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## **Teaching Literacy to Deaf Students in Nicaragua: A Common Sense Two-Step Approach**

I remember well how challenging personally it was for me when I was forced to learn French in grade school, and again in high school. I have had better luck as an adult with Spanish -- living part of the year in Nicaragua has been a powerful motivator. French and Spanish are sound based languages. Their phonetic codes are easy for me to master because I had the tremendous head start of being a native English speaker. More importantly, their rules of grammar and syntax are really not very different from those of my native English. And, beyond internalizing those rules during my earlier formative years, I later was taught labels for them in grade school. I was also taught to read and write English years before commencing the study of a foreign language.

A profoundly deaf child enjoys none of the advantages that I had when it comes to learning a foreign spoken language -- and for a deaf child, any spoken language can be defined as foreign. The obvious difference, of course, is that the phonetic nature of a spoken language -- the very key to its spelling code -- is utterly inaccessible. We must also recognize that most deaf children enter the school system with minimal or no signing skills. Their need for a first language, a visually based language, is paramount. Even children with established signing skills are expected to master literacy in a spoken language without first learning to read and write their own language.

Let us take as an example a typical Deaf American student living in an affluent, industrialized nation and attending a state funded residential school for Deaf. Let us also assume that this student is a fluent signer of American Sign Language (ASL). When it comes to writing English, he still has to memorize each word letter by letter, with no sound cues. But, there is another problem -- in my view, a greater obstacle. In the past few decades, linguists have produced a very substantial body of literature explaining how

ASL -- a visual language -- is as rule governed, as rich and as complex as any speech driven language. The era of treating ASL as somehow second class thankfully is over. The catch is that many of the rules that are critical to ASL have little or no role in English. For example, ASL uses classifiers and locative verbs. A classifier is a handshape that employs the physical characteristic of a class of nouns. A "V" handshape could be someone's legs and therefore could represent the person in some particular action. English uses shape classifiers, too, but examples are hard to come by: a "wad" of money, a "brick" of cheese. Locative verbs are used to define spatial relationships between things. That is another difficult concept for English speakers to understand because English uses prepositions instead. And, where English orders a sentence into subject-verb-object, American Sign Language might require the more stationary object to precede the moving figure. In short, for a Deaf student to learn to read English, he not only has to memorize each word in a seemingly random combination of letters, but he must also learn to construct sentences quite unlike those of his native language. This works both ways, of course. I am able to learn individual signs readily enough. But, ordering them in a fashion comprehensible to the native signer requires that I play by a substantially different set of rules.

Hearing educators of deaf children have long recognized the problem, even if they failed to appreciate ASL's sophistication, and they have come up with a variety of solutions, with limited results. In the nineteenth century, the oralists advocated suppressing signs in the belief that this would drive their deaf charges to read lip movements and thereby learn English as a first language. To me, this "tough love" approach is about as logical as daily rearranging furniture to force blind kids to see. Lipreading makes for a wonderful Hollywood gimmick and for many hard of hearing children may be a valuable skill. For profoundly deaf children, however, lipreading is no substitute for first language acquisition in ASL. Not only do deaf children fail to achieve any significant lipreading ability, time that might have been devoted to ASL acquisition or to traditional academics is wasted. Another approach, and one found in many schools that have eschewed oralism, involves teaching "Signed English" -- a pidgin form of ASL that combines English syntax and ASL vocabulary, with a host of modifications to comport with English grammar. This is a cumbersome and artificial system that no doubt makes life easier only for the native English speaking hearing teachers. Finally, more and more schools have switched to ASL, often employing Deaf teachers. This way, instruction in math, science or geography can be presented in a manner more readily accessible to the

students. Still, even with this bilingual/bicultural approach, performance levels in English literacy remain discouraging. This suggests that the problem may be not so much the philosophy, but the design of the curriculum.

Of all places, Bluefields, Nicaragua, an impoverished Caribbean town in one of the Western Hemisphere's poorest societies, may hold the key to the solution. One year ago, I asked 15 year old Barney Vega if he knew the name-sign for the famed Californian Deaf sculptor Douglas Tilden. Barney demonstrated Tilden's name-sign, then proceeded to describe Tilden's education, travels and major works. Barney, profoundly deaf since birth, recently had finished sixth grade -- the highest grade level for Deaf Nicaraguans in the public school system in Managua, the country's capital city. After a public school education devoted to teaching him to read Spanish, Barney was reading Spanish below a second grade level -- not enough to access any but the most basic information printed in Spanish. However, for a few months each year, Barney also had been attending the Escuelita de Bluefields, an experimental one room classroom project that I have been directing since its inception in 1995. At the Escuelita, students are taught to read and write their native sign language. Barney had read about Douglas Tilden in a reading lesson I had mailed to him some weeks earlier. Like so many of us, Deaf and hearing, Barney is deficient when it comes to reading someone else's language. Unlike nearly all Deaf people, Barney is quite able to read and write his own language. In the dictionary sense, Barney is clearly literate: he is "able to read and write." The reading lesson on Tilden was written entirely in Nicaragua's indigenous sign language.

Although I had been involved with the American Deaf community as a civil rights attorney for some years, I first became involved in the field of Deaf education, rather precipitously actually, back in 1994. But this story really begins over a decade earlier, just a few years before Barney was born, at a time when the language of Nicaragua's Deaf community did not exist. Not surprisingly, Nicaragua's Deaf community did not exist either. Rather, deaf children grew up in isolation from one another, hidden by embarrassed family members or relegated to a life on the streets. They lived without language, without knowledge, without prospects. Not long after the 1979 Nicaraguan Revolution, the new Nicaraguan government embarked upon an ambitious literacy crusade aimed primarily at improving the dismal literacy rate prevalent in the hearing population. However, the government decided

to try to improve the lot of its deaf citizenry, as well. Accordingly, several hundred deaf children were brought into new special schools in Managua. These schools, using only hearing teachers, were oralist: Spanish lipreading was the order of the day. I have yet to meet a Deaf Nicaraguan who could comprehend anything by watching lips; nevertheless, these oral programs managed to set into motion a linguistic phenomenon that would catch the attention of linguists, psychologists and anthropologists around the globe. Within a few years, Deaf children -- in particular young deaf children -- at these schools were signing: not just mere gestures, not words simply lumped together, but sophisticated, grammatically governed, syntactically complete sentences.

How was this possible? In 1986, at the behest of the Nicaraguan Ministry of Education, Judy Shepard-Kegl, a signed languages linguist trained at the Massachusetts Institute of Technology, began to scientifically document the emergence of Nicaragua's new sign language. "We're all born ready to create language," explains my spouse, now a professor at the University of Southern Maine-Portland. "We just need the raw materials." For the young deaf children in Managua, those raw materials were the gestures used by their peers and by older students -- the same gestures students had been using at home with their families.

The importance of environment in child language acquisition continues to be a source of raging debate among linguists. The "behaviorists", most notably the late B.F. Skinner, argue that children are not born with any language-specific knowledge, but learn language by imitation and by correction from adult speakers. The "nativists", led by MIT linguist Noam Chomsky, contend that every healthy child is genetically endowed with a system of language principles and parameters that Chomsky refers to as "universal grammar". The nativists maintain that parents do not teach their children to speak (or to sign). Rather, so long as children are exposed to linguistic data in their environment, they will spontaneously develop language without conscious instruction or reinforcement on the part of adults.<sup>1</sup>

Chomsky describes the Nicaraguan Sign Language case as the most concrete proof to date of the validity of the nativist approach.<sup>2</sup> According to my wife,

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<sup>1</sup> Akmajian, Demers, Farmer, Harnish, editors, Linguistics: An Introduction to Language and Communication. MIT Press, 4th Ed., Cambridge, MA 1995, pp. 452-453

<sup>2</sup> Interview appearing in British Broadcasting Corporation television documentary program Horizon, "Silent Children, New Language", first aired April 3, 1997.

the Nicaraguan government unwittingly had created the conditions a new language would need to blossom and flourish. Those condition included (1) critical mass -- hundreds of children had been assembled -- and (2) age range -- many of the students were very young. Acting on instinct, the young children did the rest. They observed the gestures used by the older students and simply assumed that these gestures would be combined in accordance with their expectations of grammar and syntax. The fact that the older students never followed any particular order in their attempts at communication could not be appreciated by the younger students. As my wife puts it, "When we are children, our brains all expect language to have certain properties. Our expectations start to fill in the holes, and that's what these kids in Nicaragua did." In other words, the children imposed grammar and syntax when combining the gestures that they observed in their environment. In short order, a new language, both complex and rule governed, was born.

By analogy, Judy gives the example of a farmer who takes a rock pile as his raw material and, acting on know-how, builds a stone bridge. Obviously, there is nothing inherently bridge-like in the rocks. In the same way, the deaf Nicaraguan children took gestures (the raw material) and put them together to form something very sophisticated and very different. There was no adult guidance, and no accessible model in their environment. Yet, no one had to supply them with a blueprint. The older students, in turn, learned from the younger children. But, while the communications skills of these older students improved dramatically, they were never able to sign at the level of complexity exhibited by the youngsters. Evidently, a human's window of opportunity to acquire a truly sophisticated first language begins to close by puberty, if not earlier. That is a particularly significant consideration for hearing parents of deaf infants. A deaf child needs to be immersed in a signing environment as soon as feasible.

Partially funded by a grant from the National Science Foundation, Judy returned to Nicaragua yearly to monitor the development of this new sign language. She set out to identify and videotape every deaf person in the country -- an ambitious project given that many deaf people reside in somewhat remote areas. Then, in December, 1994, at Judy;s request, and accompanied by our four year old son and Gene Mirus, a Deaf anthropology student at the University of Texas in Austin, I traveled to Bluefields, a small city on Nicaragua's Atlantic seaboard, to locate and film any deaf people we might have the good luck to find. Bluefields is separated from Managua by

mountains and rain forest, and is accessible only by air or boat. This Caribbean port of some 40,000 people is populated by English speaking Creoles (many are descendants of Jamaican immigrants; others trace their ancestry to eighteenth century British colonization) and Spanish speaking Mestizos (whose forebears had been transplanted there following Nicaragua's military annexation of the region a century earlier.) After several generations of occupation, resentments along an ethnic divide persist. However, in recent years there has been a dramatic shift to a common identification as Los Costeños -- Coast Peoples -- along with a drive for political autonomy. Bluefields' infrastructure had been taxed beyond the limit by an influx of refugees during the Contra civil war of the nineteen eighties, then devastated in 1988 by Joan, a category five hurricane. When we arrived, no one at the Ministry of Education seemed to know about any deaf children residing in the area. Two days later, while pursuing a tip in an upriver community, we happened upon two young British tourists at dockside. They informed me that they had seen a dozen or so deaf children gathered in Bluefields' municipal park a few days earlier under the auspices of a group called Los Pipitos. We hastened back to Bluefields and found the home of Zoila Garcia, the president of the local Los Pipitos chapter. Garcia lived across the street from our starting point, the offices of the Ministry of Education. Los Pipitos is the national non-governmental advocacy organization staffed by and serving families with children with disabilities. Several families with deaf children had joined the local chapter and were endeavoring to obtain educational services for their children. In the process, they had started compiling a list of all deaf children in the city. Our task of identifying and videotaping deaf youngsters could not have been easier.

These young adults, teenagers and children were remarkably outgoing and eager to be cooperative. Most clearly lived in families that nurtured them. But, none had any formal language skills at all. The vibrant sign language that had emerged in Managua eight years earlier had not penetrated the mountains and the forest.

In the first week of 1995, Judy arrived from Managua with a delegation from the Nicaraguan Deaf Association. The parents gathered to meet us at Garcia's home. There, Javier Lopez, the leader of the Deaf Association, with his sister acting as his interpreter, lectured them on the potential their sons and daughters would have if given a sign language. We then held a five day sign language workshop for nearly 20 deaf people, ranging in age from 4 to

37.<sup>3</sup> At one point, as we were conducting a class on the veranda, a young woman passerby became intrigued. She too was deaf and languageless. And up until this point, she had never seen anyone signing.

By the end of the week, the Deaf Nicaraguans had returned home. None of us had contemplated the next step -- Judy's funding and interests were supposed to be confined to research, and I was primarily just a cameraman. Bluefields is generally humid and hot, often oppressively so. At midday, I found myself resting on a low concrete wall under a stifling sun. To my great surprise, a radio station reporter shoved his microphone at me and asked, in Spanish, whether we intended to start a school. I hesitated a moment -- clearly this would entail both a shift in emphasis and a serious commitment not lightly entered upon -- then responded with a shrug, "¿Sí, cómo no?" The reporter next asked how we proposed to pay for such a program. Having not a clue, I immediately terminated the interview.

In April, 1995, Nicaraguan Sign Language Projects (NSLP) was incorporated in the State of New Jersey as a non-profit corporation organized for charitable, educational and scientific purposes. (Later, the United States Internal Revenue Service would grant us tax exempt status under Section 501(c)(3) of the Internal Revenue Code. Donations to our efforts are now tax deductible.) We returned to Bluefields in July, 1995, accompanied by Reyna Cruz, a Deaf member of the Nicaraguan Deaf Association, and by Enrique Ellis, a Deaf young man with no teaching background, but with exceptional signing skills. Both Cruz and Ellis had attended the new schools in Managua when their language was first emerging. Indeed, Ellis, who had entered school when he was very young, had been among the creators of this new sign language. Although Ellis had spent most of his life in Managua, he had a special attachment to the Atlantic side of Nicaragua -- he had been born in a small rain forest town (in the northern Atlantic region) and his mother came from Bluefields itself. Our plan was to team volunteer linguists with Deaf Nicaraguan native signers in order to conduct a sign language immersion class for some thirty deaf and one hearing student. I was the hearing student. Our linguistic staff included my wife, back then an assistant professor at Rutgers University, Jill Morford from the Centre Mackay in Montreal, and Gary Morgan from the Centre for Deaf Studies at the University of Bristol, UK. In a single classroom

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<sup>3</sup> Most of the students at our school are clinically profoundly deaf. Effectively, however, all of them are. There are no audiologists and no speech therapists in Bluefields. In addition, in the humid tropical climate, hearing aids fail within days; maintenance is neither affordable nor available.

furnished by FONIF, the governmental family welfare services agency, we spent ten weeks practicing storytelling -- mostly, the Three Little Pigs.



Jill Morford reading under a mosquito net to four year old Adela Bigman. Today, Dr. Morford is a psycholinguist at the University of New Mexico-Albuquerque and a member on the board of trustees of NSLP. (photo by Holly Marvin. 1995)

The Escuelita de Bluefields is now in its eighth year of operation. In collaboration with the Bluefields chapter of Los Pipitos and with the Nicaraguan Ministry of Education, NSLP today administers, funds and operates the Escuelita as a year round school program. The school's goal is not simply to empower Deaf children in Bluefields through language and academics. Perhaps more importantly, the Bluefields School fosters the nationalization of the indigenous signed language by training a pool of natively fluent Deaf Nicaraguans to become future school teachers and role models. For example, in 1999, the Condega chapter of Los Pipitos, nestled in the mountainous coffee growing region of northwestern Nicaragua, set up its own Deaf school modeled upon the Bluefields program. In the beginning, we sent our Deaf teachers to Condega for a series of two month stints. During the rest of the year, Claudia Avila and Tomasa Gonzalez, two young Deaf adults from Condega, stayed with us in Bluefields to be intensively trained to replace our teachers in Condega. Today, Avila and



Gonzalez continue working with us in Bluefields for several months and teaching some thirty students in Condega during the rest of the year.



Claudia Avila signing the story of the Hindenburg zeppelin to Bluefields class. James Shepard-Kegl is holding the storybook. (photo by Carol Nash, 2000)



Condega students reenacting the assassination of Julius Casear. (2001)

In addition to the academic component of the school in Bluefields, we also maintain a residential facility for students residing outside the local community and a foster care program for several orphaned or especially needy Deaf children. We are philosophically committed today, as we were in 1995, to the concept that all classes must be taught in Nicaraguan Sign Language by Deaf Nicaraguans either on their own or with hearing people acting as facilitators. In this way, all class material is accessible to the students. Moreover, those students see older Deaf people serving in positions of authority.

In 1996, we began experimenting with a literacy project. Our intention was to teach Deaf Nicaraguans to read and write their own language. This would serve some obvious and valuable immediate goals, as follows:

- (1) The very act of learning to read fosters a child's analytic and decoding skills.
- (2) A child receives a self-esteem boost as he learns to read his own language, a comparatively easier task than struggling with a wholly foreign language.
- (3) The ability to read is a critical component of formal academics. Students need to be able to read their lessons in history, literature, geography and math. Even more importantly, our Deaf teachers need to be able to read the textbooks we have been designing. And, because we now design much of the curricula from my home office in Maine, we are able to mail new lessons to our teachers in Nicaragua. They do not need to await our arrival to be trained in new material.
- (4) The ability to write signs on the chalkboard is integral to teaching grammatical concepts: verbs, nouns, classifiers, syntax.
- (5) Reading has its everyday uses from invitations to correspondence to instructions for taking medicine.
- (6) Some of our older students have their own children. We want Deaf parents to be able to read bedtime stories to their infants.

In the longer run, we think that teaching sign language literacy will enable many of our students to achieve a more reasonable level of proficiency in Spanish. We submit that no school in Nicaragua has found a way to successfully teach basic literacy in Spanish to Deaf students. Part of the explanation for this, we suggest, is that educators have been expecting Deaf children to learn to read a foreign sound based language before they are able to read their native visual language. As I have already noted, this same situation applies to Deaf children in many other countries.

Although we were familiar with a variety of experimental writing systems for signed languages, we chose to adapt SignWriting to write Nicaraguan Sign Language. SignWriting was first developed in 1974 by an American, Valerie Sutton, at the request of a sign language linguist at the University of

Copenhagen in Denmark. A year earlier, Sutton had invented a movement writing system for ballet, called Sutton DanceWriting. In the quarter century since Sutton modified her ballet notational system to represent signs, SignWriting has evolved into an effective and efficient writing system for signed languages. Although some linguists employ SignWriting as a research tool, its real popularity is with Deaf users as a writing system. Today, SignWriting is a registered trademark of Sutton's non-profit organization, the Center for Sutton Movement Writing, Inc., in La Jolla, California. Researchers, teachers and schools are experimenting with SignWriting in a growing number of countries including Belgium, Brazil, Canada, Denmark, France, Germany, Ireland, Italy, Malaysia, Malta, Mexico, Norway, Peru, Saudi Arabia, South Africa, Spain, Switzerland, Taiwan, the United Kingdom and the United States. The level of use of SignWriting from country to country is generally restricted to small groups or individual school programs. So far as I am aware, our school in Bluefields is the only one to incorporate SignWriting so thoroughly into its daily curriculum.

To understand what SignWriting is, let us begin by stating what it is not. It is neither hieroglyphic nor ideographic in the sense that pictorial symbols are not used to represent whole words or concepts. Rather, SignWriting uses a code system to represent each signed word in much the same way that Spanish, for example, uses a phonemic alphabet to transcribe the sounds of speech that form each spoken word. Metaphorically speaking, we could perhaps best describe SignWriting as "visually phonetic". One of the achievements of this system is that Deaf children learn to read it in the same way that their hearing peers learn to read phonemic orthographic systems (like Spanish). Once the student learns the code, he can reliably predict how a sign may be written. The code may seem complex to the uninitiated, but with a very little practice, SignWriting is remarkably easy to grasp. Unlike written English, which claims to be phonetically guided, but in reality has a spelling system largely governed by usage, SignWriting conforms to set rules. SignWriting employs conventions (with some variations between countries), but does not plague the learner with violations. In other words, the system is "Deaf-friendly".

Each sign is divided into various aspects: hand shape, hand orientation, contact, direction and movement, and, if appropriate, facial characteristics and body shifting. SignWriting has ten groups, each with a list of subgroups, for modifying the three primary hand shapes (flat hand, fist and

O-hand) into nearly any conceivable permutation (some 600 in all). Directional arrows are of two main types to denote movement parallel to the floor or parallel to the wall. However, these arrows are modified to show movement in any direction along a three-dimensional axis either along a straight line or in a variety of curves, loops or spirals. With slight changes, these symbols are used to indicate forearm rotation or wrist movement. There are five symbols to show manner of contact: touch, slap, brush off, rub and grasp. Combined with directional symbols, contact can be varied to show, for example, a circular rubbing or a forward brushing. Dynamic symbols denote whether the sign movements are tense, smooth or abrupt, whether the hands move in unison or alternate. There are different symbols for facial features, facial expressions or body movement which may be related to the sign or to principles of the sign language's grammar. Finally, SignWriting provides punctuation to indicate, for example, proper names, pauses, quotations, declaratives or interrogatives.

SignWriting can be used to write sufficient aspects of each sign to successfully convey the actual sign and sign sequence. Moreover, although students tend to learn to read using a "whole word approach", with a modicum of practice, each sign can be decoded. If a student has the decoding ability and sufficient fluency in his sign language to truly read simple sentences, then he should be able to decode more sophisticated texts, and when encountering signs beyond his repertoire, enjoy a fair degree of success in inferring their meaning from context.

Student Dorbie Halford (left) practicing SignWriting with fellow student Yohana Arauz on dormitory veranda, Bluefields (1999).



SignWriting can be easily written by hand, which means we can write sentences on a classroom chalkboard. (There is a short form method, but we

do not use this in Nicaragua.) The Center for Sutton Movement Writing, Inc. also markets a software program, called SignWriter, that allows the writer to type the aspects to form any sign. SignWriter is an MS-DOS program requiring 640 K bytes of memory and CGA, EGA or VGA graphics. A hard disk is required to access glossary files. The writer has the choice of constructing a sign by its elements (hand shape, orientation, contact, etc.) or by retrieving the sign from a glossary file. At present, we have about 2,000 entries in our glossary -- a mere sampling of Nicaraguan Sign Language's extensive vocabulary. As the writer is composing signs, he can assign a spoken language equivalent (we use Spanish) in order to automatically store the sign alphabetically in the glossary file. The sign can then be retrieved by typing the spoken gloss and modified as needed to conform to the grammar requirements of the sign language. Students must be taught that the vocabulary of the spoken language often will not have exact sign equivalents. Furthermore, languages have distinct grammatical structures and are governed by rules of syntax that cannot be programmed into a simple glossary. Hearing teachers who are not sign language fluent must not attempt to use SignWriter to translate material from a spoken language to a signed language. Such an abuse of the SignWriter computer program would confuse Deaf students and potentially corrupt their native language.

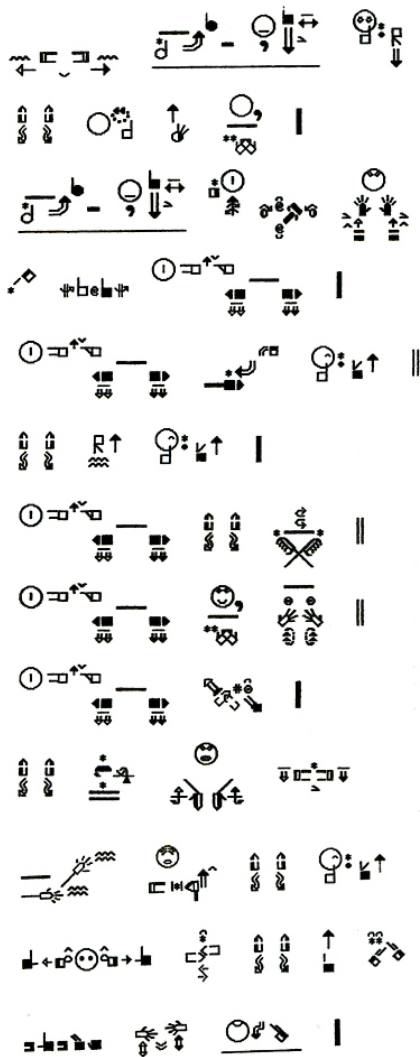


Bluefields student Yuri Mejia at chalkboard (1999).



Students as young as seven years old immediately recognize that SignWriting is a writing code. (Indeed, we have observed young Deaf children, ages 4 - 6, pretend to read SignWriting, while ignoring words printed in English or Spanish.) They are able to learn the more basic aspects of this code very quickly. However, to learn the complete code does require time and much practice. In our experience, children learn to read SignWriting quite easily. Writing, however, requires not only mastery of the code, but also the ability to put thought to paper. This depends upon experience and maturity.

The following excerpt form a composition assignment was written by Anselmo Aleman, 22 years old. Deaf since infancy, Aleman was first exposed to sign language when he was 15.



From the clouds, Zeus looks down at a woman whose face is beautiful, and he becomes enamored with her. Zeus magically POOF transforms himself into a swan. The swan swoops down to the ground to see [the woman]; the woman walking along sees [him]. The swan and the woman embrace passionately; the swan is in love; then the swan departs. The woman is pregnant and gives birth to an egg, and after a time the egg hatches and the woman is surprised to see a baby girl -- her name is E-L-E-N-A, name-sign Elena [in English, "Helen"]. (Story from Greek mythology.)

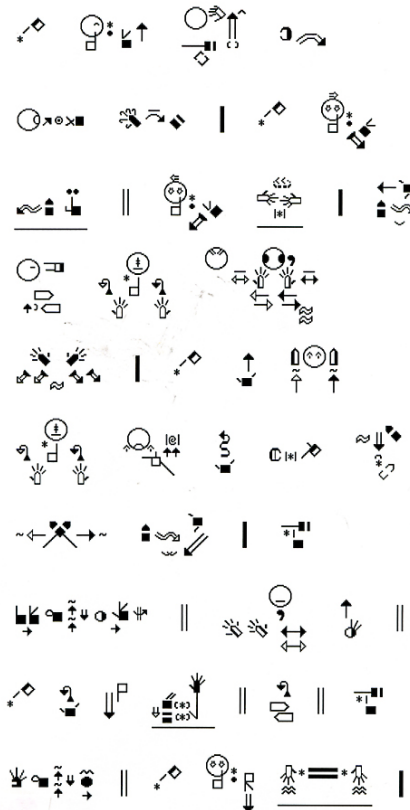
The Nicaraguan Deaf community has some excellent storytellers. However, writing a story is very different from narrating the story. Natively fluent signers had no formal training in writing prose. On the other hand, hearing staff, although they had years of schooling in English composition, lacked the sign language sophistication of a native signer. We quickly discovered that Deaf people trained in SignWriting could not prepare acceptable reading lessons. Similarly, hearing people could not translate material without corrupting the sign language. Therefore, Deaf and hearing staff work together as a team.

Apprentice teachers, like Daphny Rodriguez, have been brought to Maine to assist in the preparation of reading lessons (2001).



We now have distributed two compendiums of reading lessons in Nicaraguan Sign Language, and we are developing a third. This excerpt, describing Lindbergh's transatlantic flight, is from Reading Lessons, Volume I, 2001, p. 164:

I watch the sunrise and the red and orange sky. I look down to my right and see the Atlantic Ocean. I look down to my left at the United States. I fly close to the sea because the breeze is gentle there. I fly the airplane straight ahead because I reason that if I turn this way and that I will crash into the sea. The time is 12:08; the weather is perfect; I fly over Nova Scotia; next, at 4:00, I see Newfoundland.



This year, we distributed a workbook consisting of a variety of applied mathematics verbal problems ranging from first to ninth grade level in degree of difficulty. Verbal math problems are intended to teach students to apply mathematical principles to real world situations. These workbooks would be useless if neither students nor teachers could read them. Yet, in traditional Deaf educational settings, mathematics examinations are often actually English (or Spanish) reading lessons in disguise, and the student's consequent poor performance rarely serves as a reliable indicator of his math aptitude or achievement level. (To better understand this, consider whether you could handle even the most simple arithmetic problem if presented to you in Chinese, or some other language wholly unfamiliar to you.)

For example, we would expect an advanced student to be able to handle a simple percentage problem when presented in his sign language, but be stumped were the problem to be written in a different language. The following excerpt is from our applied math workbook:

A new shirt costs three hundred cordobas. A used shirt costs seventy percent less. How much does a used shirt cost?




Over the past several years, we have compiled two volumes of reading lessons in Nicaraguan Sign Language. These lessons include numerous classic children's stories (Babar, Jack and the Beanstalk, the Pied Piper), Greek myths (the Trojan Horse), and history (Columbus, Pasteur, Lindbergh). Given staffing and time constraints, most topics we cover in class are not presented in SignWriting. Nevertheless, sign language reading is a fundamental component of our daily routine. In addition, we believe that many students are now much better prepared to begin to read and write basic Spanish. This year, we developed the first school textbook written in






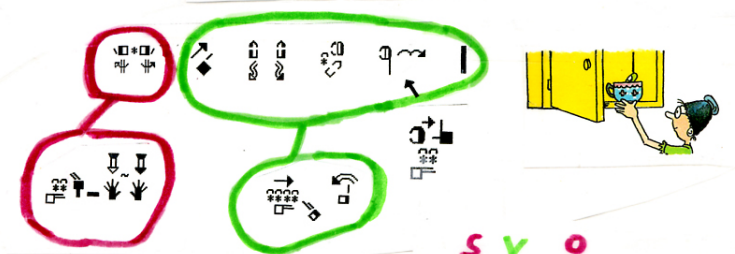
elementary syntactic structure. The goal at this beginning stage is to have students develop the ability to construct simple but correct Spanish sentences using a basic code. We also teach students to recognize how meanings of individual words, especially specific verbs, change in context or when paired with other words.

In this next illustration, from page 89 of the primer, we demonstrate the use of the preposition "en" with the verb "poner" ("to put"). Note that the two example sentences in sign are syntactically broken down into grounded object (circled in red) and moving figure (circled in green), with the classifiers indicated. The Spanish translations are marked for subject, verb and object.

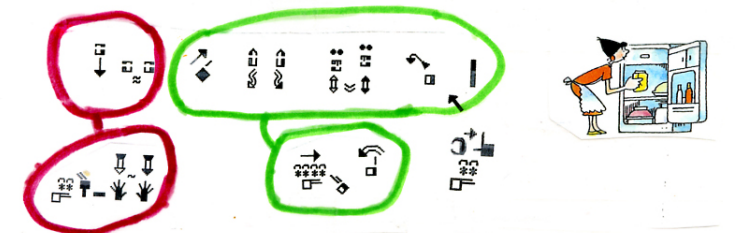
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
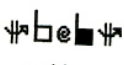




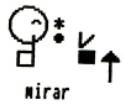
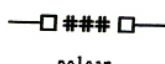
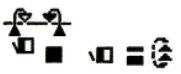



**S V O**  
La mujer pone la taza en el armario.



**S V O**  
La mujer pone la leche en el refrigerador.

[The woman puts the cup in the cupboard.  
The woman puts the milk in the refrigerator.]

The homework sheet shown below, form page 30 of the primer, provides a vocabulary list of some verbs with sign glosses. The student must select and properly conjugate the verb in order to complete the Spanish sentences.

 bailar	 cambiar	 comprar	 cortar
 limpiar	 llevar	 mirar	 pelear
 pescar	 tocar	 tomar/beber	 tomar/comer

Ellos están \_\_\_\_\_.



El hombre \_\_\_\_\_ una rueda.



Ella \_\_\_\_\_ plátanos.



La mujer \_\_\_\_\_ la tarta.



It is too early to gauge the success of this system. Clearly, the Deaf teachers, who have had much more exposure to this new format, are doing

well. Student progress will depend upon each individual's aptitude and diligence -- and, perhaps more crucially, the extent to which we are able to maintain a structured program. At the moment, our funding level does not enable us to hire the staff needed to intensively train our teachers or to effectively administer this literacy program on a year round basis. Unfortunately, like so many charitable organizations in today's economy, we find ourselves much more financially constrained than in the past. Consequently, at least for now, we are able to devote only three months per year to our Spanish experiment -- not really sufficient time to properly implement the curriculum.

Schools for Deaf children worldwide expect students to learn to read and write a spoken language without first learning to read their native signed language. We are of the opinion that spoken language literacy should be the next step, not the first step in literacy instruction. SignWriting offers the potential for placing Deaf children on a par with their hearing peers by allowing them to read their first language before delving into a "foreign" language. While enabling Deaf students to develop literacy skills in their sign language is in itself a laudable objective, we submit that our experiment at the Escuelita de Bluefields also represents a common sense two-step approach to teaching students to read and write a spoken language. We hope that others in the field of Deaf education will take an interest in our efforts.

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Nicaraguan Sign Language Projects, Inc.  
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