SignWriting Symposium 2014
July 21th-24th 2014

Implementation into the SWORD project of observations arising from the process of users' appropriating and adapting SignWriting

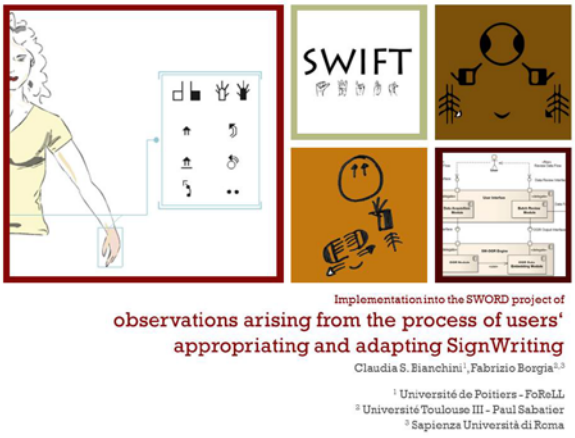
Claudia S. Bianchini[1], F. Borgia[2]

[1] Université de Poitiers – Laboratoire FoReLL

[2] Università di Roma 1 "Sapienza" - Dipartimento di Informatica

http://www.signwriting.org/symposium/presentation0001.html

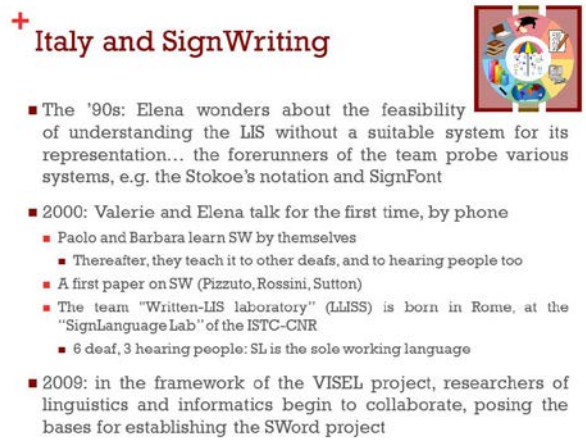
Hi everyone. We are very happy to be here today!
Now we will present you the first part of our work on SignWriting (SW), showing you the process by which deaf users are appropriating and adapting SW.



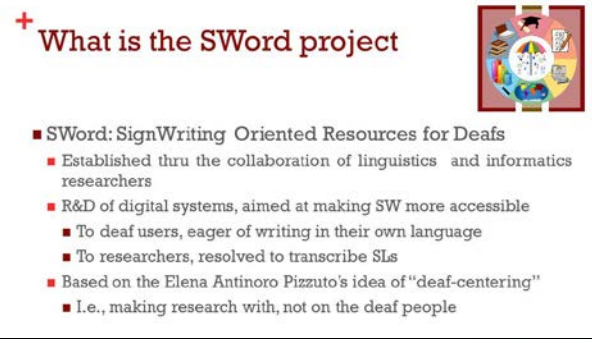
However, before that, I shall briefly introduce our group and the SWord Project...

So! Who we are…
Fabrizio is a PhD student in computer sciences. He is doing a dissertation on digitalization of SW.
Maria is Fabrizio's main professor. She is a computer science specialist and she coordinated our project.
Claudia, me! I am a linguist, expert in writing systems of SignLanguages (SLs), and I have done my PhD on SW.
For more details you can look at our CVs on the SW website

We are not the first ones working on SW in Italy, so I will tell you how SW reached Italy.
In the '90s Elena Pizzuto, who was a great SLs linguist, began a reflection about the fact that, if you really want to discover how SLs works, you need to represent it! She started investigating notation systems for SLs but she did not find any suitable one.
In 2000, she finally discovered SW and she called Valerie on the phone. After this first contact, 2 Italian deafs, working with Elena, decided to learn SW by themselves… this is the beginning of SW in Italy!
The SW working group got bigger and in 2007 there were 3 hearing people (I was one of them) and 6 deafs working with SW! Because everyone knew SignLanguage, SignLanguage was the only language used during working hours… during meetings as well as coffee breaks.
In 2009, Elena started the VISEL project, in which Maria was involved. This was the first step of our SWord project.



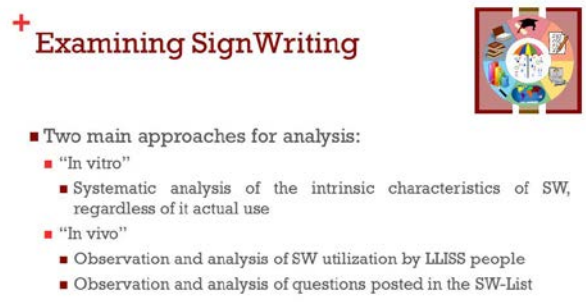
But what is the SWord project? S.W.O.R.D. means SW Oriented Resources for the Deafs.
It is a collaboration between experts of computer science and linguistics to develop a series of digital systems. It will allow SW to become more accessible to deaf users but to researchers in SLs linguistics too.
The philosophy of the project is based on Elena's idea of "deaf- centered research", which means that we need to do research WITH the deafs and not ON the deafs.



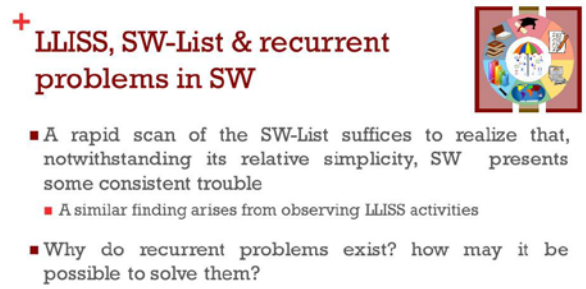
During this Symposium, you will see us 3 times, speaking about 3 parts of our project: now I'll show you the linguistics research frame, then Fabrizio and Maria will present you our two software: first SWift, a digital editor for SW, then OGR, a hand-writing recognition and digitalization software.

Ok, lets begin with the main topic of our presentation.

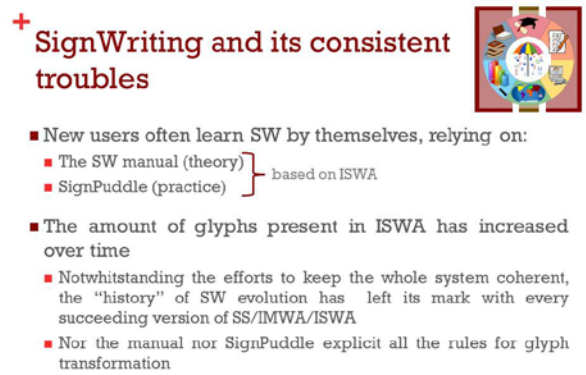
In our analysis we decided to have 2 different approaches.
The first one is an "in vitro" analysis: we consider SW in its fundamental structure, regardless of it actual use.
The second one is an "in vivo" analysis: we consider the way by which deaf and hearing individuals use SW. For this purpose, we observed Elena's collaborators for 5 years and we had also a look at the SW List.



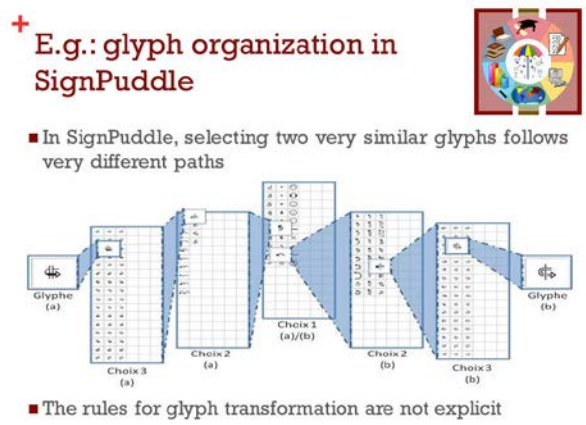
You all know the SW List, better than the specific issues highlighted at the Rome's lab, so let us speak about the List.
If you observe the mails, very often, people ask "how can I write this down? I do not understand the way this is used! Is there a difference between this and that?". We observe the same in our lab.
So our main question is: why are there recurrent problems, even if SW is quite easy to use? Is there a way to solve them once for all?



The first thing to say is that, in our experiment, SW learners don't have an "official SW teacher", they learn by themselves, alone or in groups, using the SW manual for theory and the SignPuddle to practice.
The second thing is that the amount of glyphs used in SW has increased over time and this has left some traces in the ISWA organization
Third, neither the Manual nor SignPuddle give explicit rules. Let me clarify: rules are explained in the Manual and are used in SignPuddle, but there are rules that are very similar and they are not put in relation in the Manual, so a new user does not see that it is exactly the same rule.
Let us see some examples…



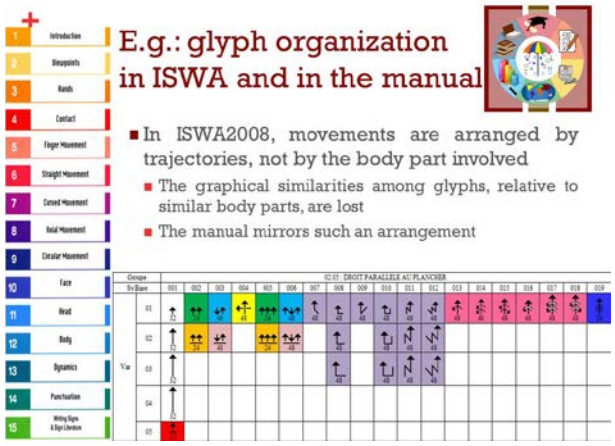
I am using SignPuddle and I am searching for an arm rotation on the vertical plan, and another on the horizontal plan… To reach them, I have to follow very different paths; so, if I'm using SignPuddle, I may not see the relationship between these two glyphs: they are similar and follow almost the same rules… but they are too far away in the "tree of choices".



Another example, I download the zip-file with International SW Alphabet (ISWA) and I start looking at it. I see, here to, that glyphs are divided by plan, so I can not see easily that there are "arm rotations" on 3 different plans and that they share similar rules. Moreover, in the same Base Symbol we can find the hand or wrist movement, but not always.

The Manual is more "user-friendly" but also shows remnants of the ISWA organization.

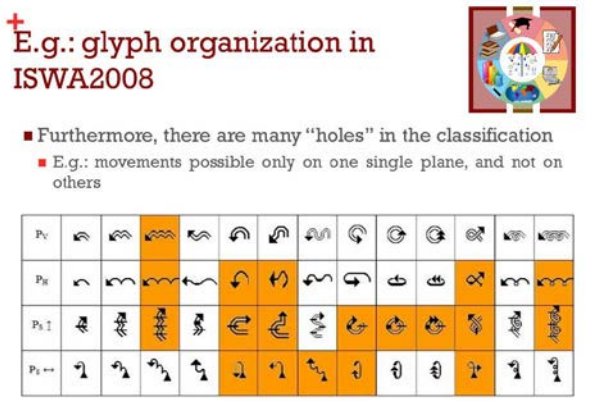
In fact, in our experience, it should be easier to understand all the movements for the hand, wrist, etc. than to understand the straight movements, the circular movements, etc… regardless of the part of the body.



If we try to organize the ISWA by looking both at the plans and at the body part, we can obtain a good view of what SW can really code.

Look at the white cells of our chart. When doing our schematization, we found that in ISWA2008, there are a lot of holes… Therefore, you could write 1 or 2 "boing" in all the plans, but you may do it thrice only in the sagittal plan (left-right). So that, for years, our deaf colleagues told us it was impossible to write down the sign "shelf" in Italian SL!

We decided to fill the holes, adding the glyphs in the orange cells. They are not very well drawn, but the purpose is to show you that SW allows drawing them, even if they are not present in the official ISWA.



Therefore, what have we done, concretely?

We decided to take the ISWA and to "deconstruct" its organization. Then we organized it again!

For this, we followed some easy principles:

- all rules allowing to transform a Base Symbol into a glyph have to be explicit
- all rules have to be coherent: we don't want a rule that works with a Base Symbol but not with another Base Symbol belonging to the same category as the previous one
- if something can be done on a plan, it can be done on other plans too
- if there are two ways to write down exactly the same glyph, we keep both, but we explicitly show that they are "synonyms"
- in general, if Sutton&Co have created a glyph, we'll try as hard as possible to keep it.

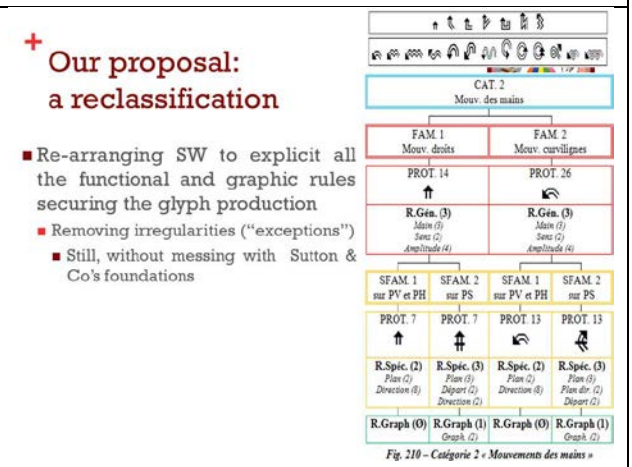
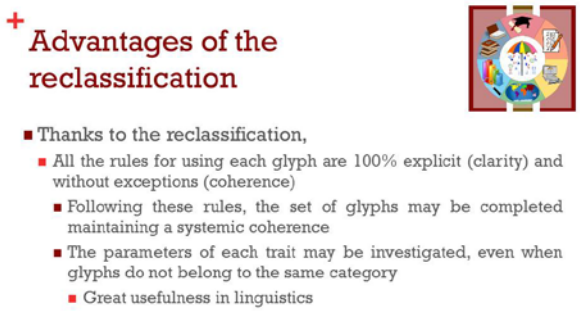


Fig. 210 – Catégorie 2 « Mouvements des mains »

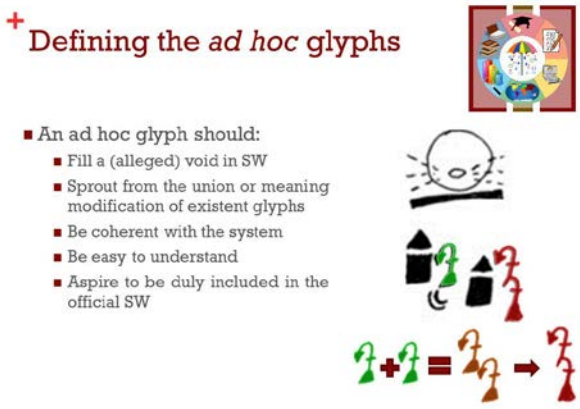
Using our reclassification has many advantages.
First of all, and this is the reason why we have done it, 100% of the rules behind Base Symbols transformations are explicit.
Second, if one wants to add a new handshape or a new movement trajectory, one can do it without changing the ISWA numbers (because we have also rearranged ISWA numbers…).
Last but not least, with our new ISWA you can investigate information on every single glyph. Thus, you can now ask our database to "find me every clockwise hand movement in the vertical plan" and it can find them all, without leaving behind any glyphs. And this is really useful for linguists like me, who wants to investigate on the relationships between different components of signs.



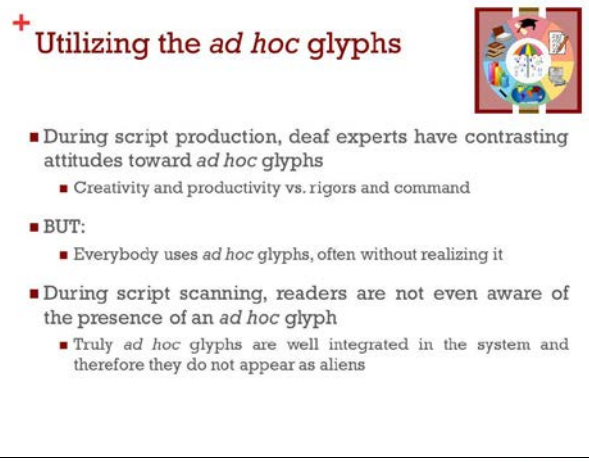
Now, if I were you, I would like to ask… "Why do you put new glyphs in your classification… 38 thousand glyphs wasn't enough for you?"
As my deaf colleagues use to handwrite SW, they never have problem to write down a sign… but once I was trying to digitalize a text, and I realized that a lot of glyphs used by my colleagues do not have a perfect match on SignMaker. I decided to call those glyphs "*ad hoc* glyphs" and to analyze them.
I discovered that those new glyphs were very well integrated with SW, because they followed all those rules that are not explicit but are present, and that the users learn because they use SW.
So, when I decided to re-organize SW, I thought it was not a problem to add new glyphs to avoid exception, but only if I could follow the implicit rules that my colleagues had followed to create a new glyph.

Let us explicit the rules that my colleagues use to create an "*ad hoc*" glyph. It is worth noting that they do that without thinking about those rules. It was my analysis which enabled us to discover those rules.
The "*ad hoc*" glyphs
- appear when there is a gap in ISWA or when my colleagues can't manage to find the appropriate glyph (although it may exist)
- are always consistent with SW rules, which means they must be created: by changing the nature or the shape of an existing glyph; by merging 2 existing glyphs; by creating a total new one but always respecting SW rules
- have to be easy to read for every SW user (the readability is, in our opinion, one of the most important features of SW)

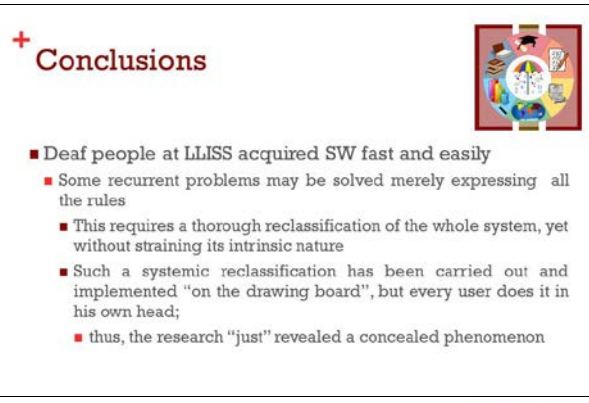
If they obey all those rules, they can aspire to become an official glyph in ISWA.



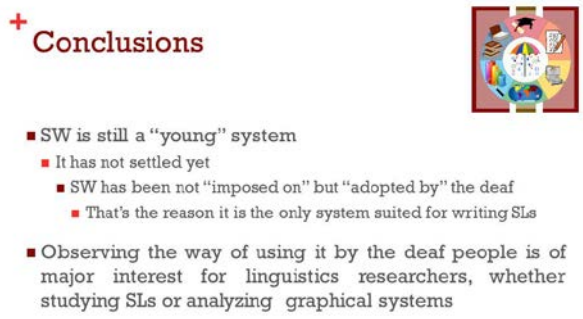
After my first analysis on "*ad hoc*" glyphs, I asked my colleagues what they think about adding new glyphs. For me, the answer of one of my colleague was much unexpected: he said that SW has to stay "pure" and only Valerie has the right to modify it! So I showed him that most of his glyphs were "*ad hoc*" and he was very upset!
For others colleagues it was normal to add "*ad hoc*" glyphs, but they did not want me to add them to my classification, because they thought it was a lack of respect for Valerie's work. I hope I know Val enough to know that she will not be upset with me if I decide to add some glyphs!



In conclusion, during the 5 years I worked in Rome, I noticed that SW is very easy and fast to learn for deaf people. However, even if they can learn it fast, some problems are recurrent. So I decided to reclassify the whole SW, to make the rules more explicit, but without changing its intrinsic nature.
Our aim is to make SW easier to learn, by "chewing the work" for users. Every new SW user needs to understand the rules, we just help him by telling them explicitly. Our research has "just" revealed a concealed phenomenon.



My last slide is a generic conclusion on SW.
Even if this year is its 40th (fortyeth) anniversary, SW is still a young, growing system which needs more users to reach is final status! Moreover, in my opinion, this is the reason why SW is so good to represent SLs. Because is not a system "imposed" to the deaf by linguists or educators, it's a system that was born from an hearing person but now grows in the deaf user community. And this is fantastic!
For me, as a linguist, research on SW is more that observing a graphic system… it is almost the first time in the history of linguistics that we can see emerging a new writing system, touching with our hand how the community uses it, how they appropriate and adapt it. That's really a very important linguistic issue.



Last thing! Maria, Fabrizio and I would like to say thank you to all the people who have helped us in our research:
- the graduating students of the Master in Computer Science at Rome's Sapienza University, who contributed in implementing parts of the SWord project
- all the deaf and the hearing staff of Elena's lab, the "Sign Language and Deaf Studies" lab of ISTC-CNR in Rome; moreover, we wish to dedicate this presentation in loving memory of Elena
- and our colleagues, PhD directors, etc. who helped us in our research.

And many thanks to you for listening to me!
Any question?

Abstract (1/2)

Since the early years of the 2000s, SW has been used as a transcription and writing system for Italian Sign Language (LIS) by the "Written-LIS laboratory" (LLISS) at the ISTC-CNR in Rome. Between 2007 and 2012 during the preparation of her doctoral thesis, Bianchini [1] observed the modalities of using SW at LLISS and analyzed the ways by which its deaf and hearing members made the system their own.

It is worth mentioning that the LLISS people were self-taught in SW, on the basis of the 1995 manual and of the 2004 version of SignPuddle. Despite a very good knowledge of SW, we noted recurring problems in its use, and tried to understand the reasons. We thus realized that many difficulties arose because of the lack of strict coherence in the organization of SW (see Note 1) that was evident both in the manual and in the 2006 SignPuddle server in use in the lab. One example is the movements of the hands in which: (1) all changes in a BaseSymbol do not describe the same trajectory; and (2) it is not possible to realize the same trajectories on every level (Figure 1). Therefore, we decided to carry out a complete reorganization of SW while totally respecting the work of Sutton and her team (I.e., no "original" glyph has been deleted), but suggesting additions so as to increase the coherence of the system (see Fig.1) [2]. This idea originated observing

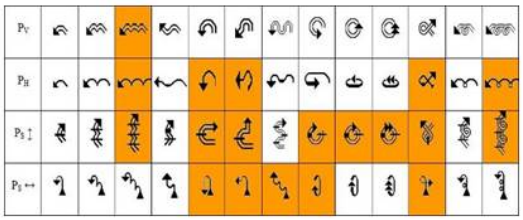


Figure 1 - White boxes: the possible trajectories within the official ISWA2008, by planes; Orange boxes: the trajectories that were added improve the system coherence.

Abstract (2/2)

the written productions of LLISS people, where many glyphs were created "ad hoc" to represent movements, configurations, facial expressions and other signing elements not already provided in the different versions of SW.

This reclassification required a new numbering system for the glyphs, which also involves the advantage, for the linguists, to easily extract the different glyph features (e.g., a query may extract all, and only, the movement from right to left of the right hand in the horizontal plane).

This work, however, was not an end in itself: in fact, all the deaf people we worked with prefer to hand-write SW, considering the use of SignPuddle too slow; therefore, as part of the project SWord (SW Oriented Resources for the Deaf) implemented by the Informatics Dept of University of Rome I "Sapienza", and in particular of the Borgia's doctoral Dissertation, a new software was created, which allows to quickly digitally-write SW. This software, called SWift (SW improved fast transcriber) [3], is based on said reclassification and will be presented in detail in the paper by Bianchini, Borgia & De Marsico.

[1] C.S. Bianchini. 2012. Analyse métalinguistique de l'émergence d'un système d'écriture des Langues des Signes: SignWriting et son application à la Langue des Signes Italienne (LIS). Ph.D. thesis, Uni. Paris 8 – Univ. Studi Perugia.

[2] C.S. Bianchini, F. Borgia. 2012. Writing Sign Languages: analysis of the evolution of the SignWriting system from 1995 to 2010, and proposals for future developments. Proc. Int. Jubilee Congress of the Technical University of Varna, 6: 118-123.

[3] C.S. Bianchini, F. Borgia, P. Bottoni, M. De Marsico. 2012. SWift: a SignWriting improved fast transcriber. *in* Proceedings of AVI2012 (Capri, 21-25 May 2012).

Note 1: Mostly due to the fact that SW is a system in constant evolution and, as such, is the result of "sedimentation" of several successive layers (see for more details Bianchini & Borgia, 2012).