Smalley's 'maximums' of orthography design and sign languages

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Originally published as:

Parkhurst, Stephen. 1993. "Smalley's 'maximums' of orthography design and sign languages." *Notes on Literacy* 19.2:18–28. See also: Parkhurst 1993b (in *Bibliography (Literacy)*)

[Topics: orthography, sign language]

1. Introduction

"You can't write sign language. It is a visual, three-dimensional system. You just can't put it adequately on two-dimensional paper." That is the attitude we have encountered in our work with the Deaf in Mexico and in the United States.

Linguists recognize nearly 80 distinct sign languages in the world used by Deaf communities, but no one written form of signing is accepted. Several systems have received limited acceptance among small communities of Deaf and linguists, but most of the Deaf communities have rejected efforts to create a practical orthography for sign languages. Literature for the Deaf in the U.S., including Bible translations, has been recorded in video format, but video and other media are highly impractical as a means of producing meaningful texts for use in developing countries. If the Deaf in these countries are to have practical access to texts created or translated into their language, they need a written form.

William Smalley (1965) proposes five factors to consider when designing an orthography:

1. Maximum motivation. The proposed orthography should create maximum motivation for the reader to use that system.

2. Maximum representation. The system should represent the language as closely as possible.

3. Maximum ease of learning.

4. Maximum transfer. It should help the reader to learn more easily how to read and write other languages in the area.

5. Maximum ease of reproduction.

Not all of these "maximums" carry equal importance in a given situation, and it is likely that one maximum will conflict with another. Smalley stresses a balance. Each ideal must be considered and weighed according to the situation.

The purpose of this paper is to continue the investigation started by Karla Faurot, Dianne Dellinger, Andy Eatough, and Steve Parkhurst on the development and use of a practical orthography for Mexican Sign Language (MSL). This paper examines some of the implications of taking Smalley's principles for orthography design seriously in the design of an orthography for sign. A variety of sign orthographies are in limited use, but none have been widely accepted as adequately practical. This paper is meant to be used as a tool for future study. It only looks at the issues involved and does not attempt to either fully critique current orthographies or design a new orthography.

2. Current situation

In March 1991, Karla Faurot and Dianne Dellinger began a survey of Mexican Sign Language as it is used throughout Mexico. They were later joined by Andy Eatough and Steve Parkhurst. The team concluded that MSL is relatively unified throughout the country, with only minor differences from city to city that do not seem to hinder communication (Faurot 1992). MSL, while historically related to American Sign Language (ASL), is unintelligible to users of ASL (14 percent mutual intelligibility, 23 percent lexical similarity). MSL is also very different from Spanish in its lexicon and grammar (Eatough 1992). We noted that the majority of Deaf do not know Spanish adequately for understanding basic literature, nor is the educational system such that there will likely be any great change in education level and literacy rate for the Deaf in Spanish. For these reasons, the team recommended that texts for the Deaf be translated into MSL.

In the US, several publications in sign are currently being worked on in ASL using either English glosses for the signs with proper ASL syntax or videotaped signing. The glossed works assume that the signer has a functional knowledge of the spoken language so as to be able to associate a written word in English with a sign in ASL. In Mexico, most Deaf do not know enough Spanish to accurately utilize this type of glossed literature. Videotaped Bible translations would be impractical for private use and study, particularly in economically depressed areas, where people cannot afford expensive video equipment or the numerous tapes needed. After considering these restrictions and others, the team concluded that some written form of sign language, which does not presuppose the knowledge of the spoken language, is necessary.

3. Current orthographies

Several orthographic systems have been proposed as a means to write sign two-dimensionally. The only system currently used in Mexico is strictly pictorial with lifelike drawings made of a signer (usually from the waist up). This system utilizes a limited number of symbols and conventions, such as three-dimensional arrows and other markings for starting and ending positions for movement (Figure 1).

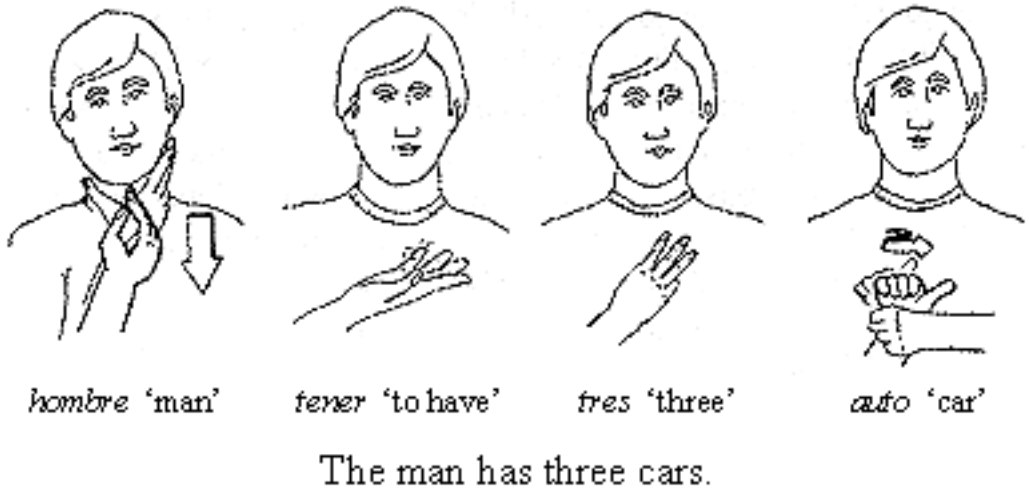

Figure 1 The pictorial system

Another system uses a linear arrangement of letters, numbers, and symbols that correlate with the basic components of signs: handshape, movement, location, orientation, and prosodic components, such as facial expression and body orientation (for example, the Stokoe System, Smith Stark (1987), Figure 2).

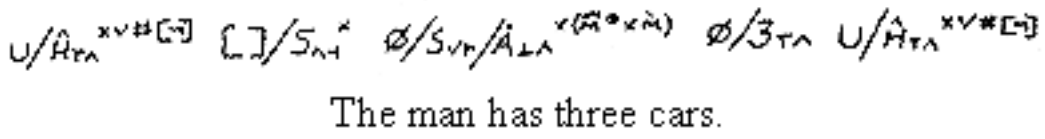

Figure 2 The Stokoe system

Between these extremes of representation systems are several others that use stylized symbols resembling the actual shape of the hand or use arrows to mark the direction of movement. These symbols may be arranged linearly, such as Sign Font (Newkirk 1987), Figure 3, or utilize real space, with symbols for the hands represented spatially in relation to symbols for the body or head, such as Sign Writer (Sutton 1990), Figure 4.

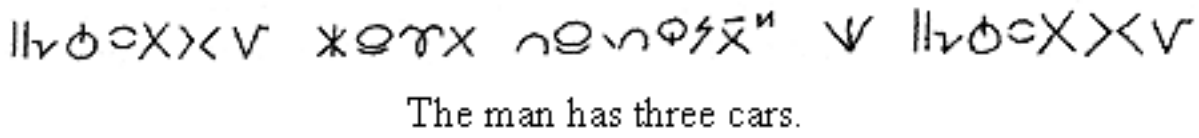

Figure 3 Sign font

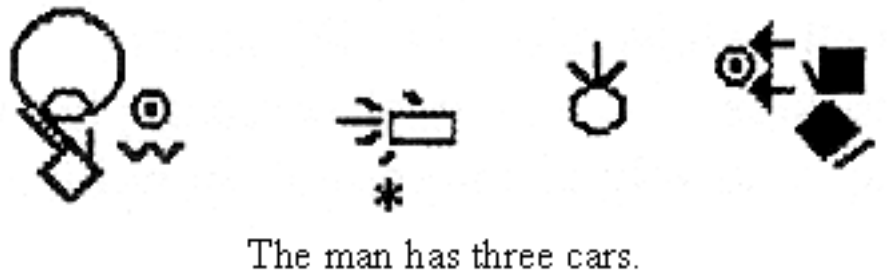

Figure 4 Sign Writer, PC Version 4.0

No one system is flawless or adequately meets the needs of the Deaf in Mexico. Before critiquing these systems or proposing another, we need a clear understanding of the issues involved. The issues are examined below in light of Smalley's maximums, especially as they apply in Mexico.

4. Maximum motivation

An adequate writing system must provide "maximum motivation for the learner, and acceptance by his society and controlling groups such as the government." (Smalley 1965:34) If society, in this case the Mexican Deaf, does not accept the orthography, it will not be used. Going against government policies that relate to the use of the orthography will do little good for the community either!

The Deaf community has strong feelings of resentment toward the hearing world and the attempts to "make the Deaf person hearing." The Deaf reject inventions by the hearing designed to help the Deaf function as hearing persons. In Mexico and the U.S., writing is considered a system for spoken languages. Any attempt to write sign language is viewed as a hearing person's idea. If the hearing write the language, then it is no longer a language solely for the Deaf. Sign language is one of the last strongholds of their culture. The skillful use of a pure form of ASL or MSL is often a criterion for membership in the Deaf community.

If the writing system is viewed as a hearing-world invention, it will never be widely accepted and used. Nearly all the current orthographies were created by hearing persons who wanted some way to write down the language as they were studying it. Even systems designed by hearing persons that have some Deaf support are still considered hearing inventions. An adaptation of current systems will probably

always carry the stigma of being “hearing” even if the adaptation is done by Deaf persons. New systems invented by the Deaf specifically for the Deaf, would have a better chance of acceptance.

Another issue is the need for the orthography to be first accepted by the leaders of the Deaf community. In the U.S., the center of Deaf culture is Gallaudet University in Washington, DC. When approached with the idea of a practical orthography, their reply was that the Deaf are “aggressively disinterested” in writing sign language. Though Gallaudet does not necessarily represent the attitudes of a majority of the Deaf, it is an influential force. The acceptance and promotion of a practical orthography by Gallaudet could insure acceptance throughout the world.

On a smaller scale, if an orthography is accepted by prominent Deaf leaders in other countries, it may be accepted by the Deaf in that country. The acceptance in one country could influence orthography acceptance in other countries. For this reason, an orthography should be adaptable to any sign language. Deaf leaders will not likely accept an orthography invented by hearing persons, or one that appears to be a tool to be used by the Hearing to manipulate the language for their uses.

What people want and what the government allows are sometimes in conflict. The Deaf want education in sign language, but the official position of the education authorities is strongly against its use in schools for the deaf. Nearly all government-sponsored deaf schools in Mexico use strictly oral instructional strategies, not allowing the use of sign to teach or for students to communicate.

The government has no reaction against material presented in a pictorial format. The office of Secretary of Public Education helped produce two dictionaries using an illustration and Spanish gloss format. A strict Spanish gloss system, however, gives the appearance of ungrammatical Spanish, making it inappropriate for use in the public schools. Systems that do not use a Roman script, yet are not clearly pictorial, may be objectionable since they do not clearly promote the use of Spanish. A simplified Spanish or a mixture of pictorial and simplified Spanish would gain the most acceptance by educators, as the pictures can be used to teach Spanish.

The conflict here is that the Deaf reject any system viewed as a hearing person’s system or one that helps the hearing community reach its goal of assimilating the Deaf into the hearing culture. On the other hand, educators for the deaf do not accept a system that compromises their ultimate goal of assimilation of the deaf.

5. Maximum representation

The orthography should maximally represent the language as it is used. For spoken languages, the sounds of the language are represented by letters with a rough one-to-one correlation of sound to symbol. Since sign languages are based on a manual/visual system, many deaf have an extremely difficult time reading a language based on sounds they cannot hear. A written system for sign languages should have one symbol for each distinct component or mixture of components of a sign. This means encoding handshape, orientation, direction and manner of movement, contact points, and prosodic features, such as body movement and facial expression. Strictly glossed versions are excluded as viable options because a lexical item depicted in a Roman script does not represent the sign in any concrete way.

The components of a sign have been represented in a variety of ways. Some have used the fingerspelled alphabet as a means of associating a particular handshape to a Roman symbol. Even in Mexico, where literacy among the Deaf is extremely low, most can accurately associate the handshape with the fingerspelled letter it represents. One problem comes from such an association: What does one do when the basic handshapes do not correlate with the fingerspelling conventions, or the language representation is nonalphabetic, such as Chinese? The two-handed signs for the fingerspelled words in British Sign Language do not correlate with the basic handshapes of the language. In such a case, associating a Roman letter with a handshape is abstract and confusing for the Deaf. Some systems have utilized symbols for the handshapes that iconically resemble the actual shape of the hand. These symbols require special computer programs or typewriters, yet increase the correlation between the representation and the sign.

Motion can be represented iconically with the appropriate use of arrows. Other sign components are not so easily represented. Many have been represented by a wide variety of abstract symbols that can be represented on a standard typewriter or word processor. Few of these conventions have any iconic representation of the actual component of the sign.

Some current systems have arranged the symbols in a logical, linear format (Figures 2 and 3). For example, the order of symbols may always be handshape, orientation, manner of movement, etc. Other systems have utilized space iconically as a means of organizing the symbols. For example, the symbol chosen for the handshape can be slanted to match the actual orientation of the hand in signing (Figure 4).

The closest correlation between the sign and a written representation is through illustration (Figure 1). In this case, only a limited number of abstract symbols need to be used, such as three-dimensional arrows.

6. Maximum ease of learning

In preliterate societies, it is crucial to develop an orthography that is easy to learn. Granted, with the proper motivation, any orthography can be learned. However, if the people have gotten along without a written language for a long time, motivation to learn a complicated orthography may be extremely difficult. Many of the Deaf in Mexico are familiar with written Spanish and often function in the hearing society through the means of short written notes. Their level of literacy, however, is often extremely low. It is important to remember that the experience of learning Spanish for many Mexican Deaf has been a frustrating and often humiliating experience.

It has been suggested that once people have learned how to read, they never have to learn again; they need only to learn the new system, (a much easier task). This theory would apply more to the transition from one alphabetical system to another than to the transition from an alphabetical system to a logographic system, like Chinese. For this reason, many of the proposed sign language orthographies have been largely alphabetical and linear.

Sign language, however, does not easily lend itself to a linear system. Speech is produced in a largely linear fashion where one sound flows into another in a single stream, but the elements that make up a sign (hand shape, orientation, movement, point of contact and prosodic features) often apply to a sign simultaneously. Only movement (and possibly point of contact) can be measured linearly. Nonlinear orthographies represent sign language much more accurately than do linear systems.

Abstract symbols place a stronger burden on the memory than do symbols that have a more direct representation of the sign. For example, if we wanted to make a road sign telling people to turn to the right, we may devise three options: (1) pick a completely abstract symbol such as a strawberry and teach people to turn right when they see it, (2) use the letter *R* to help people associate the symbol *R* with the word *right* signaling them to turn right, or (3) use the known convention of arrows to point in the actual direction we wish them to turn. One might expect the third option to be the most effective and the first option to be the hardest. Spoken language has few options in writing a language iconically. Many elements of sign language, however, can be represented accurately using illustrations and standard conventions, like arrows. The organization of the symbols can also be done in an iconic way that represents orientation, movement, and points of articulation. The ease of learning based on iconicity and lack of need for memorization may well make up for the complications in transferring from a linear system to a nonlinear system.

Accurate illustrations and the use of known conventions to represent signs require little outside instruction for the knowledgeable signer. In other words, little or no actual literacy teaching needs to be done. A knowledgeable signer can pick up a text of illustrated signs and with no prior exposure, "read" the signs with relative ease and accuracy. Material printed in this way is immediately available to any person who knows the language. No literacy program is needed to teach people to read the literature.

7. Maximum transfer

Transfer refers to choosing symbols that have qualities similar to the symbols used in the national language or a language of contact. That way, when a person wants to learn to read the national language, he or she already knows what that symbol represents. For this reason, many of the current sign orthographies use initialization as a means of labeling handshapes. As mentioned before, the use of fingerspelled handshapes as a means of distinguishing basic handshapes is not a universally usable system. However, for most sign languages (at least those based on the French system) this is one way to work toward a transferable orthography.

As discussed above, the linear organization of symbols increases the transferability of the orthography. Yet, any gain in this area is lost in the area of optimum representation and learnability. Educators in Mexico trying to stifle the use of sign in schools are not likely to want any orthography for signs. However, they may possibly accept a system that promotes the easy learning of Spanish. The Deaf, on the other hand, feel very negative toward any system that they perceive the hearing could use as a tool against them. For this reason, maximum transferability ranks fairly low in importance for the design of a sign language orthography.

8. Maximum ease of reproduction

The ease of reproduction is the last and least crucial factor. If the choice is to make an orthography easy to use or easy to produce, the burden of difficulty should always be placed on the producer, not the user.

The world is rapidly adopting computer technology to do things that only 10 years ago seemed impossible. For example, the option of using illustrations as a practical means of printing a language

seemed virtually impossible only years ago. However, with the modern technology developed for the fields of architecture, engineering, and advertising design, a program could be adapted to generate consistent, high-quality illustrations with relative ease. As the Sign Writer programs show, nonlinear approaches can be generated on standard personal computer equipment. We live in an age of technology when few things are impossible.

Cost, however, complicates this issue. The more complex computer programs are expensive and require equipment not available to the vast majority of the Deaf or those who work with the Deaf. To seriously consider the implications of costly or difficult production, one must consider how the writing system will be used. If the orthography is solely for the production of printed literature, cost and difficulty are of lesser importance. However, if the orthography is to be used also as a standard form of communication between the Deaf, then everyone should have the means to use the orthography.

The Deaf in Mexico and in the U.S. do not see a need to write their language, and videotaping is used for recording texts of literature and history. Particularly in the U.S., information for the Deaf community has been recorded in glossed forms or in simple English. In Mexico, where literacy in Spanish is low, many Deaf know enough written Spanish to keep records and write short notes to communicate the ideas they need to communicate. The greatest observed need is to record the Bible and other important texts in an accurate and understandable way. Since the new orthography will be used only for printed materials, difficult reproduction may truly be less of a concern.

9. Conclusion

This study has examined five considerations important in the design of an orthography. Motivation is the most important consideration. The conflict between what the Deaf want and what hearing educators want remains unresolved. Yet, if the orthography is not accepted by the Deaf, it will never be used. It will be easier to convince government authorities of the usefulness of a Deaf-approved system than to convince the Deaf to use a system they oppose. The need to develop an acceptable orthography overrides the need for maximum transferability and even maximum ease of learning.

Maximum ease of learning and maximum representation point to a nonlinear, non-Roman system. A strictly pictorial system requires no literacy training and is currently the only accepted form of writing signs. However, this conflicts with the maximum of ease of reproduction. The ease of reproduction becomes a major factor if the Deaf wish to use the system for anything other than for printed material.

It is clear that the ultimate decisions about the orthography should be made by the Deaf community. They need to set the priorities between conflicting factors and create the correct balance of the five areas. Those making the decisions need to be aware of the concerns discussed here. Keep in mind that regardless of the decisions made, changes will inevitably be made later. Our job as applied linguists is to facilitate those decisions. We need not wait until Deaf communities all agree on one perfect system before we produce literature. Perhaps one system will start the process and gradually a more abstract writing system will develop. The Deaf need literature in their own language in a form available to all the Deaf. Yes, it is possible to write sign language. It may not happen overnight, but the process must start. It must start now.

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