, as they afford insights into contemporary and historical trends in global script development. Furthermore, such examination aids other communities in deliberating the rationale behind their script development initiatives.

Through discussions with colleagues at The Script Encoding Initiative at UC Berkeley, a research unit that helps Indigenous scripts get accepted to Unicode, and the Endangered Alphabets Project, a non-profit that researches and preserves Indigenous scripts, I identified a list of scripts that employed visual cultural elements in their design. These scripts are: Wancho (Wancho, India), Chisoi (Kurmali, India), Mwangwego (Bantu languages, Malawi), African Lakeside (Luo languages, Kenya), Avoiuli (Raga, Vanuatu), Ditema Tsa Dinoko (Southern Bantu languages, South Africa), Ol Chiki (Santali, India), Bété (Bété languages, Cote d'Ivoire), Afaka (Ndyuka, Suriname), and Otomaung (Naasioi, Papua New Guinea).

The four main types of visual cultural elements that will be discussed are:

— Common Cultural Icons and Images: These included religious and everyday symbols familiar and important to the local population but not necessarily linked to any specific art form.

— Influences from Traditional Art Forms: This refers to specific types of art that are practised within the culture, such as styles of painting and drawing, which are distinct from general icons and images.

— Elements From Indigenous Knowledge Systems: These include representations of farming tools and techniques, medicinal plants, important food staples, and other knowledge unique to the local Indigenous community.

— Traditional Body Art Forms: This includes cultural practices and artwork applied directly to the body, such as traditional tattoos, cicatrisation, and tooth ablation.

The five primary motivations for development that will be discussed are:

— Resistance towards a more powerful language group, another group within the same language community, a state-internal colonial power, such as a nation seeking control over a small ethnic minority that desires autonomy, or a state-external colonial power such as the British in India or the French in Vietnam

— Unification of marginalised groups such as several small communities spread across a large geographic area that speak the same language or groups of people spread out over a large geographic area who speak different languages but identify as the same ethnic group

— Expression of cultural identity, particularly when the community feels overwhelmed with the culture of a more dominant group

— Language preservation and promotion at a time when the language group is concerned about the future of their language and culture

— Recuperation of literacy, described by Kelly (2018) as the reinvention of a script by a community that believes or has folklore about their script being lost in a catastrophic event or destroyed by an enemy people

Section 1 introduces the study, chosen scripts, and provides background information on the visual cultural elements examined in the scripts and the primary motivations behind their development. Section 2 provides background information about the scripts examined in the study and the information sources used. Section 3 explores various features of each script, with 3.1 covering the types of visual cultural elements identified in each script, 3.2 discussing these elements' relationship with sound, and 3.3 examining the main motivations behind the invention of each script. Section 4 discusses these features and their implications, followed by the concluding remarks in Section 5.

1 I am deeply grateful to my PhD advisor, Daniel Harbour, for his invaluable advice and guidance throughout the writing process of this paper. Special thanks to Tim Brookes and Debbie Anderson for their assistance in developing the list of scripts and connecting me with relevant contacts. Additionally, I extend my sincere appreciation to Banwang Losu, Biswajit Mandal, Jayanta Kumar Mahata, Nolence Mwangwego, Paul Sidandi, and Andrew Gray for sharing their invaluable knowledge about these scripts, without which this paper would not have been possible.

2. Exploring scripts and information sources

This section provides background information on each script and outlines the various information sources used. Section 2.1 details each script, including its language(s), speaker numbers, invention date, inventor information, writing system type, grapheme count, and Unicode status. The order of scripts was determined by how much information I could gather on each script, from most to least. I conducted interviews and reviewed written materials for scripts like Wancho, Chisoi, and Mwangwego. For others, I relied solely on available literature. Section 2.2 discusses the information sources used to gather information about the scripts.

2.1. Scripts

The Wancho script, an alphabet for the Wancho language, was invented by teacher Banwang Losu between 2001 and 2012. It is mainly spoken in Arunachal Pradesh, India, with about 60,000 speakers in Longding and Tirap districts, and in neighbouring states of Assam and Nagaland, as well as in Myanmar and Bhutan (Census of India 2011; Everson 2017). The community accepted the script after language workshops in 2011 and 2012 (Losu 2013). Comprising 44 graphemes (29 consonants and 15 vowels) plus four tone diacritics, the script has been steadily growing in use since 2012 and is now taught in many government schools for years 1–8. Accepted into Unicode in 2019, the Wancho Literary Mission continues to develop teaching materials in subjects like mathematics, science, and arts. Figure 1 shows a sample of the typeface design of the Wancho script.

As the Wancho inventor Banwang Losu is still actively involved in promoting the script and creating new teaching material, information is available directly from him about the design of the script and his motivations behind inventing it. I have also interviewed Wancho community members and members of the Wancho Literary Mission as part of my broader research. They have provided additional background information about the Wancho language and script.

Chisoi is an alphabetic script created in 1986 by Jayanta Kumar Mahata for the Kurmali language, spoken by about 600,000 people in Jharkhand, Odisha, and West Bengal (Census of India 2011; Ager 2023b). The alphabet consists of 27 letters, three diacritics, and ten numerals. Mahata invented the script to preserve Kurmali folktales (Mandal 2022). Information about Chisoi was obtained through correspondence with Mahata and Unicode proposal author Biswajit Mandal. Figure 2 shows the Chisoi script chart from Omniglot.com.

Figure 1

Wancho script design (Gautam 2023)

Figure 2.

Chisoi script chart (Ager 2023b)

a	ba	ai	aa	ga	ta	e	sa
[ɔ/ə]	[bɔ]	[æ]	[a]	[gɔ]	[tɔ]	[e]	[sɔ]
na	i	ka	ra	ma	ha	rha	u
[nɔ]	[i]	[kɔ]	[rɔ]	[mɔ]	[hɔ]	[ɽɔ]	[u]
da	la	o	iny	ang	ca	ja	pa
[ɖɔ]	[lɔ]	[o]	[ɲɔ]	[ŋɔ]	[tʃɔ]	[dʒɔ]	[pɔ]
an	ay	add	tta	jarah	sisoa		
[ˇ]	[iɔ]	[dɔ]	[ʈɔ]	[ʰ]	mutes vowel		

The script has been accepted by the local community, with educational materials, a weekly newspaper, and a dictionary published in it. Ten Kurmali elementary schools in West Bengal and other organisations in Odisha and Jharkhand teach the script (Mandal 2022). A preliminary proposal for Unicode encoding was submitted in 2021, and the script was approved for encoding in January 2023, scheduled for release in September 2024 (Constable 2022).

The Mwangwego script is an abugida invented in 1979 by Nolence Mwangwego for the Bantu languages of Malawi, including Chichewa, Yao, and Tonga, each with significant speaker populations (Chichewa 2023; Yao 2023; Tonga 2023; Ager 2023e). Figure 3 (opposite page) shows a geographic breakdown of the different languages spoken in Malawi. Mwangwego developed the script after a 1977 trip to Paris, where he encountered multiple other scripts for the first time. Information about the script was obtained through correspondence with Mwangwego. The script, launched in 2003, contains 32 base syllables, called *misisi*, with an inherent vowel, similar to many other abugidas; and an additional 32 vowel modifications for each syllable for the vowels *e, i, o* and *u*, called *misiri*. A further 11 symbols called *mituyo* indicate tone and change in the sound quality of the consonants (Mwangwego 2023). Figure 4 shows the Mwangwego syllable repertoire from the 2012 Unicode proposal.

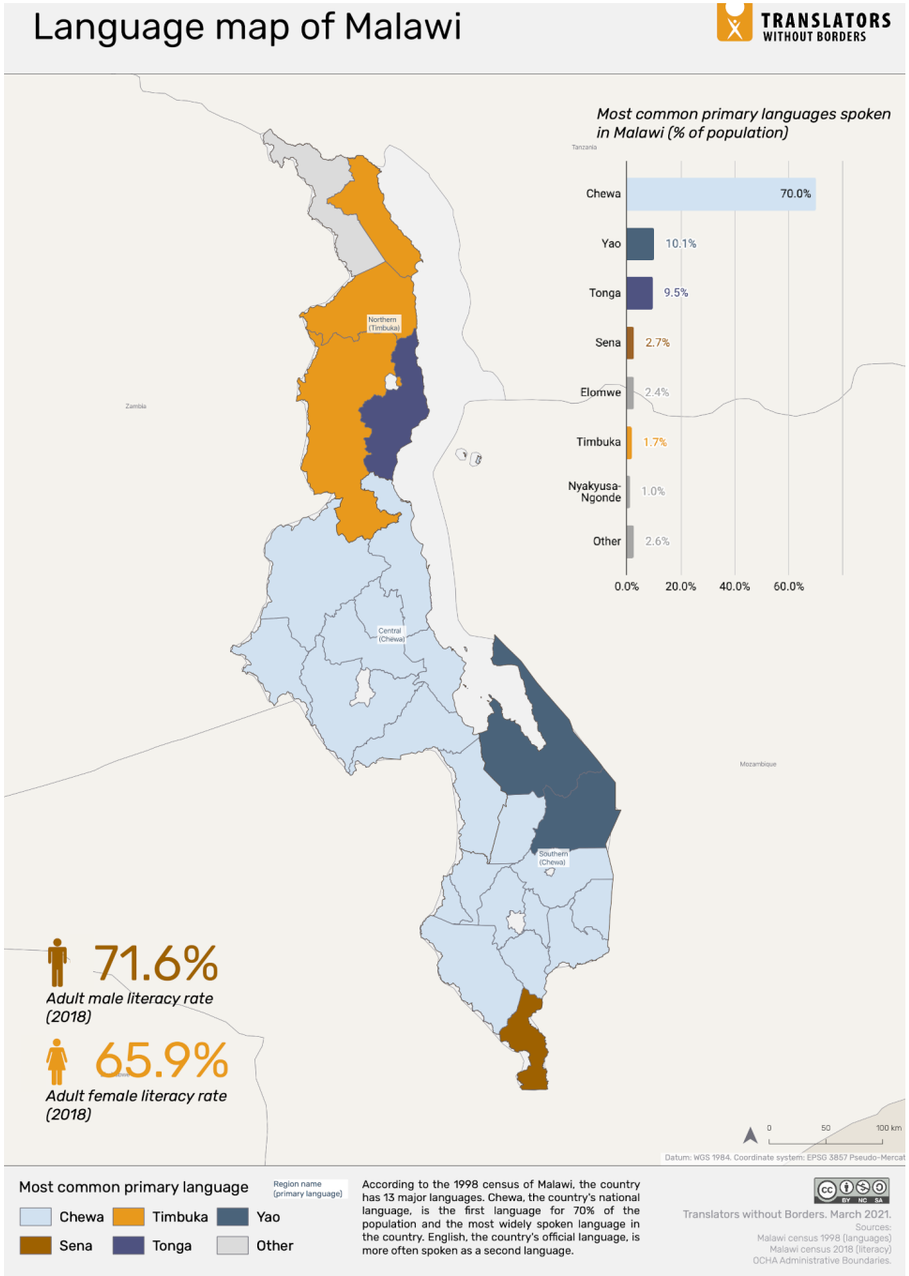
Figure 4.

Mwangwego syllable repertoire (Everson 2012b)

𞄀 a	𞄁 e	𞄂 i	𞄃 o	𞄄 u
𞄅 ba	𞄆 be	𞄇 bi	𞄈 bo	𞄉 bu
𞄊 cha	𞄋 che	𞄌 chi	𞄍 cho	𞄎 chu
𞄏 da	𞄐 de	𞄑 di	𞄒 do	𞄓 du
𞄔 fa	𞄕 fe	𞄖 fi	𞄗 fo	𞄘 fu
𞄙 ga	𞄚 ge	𞄛 gi	𞄜 go	𞄝 gu
𞄞 gha	𞄟 ghe	𞄠 ghi	𞄡 gho	𞄢 ghu
𞄣 ha	𞄤 he	𞄥 hi	𞄦 ho	𞄧 hu
𞄨 ja	𞄩 je	𞄪 ji	𞄫 jo	𞄬 ju
𞄭 ʒa	𞄮 ʒe	𞄯 ʒi	𞄰 ʒo	𞄱 ʒu
𞄲 ka	𞄳 ke	𞄴 ki	𞄵 ko	𞄶 ku
𞄷 la	𞄸 le	𞄹 li	𞄺 lo	𞄻 lu
𞄼 ma	𞄽 me	𞄾 mi	𞄿 mo	𞅀 mu
𞅁 na	𞅂 ne	𞅃 ni	𞅄 no	𞅅 nu
𞅆 nya	𞅇 nye	𞅈 nyi	𞅉 nyo	𞅊 nyu
𞅋 pa	𞅌 pe	𞅍 pi	𞅎 po	𞅏 pu
𞅐 ra	𞅑 re	𞅒 ri	𞅓 ro	𞅔 ru
𞅕 sa	𞅖 se	𞅗 si	𞅘 so	𞅙 su
𞅚 sha	𞅛 she	𞅜 shi	𞅝 sho	𞅞 shu
𞅟 ta	𞅠 te	𞅡 ti	𞅢 to	𞅣 tu
𞅤 tsa	𞅥 tse	𞅦 tsi	𞅧 tso	𞅨 tsu
𞅩 psa	𞅪 pse	𞅫 psi	𞅬 pso	𞅭 psu
𞅮 va	𞅯 ve	𞅰 vi	𞅱 vo	𞅲 vu
𞅳 wa	𞅴 we	𞅵 wi	𞅶 wo	𞅷 wu
𞅸 ya	𞅹 ye	𞅺 yi	𞅻 yo	𞅼 yu
𞅽 za	𞅾 ze	𞅿 zi	𞆀 zo	𞆁 zu
𞆂 dza	𞆃 dze	𞆄 dzi	𞆅 dzo	𞆆 dzu
𞆇 dhla	𞆈 dhle	𞆉 dhli	𞆊 dhlo	𞆋 dhlu
𞆌 hla	𞆍 hle	𞆎 hli	𞆏 hlo	𞆐 hlu
𞆑 xa	𞆒 xe	𞆓 xi	𞆔 xo	𞆕 xu
𞆖 qa	𞆗 qe	𞆘 qi	𞆙 qo	𞆚 qu
𞆛 tha	𞆜 the	𞆝 thi	𞆞 tho	𞆟 thu

Figure 3

Language map of Malawi (Translators without Borders 2021)



Though it has about 2,000 users, the script is not yet recognised by the Malawian government or taught in schools, nor is it accepted by Unicode (personal communication 2023). The Script Encoding Initiative submitted an initial proposal in 2012 but has not resubmitted since. Plans are in place to support unencoded African scripts in 2023 and 2024.

The African Lakeside Script, comprising the Luo script and numerals, was developed for the Luo languages of East and Central Africa, spoken in countries such as Botswana, the Democratic Republic of the Congo, Ethiopia, Kenya, Sudan, Tanzania, and Uganda (Ager 2023d). Kefa Ombewa created the Luo script in 2009 for the Dholuo language, which has about 4.2 million speakers (Dholuo 2015), and Paul Sidandi developed the numerals in Botswana. The script has 26 consonant and vowel graphemes with upper and lower case versions. The numeral system is based on the number of fingers on the hand, and factors of 10 are represented by elements found in nature. Figure 5 shows the Luo script inventory.

Figure 5.

Luo script inventory (Ager 2023d)

A joint Unicode proposal was submitted in 2019 but is still under review (Anderson 2019b). Information was obtained from Sidandi, who indicated that the script is being trialled in several schools in Botswana and that a new academy in Kenya has committed to teaching it (personal communication 2023).

Avoiuli is an alphabetic script invented by Chief Viraleo Boborenvanua in the 1990s for the Raga language of Pentecost Island, Vanuatu (Ager 2023a). Raga is an Austronesian language spoken by around 6,500 people on Pentecost Island (Hano 2015). The Avoiuli script consists of 20 letters and ten numerals. Initially designed to be written boustrophedon (right to left and left to right in mirror style), it is usually written left to right. Figure 6 shows the Avoiuli script and numeral inventory. The script was invented as part of the Turaga Movement, which supports the restoration of traditional Melanesian customs. It has not been accepted to Unicode, and the Script Ad Hoc Committee has not yet received a preliminary proposal for encoding. According to local schoolteacher Andrew Gray, the script is currently used by a few people on the island and is not being actively promoted while its inventor is away (personal communication 2023). Although the script seems to be nearly dormant, Gray adds that it could be picked up and promoted by another political leader in the future (personal communication 2023).

Figure 6.

Avoiuli script and numeral inventory (Ager 2023a)

Ditema Tsa Dinoko, also known as Isibheqe Sohlamvu, is a syllabic script developed for the Southern Bantu languages of South Africa, Botswana, Eswatini, Mozambique, Zimbabwe, and Lesotho (Ager 2023c). Figure 7 shows an example text in the script. It was invented

between 2010 and 2015 by a group of linguists and designers (Tolmie 2023). It is described as a featural syllabic script by Ager (2023c) and as a decolonial script and "alternative literacy in line with principles of decoloniality" by the organisation's website (Ditema Tsa Dinoko 2022).

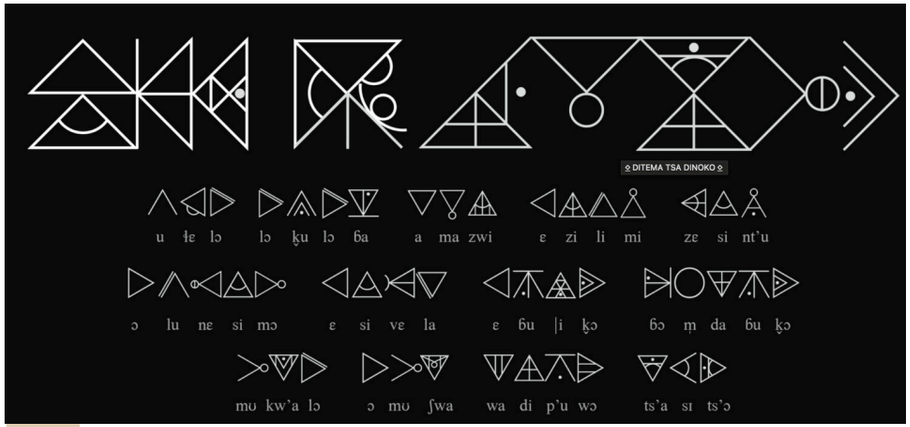


FIGURE 7.

Example text in Ditema Tsa Dinoko (Ditema Tsa Dinoko 2022)

As seen from Figure 8, the design of the graphemes is meant to replicate the shape of the mouth for specific places of articulation, such as a curved line simulating the tip of the tongue resting near the alveolar ridge to block airflow for [s], a curved line outside the triangle mimicking the top teeth touching the bottom lip for [f], and so on. The direction of the triangle determines whether the vowel is open or closed. The consonant is then determined by the additional strokes or circles attached to the base triangle; for example, as stated above, an [s] is identified by a single curve inside the triangle, a [z] by a single curve with a line through it, and so on. It has not been proposed to Unicode and is promoted primarily on its website and Instagram.

Ol Chiki is an alphabetic script developed for the Santali language, spoken by seven million people in India, Bangladesh, Bhutan, and Nepal (Santhali 2023). Most speakers reside in Eastern India, specifically in the states of Assam, Bihar, Jharkhand, Mizoram, Odisha, Tripura, and West Bengal. Figure 9 shows the distribution of the Santali language in Eastern India. Classified by Ethnologue as a large institutional language, Santali ranks as the third most spoken Austroasiatic language after Vietnamese and Khmer (Santhali 2023). The script was created in 1925 by Raghunath Murmu, a Santali teacher. It consists of graphemes representing single consonant and vowel sounds. Although Ol Chiki is used in West Bengal and Jharkhand schools and was accepted to Unicode in 2008, not all

FIGURE 8.

Ditema Tsa Dinoko consonants (Ditema Tsa Dinoko 2022)

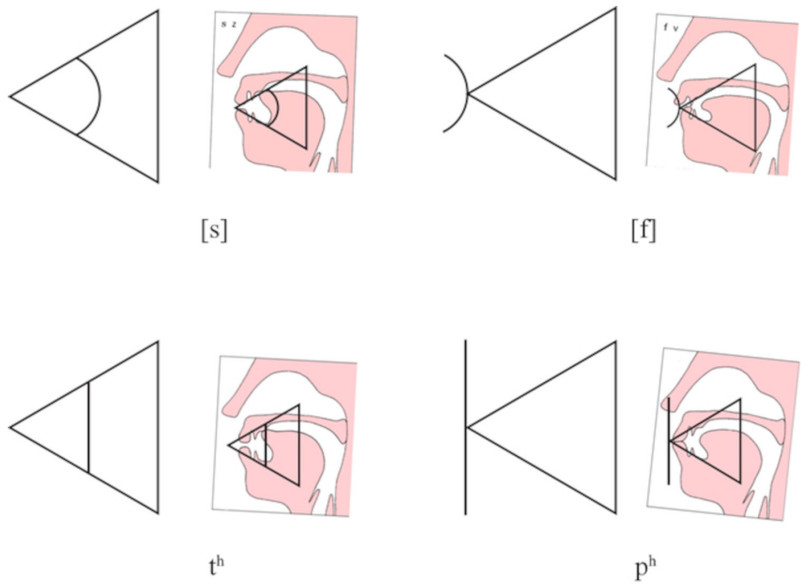


FIGURE 9.

Santali language map (Likomitros 2022)

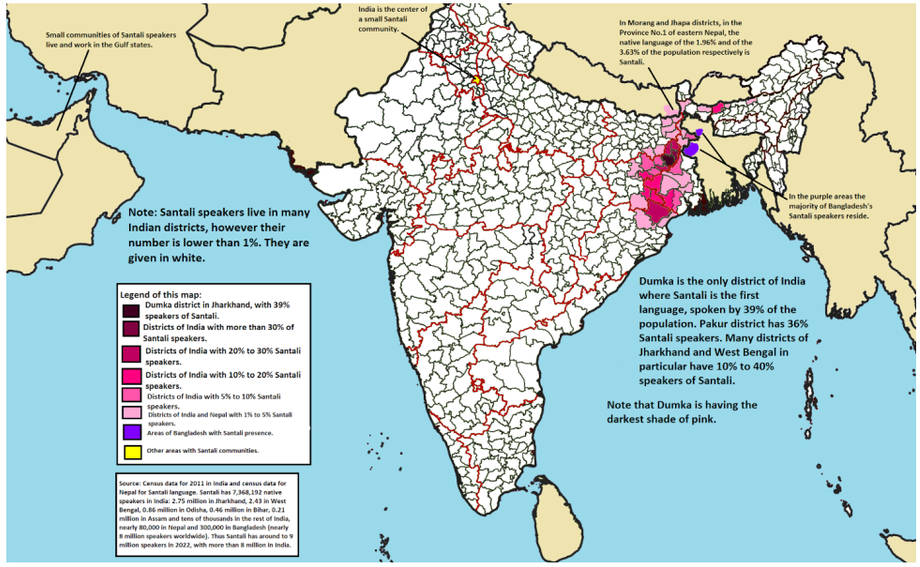
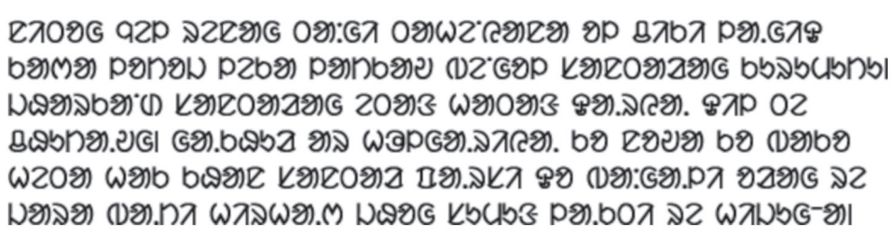


Figure 10.

Ol Chiki example text (Ol Chiki script 2022)

Santali speakers use it, and the language is also written in Bengali-Assamese, Odia, and Latin scripts (Ol Chiki Script 2022). Figure 10 shows an example text in the Ol Chiki script.

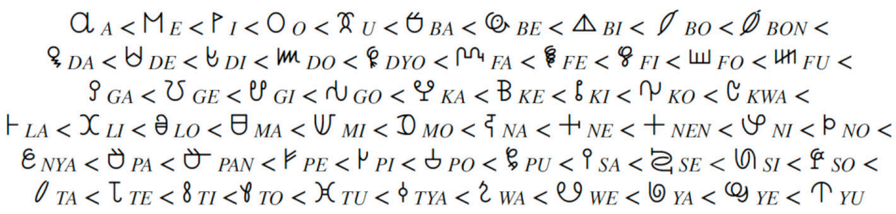


The Bété script is a syllabary designed for the Bété languages spoken by approximately 100,000 people in the central-western region of Côte d'Ivoire (Kru 2023). It was invented in the 1950s by local artist Frédéric Bruly Bouabré. The syllabary, with 440 graphemes, represents different consonant-vowel combinations. Figure 11 (opposite page) shows the Bété grapheme inventory from a graphic design project. A report on the syllabary has been submitted to the Unicode document register and is currently under review (Anderson 2019a).

The Afaka script is a syllabary invented in 1910 by Afáka Atumisi for the Ndyuka language of Suriname. Ndyuka, an English-based creole with additional influences from Dutch, Portuguese, and several West African languages, is spoken by around 40,000 people in Suriname and French Guiana (Aukan 2020; Ager 2023g). The syllabary consists of 56 graphemes, invented by Atumisi who claimed they had been revealed to him in a dream. Figure 12 shows the Afaka graphemes and their phonetic pronunciation.

Figure 12.

Afaka grapheme inventory from Unicode proposal (Everson2012a)



Afaka is the only known Indigenous script developed for a Creole language (Afaka 2023). By 1915, about 30 people were literate in the script, promoted by a local Catholic missionary. However, the script fell out of use as it failed to represent all sounds and became associated with Western religion (Ager 2023). Though not yet accepted by Unicode, a working document was submitted in 2012, and the script is being

Figure 11.

Bété grapheme inventory (Yeo & Cao 2021)

promoted by the Sabanapeti Foundation (Everson 2012a). It is included in the Unicode Roadmap and has been used in works by local artist Marcel Pinas, enhancing its visibility (Afaka 2020). Figure 13 shows Afaka artwork by Pinas.

Figure 13.

Afaka artwork by Marcel Pinas (Pinas 2020)

The Otomaung script was developed during the Bougainville Crisis (1988–1998) for the Naasioi language of Papua New Guinea. Invented by Chief Peter Karatapi, the alphabet contains 26 graphemes and is intended to function as a universal script for Bougainville languages (Ager 2023f). The Naasioi language is spoken by around 20,000 people (Naasioi 2023). Figure 14 displays the Otomaung graphemes in their upper-case, lower-case, and ornamental forms. Although the script has not been proposed to Unicode, its significance may rise with Bougainville's advances toward political independence (Kelly 2021).

Table 1 displays the Unicode status of the scripts from the study and the corresponding dates of their submissions and encodings, including the proposal duration from start to finish. This information is essential as it indicates whether each script is "encoded", "accepted", or "not proposed". Understanding these timelines is vital to appreciate the broad range of durations that scripts can take to be encoded. The Script Encoding Initiative is aware of all scripts listed as "not proposed" and is collaborating with researchers and community members to develop proposals for these scripts.

Figure 14.

Otomaung inventory from Omniglot.com (Ager 2023f)

Script	Status	Date submitted	Date encoded	Length of application
Wancho	Encoded	2017-01-23	2019-03-05	2 years 2 months
Chisoi	Accepted	2021-05-29	2024-09-01[1]	3 years 4 months[2]
Mwangwego	Proposed	2012-07-23	-	-
African Lakeside	Not proposed	-	-	-
Avoiuli	Not proposed	-	-	-
Ditema Tsa Dinoko	Not proposed	-	-	-
Ol Chiki	Encoded	1999-01-29	2008-04-04	9 years 3 months
Bété	Not proposed	-	-	-
Afaka	Proposed	2010-12-21	-	-
Otomaung	Not proposed	-	-	-

TABLE 1

Scripts and their Unicode status

2.2. Information Sources

For the first stage of this research, identifying which visual cultural elements were employed in each script and the inspiration behind their development, I reviewed publicly available information about the scripts, such as Wikipedia articles, websites published by promoters of the script, and academic literature. In some instances, information about script design was readily available. For example, both Ditema Tsa Dinoko[2] and Ol Chiki[3] have websites explaining the inspirations behind their script design in detail. Through these sources, I was able to determine the visual cultural elements for these two scripts, as well as Bété, Afaka, and Otomaung.

Where scripts lacked publicly available information, I attempted to contact either the inventor or someone known to be highly involved with developing or promoting the script[4]. I spoke directly with the inventor of Wancho (WhatsApp, Zoom, and in-person), the inventor of Mwangwego (Facebook Messenger), the inventor of Chisoi (Facebook Messenger) and its Unicode proposal author (Facebook Messenger), and the inventor of the Luo Numerals[5] (email). I was unable to contact the inventor

2 https://isibheqe.org.za/

3 https://wesanthals.tripod.com/

4 I have standardised punctuation and use of italics from my written interviews to meet linguistic norms.

5 In the African Lakeside Script, it is the numeral system rather than the alphabet which contains visual cultural elements.

of the Avoiuli script but was able to speak with a local teacher who is familiar with the inventor and script (Facebook Messenger). In a modified form of an online personal interview, I asked these individuals direct questions about the visual cultural elements they employed in the script design and the motivations behind their development. All interviews were conducted in English.

3. Features of Each Script

This section will discuss features of each script with 3.1 covering the visual cultural elements that were found to be implemented into the scripts in the study. Additionally, 3.2 will examine the scripts' relationships with the use of acrophony and the rebus principle. Finally, 3.3 will suggest the main motivations behind the development of all scripts.

3.1. Visual Cultural Elements

This section examines visual cultural elements in each script (see Table 2). Evidence from interviews and written materials illustrates these elements and their integration, supplemented by examples. Common cultural icons and images are present in six scripts: Wancho, Chisoi, Mwangwego, Ol Chiki, Bété, and Afaka. Traditional and body art are present in three scripts each: Chisoi, Avoiuli, and Ditema Tsa Dinoko, and Wancho, African Lakeside, and Otomaung, respectively. Indigenous knowledge systems are found in two scripts: African Lakeside and Ditema Tsa Dinoko.

TABLE 2.

Scripts and incorporated visual cultural elements

Script	Common Cultural Icons and Images	Traditional Art	Body Art	Indigenous Knowledge System
Wancho	X		X	
Chisoi	X	X		
Mwangwego	X			
African Lakeside			X	X
Avoiuli		X		
Ditema Tsa Dinoko		X		X
Ol Chiki	X			
Bété	X			
Afaka	X			
Otomaung			X	

In his self-published article on the Wancho script that Losu shared with me, he states (2013: 2):

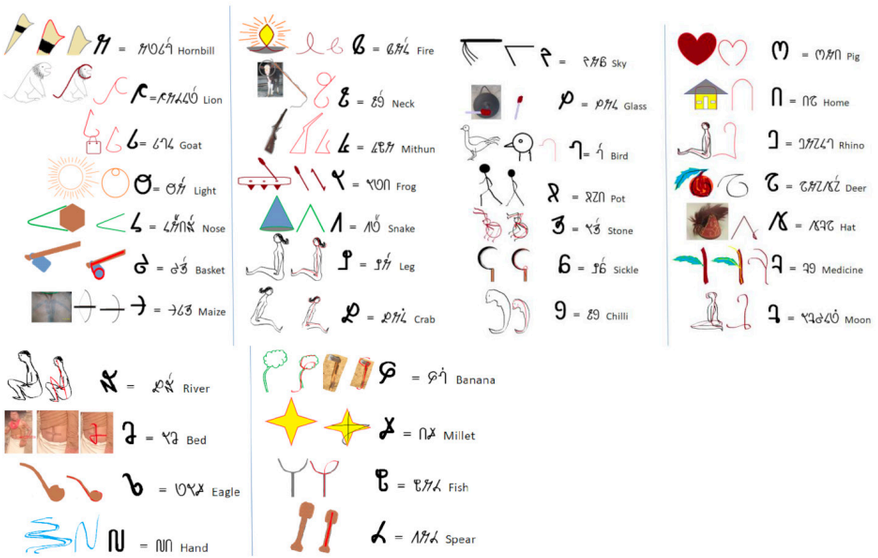
> Orthography of Wancho Script represents human actions, birds, insects, trees, tattoos, traditional handy-crafts, house, sun, star, etc. 𞋀 is a feather of hornbill which is very significant in our culture, we used it in our headgear during festival and several occasions. Hence, it is relevant to local people and easy to memorise and understand.

In my interview with Losu, he also explained to me that he knew from the beginning that the characters in the script should be familiar to the people; otherwise, it would be difficult for them to understand, and this was his reason behind choosing familiar local symbols for each character. Losu also explained to me that some of the characters are based on the rebus principle; for example, the grapheme 𞋂 tʃa is based on a lion, the word for lion in Wancho is tʃanu, which starts with the sound tʃa (personal communication 2024).

Losu has provided a chart demonstrating the etymology of 36 of the Wancho graphemes in Figure 15.

Figure 15.

Wancho graphemes and icons chart (Losu 2013)



Interviews with Wancho community members also revealed further information about the script's design. When asked about the inspiration behind the design of the script, one participant stated, "Yes, there was a very good idea that some letters are designed with the scripture or with the crafts of our Wancho area…" (personal communication 2023). One participant spoke to me about Wancho traditional body art stating, "tattoo for men is for bravery and for women is to signify stages of age since puberty up to marriage" (personal communication 2023). I followed up on this report of traditional tattoos being found in the design of the script with Losu, who confirmed that two of the graphemes are based on traditional tattoos. Images 16 and 17 below indicate that the design of these graphemes comes from a female chest tattoo and a navel tattoo (personal communication 2024). Through these interviews, we can determine that the script employs common cultural icons and images and influences from traditional body art in its design.

Figure 16.

Wancho chest tattoo and grapheme (personal communication 2024)

Figure 17.

Wancho navel tattoo and grapheme (personal communication 2024)

Through my correspondences with the Chisoi inventor and Unicode proposal author, I have learned that the inventor collected cultural symbols, including Alpanas and Rangolis, two forms of decorative patterns created on the floor using various powders such as limestone, ochres, flour, sand, etc. (Alpana 2023; Rangoli 2023), which he then used for the design of his new script. Mandal and Mahata state that

many of the graphemes are based on the Kurmali deity Buṛhābābā [6] (personal communication 2023), also known as the svastika or "conducive to well-being" (Britannica 2023; Mandal 2022). Mandal (personal communication 2023) states:

> Buṛhābābā is the supreme deity of the Kurmali community, Buṛhā means old and bābā refers to father. Buṛhābābāis nothing more than Bholababa another name of Lord Shiva of Hinduism. They believe Buṛhābābā is the first humanoid of this planet and all of us are his sons.

Figure 18.

Kurmali traditional symbols (Mandal 2022)

Although I have not seen any specific examples about the origin of the design besides those shown in Figure 18, this script appears to employ common cultural icons and images as well as influences from traditional art, similar to the design of Ditema Tsa Dinoko discussed below.

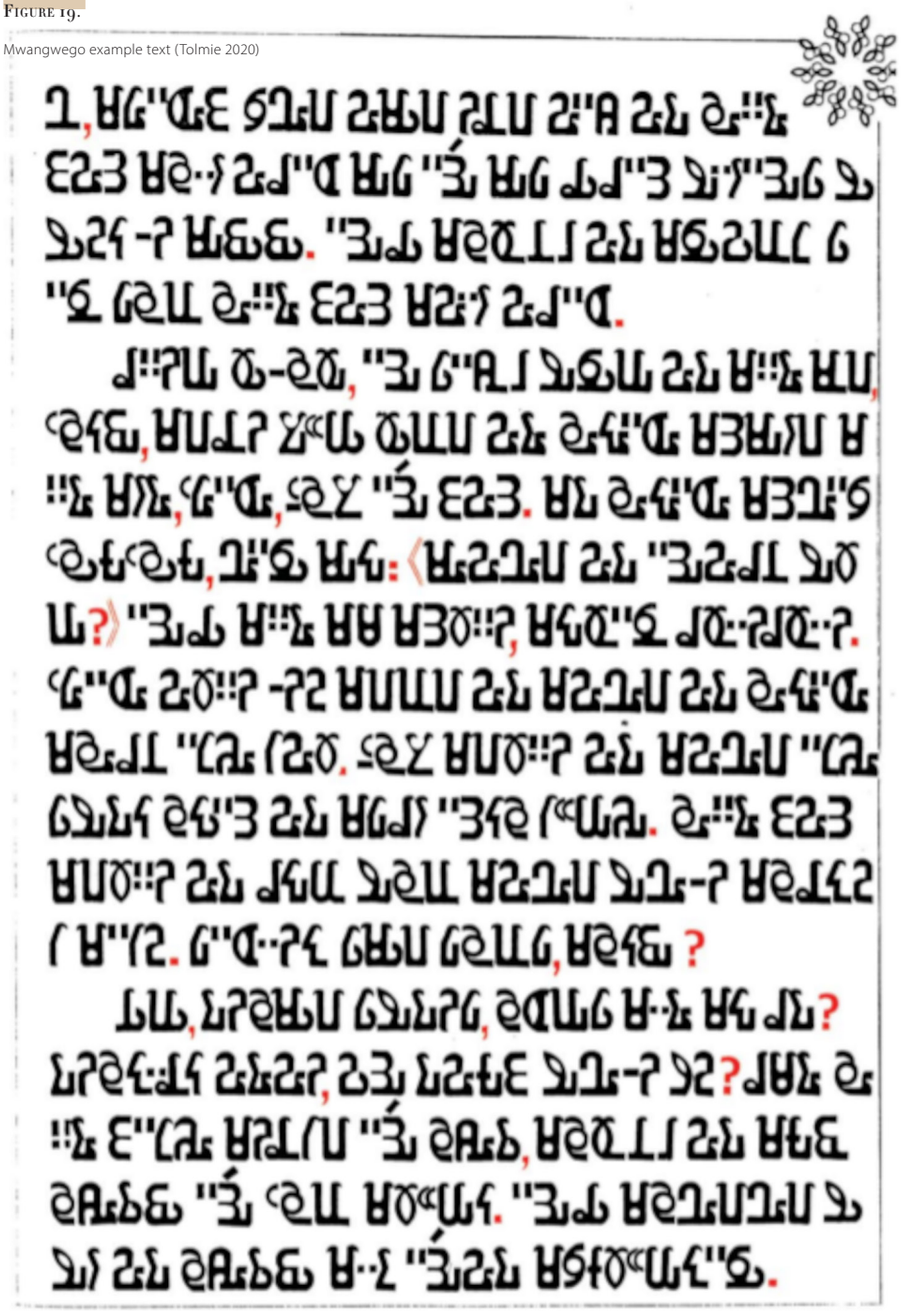
In my correspondence with the inventor of the Mwangwego script, when asked about how he came up with the design of the script, Mwangwego (personal communication 2023) responded:

> It was not easy to design the script and that's why it took a long time to finish the project. First, I had to decide on the type of system. When I realised that syllables of Malawian languages are detached, I opted for a syllabic system in which a symbol stands for a syllable. I had to create symbols that I assigned to syllables, and this was the main and most difficult part of the invention. Three sources of symbol: imagination, household objects like 'spear', 'gold', 'clay', 'pot', 'jug', and 'sickle'. From nature: 'root', 'leaf'. Human body: 'palm', 'ear'. *La* is from a 'folded leg when walking uphill', *cha* is from 'ear' (when handwritten), *tha* is from a 'sickle', *a* and *na* from a 'jug', *ba* and *ja* from a 'clay pot', *ya* and *qa* from a 'leaf'. During refinement of the script, I dropped or modified some symbols in order to make them compatible with new additions as I went on.

6 Top left image in Figure 18

Figure 19.

Mwangwego example text (Tolmie 2020)



Based on the information provided by the inventor, Mwangwego designed the symbols using icons and images familiar to him, such as household objects, elements from nature, the human body, and tools. In this way, Mwangwego drew inspiration from common cultural icons and images to create his symbols.

Unlike other scripts discussed in this paper, the Luo numeral system is of interest when discussing visual cultural elements in the African Lakeside script. In my email exchange with Sidandi, he explained that the Luo numerals were his own recreation of the Lost Hebrew Numbers of Botswana. The Luo Tribe claims to have migrated from Egypt around the same time as the Jews, although they do not claim to be Jewish. Sidandi (personal communication 2023) states:

> A geographic search and word search was made in the Atlas and the Bible. Amazingly, over 40 Luo place names were found in Sudan, Southern Egypt and Israel. The Luo language was found to have clues on how to represent the numbers from one (1) to ten (10). The cardinal numbers were based on digits of the hand. These are represented as sticks in the Luo language. The large numbers from 10 are represented by elements found in nature. For example, 10 is called *Apar*, meaning remember and multiples are derived from counting bottoms not heads. So, 10 was represented as a 'W' with rounded base. 100 is based on two hands facing each other from the word *miya* or give me. A thousand is based on the gap at the lower teeth after extraction of the two central incisors. The gap used by Nilotes who are cattle herders prone to tetanus or lock jaw provided an opportunity to force feed the person. The Luo word for force feeding is *gag* so if you say *gagna jatuo* you are force feeding an ill person. The Herero of Namibia also have the same method of tooth extraction which has been made into a custom similar to circumcision. The word for 1000 is *gana* so it came to be represented by the sign of a gap and so on. Each cardinal number has a horizontal base and most of the large numbers.

Figure 20.

Luo numeral inventory from Omniglot.com (Ager 2023d)

In his explanation, Sidandi maintains that the numeral system, illustrated in Figure 20, contains certain digits influenced by the Indigenous knowledge system and integrates elements of traditional body art, specifically tooth ablation or ritual tooth removal. The practice of tooth ablation by the Nilotes, originally performed for medical reasons, has evolved into a coming-of-age ritual. Consequently, it is regarded in this study as a form of traditional body art.

Although the inventor may have drawn some inspiration from the Latin alphabet, the Avoiuli script bears little resemblance to it. Gray (personal communication 2023) states that the inventor claimed to have 'rediscovered' the alphabet and that he drew inspiration for the design from traditional Vanuatu sand drawings, as seen in Figure 21, similar to the Rangoli and Alpanas used by the Chisoi script but drawn directly in the sand. We can see below the similarities between the script and the sand drawings, which show that the script employs a form of traditional art as a visual cultural element in the overall design of this script.

Figure 21.

Vanuatuan sand drawing (Kastom Stories and Sand Drawing 2014)

The design of Ditema Tsa Dinoko takes its inspiration from Litema, a 1500-year-old form of Sesotho mural art consisting of geometric patterns usually engraved and painted on the outer walls of homes (Grant & Grant 1998: 45; van Wyk 1998: 88), as seen in Figure 22, and is "based on well-established regional symbologies and received wisdom of Indigenous knowledge systems" (Ditema Tsa Dinoko 2022). The graphemes in the system are not based on specified elements but were designed, as a whole, to resemble the traditional art form of Litema, which in itself draws from the existing Indigenous knowledge system.

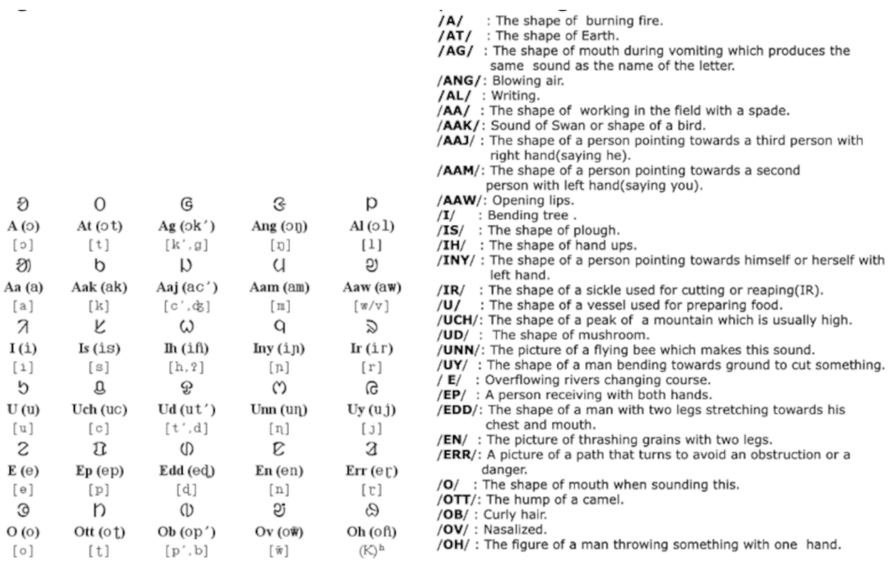
Figure 22.

Litema mural artwork on a local house (Beyer 2003)

The main feature of the Ol Chiki script is that every grapheme is based on common icons or images familiar to the Santali community. The script's website states, "letters of Ol Chiki script are also derived from the physical environment and what surrounds the people – hills, rivers, trees, birds, bees, plough, sickle – the list is endless" (Ol Chiki Script 2022). Figure 23 shows the elements all graphemes are based on; for example, the grapheme for /ɔ/ comes from a burning fire, /a/ comes from someone working in the field, /u/ comes from a vessel for holding food, /t/ and /d/ from a mushroom and so on. This script differs from others like Ditema Tsa Dinoko as every grapheme is based on common cultural icons and images rather than the overall look of the script mimicking a traditional art form.

Figure 23.

Ol Chiki grapheme inventory and explanation (Ol Chiki Script 2022)



In their report on the graphic design of the Bété script, Yeo and Cao (2021: 160) state, "Each syllable is coded by a referent in the Bété language, generally borrowed, according to the author's stated intention, from the acts or objects of daily life". This clarifies that Bété employed common cultural icons and images in his script design. Furthermore, it can be seen that he utilised a method similar to the rebus method in the creation of his script with Yeo and Cao (2021:160), stating:

> Bruly Bouabré's "alphabet" book is based on logic similar to that of the rebus, and therefore relies on the indispensable peg of the drawing: each syllable is coded by a referent in the "Bété" language, generally borrowed, according to the author's stated intention, from the acts or objects of daily life.

For example, it can be seen in Figure 11 that various graphemes appear to be based on different foods (C5R3[7] <FRE> – berries, C3R18 <DRÊ> - apple), plants (C17R2 <TLÔ> - flower, C15R16 <PROU> - potted plant), animals (C21R4 <SEAU> - snail, C15R7 <PRE> - fish, C19R20 <YO> - small fish), and activities (C4R20 <FLA> - walking together, C16R1 <NU> - sitting at a table).

7 This refers to location of the grapheme in the chart, C5R3 refers to column 5, row 3

The Afaka syllabary consists of graphemes whose design comes from the Latin and Arabic scripts and "traditional African symbols" (Ager 2023g). Everson (2012a: 1) states, "The script appears to be unrelated to any other script, its glyphs having been developed on the principle of the acrophonic rebus." Figure 24 shows which Afaka graphemes utilise acrophony. Scriptsource (Afaka 2023) additionally states:

> A more controversial view is that the symbols already existed prior to the creation of the script, but they had religious, rather than phonetic, significance. Many of them resemble acrophonic rebuses – stylised pictures of something which begins with the sound the symbol stands for – from Africa, where they may have been used in religious ceremonies. Some Nenge may have felt using the sacred symbols for mundane or secular purposes would be irreverent.

Figure 24.

Afaka graphemes and explanation (Everson 2012a)

GI *gi* 'give' (two hands)
WE *wi* 'we' (two hands)
MI *mi* 'me' (glyph reversed from YU)
YU *yu* 'you' (glyph reversed from MI)
KO *kon* 'come' (glyph reversed from GO)
GO *go* 'go' (glyph reversed from KO)
TU *tu* 'two' (two strokes)
FO *fo* 'four' (four strokes)
NEN *nen* 'name' (a cross used in signing one's name)
BE *a de anga bee* 'she has belly; she's pregnant' (the dot helps to distinguish this from ɛ NYA)
U *uku* 'pair of hooks' (character used for both *u* and *ku*)
KA *kaka* 'faeces'
PI *pisi* 'urine'

The grapheme chart suggests that this script employs numerous common cultural icons and images, in addition to its influences from Latin and Arabic.

In his report on Otomaung, Kelly (2021:1) states, "the script exhibits a formal influence from cursivised Roman while its inventory of letters presents as a cypher for the English alphabet" and (2021:8) "a writing system is designed to model aspects of linguistic structure, usually phonological, of a language or languages. A cypher script, meanwhile, models another writing system." The Otomaung script has three primary forms in which it can be written, similar to our versions of lower case, upper case, and bold or decorative. The lower and upper-case forms draw inspiration from the Latin script however, it is the decorative form of the script which was inspired by the ceremonial scarring practices of the local Naasioi. Ceremonial scarring is not practised as widely in modern-day Naasioi culture

Figure 25.

Otomaung grapheme design example (Kelly 2021)

as it was in the past, and now, "for the promoters of the Naasioi Otomaung alphabet, the script is seen to represent these once prevalent sacred designs" (Kelly 2021: 16). Figure 25 shows Naasioi ceremonial scarrings and their corresponding graphemes. This information indicates that the Otomaung script uses influences from traditional body art in its design.

3.2 Common Cultural Icons and Images' Relationship with Sound

Scripts incorporating common cultural icons and images can be categorised into three subcategories based on how the elements are used: with the rebus principle, the acrophonic principle, or with no connection to sound (see Table 3). The rebus principle uses existing symbols for their phonetic value, regardless of their original meaning, while the acrophonic principle names graphemes so that the grapheme's name begins with the grapheme itself.

Two scripts, Wancho and Bété, utilise the rebus principle, and one, Afaka, employs acrophony. Wancho and Bété use familiar icons and images for their graphemes, ignoring the icons' meanings. Afaka's graphemes' names start with the sound they represent. Though only three scripts in the study use these principles, it is noteworthy that these ancient practices continue in modern script creation. This parallels ancient script studies, where the use of acrophony and the rebus principle offers insights into script development motivations and contexts, both historically and contemporarily. While less common today, their continued use highlights enduring trends and innovations in script creation.

Table 3.

Common cultural icons and images relationship with sound

Script	Rebus	Acrophonic	No connection
Wancho	X		
Chisoi			X
Mwangwego			X
Ol Chiki			X
Bété	X		
Afaka		X	

3.3. Motivations for Script Development

This section discusses the main motivations behind developing these scripts, as identified in the study and reflected in Table 4. Derived from primary and secondary sources, the motivations include the unification of marginalised groups and resistance towards powerful groups, with nine and eight instances, respectively. Expressing cultural identity was common, with six cases. Recuperation of literacy and language preservation were less common, with three and two instances, respectively.

The Wancho script development was influenced by multiple factors. In Arunachal Pradesh, people also speak Assamese, Hindi, and English, causing a language shift. Interviewees mentioned past written communication in English or Assamese (personal interview 2023). The Wancho script resists this shift, protecting the language from endangerment. It also serves as resistance against state-internal (Hindi) and state-external (English) colonial languages. Interviewees highlighted that the script aimed to unify all Wancho dialects, not just those in Longding District.

Table 4.

Script and motivations behind their development

Script	Resistance	Unification	Cultural Identity	Language Preservation	Recuperation of Literacy
Wancho	X	X		X	
Chisoi	X	X	X		
Mwangwego	X	X			X
African Lakeside	X	X	X		X
Avoiuli	X		X		
Ditema Tsa Dinoko		X	X		
Ol Chiki	X	X			
Bété		X	X	X	
Afaka	X	X			X
Otomaung	X	X	X		

When asked if the script faced any opposition during its adoption, one of the interviewees (personal interview 2023) responded:

> Actually, there is not directly an opposition, just confusion... Banwang Losu belongs to Kamhua Noknu village, it is in Pancho circle, and we are belonging to Longding area, there is also Wakha area, we have nine blocks, and so as I told you there is tonal variation, so this is not an opposition but a confusion. So many people used to say Kamhua Noknu language cannot be spoken by all Wancho. How can it be taught to all Wancho, it is not possible, it is not an opposition it is a confusion. So as a member I told them Wancho script is not to promote any particular language or language of that area it is a method of sound, already I told you that there is a sound, we cannot write in English or Hindi our own names but in this Wancho script we can write our name in the perfect way, there is no opposition but a confusion of the people.

Government workshops in 2011 aimed to preserve Wancho, and many interviewees were optimistic about the script promoting language preservation for future generations.

The development of the Chisoi script can be inferred from the sociolinguistic and political context. The Unicode proposal indicates the language was written with three other scripts, suggesting resistance towards these more powerful scripts and unification of Kurmali-speaking communities. The script's use of Rangolis, Alpanas, and other cultural symbols expresses cultural identity, which other scripts could not achieve.

When asked about the influences behind the development of his script, Mwangwego (personal communication 2023) states:

> In October 1977, while undergoing a training in Library management, I saw for the first time, in an encyclopaedia, different writing systems for Arabic, Chinese, Greek, Hebrew and Hindi. I was puzzled and wondered why we, in Malawi, were writing our languages with the system brought by colonisers. Then the verb '*kusimba*' in my language, Kyangonde, and '*kulemba*' in Chichewa (to write) made me believe that people in this part of Africa used to write before the arrival of Europeans because a verb cannot exist without an action. The writing system must have been destroyed by colonisers in order to dominate better. Therefore, I decided to create a system for writing all Malawian indigenous languages. Today, when we write our languages with this script, we

> feel decolonised in our minds. Each time I want to write in Chichewa, my brain switches to Mwangwego script and it switches to the Latin alphabet when I have to write in English, French or Portuguese.

Mwangwego's creation appears to be driven by a desire to reclaim a lost literacy, as suggested by his interpretation of linguistic evidence in his native languages. However, it's essential to approach this narrative critically. While Mwangwego may see this as reclaiming a pre-colonial tradition, it could be interpreted as a folkloric justification rather than a historical reality. Nonetheless, his invention of the script was a deliberate effort to resist colonial influences and unify Malawian languages, reflecting his broader goal of cultural and linguistic decolonisation.

The Luo alphabet in the African Lakeside script incorporates cultural identity through its design, inspired by the practice of children writing on the ground. In my email exchange with Sidandi, he explains "The ABC was designed around a horizontal line on which letters were anchored. This is derived from the practice of children being taught to write on the ground before writing on the black board" (personal communication 2023). Sidandi's explanation of the numerals based on a legend about missing Hebrew numerals exemplifies reclamation of literacy. The script started as a project to decolonise the alphabet and better capture Dholuo sounds (personal communication 2023). The script promotes all Indigenous languages of the region, unifying marginalised groups.

Avoiuli was explicitly invented for an Indigenous movement that sought to return to traditional ways of life and away from Western Society. This suggests that it was, first and foremost, a form of resistance against the more powerful language groups in Vanuatu and Western Society as a whole. Not only is this movement an expression of cultural identity, but the script's design, incorporating traditional sand drawings, reflects this as well.

As Ditema Tsa Dinoko was developed by a team of linguists and designers to be used for all of the Southern Bantu languages, it predominantly serves as a tool of unification for marginalised Indigenous language groups spread across Southern Africa. The use of Litema as the inspiration for the overall design of the script likewise serves as a strong expression of Southern African cultural identity that the inventors wanted to promote simultaneously with the new script.

The Ol Chiki script appears to have been created to unify marginalised Santali-speaking communities, distancing them from state-internal Indic scripts and addressing the shortcomings of using the Latin script for Santali. The organisation's website states, "Ol Chiki is alphabetic and does not share any of the syllabic properties of other Indic scripts" (Ol Chiki Script 2022). This differentiation highlights its resistance to

other scripts. However, the promotion of Ol Chiki is seen by some as divisive and hindering language development. During its Unicode application, some Santali communities protested, favouring the Latin script for its longer history and broader acceptance, arguing that Ol Chiki would divide rather than unite Santal communities across India, Bangladesh, Nepal, and Bhutan (Raska 2002). Although proponents of Ol Chiki intended unification, it's essential to recognise that different communities may perceive such initiatives differently, especially in such a geographically and culturally diverse region.

The Bété syllabary may have been invented by Bouabré to unite all Bété languages in Cote d'Ivoire, similar to Ditema Tsa Dinoko. Bouabré envisioned it as a universal script, particularly for African languages (Schuster 2018). As an artist, Bouabré aimed to preserve and promote Bété languages and express local cultural identity. Schuster (2018: 1) states:

> One way Bruly Bouabré preserved Bété culture was by recording Bété heritage and myths in crayon and ink drawings on postcard-sized pieces of paper. The Bété people did not have a writing system for their spoken language, so the artist created one and used it, along with French, to incorporate descriptions of these scenes within the composition.

Although this script has yet to gain much attention outside the art world, it holds the potential to serve as a crucial preservation tool for the Bété languages, which continue to face a decline in the number of speakers. Bouabré's creation of this script not only aims to document endangered languages but also embeds the heritage and culture of the Bété people within the script, serving as an instrument for cultural resilience.

Although Afaka resources, particularly those in English, are scarce (most are in Dutch), literature provides clues about the script's development influences. Pakosie and Dubelaar (1988: 2) note that Atumisi told a missionary in Paramaribo that the script was for his people's benefit. This suggests it aimed to unify the marginalised Ndyuka people spread across central and eastern Suriname. Huttar (1992: 10) reports an elder advocating for the script's adoption, saying, "A Frenchman writes in his way, a Dutchman in his, Chinese and Javanese each have their own scripts; but now God has wanted to give Ndyuka a script – so don't reject it!" This highlights the goal of gaining legitimacy for the language. This relates to Kelly's (2018) discussion of how script creation is often framed within narratives of 'recuperation of literacy,' where such efforts are viewed as attempts to reclaim or invent an 'ancient tradition' as seen in Southeast Asian contexts. Huttar likewise (1992: 9) mentions that "Afaka received visions from God instructing him to develop the script and teach it to others" and (1992: 15) that:

> Many of these scripts were developed by men who, like Afaka, saw themselves as or were perceived by their peers to be prophets, often active in the development of a new variety of local religion, which often was a fusion of traditional and outside (Christian or Muslim) beliefs and practices.

The influences behind the development of Otomaung seem apparent. It appears that the creation of the Otomaung Cultural Society and the Otomaung script during the Bougainville Crisis was intended to promote and preserve the cultural identity and values of the Otomaung-speaking peoples. Additionally, the script seeks to act as a universal script for the languages of Bougainville, including English, unifying the Indigenous language groups (Kelly 2021: 20). However, it also functions as a form of resistance to the outside world, particularly the government of Papua New Guinea.

4. Emergent Themes

Implementing visual cultural elements into a script may significantly enhance community acceptance. According to interviewees, three of the scripts in this study have already been encoded to Unicode[8], and two are seeing an increase in user numbers. However, the impact of visual cultural elements on their acceptance remains to be seen for the remaining scripts. Common cultural icons and images appear to be the most prevalent elements found in these scripts due to their ease of implementation and accessibility. Although handwriting and hand drawing are diminishing due to digital design, these icons and images are preserved within the scripts.

Traditional art forms and body art, while less common, serve as important tools for cultural preservation. As these art forms face extinction due to changing cultural practices and globalisation, scripts may act as repositories for preserving them and the knowledge they embody. For instance, Ditema Tsa Dinoko preserves Southern African mural art, Chisoi conserves Rangolis and Alpanas from India, and Avoiuli preserves traditional sand drawings from Vanuatu. Similarly, body art practices like cicatrisation and tooth ablation are referenced in the Wancho, Otomaung, and African Lakeside scripts. However, it's important to note that this association might be more of a retrospective explanation rather than an intentional act of preservation, as Kelly (2018) cautions against making strong claims of direct continuity between scripts and traditional practices.

Elements from the Indigenous knowledge system are less commonly observed, possibly due to their abstract nature, which

8 Including Chisoi which will be added with Unicode Version 16.0

can make them more challenging to render. However, they serve as powerful tools for preserving local knowledge and culture. Incorporating these elements helps in their survival and preserves Indigenous knowledge systems, safeguarding crucial cultural knowledge.

Unification of marginalised groups appears to be the most common motivation behind script development, followed by resistance towards more powerful groups. Most scripts seem to reflect both motivations, which may indicate communities' efforts to resist outside influences while attempting to unite minoritised groups. Expression of cultural identity also emerges as a prevalent motivation, often aligning with the incorporation of visual cultural elements to potentially showcase local identity. Despite feeling threatened by cultural loss, these communities strive to share their heritage with the world.

Recuperation of literacy emerged as a relatively uncommon yet intriguing motivation, identified in the Mwangwego, African Lakeside, and Afaka scripts. This reflects communities' narratives of losing writing and their struggles to reclaim it. Exploring other cultures and similar legends of literacy loss could provide valuable insights into the desire to recuperate literacy and its potential role in script creation. Surprisingly, language preservation is the least common motivation, explicitly mentioned in only two cases: Wancho and Bété. However, it has become an indirect outcome for scripts like Chisoi and Ol Chiki, which have been encoded to Unicode, enhancing their chances of survival. The invention of scripts for all languages in this study offers potential avenues for language preservation, even if these have not yet been fully realised.

5. Concluding Remarks

Incorporating visual cultural elements in scripts may help transfer cultural knowledge to more stable forms. Although visual cultural elements and the motivations behind script invention may not directly impact Unicode acceptance, they remain significant. Unicode encoding facilitates script use but does not guarantee the community will use that script indefinitely. However, incorporating visual cultural elements could help users remain connected to incorporated cultural aspects, potentially preserving them from vanishing. Understanding these motivations sheds light on the challenges faced by Indigenous language communities and their choices in script development, highlighting the importance of community connection to scripts.

Future research could further explore the use of visual cultural elements across various scripts. This kind of research can also be conducted on understudied ancient scripts, and the features of both ancient and modern scripts can be analysed alongside one another. By

doing so, we can gain a richer understanding of script development trends and innovations across different times and cultures, further emphasising the role of visual cultural elements in the preservation and revitalisation of languages.

This study on the visual cultural elements incorporated in script design and the motivations behind script development is not exhaustive, nor does it imply that these are the sole determinants for the success of a script. Linguistic, sociolinguistic, and socio-political factors all play crucial roles in script uptake. However, among these factors, the sociolinguistic situation is the most critical. Even with linguistic and socio-political stability, a script's acceptance ultimately relies on community acceptance. Therefore, language communities contemplating script development could consider implementing visual cultural elements relevant to their unique identities.

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I am a grapholinguist specialising in the study of endangered Indigenous languages and writing systems, with a focus on newly invented writing systems. My research delves into the intricate relationship between language, culture, and the written word, mainly focusing on the development and impact of writing systems on linguistic preservation and cultural identity.

I explore how the creation of writing systems facilitates the preservation of language and culture and how these elements can inform the design and evolution of writing systems themselves. Additionally, I investigate the sociolinguistic factors that influence the successful adoption of new writing systems within communities, including the intricate process of submitting proposals for Unicode encoding.

My passion lies in collaborating with Indigenous language communities, offering expertise and support as they navigate the adoption of a new script for their previously unwritten language or seek to replace an existing one. I am completing my doctoral studies in linguistics at Queen Mary University of London.