INVENTED ORTHOGRAPHY

The Role of Maya-speaking Children in Bilingual Elementary Education

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Abstract. This article addresses the conceptualizations of written language held by Mayan children who attend bilingual elementary school. The article's attempt to show the results of psycholinguistic research carried out with Mayan children follows the conviction that school-age Maya speakers play an important role in generating knowledge of literacy proposals in the context of bilingual education. By being in contact with two languages (the native language and Spanish), the Mayan children make precise linguistic reflections on Spanish that allow them to infer principles of the graphic and orthographic system of their own language. This article explains those reflections.

Keywords: Bilingual intercultural education. Literacy in indigenous zones of Mexico. Cognitive processes involved in school-age children's acquisition of written language in Maya and Spanish.

Chinese
[Translated by Shek Kam Tse[
論文摘要：本文闡釋馬雅兒童進入雙語小學時，如何把書寫語言概念化。本文嘗試把一個關於心理語言學研究的結果展示出來，該研究的研究對象是馬雅兒童，研究假設是學齡的馬雅語兒童，能在雙語教育的背景下研究讀寫能力的議題上，擔當重要的角色。當馬雅兒童接觸兩種語言時（原本的語言和西班牙語），他們能準確反映西班牙語語言學的現象，並把圖象和拼字系統的原則在馬雅語上推演。本文會介紹這些現象。

關鍵詞：雙語多文化教育、墨西哥土著地區的讀寫、馬雅語和西班牙語學齡兒童書寫語習得的認知過程

Dutch
Samenvatting [Translated by Tanja Janssen[
Deze bijdrage gaat over de voorstellingen van geschreven taal van Maya kinderen die tweetalig basisonderwijs volgen. Dit psycholinguïstische onderzoek onder Maya kinderen is gebaseerd op de overtuiging dat Maya-sprekende leerlingen een belangrijke rol spelen bij het genereren van kennis over geletterdheid en tweetalig onderwijs. Doordat Maya kinderen in contact staan met twee talen (hun moedertaal en Spaans), kunnen zij heel precies reflecteren op het Spaans en daaruit inferenties maken over de principes van het orthografische systeem van hun eigen taal. Deze bijdrage gaat in op deze reflecties.

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French
Résumé [Translated by Laurence Pasa]
Cet article s'intéresse aux conceptualisations de la langue écrite des enfants Maya qui vont à l'école primaire bilingue. Il présente des résultats d'une recherche psycholinguistique qui montre que les écoliers mayas produisent de la connaissance à partir de l'offre didactique dont ils disposent dans un contexte scolaire bilingue. En contact avec deux langues (la langue maternelle et l'espagnol), les enfants mayas élaborent des réflexions linguistiques précises sur l'espagnol qui leur permettent d'inférer certains principes du système graphique et orthographique de leur propre langue. La nature de ces réflexions est discutée.
Mots-clés : Enseignement interculturel bilingue. Littéracie dans des zones indigènes du Mexique. Processus cognitifs impliqués dans l'acquisition de la langue écrite maya et espagnole par les écoliers.

German
Zusammenfassung [Translated by Irene Pieper[
Der Beitrag beschäftigt sich mit Konzeptionalisierungen geschriebener Sprache bei Maya-Kindern, die eine bilinguale Schule besuchen. Es werden Ergebnisse psychologischer Forschung dargestellt. Der Ansatz folgt der Überzeugung, dass Maya-Sprecherinnen im Schulalter eine wichtige Rolle im Kontext bilingualer Erziehung spielen, indem sie Wissen über Literalität produzieren. Weil die Maya-Kinder mit zwei Sprachen (ihrer Muttersprache und Spanisch) in Kontakt sind, stellen sie genaue Reflexionen zum Spanischen an, die es ihnen erlauben, Prinzipien des graphischen und orthographischen Systems ihrer eigenen Sprache zu inferieren. Der Artikel analysiert diese Reflexionen.

Greek
Metafrase [Translated by Panatoya Papoulia Tzelepi[
Αυτό το άρθρο παρουσιάζει τις εννοιοποιήσεις για τη γραπτή γλώσσα παιδιών των Μάγια που παρακολουθούν δίγλωσσο δημοτικό σχολείο. Το άρθρο επιζητεί να δείξει τα αποτελέσματα ψυχογλωσσικών ερευνών που έγιναν με παιδιά των Μάγια και ασπάζεται την παποίθηση ότι παιδιά σχολικής ηλικίας που είναι φυσικοί ομιλητές Μάγια παίζουν σημαντικό ρόλο στην απόκτηση γνώσης για τη δίγλωσση εκπαίδευση. Με το να βρίσκονται σε επαφή με τις δύο γλώσσες (τη μητρική και τα ισπανικά) τα παιδιά των Μάγια πραγματοποιούν ακριβείς γλωσσολιγκούς στοχασμούς στα ισπανικά, που τους επιτρέπουν να συμπεράνουν αρχές του γραφημικού και ορθογραφικού συστήματος της δικής τους γλώσσας. Το άρθρο εξηγεί αυτούς τους στοχασμούς.

Polish
Streszczenie [Translated by Elżbieta Awramiuk]
Niniejszy artykuł poświęcony jest konceptualizacjom języka pisanego przez majskie dzieci, które uczęszczają do dwujęzycznej szkoły podstawowej. W artykule staramy się wykazać, że rezultaty psycholingwistycznych badań prowadzonych z udziałem majskich dziećmi dowodzą, iż uczniowie mówiący po majsku odgrywają ważną rolę w zdobywaniu wiedzy na temat umiejętności czytania i pisania w trakcie dwujęzycznej edukacji. Pozostając w kontakcie z dwoma językami (ojczystym i hiszpańskim), majskie dzieci snują o języku hiszpańskim precyzyjne lingwistyczne refleksje, które pozwalają im wnioskować na temat pryncypiów systemu graficznego i ortograficznego ich własnego języka. Niniejszy artykuł wyjaśnia te refleksje.
Słowa-klucze: dwujęzyczna międzykulturowa edukacja; umiejętność czytania i pisania w autochtonicznych strefach Meksyku; procesy poznawcze dotyczące przyswajania języka pisanego w majskim i hiszpańskim przez dzieci w wieku szkolnym

Portuguese
Resumo [Translated by Paulo Feytor Pinto].
Este texto trata da conceptualização da língua escrita por crianças maias que frequentam escolas básicas bilingues. Nele procura-se apresentar os resultados de uma pesquisa psicolinguística levada a cabo junto de crianças maias, na convicção de que os falantes de maia em idade escolar desempenham um importante papel na produção de conhecimento sobre literacia em contexto de educação bilingue. Ao estarem em contacto com duas línguas (a língua materna e o espanhol), a crianças maias fazem reflexões linguísticas objectivas sobre o espanhol que lhes permitem inferir princípios do sistema gráfico e ortográfico da sua própria língua. Este artigo explica essas reflexões.

Palavras-chave: educação bilingue intercultural, literacia em zonas indígenas do México, processos cognitivos envolvidos na aquisição da escrita em maia e espanhol, por crianças em idade escolar.

1. INTRODUCTION

This article addresses the conceptualizations of written language held by Mayan children who attend bilingual elementary school. In the past two decades, the comprehension of children's ideas regarding writing has been a recurring topic in psychological, psycholinguistic and didactic research (Ferreiro, 1997; Teberosky, 2003; Kamii & DeVries, 1997; Treiman, 2002). The results of these studies (based on constructivist theories) have contributed to restating the traditional conception of literacy, since they offer new ideas that explain in psycholinguistic terms the processes of acquiring written language. In the same manner, recent research of a constructivist nature has opened novel lines in language teaching (Castedo, 1995; Lerner, 2001; Teberosky, 2002; Kaufman, 1991). Our work is part of this approach. We are interested in participating in ongoing discussion on bilingual literacy in Mexico and offering data (obtained with the same constructivist focus) that show Mayan children's reflections on writing their language.

It must be emphasized that in the setting of indigenous education (bilingual intercultural) where our study takes place, few studies explain indigenous children's reflections and conceptualizations regarding their native language and Spanish. Therefore, we became interested in studying the cognitive processes used by Mayan boys and girls to appropriate written language. Understanding these processes offers us a conceptual framework to identify the type of cognitive resources the children use to begin to learn literacy. We hope that the results of our research contribute theoretical/didactical elements to help design, over the medium term, proposals for bilingual literacy of higher quality.

Before showing the results of our study, we shall present data that illustrate, on a large scale, the national socio-educational context of Mexico's indigenous population. In particular, we shall offer data on the prevailing literacy indexes in the state of Yucatan (in southeast Mexico) where Maya is spoken.

Our aim is not to study the underlying linguistic and educational policies of the model for bilingual and intercultural education in Mexico, nor to analyze and describe in full the principles that sustain this model, but to point out statistical data that show the worrisome current situation of indigenous education in the nation.

Mexico's educational system (only at the preschool and elementary levels) has schools known as *Escuelas Indígenas* that offer education in the indigenous language; these schools attempt to teach children literacy in their native language[1] and in Spanish. National statistics show, however, that the desired literacy indexes have not been attained. In Mexico, 9.6% of the population over age fifteen is illiterate, with unequal distribution that depends on the number of inhabitants per community. For example, in towns of fewer than 2,500 inhabitants, the illiteracy index reaches 20% and in such towns, the presence of the indigenous population is considerable.

[1] *At the present time, 62 ethnic groups are distributed among the 24 states of Mexico, and at least 80 languages and dialectal variants are spoken (DGEI, 2001).*

The indigenous population of the entire nation is 10%, and out of the ten million speakers of an indigenous language, 75% live in southeast Mexico. The state of Yucatan (located in the southeastern part of the nation) has a population of 1,658,210 of which 33.1% (549,532 inhabitants) is indigenous. The illiteracy index in Yucatan is 12.5%, although the poorest municipalities in the southern area of the state have illiteracy indexes up to 35% (totalling more than 300,000 people in Yucatan who cannot read and write) (INEGI, 2000; CONAPO, 2000).

The number of indigenous Mayan children who live in Yucatan and are required to obtain basic schooling (ages 5 to 14) is 83,890; in other words, close to 16% of the Maya population is school-age girls and boys. However, only 20% of them (16,778 out of 83,890) are able to attend school; i.e., one out of every five Mayan children attends elementary school (INEGI, 2001). One of the reasons is that many communities in Yucatan with large Maya populations do not have a school for indigenous education. Many municipalities in southern Yucatan have an average educational level of 4.2 years, compared with a national average of 7.5; while the poorest municipalities in the state have an average educational level of 3.6 years.

Mexico has advanced substantially during the past fifteen years in accepting its cultural and linguistic diversity. Such progress is clearly evident in the modifications made to its legal structure, which reflect a more favorable (or at least more tolerant) political atmosphere for developing intercultural education (Díaz-Couder, 1998).[2]

In spite of the efforts of the past decade, however, education in the indigenous areas remains deficient. This is due not only to the irregular and limited services, but also to the presence of an inadequate pedagogical and cultural focus that ends up reproducing, with marginal adaptations and under precarious conditions, the same basic system of educational service as the urban schools (known as *regular*). It is known that the *Dirección General de Educación Indígena* (the government organization responsible for indigenous education in Mexico) has promoted, since the 1990s, the implementation of the model of bilingual intercultural education to respond to and satisfy the educational expectations, characteristics, circumstances and basic needs of indigenous girls and boys in each community. However, it is also true that the current national proposal for initial and basic education in indigenous zones has not attained its goals, in part because it does not teach indigenous children literacy in their native language (teaching is in Spanish). Consequently, bilingual education continues to be a national concern while poor results translate into rising illiteracy indexes. One of the main reasons the goal of teaching children literacy in their native language is not attained is that many teachers in indigenous zones are not fluent in that language. Yet even when teachers speak the same language as their students, they feel insecure about teaching literacy in the indigenous language because the writing of Mexico's 62 indigenous languages has not been stabilized and standardized. For example, in the Mayan communities of northeastern Yucatan, the teachers write the Maya language with orthographic criteria different from that of

[2] *For example, in 1992, the first constitutional modification was made to recognize the multicultural character of Mexico; in 1993, the general law of education was modified; in 1996, the agreements on indigenous rights and culture were signed; in 1998, the proposed federal law on indigenous rights and culture was presented.*

the teachers in Mayan communities in southern Yucatan, in spite of minimal dialectal variants in each region. This explains in part why the official proposal for literacy in Maya offered by the bilingual education system is not accepted by a considerable number of Mayan teachers. Many more causes could be listed to explain teachers' difficulties, problems and resistance with regard to the teaching of literacy in the indigenous language, but the limits of this project prevent going into further detail.

We want only to indicate that it would be naive to argue that analyzing a single dimension could explain the complexity of the educational phenomenon as well as the current deficiencies of bilingual education in Mexico. Interaction must be generated between public officials and academics and the qualified representatives of indigenous populations, in order to encourage dialogue based on common concerns. If we are to strengthen native cultures and gain equality for them, to broaden the communicative functionality and use of indigenous language in institutions, and to modify the attitude of mere tolerance for Mexico's cultural diversity in order to promote the development of indigenous language and culture and prevent discrimination (all priority objectives of bilingual education), we must recognize that reflections of a pedagogical, psycholinguistic and ethno-political nature are indispensable for attaining optimal, high-quality levels in bilingual education.

In this difficult educational panorama and context for teaching literacy to Mayan girls and boys, we have taken on the task of researching the types of reflections these children make on writing in their native language and in Spanish. We start from the idea that having exact data on the processes indigenous children use to learn to write language will enable us to contribute to restating and defining linguistic and educational policies with regard to teaching literacy to indigenous children.

Even if it is in the school context where Mayan children explore different childhood notions, the literacy context in which they develop differs significantly from their monolingual, non-indigenous Spanish-speaking peers who are also learning to read and write in school. The children's reflections on written language revolve around writing that is practically non-existent in their sociocultural setting. Let us clarify this point. In the communities where these children live, the Maya language is employed for oral communication, and almost all of the writing that circulates in the community is in Spanish. The use of written Maya is not extensive, and is found only in the children's houses, in a sporadic fashion, in documents of a religious nature (some dating from the 19th century), literacy cards (from the 20th century) or textbooks written in Maya (published mainly in the 1980s). Outdoors, some signs can be seen with place-names of the region written in Maya. We can affirm that reference books and literature in Maya are practically non-existent in most Mayan communities. It is worthwhile to point out that the limited documents and signs written in Maya show a variety of orthographic solutions ranging from the use of the apostrophe (diacritical mark to represent glottalized phonemes) up to consonants or a combination of consonants like the (h), (tz), (ts), (d), (dz), (ds) first seen in colonial times to represent Maya phonemes that do not exist in Spanish. On one hand, the presence of written Maya is scarce, and on the other, no social practices exist for reading and writing in Maya; therefore, Maya speakers do not use written language for communicative interchange.

As a result, we asked children who are Maya speakers to make use of their incipient knowledge of the graphic system in Spanish (they are in the process of learning literacy in Spanish), to write Maya and reflect on their native language. However, as we shall see below, this situation (the children's unsystematic, inconstant and random instruction in writing Maya) did not impede us from obtaining data.

It should be mentioned that the task we assigned the children – writing their native language without having explicit knowledge of how to do so – is not unknown in the history of writing in Maya. The Spanish evangelizers of the 16th century were the first in a long chain of individuals (religious, caciques, Maya scholars, linguists, etc.) who used the Latin alphabet as a model for writing Maya. They, like their successors, proposed other alternatives. Although different in scope, our request for the children's writing represents a similar challenge.

2. OBJECTIVE OF THE STUDY

The central objective of this research is to explore, based on the regularities of the graphic system of writing in Spanish, the way Maya-speaking children construct individual strategies for systematizing the alphabetic manner of representing their language. The hypothesis that guides this exploration is that writing, as a system of representation, has general principals that are applicable to any language – principles to which children are sensitive (as were the first Spanish evangelizers). Thus as a function of their sensitivity to such principles, the children adapt the graphical proposals (alphabet, orthography) of Spanish to write the Maya language.

As carried out previously in a case involving Spanish (Ferreiro and Teberosky, 1979), we analyze the written productions of Mayan children in order to infer their conceptualizations of writing in their native language.

3. BRIEF PANORAMA OF THE MAYA LANGUAGE AND ITS WRITTEN REPRESENTATION

The Mayan culture is the only indigenous culture of America that developed a system of autochthonous writing (hieroglyphic writing in the pre-Hispanic era)[3]. The Maya also developed alphabetic writing (like other indigenous cultures of Mesoamerica) after the Spanish conquest. A question thus arises: Has the same alphabet been used since the Spanish missionaries introduced Latin characters into Maya

[3] *This article does not intend to discuss if Aztec and Mixtec "writing" is considered a true writing system. At present, the topic is polemical and not within the scope of this study. Our basis is the work of Coe (1995), Marcus (1979) and Hill (1994), who argue that the Mayan culture is the only ethnic group in America to develop a writing system. "Maya writing is a glottographic system, considered even by traditionalists as close to being 'real writing'. The other Pre-Columbian writing systems are semasiographic. In Mesoamerica, the Mixtec and Aztec recordkeeping systems are highly pictorial. Often called picture writing, they can be classified as iconic systems within the larger semasiographic category. Where Maya hieroglyphs are predominantly phonetic, the Mixtec and Aztec systems are largely ideographic" (Hill, 1994: 18).*

writing? The answer is a conclusive 'No'. Alphabets have varied over time (from colonial times to the present, more than thirty alphabets have been proposed) (Tozzer, 1977).

We know that internal inconsistencies have existed (and continue to exist) in the use of an alphabet for writing Maya. The writing of consonants, especially glottalized consonants, has been frankly inconsistent over time; yet the inconsistency is even greater in the case of vowels. In colonial texts, the same word can be written with a short vowel (single) or with a long vowel (double), depending on the type of text being handled. Rearticulated vowels can appear as written with a single or double vowel (Álvarez, 1980).

Such orthographic inconsistencies in Maya may have given rise to the creation of multiple alphabets. The appearance of a variety of alphabets may have been provoked by the need (of the Spanish initially, followed by the Maya scholars, and now linguists) to avoid such inconsistencies. A large part of the effort has been concentrated on unifying into a single alphabet the diverse variants of the language; however, such efforts have not been highly fruitful. The search for a better alphabet to represent the phonological structure of the Maya language, a search encouraged by various hegemonic groups, has been a constant throughout history. Each group, on launching a new proposal, has of course attempted to be at the vanguard in standardizing writing. The lack of consensus in the use of different alphabets has evidently led to experimentation with many proposed alphabets.

There are only five glottalized consonantic phonemes in Maya: /p'/, /t'/, /ch'/, /tz'/ and /k'/[4] – phonemes that have shown wide variation in their representation over time. It can also be observed that other letters like (j), (s) and (x) have not been used systematically to represent the same phoneme in each case: /x/, /s/ and /š/. It is worthwhile to mention that the Maya language does not have graphs to codify sounds for /d/, /f/ and /g/, since these phonemes do not exist in the Maya language. Although these phonemes were not found originally in the Maya language, they have been incorporated into the writing, as loans. Nor are the letters (q), (v), (z), (c) and (h) currently used to represent the Maya phonemes of /k/, /b/, /s/, /k/ and /h/, respectively. The exceptions are found in the writing of some place-names and surnames (Cancun, Hó, Zaci) since such graphic forms, due to their function, are more resistant to graphic modification. Maya has the same five vowels of quality as Spanish.

As a result of the meeting held in Merida in 1984, with participants from various institutions (INEA, INI, *Centro Regional del INAH*, *Culturas Populares, Educación Indígena y la Academia de la Lengua Maya*), an attempt was made to unify the Yucatan Maya alphabet. A commission was formed at the meeting to take charge of making the alphabet known. But very few have been faithful to the agreed-upon alphabet. Observations have shown that members of the same Mayan institutions, who intervened in preparing the above proposal, still reveal divergence in their use of the alphabet.

Defining alphabets for teaching literacy has not been the only educational concern. There has also been a need to define the language of instruction and literacy in

[4] *In 1875, the apostrophe (') began to be used to represent glottalized phonemes.*

the bilingual elementary context. During the Spanish conquest, the Maya came into contact with the Spanish language. The exchange resulting from the contact between the two languages necessarily encouraged bilingualism. This does not mean, however, that bilingualism emerged at the conquest, since the Maya had an important tradition of multilingualism due to their relations with members of other ethnic groups. What did arise at the conquest was the religious concern about determining the language for evangelization or instruction; in other words, the mixture of two aspects that would definitively mark Mayan culture – aspects of linguistic and educational policy. It must also be remembered that Hispanicizing movements assumed that reading was a factor of priority in evangelization. In their work to evangelize the Maya, the missionaries made the decision to teach the catechism in the Maya language. Today we know that such a situation is an indisputable condition for teaching literacy. We know that since 1951, the UNESCO has emphasized the need to teach literacy in the native language (UNESCO, 1990).

4. POPULATION AND SAMPLE

All the written productions used as data for our study were obtained from Maya-speaking children attending elementary schools in the state of Yucatan. The data were collected in four different schools in the municipality of Valladolid; all the schools are part of the system of indigenous education. Table 1 shows the distribution of children by grade and sex.

Table 1. Distribution of Children by Grade and Sex

Grade	Males	Females	Total
2nd	23	27	50
6th	24	26	50
Total	47	53	100

Another characteristic we want to emphasize is the level of monolingualism/bilingualism present in the communities' populations. We shall start by reporting that almost the entire population of the communities – 97.1% – speaks Maya. This authenticates our assumption that we were working with a sample of children from the Maya-speaking population.

5. METHODOLOGY

We obtained the children's writing during group sessions at locations provided by the authorities of the four schools where we worked. Each session had an approximate duration of 60 minutes. During all the interviews, we worked in small groups of three or four children to facilitate communication. The children's comprehension

and speaking (to a lesser degree) of Spanish undoubtedly facilitated communication while the interviews were being held. However, since many children preferred to speak Maya among themselves, our intervention was affected and we requested the aid of an interpreter, especially for the second graders, who show less mastery of Spanish. In the upper grades, the children who knew more Spanish than the others often took the initiative to serve as interpreters.

Almost all of the sessions were held with groups of children of the same sex. We had realized that such groups generated greater communication among the children, given the girls' tendency to be quieter around the boys. However, when feasible, we also worked with heterogeneous groups.

To determine if the children try to establish graphic differences in writing words with phonological proximity, and to trace the possible use of graphic polyvalence, we attempted to guarantee the presence of all the glottalized consonantic phonemes and their respective nonglottalized contrasts in the list of words that the children had to write. We used phonological criteria as the basis for selecting the type of words we asked the children to write, in Spanish as well as in Maya.

After testing a long list of words and taking into account the difficulties of their translation (from Maya to Spanish and from Spanish to Maya) in various repetitions, we selected five subsets of words. These words have phonological proximity to promote the children's reflection during their writing attempts.

/ch/	/ch'/	/ts/	/ts'/	/p/	/p'/	/t/	/t'/	/k/	/k'/
cháak	**ch'ala'at**	**Tsaaj**	**ts'aak**	**pak'**	**p'aax**	**taak'in**	**t'aan**	**kaan**	**K'an**
Lightning/rain	*rib*	*to fry*	*medicine*	*wall*	*debt*	*money*	*to talk*	*snake*	*yellow*
che'	**ch'e'en**	**Tseem**	**ts'eej**	**paach**	-	-	**t'eel**	**kéej**	**K'ab**
tree	*well*	*chest*	*to peel*	*back*	-	-	*rooster*	*deer*	*hand*
chi'	**ch'ik**	**Tsíimin**	**ts'íib**	-	**p'eex**	**Tiik**	**t'in**	**ke'el**	**k'éek'en**
mouth	*flea*	*horse*	*to write*	-	*sick*	*to ravel*	*to hang*	*cold*	*hog*
cho'	**ch'o'**	**tso'**	**ts'oya'an**	**píix**	**p'iis**	**Toot**	**t'óon**	**kib**	**K'iin**
to clean	*mouse*	*turkey*	*Skinny*	*knee*	*to measure*	*mute*	*leg*	*candle*	*sun*
chokwil	**ch'óop**	-	**ts'u'uy**	**pool**	**p'óok**	**Tuuch**	**t'u'ul**	**kool**	**k'oxol**
fever	*blind*	-	*Hard*	*head*	*hat*	*navel*	*rabbit*	*corn field*	*mosquito*
chuuk	**ch'uul**	-	**ts'u'**	**puut**	**p'u'uk**	**tu'**	**t'uut'**	**kook**	**k'óoben**
to fish	*to wet*	-	*Center*	*papaya*	*cheek*	*stinky*	*parrot*	*deaf*	*kitchen*
-	-	-	-	-	**p'urux**	-	-	**kúuk**	**K'u'**
-	-	-	-	-	*fat*	-	-	*elbow*	*nest*

In each group of words that share the same phoneme, the glottal/non-glottal phonological contrast appears at the beginning of the word. The word list provides a sufficiently large corpus for evaluating how the children write the five consonants (glottalized and non-glottalized) accompanied by the five vowels. The procedure for requesting the children to write the words was as follows. We began by asking in

Spanish how to say the word in Maya. We would say, for example, "How do you say *lightning* in Maya?" Once the children responded, we would ask them to write the word in Maya; then we would ask them to write it in Spanish. On some occasions, we showed illustrations (drawings or photographs) to facilitate their understanding of the word's meaning. The order of requesting the writing is presented in the above table; i.e., the columns were read from top to bottom and from left to right (complete columns). Lastly, we asked each child to read all the words he had written, to ensure the inclusion of the requested words.

6. RESULTS

This article presents the most relevant results of the situation of writing isolated words in Maya. The objective of the study is to show how children make pertinent graphic distinctions for writing a list of words in Maya. To contrast graphically one of the five pairs of glottalized and non-glottalized phonemes in Maya, we centered the analysis of writing on discovering how the children represent graphically the five pairs of phonemes.

We found that all the children use al least one of the following six graphic solutions in representing the ten consonants. To analyze the children's writing and classify it as pertaining to one of the six groups, our parameter of reference was orthography in Spanish as well as the orthographic proposal for Maya (of 1984).[5]

1) *Conventional representation of the phoneme*. The children use the graph of the Maya alphabet agreed upon in 1984. They mark the glottalized consonants with an apostrophe and do not mark the non-glottalized consonants.

2) *Semi-conventional representation of the phoneme*. The children use the graph of the Maya alphabet agreed upon in 1984, but with an unconventional use of the apostrophe. In other words, they omit the apostrophe in the glottalized consonants and/or they use the apostrophe for the non-glottalized consonants.

3) *Unconventional representation of the phoneme:*

3.1) The children use proximate graphs. Since most of the proximate graphs proposed by the children do not exist in the Maya alphabet, it becomes necessary to use the Spanish alphabet as a reference. We shall call two types of graphs proximate graphs: 1) the set of letters that represent proximate phonemes from the viewpoint of articulatory phonetics; for example, the graphs (t) and (d) are proximate in the sense that both represent homo-organic phonemes: /t/ and /d/ (D'Introno, Del Teso and Weston, 1995, Chapter II); and 2) proximate graphs will also be the letters that have a sound value that is pertinent to the phoneme to be represented, although the orthographic principle in Spanish is violated; for example, (s) and (z) are proximate letters in the sense that they are pertinent for

[5] *The alphabet from the agreement of 1984 is: (a, aa, a'a, a',b, k, k', ch, ch', e, ee, e'e, e', j, i, ii, i'i, i', l, m, n, o, oo, o'o, o', p, p', r, s, x, t, t', ts, ts', u, uu, u'u, u', w, y). Commission for the diffusion of the Maya alphabet Maya, 1984.*

representing the phoneme /s/, but cannot be used in every context because of orthographic restrictions.

3.2) The children use alternative unigraphs. Alternative unigraphs are any letter other than the conventional or proximate letter: for example, the use of the graph (k) to represent the phoneme /ch/.

3.3) The children use alternative digraphs. Alternative digraphs are the combination of the two letters different from the conventional or proximate digraph or graph: for example, (kl) to represent the phoneme /ch'/.

3.4) The children use any of the above three conventional solutions but with the addition of a diacritical mark: the apostrophe. An example is (kl') to represent the phoneme /ch/.

Do a systematic use and homogeneous distribution exist for each graphic solution in each child's representation of the phonemes? Below we shall see that they do not. Let us begin by describing each graphic solution, as well as its frequency of appearance by grade and type of phoneme. The percentages shown in Tables 2 and 3 were obtained from each child's total written words. That is, the percentages are relative to the number of written words, and are distributed among the six graphic solutions used by the children. We must remember that each child was asked to write a variable number of words for each phoneme; since some children did not write all the requested words, we find slight variations in the total number of written productions for each type of phoneme.

Table 2. Distribution of percentages of graphic solutions for words second graders wrote with the ten phonemes. The numbers in parentheses indicate percentages (from the total number of words written for each phoneme)

Grade 2	*(ch)*	*(ch')*	*(ts)*	*(ts')*	*(p)*	*(p')*	*(t)*	*(t')*	*(k)*	*(k')*
Conv	226 (93)	-	-	-	231 (98)	-	161 (98)	-	34 (12)	-
Semi	-	198 (78)	-	-	-	158 (68)	-	125 (49)	-	43 (15)
Prox	-	-	87 (53)	93 (44)	-	35 (15)	-	92 (36)	254 (86)	202 (67)
Unigr	11 (5)	24 (9)	23 (14)	46 (22)	2 (1)	9 (4)	-	14 (6)	3 (1)	10 (3)
Digra	5 (2)	32 (13)	55 (33)	71 (34)	2 (1)	29 (13)	4 (2)	23 (9)	4 (1)	45 (15)
Mark	-	-	-	-	-	-	-	-	-	-
Total	242	254	165	210	235	231	165	254	295	300

Table 3. Distribution of percentages of graphic solutions for words sixth graders wrote with the ten phonemes. The numbers in parentheses indicate percentages

Grade 6	*(ch)*	*(ch')*	*(ts)*	*(ts')*	*(p)*	*(p')*	*(t)*	*(t')*	*(k)*	*(k')*
Conv	263 (92)	40 (14)	7 (4)	12 (5)	274 (99)	39 (15)	191 (96)	37 (13)	152 (43)	37 (11)
Semi	11 (4)	177 (60)	4 (2)	7 (3)	4 (1)	127 (50)	5 (3)	112 (38)	4 (1)	160 (47)
Prox	-	-	83 (44)	132 (55)	-	72 (28)	-	118 (41)	192 (55)	108 (32)
Unigr	13 (4)	31 (10)	31 (17)	39 (16)	-	-	4 (1)	4 (1)	-	-
Digra	-	45 (15)	57 (30)	49 (20)	-	17 (7)	-	21 (7)	2 (1)	35 (10)
Mark	-	3 (1)	5 (3)	3 (1)	-	-	-	-	-	-
Total	287	296	187	242	278	255	200	292	350	340

6.1 Conventional Representation of the Phoneme

The percentage of use of conventional graphs to represent words with the phonemes /ch/, /p/ and /t/ is quite high in both grades. This means that the consonants (ch), (p) and (t) were used systematically and homogeneously by second graders as well as sixth graders. In the sixth grade, conventional graphic solutions appeared for all the phonemes, although the percentages are very low for /ts/, /ts'/, /k'/, /p'/, /ch'/ and /t'/. In contrast, in the second grade, conventional graphs appeared only in the representation of the phonemes /ch/, /p/, /t/ and /k/. These data suggest that due to the similarity of some Maya phonemes and Spanish phonemes, the children used letters in Spanish to write in Maya. For phonemes that do not exist in Spanish, the children had to invent specific solutions, thus expanding the possibilities of unconventional graphic proposals. With regard to the representation of the phoneme /k/, we found that the sixth graders show a higher percentage of conventional graphs than the second graders. This may be because since they have learned literacy in Spanish, many of the small children were not necessarily familiar with the letter (k). However, we should ask why the sixth graders did not make extensive use of the letter to represent /k/. The reason seems to be that there is a tendency to use Spanish orthography as a reference when the sounds are similar in the two languages; thus there is considerable use of the letters (c) and (qu) in both grades, and little use of the letter (k) to represent /k/. The data in Tables 2 and 3 confirm this hypothesis, since out of all the words with the phoneme /k/, 86% (written by second graders) and 55% of those written by the sixth graders were represented with proximate graphs. Thus rather than achieving conventional representation with the Maya alphabet, the children adapt known graphs from Spanish when the phonemes are shared by the two languages.

6.2 Semi-conventional Representation of the Phoneme

As Tables 2 and 3 show, the frequency of appearance of this graphic solution is concentrated in the glottalized phonemes /ch'/, /p'/ and /t'/. Since this solution corresponds to an unconventional use of the apostrophe, it means that the children used the same letters (without the apostrophe) to represent /ch'/, /p'/ and /t'/ and their respective non-glottalized phonemes. It must be pointed out, however, that the percentage of use of semi-conventional graphs is lower in words with /t'/ than with /p'/ and /ch'/. Although these glottalized phonemes do not exist in Spanish and many children searched for alternative graphs to represent them, there was a tendency, especially when representing /ch'/, to use the graph in Spanish. Our interpretation in this regard is that the children did not differentiate equally among the five pairs of proximate phonemes. Would the absence of explicit instruction in written Maya cause a tendency toward homogenization? If so, we should find similar percentages of graphic homogenization in the representation of the five pairs of phonemes, and we do not. Tables 2 and 3 show a different distribution of percentages of graphic solutions, depending on the pair of phonemes the child is trying to represent.

On the other hand, the apostrophe appears more in words written by sixth graders than by second graders. Although the percentage is low, the sixth graders reveal semi-conventional solutions for all phonemes (see Table 3). It is unknown if the sixth graders consider the apostrophe a resource of graphic differentiation. Even if it were so, the apostrophe would not be their preferred resource of graphic distinction given the infrequency of its appearance.

6.3 Unconventional Representation: Use of Proximate Graphs

Selecting proximate graphs may be motivated by a reflection on graphic or phonetic/phonological aspects. Based on phonetic/phonological reflection, the children use the letter that represents the sound most similar to the phoneme to be written. For example, to represent the phoneme /t'/, many children select the graph, (d); to represent /p'/, they select the graph (b), and to represent /k'/, they choose (g). Using a description of articulatory phonetics, the phonemes (/k/ and /g/); (/p/ and /b/); and (/t/ and /d/) share the same point and mode of articulation and the only difference between them is the sound. For this reason, it is said that each of these pairs of occlusive phonemes is homo-organic (D'Introno, Del Teso and Weston, 1995, Chapter II). In this sense, we say that phonetic/phonological criteria prevail.

On the other hand, some children use graphic criteria to decide which graph to use to represent a phoneme having an unknown graphic solution. Based on graphic similarity or on correspondence with alternative letters to represent a phoneme with Spanish orthography, the children use available letters in Spanish. For example, to represent /k'/, some children use the letters (c) or (qu); for /ts/, they select (s), (z), (c), and so on. In this sense, we say that graphic criteria rule. We do not discard the possibility that some children may be reflecting simultaneously on both criteria. For example, the use of the digraph (dz) to represent /ts/ explains this fact. Because of phonic similarity, some children identify the phoneme /d/ as proximate to /t/ and use the letter that represents this phoneme; but at the same time, they use the letter (s) or

(z) to construct the digraph (dz) and represent the phoneme /ts/. We must clarify that we are including this group in proximate graphs and not in semi-conventional graphs, since using the Maya alphabet as a reference shows that none of these proximate graphs is found in the official alphabet. The graphs that correspond strictly to the Maya alphabet, although lacking an apostrophe, are included in the previous group.

Table 4 concentrates the proximate letters used to represent the phonemes /ts/, /ts'/, /k/, /k'/, /p'/ and /t'/, since only proximate graphs were used in these phonemes. It is noteworthy that the second and sixth graders coincide in using the same proximate graphs to represent the above mentioned six phonemes. We assume that in this case, the children utilize the graphic repertory of Spanish to select the letters they consider most pertinent for adapting to Maya writing. The appearance of the graphs (tz, dz, zt) does not come from Spanish (but from Mayan place-names); since these phonemes are nonexistent in Spanish, the children construct graphic solutions most different from Spanish.

Table 4. Proximate Graphs Used to Represent the Phonemes /ts/, /ts'/, /p'/, /t'/, /k/ and /k'/

Grade	/ts/	/ts'/	/p'/	/t'/	/k/	/k'/
2nd	s,z,t, tz,dz,cs,cz	s,z,t, dz,tz,cz	B,v	d	c,q	c,q,g
6th	s,z,t,sz,zt tz,dz,cs	s,z,tz,cs, tz',dz,zt	B,v	d	c,q	c,q,g

6.4 Unconventional Representation: Use of Alternative Unigraphs

	Unigraphs (2nd)	Unigraphs (6th)
/ch/	**k, c**, h, x, t	**k, c**
/ch'/	**g,** c, h, x, l, v,	k, **g**
/ts/	**C, x**, p	**c, x,** k
/ts'/	**c, x**, **k, j**, y, p	**c, x, k, j,** d
/p/	T	-
/p'/	c, n	-
/t/	-	K
/t'/	**b, k**, g, c, s	**b, k**
/k/	X	-
/k'/	X	-

Although the percentage of use of alternative unigraphs in general is lower for the two grades, their presence reveals very interesting data. The highest percentage of use of unigraphs is present in the affricate phonemes /ts/, /ts'/ and /ch'/. In the three

pairs of occlusive phonemes, unigraphs appear in a low percentage. Below we shall see the variety of unigraphs in the two grades.

The children seem to assign a "wild card" value to alternative unigraphs. In other words, they decide which sound value to attach to a reduced number of letters. For example, some sixth graders (not necessarily the same) use the letter (k) (which they practically do not use to write words in Spanish) to represent /ts/, /ts'/, /ch/, /ch'/ instead of the conventional digraphs (ts), (ts'), (ch), (ch'). We say that they use the letter (k) as a substitute letter (Quinteros, 1994): without knowing its conventional sound value, they assign it a provisional sound value different from the conventional value.

It is difficult to make an adequate interpretation of the motivation that guides children to use one of these unigraphs in a specific context. Knowing why an alternative graph is selected by centering only on the analysis of an isolated representation of the phoneme is very complex, but if we analyze the way of representing the phonemic contrast, we may find a possible explanation. Our hypothesis at present is that alternative unigraphs can be used as substitute letters when an immediate conventional solution is not found for differentiating graphically between two proximate phonemes.

It can be seen in Tables 2 and 3 that alternative unigraphs tend to be used more to represent glottalized phonemes than non-glottalized phonemes; they appear in higher percentages for affricate rather than occlusive phonemes; and the second graders use them more than the sixth graders.

As previously stated, the appearance of these unigraphs is of interest because in the presence of a wide range of possible graphic solutions, the selection is restricted and similar in both grades. The sixth graders use almost the same unigraphs as the second graders to represent the ten phonemes (see the bold graphs in the above table). It is surprising that these unigraphs are so similar in children of different ages and grades. For example, the second graders use the graphs (c, x, k, j, y, p) as alternative unigraphs to represent the phoneme /ts'/; the first four graphs also appear in the sixth grade. If there are 29 letters in the Latin alphabet, why do children of such diverse ages and school experiences select the same four letters? What criteria do the children take into account to make this restricted selection? The similarity of graphic alternatives (among children of different ages) as well as the regular appearance of certain graphs (k, g, x, h) to represent different phonemes (/ch/, /ch'/, /ts/, /ts'/, /t/, /t'/, /k/, /k'/), and particularly glottalized phonemes, become revealing events for future research. We confirm that regardless of the age and grade, Mayan children tend to represent certain phonemes in their language with alternative unigraphs that are infrequent in written Spanish, especially the letters (x) and (k). In this sense, we identify similarities in the graphic decisions made by children from different grades.

6.5 Unconventional Representation: Use of Alternative Digraphs

The children from both grades tended to use digraphs to represent basically glottalized phonemes and the affricate phoneme /ts/. In the second grade, the use of di-

graphs is more extensive: although in a low percentage, digraphs appeared in the representation of all phonemes. We found other graphic combinations such as (chx), (sch), (dtch), which were included in this group because of their low frequency. Such combinations of letters appeared only in the productions of sixth graders and in words with the phonemes /ts/ and /ts'/. These solutions are interesting because they could be reflected in the recognition of the co-articulation of the affricate phoneme: this phoneme has one moment that is dental and another that is palatal. In no other case was the use of trigraphs or combinations of more letters found. Below we shall see the variety of proposed digraphs.

	Digraphs 2nd	Digraphs 6th
(ch)	Gr, dr, pl	-
(ch')	gl, gc, tx, vl, cu, qu, cll	gh,gr, kh, kj, kz, dz, cr
(ts)	ch, cl, tr, ps	ch, ck, sh, sr, kz, dh, td, tx, xt, gh
(ts')	ch, cr, tr, tx	ch, cr, ck, sr, sh, dp, dx, qt, gh
(p)	pr, kp	-
(p')	pr, pl, pñ, kp, cr, gl	pb, ph, pr, bk, br, bj
(t)	Tr, tl, gr	-
(t')	tr, tl, dr, pr, bt	td, tg, dr, dj, dt
(k)	Ch	-
(k')	ch, cl, cr, kr, gr, gl, cu	kj, ch, cr, dk, gc, gj, gr

Notice that most of the digraphs (26 out of 45) used by the second graders have the letters (r) and (l) in the second position. This selection seems not to be random since the consonants (r) and (l) are the only graphs in Spanish that can form consonantic groups; that is, they can be written next to other consonants in the same syllable. The selection of this pair of graphs to form digraphs in Maya allows us to sustain the hypothesis that on one hand, the children are sensitive to the identification (perhaps not yet consciously) of combinations of letters permitted in the graphic system of Spanish; and on the other hand, that they are able to adapt this restriction and similar restrictions (ns) to the writing of words in Maya. Since Maya has no consonantic groups (D'Introno, Del Teso and Weston, 1995), we can surmise that the construction of certain digraphs is motivated not by reflecting on the phonological structure of Spanish but on the knowledge of writing in Spanish.

Selecting the graph (u), used preferably in the second position by the second graders, for example in *cu* and *qu*; and the graph (h), used preferably by the sixth graders, for example in *gh* and *kh*, represent a possible adaptation of the Spanish digraphs (qu) and (ch), respectively.

In that sense, the children conceive the digraphs as a composition of letters that can have a fundamentally graphic and not necessarily a phonological motivation. Other graphs that appear in the second position of the digraphs, such as (z) and (c), could be used only as wild cards.

On the other hand, no sixth grader used the graph (l) as the second letter of the digraph; this supports the idea that the older children do not necessarily make the same graphic decisions as the younger children. The second graders prefer to use (r, l, u) in the second position and the sixth graders use (h, r, k, j). Sixth graders may attempt to create letter combinations that are impossible in Spanish (gh, bk, dj) and the second graders try not to break certain graphic rules of Spanish (pr, gl, dr). If this were true, both considerations would be tied to the need to establish similarities and differences in writing the two languages. In other words, the presence of digraphs is somewhat common in both languages, but the combination of possible letters is different for each language.

It is difficult to explain children's motivation for constructing digraphs. We believe it is important to indicate that, based on these data, the children may be considering some principles of the graphic system in Spanish and applying them to written Maya, in the understanding that all written languages must share principles with other languages. But at the same time, they may be attempting to construct alternative digraphs by creating impossible letter combinations in Spanish, in an attempt to show that written Maya has its own graphic rules that distinguish it from Spanish. The simultaneous coordination of both considerations is complex, and may explain in part why some children do not use graphs systematically in all words that have the same phoneme.

6.6 Unconventional Representation: Use of the Apostrophe with Unigraphs, Digraphs or Proximate Graphs

Although the percentage of use of this graphic solution is very low in the sixth grade and null in the second, it serves to show the difficulty of using the apostrophe in the absence of specific instruction in writing Maya. Its appearance may be due to the presence of the apostrophe in the writing of some place-names, or to its use by teachers at school. In any case, it must be emphasized that no child had received specific instruction for using the apostrophe. On exploring its usage, the older children employ it minimally in the conventional sense.

As Table 2 shows, no second grader resorted to the use of this diacritical mark. In contrast, the sixth graders are able to use the mark in a conventional sense (see the line corresponding to conventional writing for the five glottalized phonemes) and unconventional sense for representing /ch'/, /ts/ and /ts'/.

To summarize the above presentation, we state that Mayan children write the ten phonemes studied with different graphic solutions. However, on identifying common traits between phonemes, the children are able to unify the criteria for their representation. On one hand, the Maya phonemes that are phonically similar to Spanish phonemes receive similar treatment; and on the other hand, the children search for pertinent solutions for Maya phonemes that do not exist in Spanish. In this sense, we conclude the following:

- The non-glottalized phonemes /p/, /t/ and /ch/, which are similar in the two languages and are represented with a single graph based on the graphic system of Spanish, were represented systematically and homogeneously by the second

graders as well as the sixth graders at a higher percentage because of their corresponding conventional graphs.

- The representation of the phonemes /k/ and /k'/ presents different problems for the children. The phoneme /k/ tends to be represented with different graphs because a majority of the children uses the orthography of Spanish as a reference. On the one hand, the phoneme /k/ shares phonic similarity with the phonemes /ch/, /p/ and /t/ in both languages and therefore permits using Spanish graphs to write Maya, for the respective representations. However, in contrast with these three phonemes, the representation of /k/ in Spanish presents specific orthographic rules. Therefore the graphic selections to represent /k/ were not as consistent and similar to those in Spanish as the graphic solutions for representing /ch/, /p/ and /t/. On the other hand, the glottalized phoneme /k'/ shares with the other glottalized phonemes the non-existence of a graphic solution in Spanish, although it is the only phoneme for which Spanish provides diverse graphs in the representation of its respective non-glottal phonemic contrast.
- The phonemes, /ts/, /ts'/, /ch'/, /p'/, /t'/ presented an interesting and heterogeneous range of responses in terms of their graphic representation. The representation of the phonemes /ch'/, /ts/ and /ts'/ in both grades presented a wider dispersion of graphic solutions than that of the other phonemes (see Tables 2 and 3). However, there was a higher percentage of use of proximate graphs and digraphs in the representation of these phonemes. On the other hand, in spite of a low percentage of use of digraphs and alternative unigraphs to represent glottalized occlusive phonemes, this does not mean that the children used conventional graphs; remember that for these phonemes there was also a high percentage of use of proximate graphs. In other words, there was an important presence of the graphs (b), (d), (g) to represent /p'/, /t'/, /k'/. The children seem to make an initial distinction that groups the affricate phonemes on one side and the occlusive phonemes on the other, resulting in differentiated graphic treatment for the two groups of phonemes.
- We found distinct graphic solutions in the three pairs of occlusive phonemes. The non-glottalized phonemes tend to be represented conventionally and the glottalized phonemes with proximate graphs. Such a diversity of graphic solutions (in both grades) is expected since the children must invent graphic solutions in the absence of specific scholastic instruction.

7. FINAL DISCUSSION

The Mayan children offer clear evidence of profound linguistic reflection on writing their native language: they formulate different solutions based on graphic and phonetic/phonological criteria when asked to represent Maya phonemes that do not have a specific solution in Spanish. They make orthographic adaptations according to their most immediate and available graphic referents. They do not invent letters, but write with the letters of the alphabet and/or combinations of letters to represent the sounds of Maya. The number of letters in the Latin alphabet is limited, but the children know and use that repertory to write the Maya language. They also know that

consonants are represented with unigraphs or digraphs, and that digraphs are few in Spanish. They are aware that certain letters do not represent sounds, such as the letter (h), although exceptions exist in writing place-names. Almost all of the children discovered at an early age the existence of graphic polyvalence and alternation in Spanish. A few have knowledge of the existence of the diacritical mark although most are not certain of its function. The above affirmations lead us to emphasize that the children's considerations of the graphic and orthographic system in Spanish are clearly reflected in their attempts to write Maya.

Although the children extract principles from their knowledge of written Spanish that allow them to construct a graphic system for their own language, we do not imply that their proposed way of writing Maya is a copy of Spanish. We do not want to suggest that children should be taught literacy only in Spanish, nor do we propose a rigid sequence in learning written language (from Spanish to Maya or from Maya to Spanish). If we accept that bilingual children, in this case, Mayan children,[6] are reflecting simultaneously on two languages with the intention of understanding the principle that guides all writing systems, we could consider the possibility of the simultaneous teaching of literacy. The simultaneous presence of two languages (Spanish and Maya) at both the oral and written level at school can generate spaces of linguistic reflection (on units of oral language in both languages). Such reflection can permit the identification, on the one hand, of similarities in the writing of both languages, and serve as an aid, on the other hand, in recognizing differences. We know that proposing the simultaneous teaching of literacy in indigenous communities is risky, premature and complex. A serious proposal would require the support and backing of a study. Our future challenge and commitment is to make progress in consolidating that line of research.

Meanwhile, it is necessary to point out that we are not trying to praise the originality and creativity of the Mayan children's writing; we are interested in presenting the idea that the cognitive work of the Mayan children in a situation of spontaneous writing (the absence of formal teaching and the absence of social practices of writing) makes them reliable informants. Without any doubt, awareness of the children's cognitive efforts can contribute to discussions on policies for the bilingual teaching of written language. In this sense, we believe that it is possible to begin to consider the valuable responses of children for their own benefit.

We have illustrated the precarious conditions in which indigenous children in Mexico are taught literacy; we have mentioned that the illiteracy indexes in the nation's rural areas are worrisome; we have pointed to the inexistence of learned culture in indigenous languages that would allow children to appropriate graphic and orthographic norms for generating a desirable setting for literacy; and we have also stated that in the context of all these adverse circumstances, Mayan children are writing in their own language. Transforming the current conditions of bilingual education in Mexico will most certainly require intense work by academics and public servants, as well as educational projects in which students and teachers participate in a dynamic fashion; it will require enormous collective effort by multiple social actors, and the exchange of the results of research from diverse disciplinary settings

[6] *Of course we are not thinking about balanced bilingualism.*

(pedagogy, psychology, sociology, anthropology, politics, etc.). Of equal certainty is that traveling the road toward change in bilingual education will start with small steps. Studies like ours represent the small steps in an enterprise of great magnitude.

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