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# Writing Sign languages:

## analysis of the evolution of the SignWriting system from 1995 to 2010, and proposals for future developments

Claudia S. Bianchini<sup>1\*</sup>, Fabrizio Borgia<sup>2,3</sup>

### I. REPRESENTATION OF SIGNED LANGUAGES (SL)

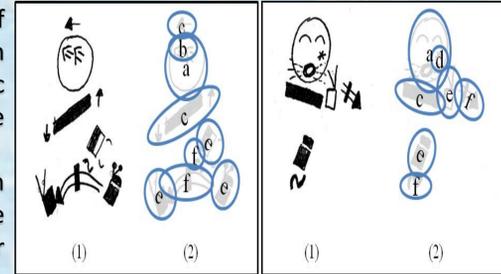
Sign Languages (SL) are visual-gestural languages used by most deaf people to communicate with each other. SL have an exclusively oral tradition and they cannot be represented using the International Phonetic Alphabet because of their visual-gestural nature.

Most of the system invented to represent SL don't take into enough consideration their iconicity, thus hindering the representation of discourse in SL.

### II. SIGNWRITING

SignWriting (SW – Sutton, 1974) is based on a set of glyphs (i.e., symbols) that allow to represent each component, manual and not, of the SL. Glyphs are iconic and they are arranged in a 2D sketch which is the transposition of the signing space.

Numerous studies conducted on Italian Sign Language (LIS) by the ISTC-CNR-SLDS group have demonstrated the benefits of using SW as an instrument for transcription of the SL as well as a way for creative writing.



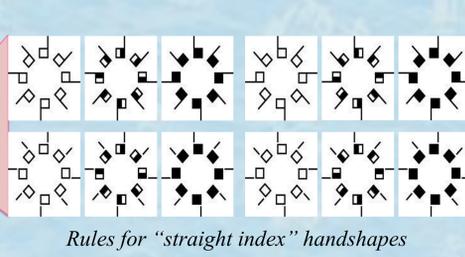
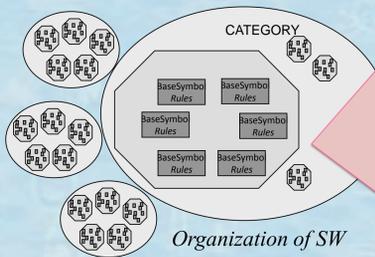
Examples of signs represented in SignWriting:  
(1) sign in SignWriting;  
(2) identification of glyphs  
**Kind of glyphs**  
(a) facial expression; (b) gaze;  
(c) body and head position;  
(d) contact; (e) handshape;  
(f) hand and arm movement

### III. EVOLUTION OF SIGNWRITING

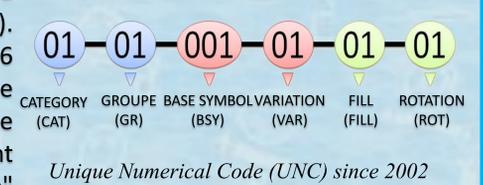
Since its creation in 1974, SW is a constantly evolving system: from 1995 to 2010, 6 versions have been released: SSS1995, SSS1999, SSS2002, IMWA2004, ISWA2008 (our reference), ISWA2010

#### A. SUTTON CLASSIFICATION

SW is organized in Categories (CAT), Groups (GR) and Base Symbols (BSY). Every BSY has rules that are nearly the same than for the other BSY of the GR.

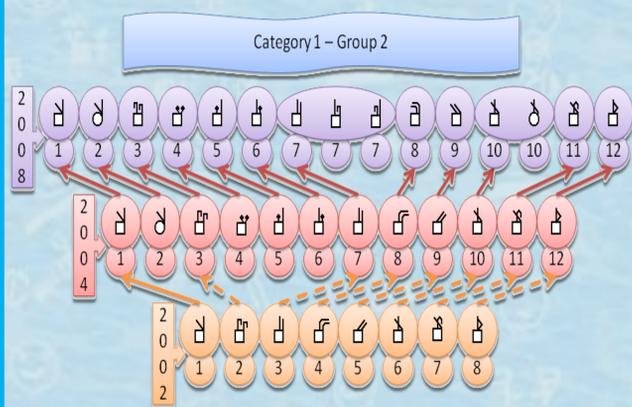


Every glyph is identified by a Unique Numerical Code (UNC). Since 2002 UNC consisted of 6 numbers: CAT and GR identify the type of glyph; BSY and VAR define the prototype graph element described; FILL and ROT "decline" the graphical glyph.



#### B. EVOLUTION OF THE UNIQUE NUMERICAL CODE

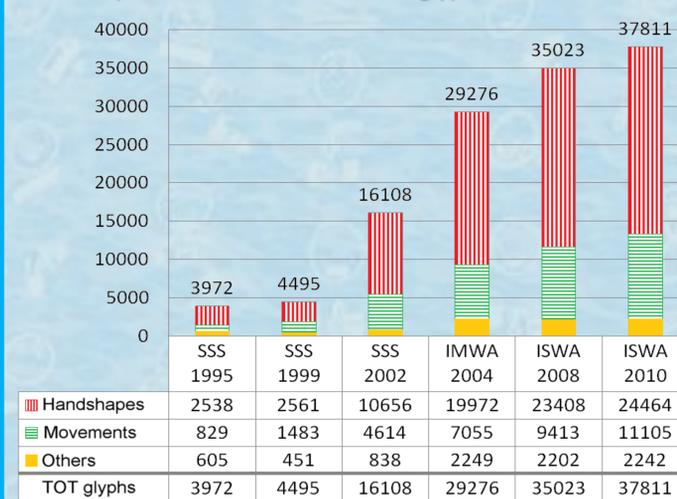
With each new version, Sutton adds new glyphs and this results in substantial changes of UNC; she must decide whether to keep the consistency of the classification, keeping together glyphs that encode similar elements, or to maintain the UNC.



Changes in the BSY's part of UNC, from 2002 to 2008:  
changing the UNC or creating inconsistency?

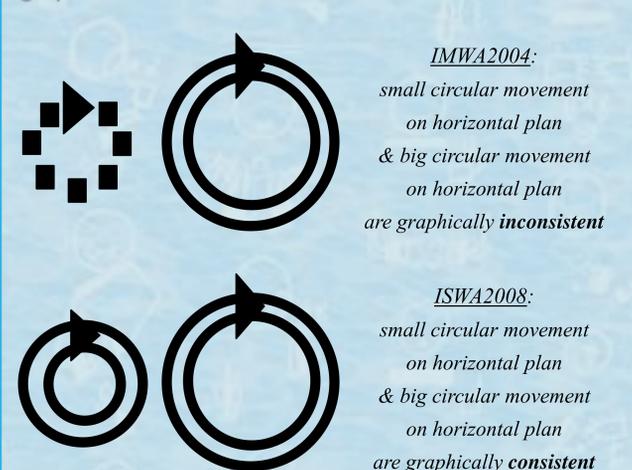
#### C. EVOLUTION OF THE NUMBERS OF GLYPHS

The tendency of SW to be a system based on very detailed graphical rules may justify the 10-fold growth of the number of glyphs from 1995 to 2010; e.g., every handshape which is added implies an increase of 96 new glyphs.



#### D. GRAPHIC EVOLUTION OF GLYPHS

Some changes of SW do not increase in the number of glyphs nor entail modifications in the UNC: they are replacements of glyphs to make more consistent the graphical solutions of SW.



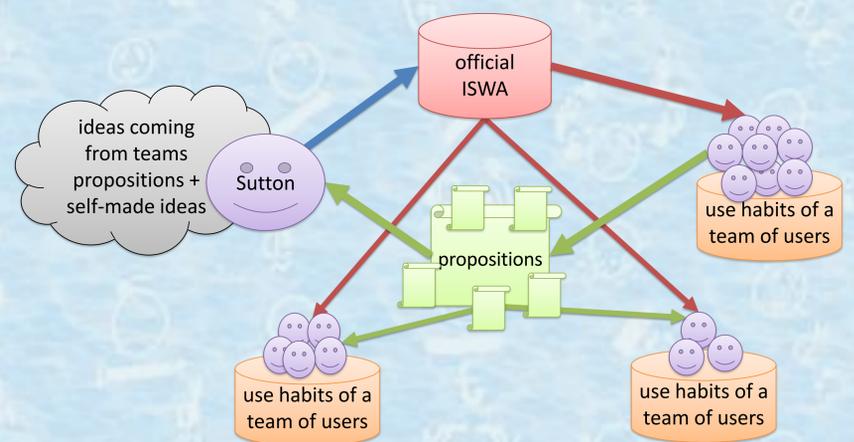
### IV. DYNAMICS OF SW EVOLUTION AND FUTURE PERSPECTIVES

All changes SW has undergone are detectable in the official versions of SW, since they were formalized by Sutton and her team and disseminated to the user community of SW, following a stream that could be defined as "top-bottom" dynamics.

However, each group of users of SW is, in its turn, promoter of these changes *via* several channels, including the website ([www.signwriting.org](http://www.signwriting.org)) SW and/or a dedicated mailing list (SW-L@listserv.valenciacollege.edu); thus, there is also a "bottom-top" dynamics in the evolution of SW.

The integration between these two types of dynamics means that Sutton is able to adapt her system of representation according to the needs of its users, making it a system of representation more and more efficient.

It is therefore conceivable that, at least until these two dynamics resist, the evolution of SW will lead it to represent the different components of the sign, including those that Sutton may not have considered originally, with an increasing range of details. If the flow of information between users' groups and Sutton were to stop, a differentiation of SW at local level would probably develop.



### ЕЗИЦИ ЗА ПИСАНЕ ЧРЕЗ ЗНАЦИ: АНАЛИЗ НА ЕВОЛЮЦИЯТА НА СИСТЕМАТА „SIGNWRITING“ (ПИСАНЕ ЧРЕЗ ЗНАЦИ) ОТ 1995 ДО 2010 И ПРЕДЛОЖЕНИЯ ЗА БЪДЕЩЕТО Ї РАЗВИТИЕ

**Резюме:** „SignWriting“ (SW) [„Писане през знаци“] е система за представяне на езика на знаците, която, подобно на много вокални езици, не са развили собствена система за писане. „SignWriting“ е съставена от сложен набор от символи (наречени глифове), която позволява кодиране на всеки компонент на знака и е организиран в класификация наречена ISWA (International SignWriting Alphabet [Международна Азбука на Езика на Знаците]), където всеки глиф се идентифицира с уникален цифров код (CNU). Тази статия разглежда промените в „SignWriting“ през годините, промени, които са повлияли на броя на глифове, техните графики и общата организация на класификацията; анализ на динамиката на измененията на „SignWriting“ (които са както "отгоре надолу" така и "отдолу нагоре"), която позволява да се направи предположение как „SignWriting“ може да се развива в бъдеще.