CURRENT TRENDS IN MAYAN LITERACY

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Abstract: The Maya are not dead, and their languages continue to be used. Reviewing the history of Mayan literacy, we focus on several important changes which have been facilitated by an invigorated spirit of pan-Mayanism since the mid-1980s. The Maya have succeeded in changing Guatemalan language policy and statutory law during the past generation. Key legal changes and policy decisions, which seemed perhaps insufficient at first, have resulted in increased literacy, including multimodal literacy, throughout the Mayan areas of Guatemala. Robust language communities, such as the K'iche' and the Q'eqchi', have certainly benefitted from government literacy initiatives, but even endangered communities, such as the Ch'orti', have seen improvements in literacy. Guatemala clearly deserves most of the credit for initiating the new laws and policy changes which have fostered growing literacy among the Mayans. The spirit of pan-Mayanism has also helped to improve Mayan literacy in Belize and Mexico. Guatemala's initiatives have also been a catalyst for NGO literacy programs, and they have served as a touchstone for pan-Mayan coöperation and coördination in general. Of course, the Maya's ancient writing is legend, so today's Mayan literacy is actually a recovery of literacy. Still, on balance, the past 25 years represent perhaps the most optimistic period for Mayan literacy since the destruction of the indigenous Mayan literature in 1697.
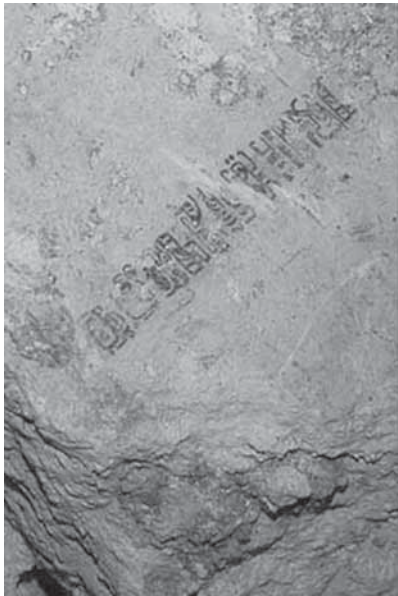
Key words: Mayan languages, language policy, pan-Mayanism, literacy revitalization

MAYAN LANGUAGES AND HISTORICAL MAYAN LITERACY

Mayan is a Mesoamerican language family, characteristic of the Maya people. The Maya are localized into many cultural subgroups, with different languages, different clothing, different music, and different eating habits. There are about 30 Mayan languages spoken today, in various parts of Guatemala, Belize, Mexico, Honduras, and, because of recent migration, El Salvador and the United States. This paper follows a long anthropological tradition of using "Mayan" to refer to the language family and linguistic properties, whereas "Maya" or "Mayas" refer to the people and their properties in general. Thus, in the usage promoted here, Mayan language speakers are "Mayans", whereas otherwise culturally Maya persons are "Mayas". Moreover, we might say that "the Maya love tortillas", just as we might say that "the British hate the French". (Cf. Justeson 2009 for a historically consonant, though emotionally variant, viewpoint.)

There are seven agreed-upon subgroups of the Mayan language family. There has been significant variation of language names and spellings over the years. This paper gives some popular alternates in parentheses (cf. Guatemala 2003 and ALMG 2012 for official, though sometimes inconsistent, spellings of the Guatemalan language names). The Huastecan subgroup includes the Wastek (Teenek) language spoken in the Pánuco River area of Mexico and the extinct Chicomuceltec. Yucatecan includes Yucatec (Maya), Mopán, Lacandón (Lakantum), and Itzaj. Cholan includes Ch'ol, Chontal, Ch'orti', and

the extinct Ch'olti'. Tzeltalan includes Tzotzil and Tzeltal. Greater Kanjobalan includes Jakaltek (Poptí), Q'anjob'al, Akatek, Chuj, Tojolabal, and Mocho. Greater Quichean includes Q'eqchi' (Q'eqchi', Kekchi), Uspantek, K'iche', Achi', Kaqchikel, Tz'utujil, Sakapultek, Sipakapense, Poqomchi', and Poqomam. Mamean includes Mam, Awakatek, Chalchiteko, Ixil, and Tektitek (Teko). Two of the languages encountered by Spanish conquistadores became extinct long ago (Chicomuceltec and Ch'olti'). Three languages are currently in great danger of extinction (Lacandón, Itzaj, and Mocho). With the exception of Wastek, the traditional homelands of all Mayan languages are in the "Maya area" stretching east from Mexico's Isthmus of Tehuantepec to Honduras. Recent urbanization has increased the pressure to switch and shift to Spanish and English; however, despite this pressure, many of the languages are quite robust.

Figure 1: Photograph by B. Beltrán, drawing by D. Stuart (Science)

Mayan writing is nearly as old as the oldest known Mesoamerican writing, and literacy has been an important component of Maya culture for over two millennia. The oldest known Mayan writing (Figure 1) has been dated at 300-200 B.C. During the First Millennium of the Christian Era, the Mayan script flourished (Figure 2). This was the Classic period of

Figure 2: first four glyph blocks of the Tablet of the 96 Glyphs at Palenque (cf. A1, B1, A2, B2 of Figure 3)
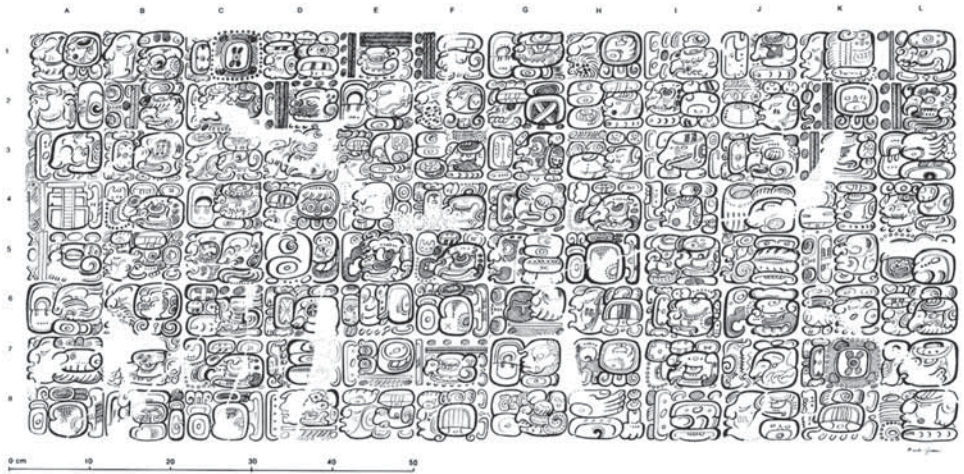
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Figure 3: Table of the 96 Glyphs, as drawn by Merle Greene Robertson

Figure 4: a page from the Dresden Codex

Maya history (A.D. 200-900). We believe that the language spoken by the scribes of this time was similar to modern Ch'orti'. Post-Classic writing was more likely Yukatek, whereas early scribes may have spoken a language similar to Q'eqchi' (though this is rather speculative). Oracy skills are esteemed as in many cultures; however, beyond oracy, the Maya accord great respect to individuals who can read and write well, and nearly every community has a respected literate adult male who is known as "the Scribe" (e.g., aj Tz'ib'; cf. Laughlin 1993).

Classic Mayan script was written as a sequence of glyph blocks, with glyphs written in pairs arranged in descending columns, with columns progressing from left to right. Thus, for the Tablet of the 96 Glyphs (Figure 3), beginning in the upper left-hand corner, with the columns labeled alphabetically and the rows labeled numerically, the glyph blocks are read in this order: A1, B1, A2, B2, A3, B3, …, A8, B8, C1, D1, C2, D2, …, C8, D8, E1, F1, E2, F2, E3, F3, ….

The Mayan script is normally said to be logosyllabic, because an individual glyph typically represents either a morpheme or a syllable; however, a glyph can also represent just the onset of a syllable. In some ways, Mayan script resembles Japanese script. There are

homophonous glyphs, just as there are homophonous kanji; there are phonetic determinants in both scripts; and Mayan script suffixes are in some ways like okurigana. Yet, despite this resemblance to a modern script, modern researchers were unable to phonetically read Mayan script until the 1980s (Coe 1992).

Spanish contact with the Maya began in 1511, but the conquest was not completed until 1697, so there were nearly two centuries during which the various Maya communities evidenced radically different situations of language contact, language dominance, and literacy models. The Mayas had no central government; they were organized more like city-states, and they often warred with each other. Because of this, the Spanish conquest took many years. In fact, the Q'eqchi' and Poqomchi' of Guatemala's Verapaz were never conquered militarily; their territory in northern Guatemala was eventually placed under protection of the Spanish Crown, and their pacification and christianization was entrusted to the Church at the behest of Bartolomé de las Casas. Some Maya welcomed alliances with the Spanish, others submitted to Spanish might, and others were won over by Dominican and Franciscan proselytizers.

As a result of their capture on the Yucatan Peninsula in 1511, Gerónimo de Aguilar and Gonzalo Guerrero became the first notable Europeans who could speak and understand Mayan languages. Aguilar (1489–1531) was a Franciscan friar from Spain. During the 1519 Spanish conquest of Mexico, Aguilar assisted Hernán Cortés (together with La Malinche) in translating indigenous language to Spanish. Guerrero (died 1532; also known as Gonzalo Marinero, Gonzalo de Aroca and Gonzalo de Aroza) was a sailor from Spain. Guerrero married the daughter of Nachan Can (Lord of Chactemal, which included parts of Mexico and Belize), and he fathered three of America's first mestizo children. Later, Guerrero led Maya warriors against Cortés and Pedro de Alvarado. The complexity of such early multiple allegiance is evident in the account of Bernal Díaz (who accompanied Cortés, but wrote in 1568) of Guerrero's response to Aguilar's plea to join Cortés:

> "Hermano Aguilar, yo soy casado y tengo tres hijos. Tienenme por cacique y capitán, cuando hay guerras, la cara tengo labrada, y horadadas las orejas. ¿Que dirán de mi esos españoles, si me ven ir de este modo? Idos vos con la bendición de Dios, que ya veis que estos mis hijitos son bonitos, y dadme por vida vuestra de esas cuentas verdes que traeis, para darles, y diré, que mis hermanos me las envían de mi tierra."
> ["Brother Aguilar; I am married and have three children, and they look on me as a cacique (lord) here, and captain in time of war. My face is tattooed and my ears are pierced. What would the Spaniards say about me if they saw me like this? Go and God's blessing be with you, for you have seen how handsome these children of mine are. Please give me some of those beads you have brought to give to them and I will tell them that my brothers have sent them from my own country."]

Throughout this period, Spanish conquerors destroyed Mayan-script books. Today, readable remnants of only three Conquest-era Mayan-script books are confirmed to exist. The Madrid Codex, The Dresden Codex (Figure 3), and the Paris Codex are named for the cities in which they currently reside. The authenticity of the Grolier Codex, which has been in Mexico since its public display at the Grolier Club in New York in 1971, is disputed.

Other confirmed precolumbian Mayan books have been recovered by archeological excavation, but they are unreadable, because their pages are either fused together or in fragments. Because of this, modern Mayan script decipherment has relied heavily on the corpus of pottery inscriptions, as well as on stone monument inscriptions. During the colonial era, the indigenous Mayan script fell into disuse, and Mayan scribes began to write in Latin script.

In 1549, a Franciscan monastery was established at Maní (which is south-southeast of Mérida, Yucatán, Mexico) with the coöperation of the local Maya, and the Maní Land Treaty provides a 1557 example of Mayan language written in Latin script. Indeed, by the time of this treaty, use of the Latin script for Mayan language seems to have been fairly well established (Roys 1933: 11-13). In subsequent decades, missionary linguists and young bilingual mestizos produced some of the earliest known Mayan dictionaries and grammars.

Sometime between 1554 and 1558, the Popol Vuh was written in K'iche' using the Latin script, being probably transliterated from a precolumbian Mayan script document. This Latin script transliteration was discovered in 1701 in a parish church in Chichicastenango by Francisco Ximénez, who copied it and translated it into Spanish. The manuscript of Ximénez was later discovered by Brasseur de Bourbough, and it is now in Chicago. Having recognized the importance of Mayan folklore, many friars recorded oral literature and translated it into Spanish.

The first major work of Mayan literature known to be originally written in Latin script is a manuscript written in Kaqchikel, by Francisco Hernández Arana Xajilá in 1571 (later completed by his grandson, Francisco Rojas, in 1604). Although this document continues an oral tradition, it was not transliterated from an existing Mayan script document. An English translation, The Annals of the Cakchiquels, by Daniel G. Brinton was published in 1885. The colonial scribes quickly recognized that certain Mayan phonemes could not be written using the regular Spanish spelling rules, so they adopted conventions for diacritics and special characters to write several Mayan languages. These special characters are thought to have been invented by Francisco de la Parra around 1545. In the excerpt here from Brinton (1885: 128), we can plainly see the "cuatrillo", the "cuatrillo con coma", and the "tresillo" characters, some of the special adaptations which were used to write uvular obstruents and ejectives.

68. Ru tzih ahauh Ɛikab, tok xepon chic ka mama chuvi tinamit Chiavar ƐupitaƐah, xavi Ɛa xlaƐabex can ronohel huyu ruma vinak, quere navipe xbe cuƐin ahaua ok xquilaƐabeh tinamit Chiavar, ru chi Ɛikab.

["68. It was by command of the king Qikab that our ancestors returned to the city of Chiavar and Tzupitagah. All the towns were occupied by the nation, therefore they came with the chiefs when these removed to Chiavar by order of Qikab."]

Recently, Unicode has been revised to include these special Mayan letters, thus permitting the standard encoding of many colonial documents. The Unicode block "Latin Extended-D"

now contains both upper and lower case versions of "HENG", "TZ", "TRESILLO", "CUATRILLO", and "CUATRILLO WITH COMMA".

THE LOSS AND RECOVERY OF ORTHOGRAPHY

Orthography is a "proper" or "standard" way of writing, but writing is indeed possible without "orthography". It can be said that the Maya had lost their orthography by the early 19th Century, even though there has never been a time when Mayan languages were not written. The ancient Mayan script was fairly standard, with no more variation than modern Japanese writing. Moreover, the transition from Mayan to Latin script resulted in fairly standard orthographies for several Mayan languages. However, as the Ladino population grew, the writing of Mayan texts decreased. By the 19th Century, becoming "literate" meant learning to read and write Spanish, so even educated multilingual Mayan speakers typically wrote in Spanish. The Mayan script had been forgotten, but Latin script literacy for Mayan languages also languished. Consequently, whenever it was necessary to compose a Mayan language text, writers resorted to various non-standard spellings, because they had not mastered the older Latin script conventions. When scholarly interest in the Maya and the Mayan languages grew in Europe and the United States at the end of the 19th Century, different authors adopted different Spanish, Anglo-American, or other foreign spelling conventions, and the Latin script variation increased further.

Although most national governments are not renowned for their tolerance of linguistic minorities, Guatemala has shown concern for the assimilation of the Maya and their languages into the national bureaucracy. This is surely because the majority of Guatemalans are Mayas and their cultural history is such an important part of the national identity of Guatemala. Worried about the "proper" writing of names (for the preparation of maps and for the registration of taxpayers), the Guatemalan government decreed official orthographies for the various Mayan languages on a number of distinct occasions. These decrees were no more than feeble attempts to legitimate the dominant writing customs already operative. The prevailing habits, which generally fell within the Spanish orthographic tradition, coincided in the main, but they conflicted in certain aspects. For example, in 1962, orthographies were published for thirteen of the Mayan languages by the Dirección General de Cartografía. Interestingly, the Dirección, which published the orthographic system, and for whom it was ostensibly prepared, never did use it. Instead, it authorized a practice of not distinguishing between plain and ejective stops and affricates in order to facilitate pronunciation by "the users of the technical maps" (Guatemala 1962: 3). It is easy to believe that there were no Mayan speakers working for the Dirección.

It is important to mention that the official orthographic system of 1962 was formulated in consultation with the Summer Institute of Linguistics (SIL). Also, SIL received special permission from the Guatemalan government to establish its original compound in Zone 2 of Guatemala City. The compound comprised a library, a print shop and bindery, a chapel, offices, meeting rooms, and living quarters. As part of the quid pro quo for certain sweetheart concessions involving land use and taxes, SIL agreed to use orthographies for the Mayan languages which conformed to the Spanish tradition (rather than to an international linguistic tradition, e.g., Americanist, IPA) in its publications, and SIL agreed to promote such orthographies through its literacy education of the Maya (cf. Eachus & Carlson 1980 for Q'eqchi'). In light of SIL's role as Latin America's ubiquitous linguistic

organization, and given the high degree of Spanish-language familiarity among SIL's employees, this concession was not such a bitter pill to swallow. We gain further insight into how the concession was made when we remember that SIL's top administrators are not necessarily linguists and that SIL has competing nonlinguistic desires which must be accommodated. Of relevance to the topic at hand, we note SIL's commitment to the promotion of literacy in the national language and SIL's position that any literacy training in other languages must be justified in terms of this primary goal. In Pike's terms (1943: 208), SIL was willing to make certain sacrifices in the area of scientific adequacy in order to minimize any offensiveness to the national government. By striking the Guatemala City deal, SIL became the primary disseminator of Mayan-language publications, and the Guatemalan government acquired a linguistic organization willing to legitimate Spanish-based orthographies in the face of mounting pressure for orthographic reform within the linguistic tradition. SIL's influence in the establishment of 20th Century Mayan language policy was enormous.

In the 1970s, a new player entered the Mayan orthography drama. The Proyecto Lingüístico Francisco Marroquín (PLFM) trained many native Mayan speakers as linguistic informants. These informants were taught to work with transcriptions based on linguistic tradition, with knowledge of both Americanist typewriter norms as well as IPA symbols (cf. Kaufman 1970). Some of the native informants were literate in Spanish-style orthographies when they came to PLFM. With rare exception, the native speakers preferred the more linguistic orthographies to the Spanish orthographies. PLFM and other groups began to commission Mayan-language publications, which increasingly familiarized native Mayan speakers with the more linguistic orthographies.

some Mayan transcription choices

International Phonetic Alphabet (IPA)

	[p]	[t]	[k]	[q]	[ʔ]	[ts]	[tʃ]	[ʃ]	[x]
[ɓ]	[p']	[t']	[k']	[q']		[ts']	[tʃ']		

Summer Institute of Linguistics (SIL)

	p	t	c/qu	k	'	tz	ch	x	j
b'	p'	t'	c'/qu'	k'		tz'	ch'		

Proyecto Lingüístico Francisco Marroquín (PLFM)

	p	t	k	q	7	tz	ch	x	j
b'	p'	t'	k'	q'		tz'	ch'		

Academia de Lenguas Mayas de Guatemala (ALMG)

	p	t	k	q	'	tz	ch	x	j
b'	p'	t'	k'	q'		tz'	ch'		

DeChicchis

	p	t	k	q	ʔ	z	c	x	j
b	p'	t'	k'	q'		z'	c'		

Burkitt (plosives)

	p	t	k	q	'	ts	tx	x	j

Figure 5: key differences of Q'eqchi' Mayan transcription

Little by little, the population of linguistically sophisticated Mayan speakers grew. Also, the entrance of native Mayan speakers into Guatemalan government service positions accelerated during the 1980s. Mayan speakers of the four largest language communities helped set up the Ministry of Education's Program for Bilingual Education. The Maya who ran the Program had received training in linguistics, and they were very keen to apply their knowledge in setting Mayan language policy. Faced with the competing orthographic systems of SIL and PLFM and a number of lesser entities, the Program

became concerned that there be a single unified system of orthographies for all the Mayan languages. Other important groups, both private and governmental, also wanted a unified system. SIL had expected everyone to use the SIL orthographic system; however, SIL no longer enjoyed exclusive access to the government's ear on this subject. As the writers of Mayan languages grew in both number and sophistication, they became more opposed to SIL's system. Eventually, PLFM's system of orthographies was adopted almost intact as the official Guatemalan system. On 30 November 1987, the Guatemalan Ministry of Culture and Sports adopted a system of orthographies for twenty-one Mayan languages. The system was proposed after a long and heated debate involving representatives from a wide range of ethnic, governmental, and scholarly interests. Though not perfect, it was the best orthographic standard ever issued by the Guatemalan government. In 1989, the Guatemalan government passed a law to organize an academy of Mayan languages, which was founded in 1990 as the Academia de Lenguas Mayas de Guatemala (ALMG), which has ever since been entrusted with developing and promulgating the orthographies of the Mayan languages of Guatemala.

One of PLFM's failures, and hence a failure of the ALMG system, was the continuation of the Spanish-style spellings for the affricates (Figure 5). DeChicchis (1989) suggested a non-Spanish-style practical alternative, using simple Z and C for writing the affricates. Other scholars (e.g., Fought 1972) advocated the well-regarded linguistic practice of writing affricates with the digraphs TS and TX, as was done by Burkitt (1902), for phonetic perspicuity. In the end, however, the TZ and CH diagraphs were just too well accepted to be discarded.

ALMG's system continued SIL's apostrophe problem. PLFM had used a distinct symbol (usually 7, or sometimes 2, on a typewriter when ʔ was not available) to write the glottal plosive, in order not to confuse this with the apostrophe used to write the ejective consonants. Unfortunately, many of the Maya disliked the use of a numeral (i.e., "el siete") as a letter. Thus, SIL used a simple apostrophe to write the glottal plosive, and it used the same apostrophe to write ejective consonants; however, this resulted in ambiguity. Does written T' represent an ejective [t'] or a sequence of plosives [tʔ]? For most languages, the phonotactic system prevented any misunderstanding, but sometimes the ambiguity was problematic. Thus, for the language Q'eqchi' ad hoc solutions for the ambiguity were devised, such as writing T- for the plosive [tʔ] (cf. DeChicchis 2011 for further discussion). Nevertheless, although scholars at ALMG have acknowledged the apostrophe problem, the ambiguity was deemed tolerable, so the apostrophe continues to have a dual function, unfortunately for Q'eqchi' orthography.

The great success of the ALMG orthographies was the pan-Maya agreement to (1) use K for the velar stops, and (2) use Q for the uvular stops (Figure 5). The use of both letters is in line with IPA practice, and this usage made printed Mayan texts jump off the newspaper as non-Spanish language texts. Siglo Veintiuno (Siglo XXI, Siglo21), a daily Guatemalan newspaper, soon began publishing regular supplements written in four Mayan languages (Mam, K'iche', Kaqchikel, and Q'eqchi') using the ALMG orthography. The importance of this one publishing gesture cannot be overstated. Casual Spanish readers knew immediately which pages were written in Mayan, even if they might not be sure about which of the four Mayan languages was being written. Readers who knew one of the Mayan languages were immediately impressed by cognate similarities, especially

among the three languages of the Greater Quichean subgroup, which served to reinforce pan-Maya feelings of solidarity (cf. Cojtí Cuxil 1996 for an English-language expression of pan-Maya feelings). The phonetic differences between Spanish and Mayan languages became as clear as the printed letters. The new ALMG orthographies were a source of pride and a focus for new multilingual education initiatives. In 1996, the Primer Congreso de Estudios Mayas also made a point of requesting and publishing academic abstracts in Mayan languages using the new orthographies. Today, Guatemalans can take pride in their orthographic policy leadership, as Mayas in Mexico, Belize, and Honduras have begun to follow the ALMG guidelines.

GUATEMALA'S MAYAN LANGUAGE POLICY

As the civil war in Guatemala came to an end, bilingual education became instituted, putting further pressure on the government to promote orthographic standards. Since 1990, there has been an explosion of publications in the new official Mayan orthographies, including important grammars, dictionaries, and collections of folklore. Key elements of Guatemala's educational language policy include the new orthographies, Mayan-Spanish bilingual education, the recognition of language rights (e.g., the provision of translators in judicial courts), and the publication of Mayan books.

In 1995, DIGEBI, the Directorate General of Bilingual and Intercultural Education, was created. In 2003, the Vice Ministry of Bilingual and Intercultural Education was created, and a new language protection law was enacted. Under the new law, the Mayan languages are to be "recognized", "promoted", and "respected". Thus, the legal status of the Mayas, who constitute the majority of the Guatemalan population, is now comparable to Spanish. Moreover, this legal status is also accorded to the languages of the minority Garifuna and Xinca peoples as well.

Of the 100,000 teachers in Guatemala, 30,000 can speak at least one Mayan language, according to the Ministry of Education (Barreno Castillo 2012). There are well over 6,000 certified bilingual teachers working in the public education system in 14 of the country's 22 departments (provinces), and these teachers use 18 languages, in addition to Spanish, as media of instruction. As a direct result of these efforts, literacy among 15-to-24-year-old Guatemalans rose from 54% in 1989 to 71% in 2006. (Inez 2007) Despite this progress, literacy rates are still among the lowest in Latin America, and this lack of educational attainment is linked to ethnicity, gender, poverty, and residence (Hallman, Peracca, Catino & Ruiz 2006: 13). Nevertheless, the outlook is positive.

The cadre of linguistically trained native Maya have been working hard to standardize neologisms. The rich morphology of Mayan languages permits the easy and elegant creation of new words for just about anything. Not only have new words for fax machines and photocopiers been created, but also words for unfamiliar natural phenomena (e.g., snow in the lowlands) are needed. Scholarly Mayas with pan-Maya concerns are seeking to standardize these neologisms, certainly across dialects of one language, but also across Mayan languages generally.

Mayan literacy includes the "recovery" of Mayan script elements, especially numerals and calendar glyphs. For example, it is now common for books written in Mayan languages

to use Mayan numerals for page numbers. Moreover, using the Application Programming Interface (API) of modern cell phone technology, it is now possible to render spoken language directly into ancient Mayan script, and this can even be done for those Mayan languages which had not been written in ancient times. An API ontology relies on dictionary data for GLOSSes and COGNATEs and GLYPHs and SPELLINGs, which usually looks something like this in a computer program:

<English "fish">,
<QEQ kar, TZO choy, YUK kay>,
<GLYPH T738>

Given such an ontology, voice recognition software, together with knowledge of the language of the speaker, can be used to transcribe an acoustic signal into either Latin or Mayan script. For example, the word for fish spoken by a Q'eqchi' speaker would be transcribed as KAR, whereas the word for fish spoken by a Yukatek speaker would be transcribed as KAY; and both pronunciations could appear on a smart phone display as the same ancient Mayan logographic glyph:

Even cognates for more distantly related Mayan languages could be transcribed with the same Mayan script glyph. For example, the Tzotzil word for fish, which is CHOY. Thus, the use of voice recognition API-assisted transcription can be used, not only to ensure that standard Latin spellings are used across dialects, but also to facilitate the use of logographic written communication between speakers of mutually unintelligible Mayan languages, much as written Chinese is used to communicate between speakers of different Sinitic languages.

SUMMARY

The literacy of the ancient Maya never really died. The Mayan scribes shifted from Mayan script to roman, in a long process of nearly 200 years. Christian missionaries began to teach roman script to their regular Maya churchgoers from the 1960s onward. This democratization of literacy was increasingly secularized by university scholars during the 1970s and 1980s. Official bilingual education since the 1980s has dramatically increased the number of Maya, especially women, who can read and write.

When not carving stone, the ancient Maya typically used brushes to write, and later writers used quills, fountain pens, pencils, and ballpoint pens. The use of typewriters resulted in character substitutions and further standardization. Eventually, Maya writers switched from typewriters to computers in the 1980s. By the 1990s, Maya writers were sending me e-mail messages written in their native language. Now they are composing and transmitting Mayan language texts with cell phones.

Although the Mayan script was nearly destroyed by the Spanish colonizers, it was rediscovered and later re-learned by linguists. Computers have facilitated the recovery

and use of the ancient Mayan script elements, which are now in widespread usage. Mayan numerals and name glyphs are increasingly found in both electronic and printed documents.

API programming initiatives will further facilitate Mayan script use and pan-Mayan translation. It is now technologically feasible to use a preprocessor to turn a Latin script character string into a Mayan glyph, just as we use a preprocessor to type Japanese kanji using a Latin script keyboard. A Mayan logograph can also be phoneticized into alternate spoken languages. Voice recognition software will eventually permit the direct transcription of Mayan oral texts into Mayan script texts. With such modern voice recognition interfaces, the Maya can leapfrog directly from their spoken languages to Mayan script, and back again, with the option to use Latin script as well. Watch out Apple Siri: Here comes Chilam Balam!

ILLUSTRATIONS

Figure 1: Photograph by B. Beltrán, drawing by D. Stuart (Science). National Geographic, "http://news.nationalgeographic.com/news/bigphotos/30567508.html", accessed 18 April 2012.
Figure 2: first four glyph blocks of the Tablet of the 96 Glyphs at Palenque. Canadian Museum of Civilizations, "http://www.civilization.ca/cmc/exhibitions/civil/maya/images/maycrv1b.gif", accessed 18 April 2012.
Figure 3: Tablet of the 96 Glyphs, as drawn by Merle Greene Robertson. Mesoweb, "http://www.mesoweb.com/palenque/monuments/96G/65.html", accessed 18 April 2012.
Figure 4: a page from the Dresden Codex. Wikimedia, "http://upload.wikimedia.org/wikipedia/commons/c/ce/Dresden_codex%2C_page_2.jpg", accessed 18 April 2012.

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