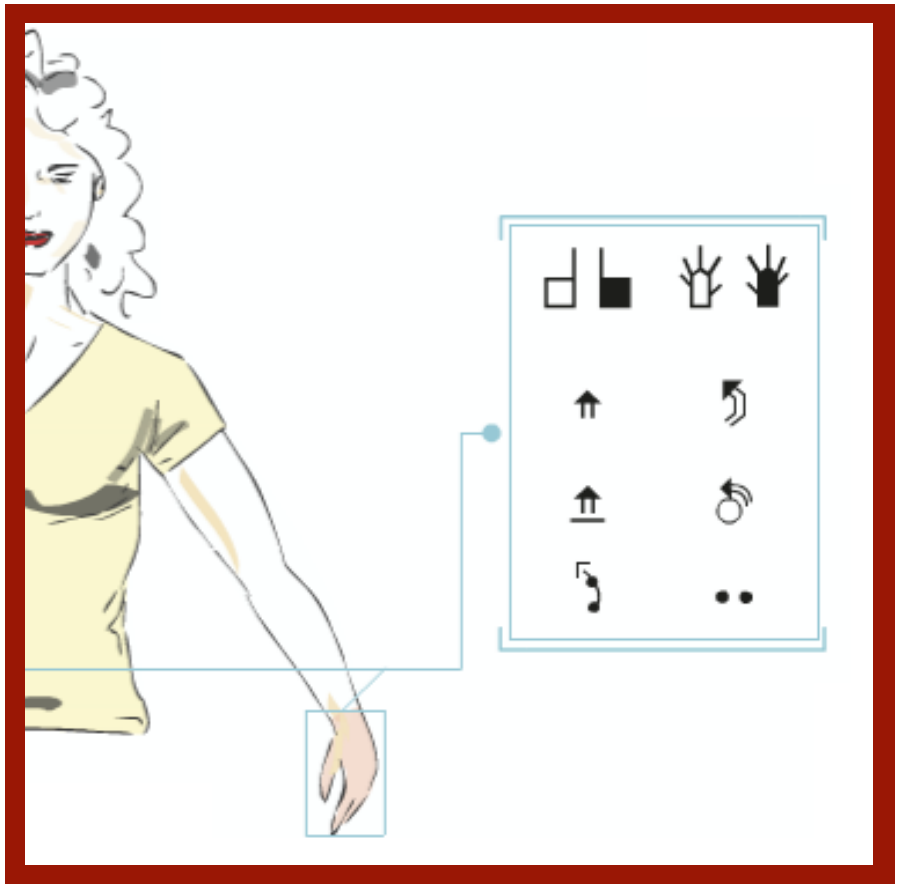

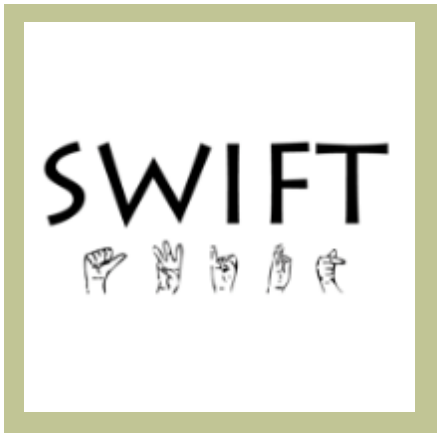


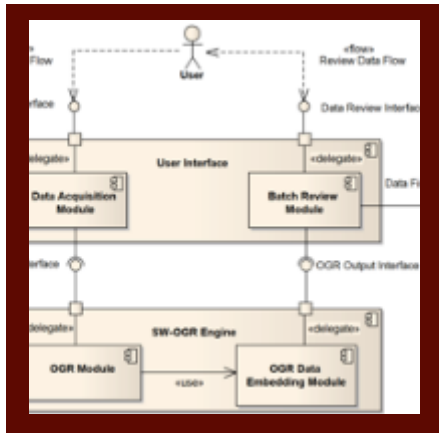


# SWift, a user-centered digital editor for SignWriting within SWORD project

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# Outline

- Introduction
- SignWriting digital editors - Overview
- SignWriting digital editors - Challenges
- SWift - Introduction
- SWift – Overview
- SWift - Advanced features
- SWift – Supporting different ISWA versions
- SWift - Testing
- Conclusions and Future

# Introduction

- A pencil and a piece of paper are the only required items to produce signs using SignWriting
- Since the early years the need to produce a digital version of the system was evident
- The informatization of the system, started in 1986 with the SignWriter computer program, allowed SignWriting to achieve a wider diffusion through:
  - Newspaper
  - Books
  - Websites
  - Other digital resources

# Introduction

- Digital versions of the glyphs were created
- The conceptual organization of the glyph images was ensured by assigning to each of them a unique ISWA code

# SignWriting digital editors
## Overview

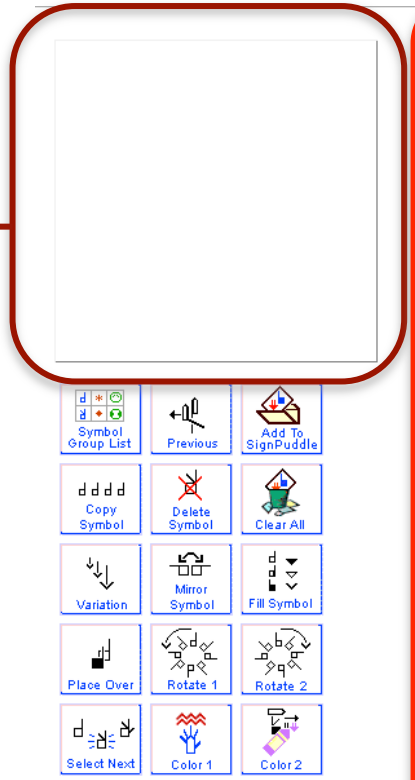
- SignWriting digital editors are the tools that enable the creation of digital resources written in SignWriting
- In other words, they are critical for the informatization of SignWriting and therefore the "digital transcription" of SLs
- Many applications have been produced by different teams, delivered in different ways, ranging from desktop to web applications

# SignWriting digital editors
## Overview

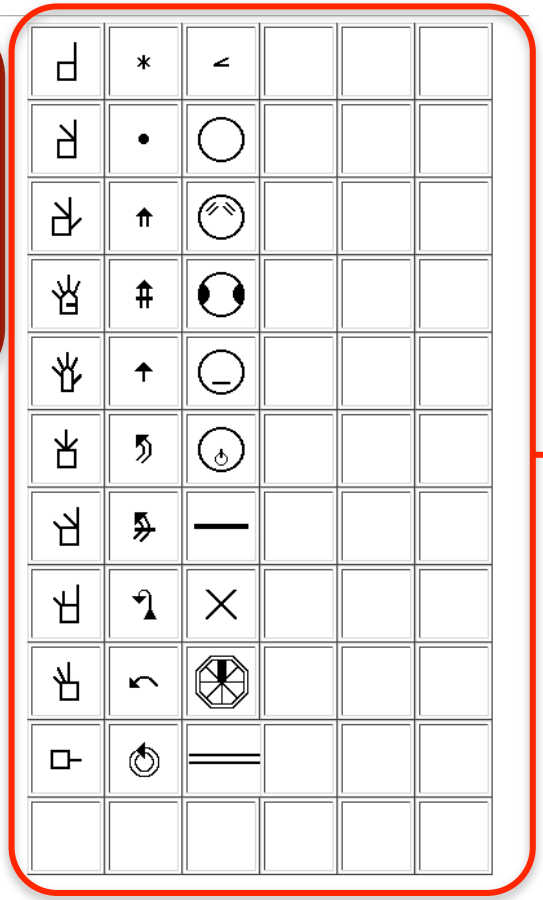
- Most SignWriting digital editors basically provide the same functionalities
- Despite differences in design and implementation existing from one editor to another, such functionalities are:
  - Search for (or type) glyphs which belong to the ISWA
  - Insert the chosen glyphs onto an area which is designated for the composition of the sign
  - Manage the glyphs on the sign composition area
  - Save the sign in one (or more) formats

# Digital SignWriting
## Overview

**Sign Composition**




**Glyph Search**



# Digital SignWriting Challenges

## General:

- The system should provide at least:
  - An area to compose the desired sign(s)
  - An area to search for the desired glyphs(s)
- Achieve the best possible level of usability
- Achieve the best possible level of accessibility (at least deaf-oriented accessibility)
  - Minimize the use of  text (Vocal Language)
  - Visual-oriented organization

# Digital SignWriting Challenges

## Glyph Search Area:

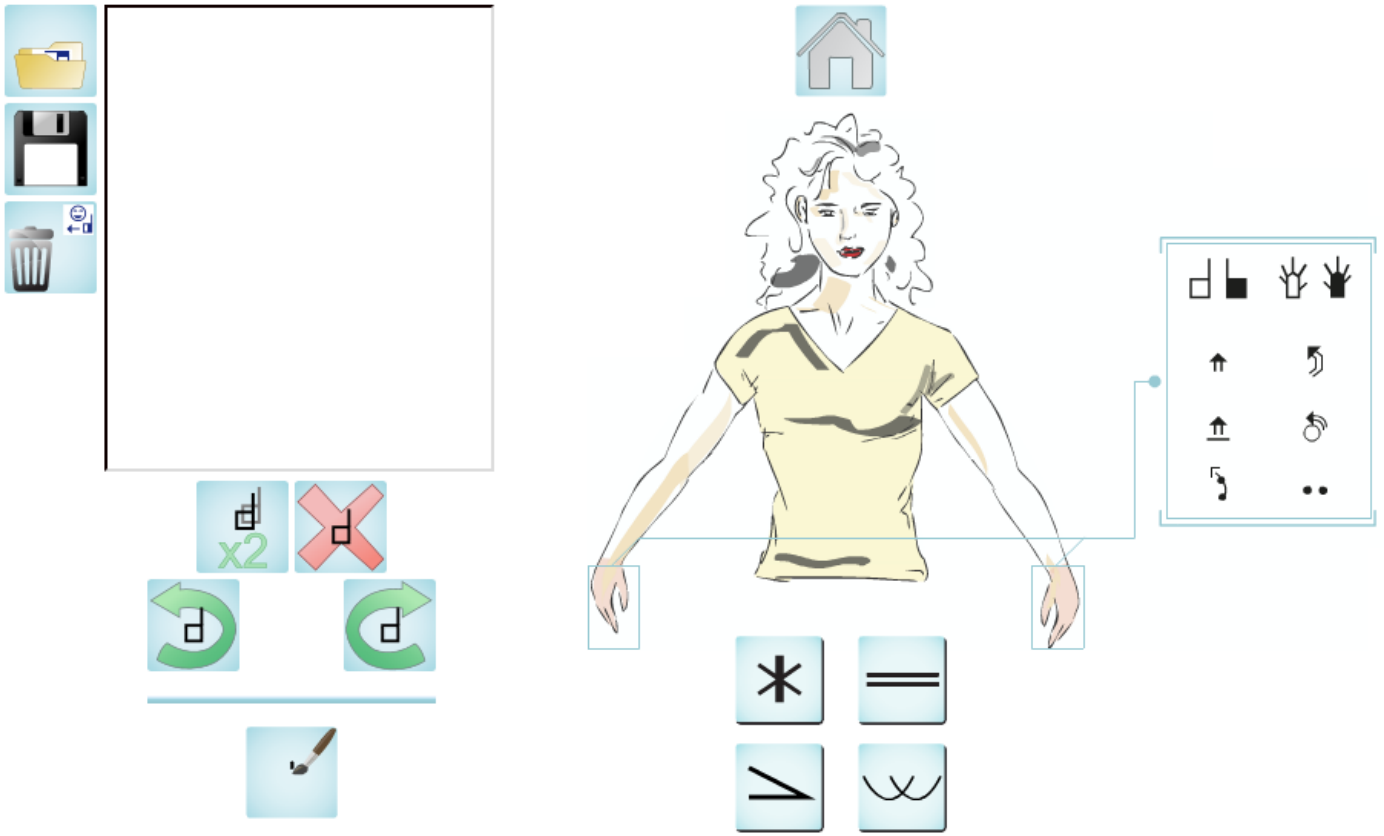
- The large amount of glyphs requires a robust yet intuitive organization of the glyph search area
- The organization of the glyph search area should reflect the organization of the International SignWriting Alphabet (ISWA)
- The glyph search area should provide a user-friendly navigation context for finding and fetching glyphs
- SignWriting beginners should be able to find their orientation within the glyph search area too

# SWift
## Introduction

## SignWriting improved fast transcriber

- Provides all the features of a SignWriting digital editor
- Produced by "Sapienza" University of Rome, in partnership with the research team at ISTC-CNR (which includes many deaf people)
- New features with respect to other digital editors
- Key requirements: usability and accessibility
- Application tested with deaf participants

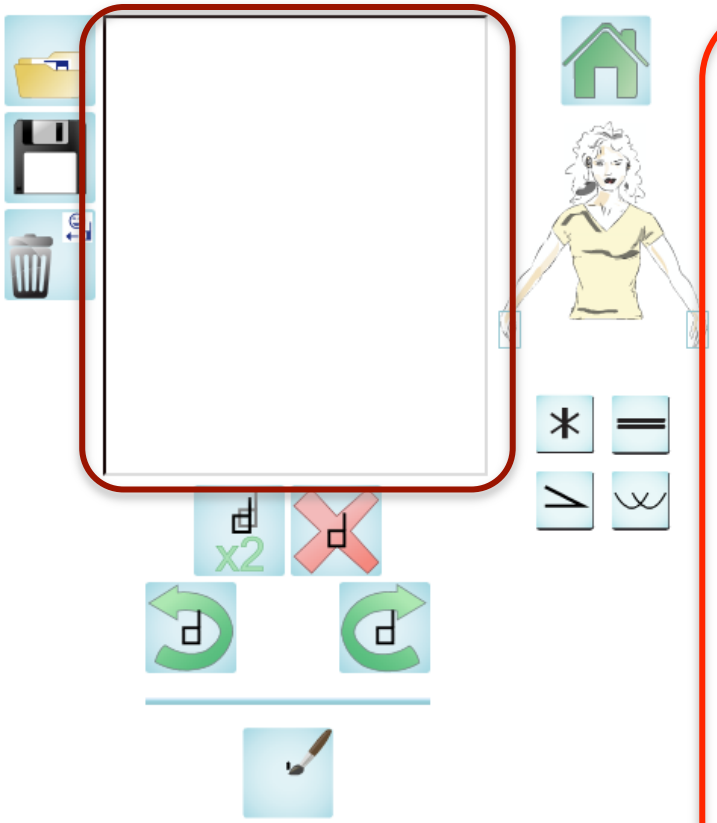
# SWift



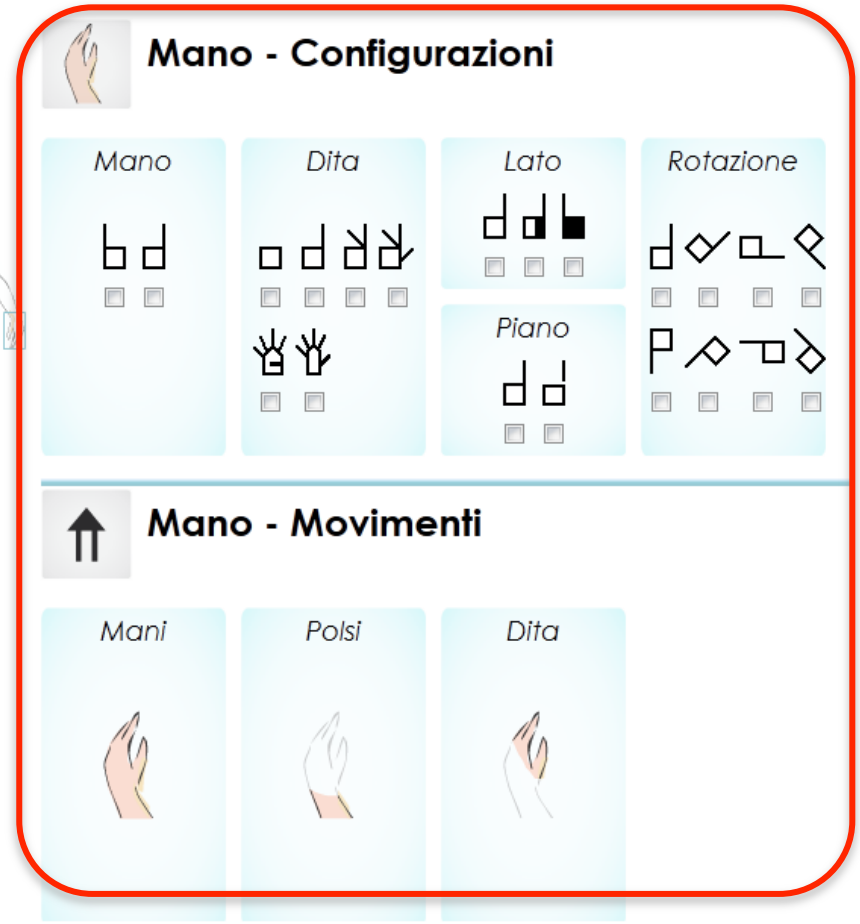
SWift, a user-centered digital editor for SignWriting within SWORD project

# + SWift

**Sign Composition**




**Glyph Search**



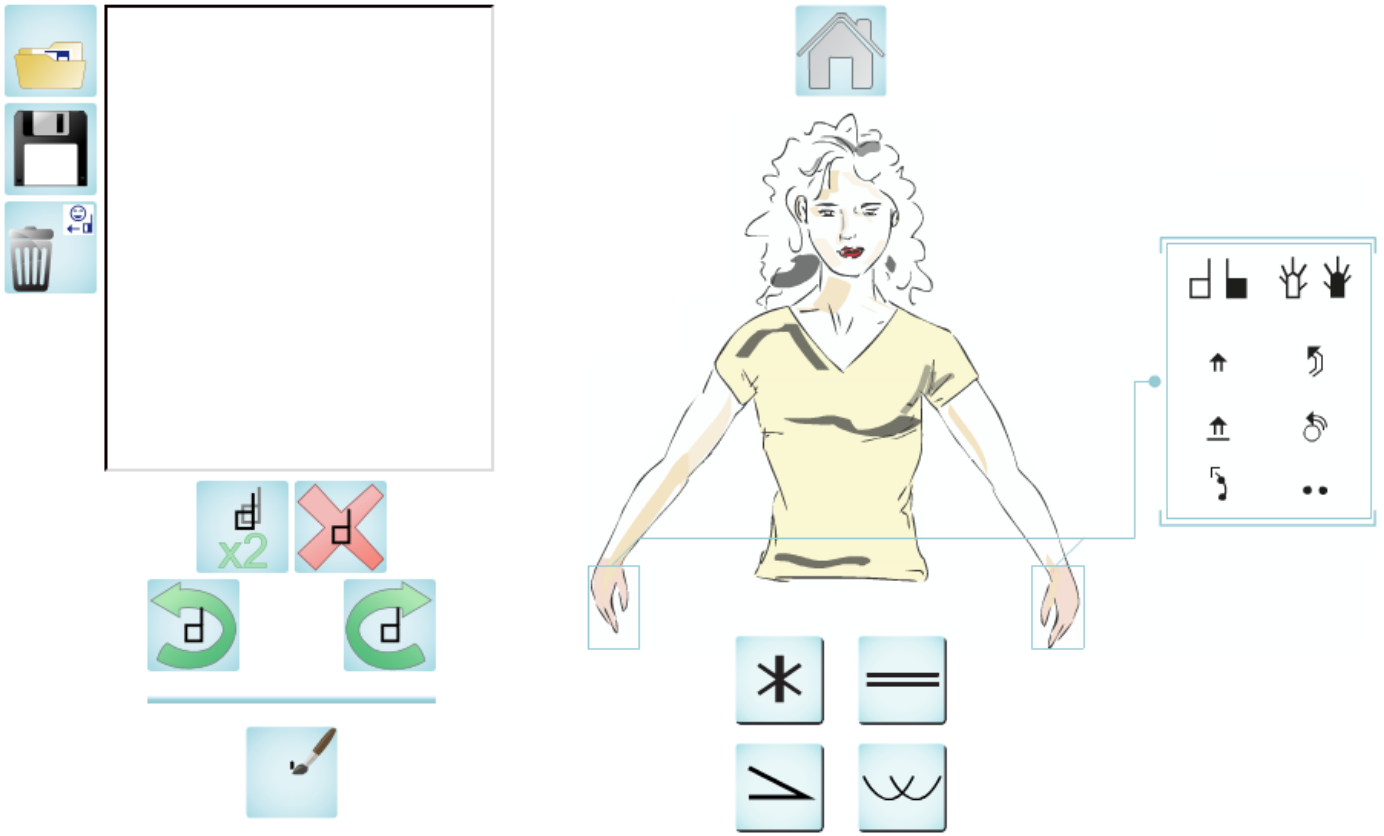
# SWift

## Basic features

- Sign composition area and glyph search areas
  - Interaction via click, and drag-and-drop
  - Natural organization of the search space according to intuitive criteria (e.g., the part of body involved)
- Functionalities for glyph editing
  - Rotation, duplication, deletion, etc.
- Multiple save options
  - PNG, XML and remote save
- "Open" functionality to edit signs composed previously
- Each sign is save in a database with the list of its component glyphs
  - Support for linguistic analysis

# SWift

## Overview




SWift, a user-centered digital editor for SignWriting within SWORD project

# SWift
## Overview

- Support for SignWriting beginners
  - Presence of graphic elements within the glyph search area, to guide the user towards the correct glyph
  - Buttons that are used to modify glyphs have very simple icons
  - Use of mouseover-activated animations (instead of textual labels) to provide additional information to the user (e.g., the meaning of buttons to modify glyphs in the composition area)

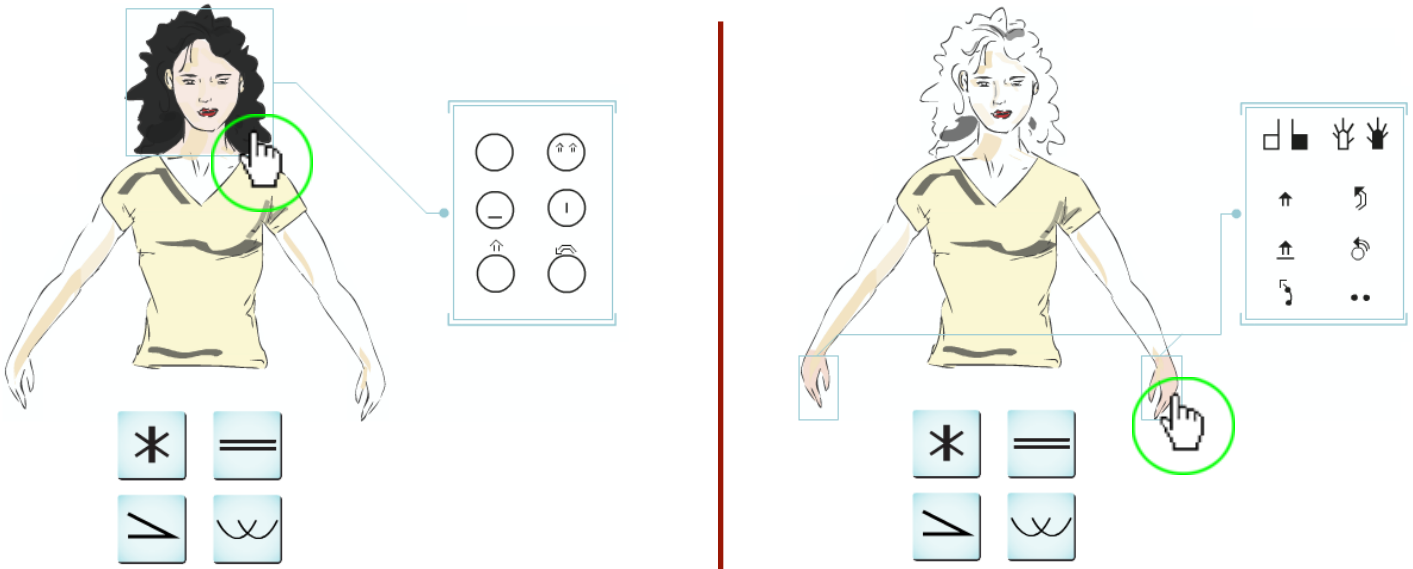
# SWift
## Overview

- Support for SignWriting beginners
  - The puppet: a stylized human figure helps the user to choose the appropriate anatomic area (head, hands, etc.) of the glyph
  - Animations on mouseover show a set of example glyphs for any area

# SWift

## Overview

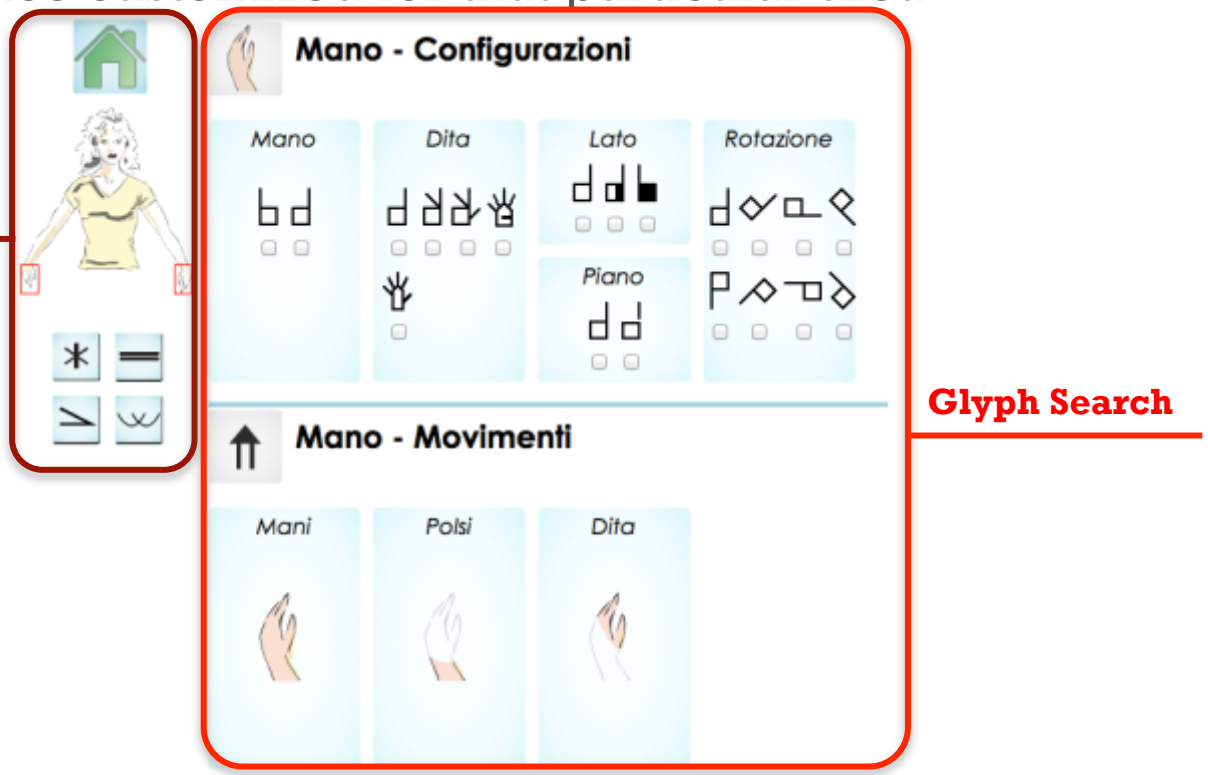
- Support for SignWriting beginners
  - The puppet: a stylized human figure helps the user to choose the appropriate anatomic area (head, hands, etc.) of the glyph
  - Animations on mouseover show a set of example glyphs for any area



# SWift

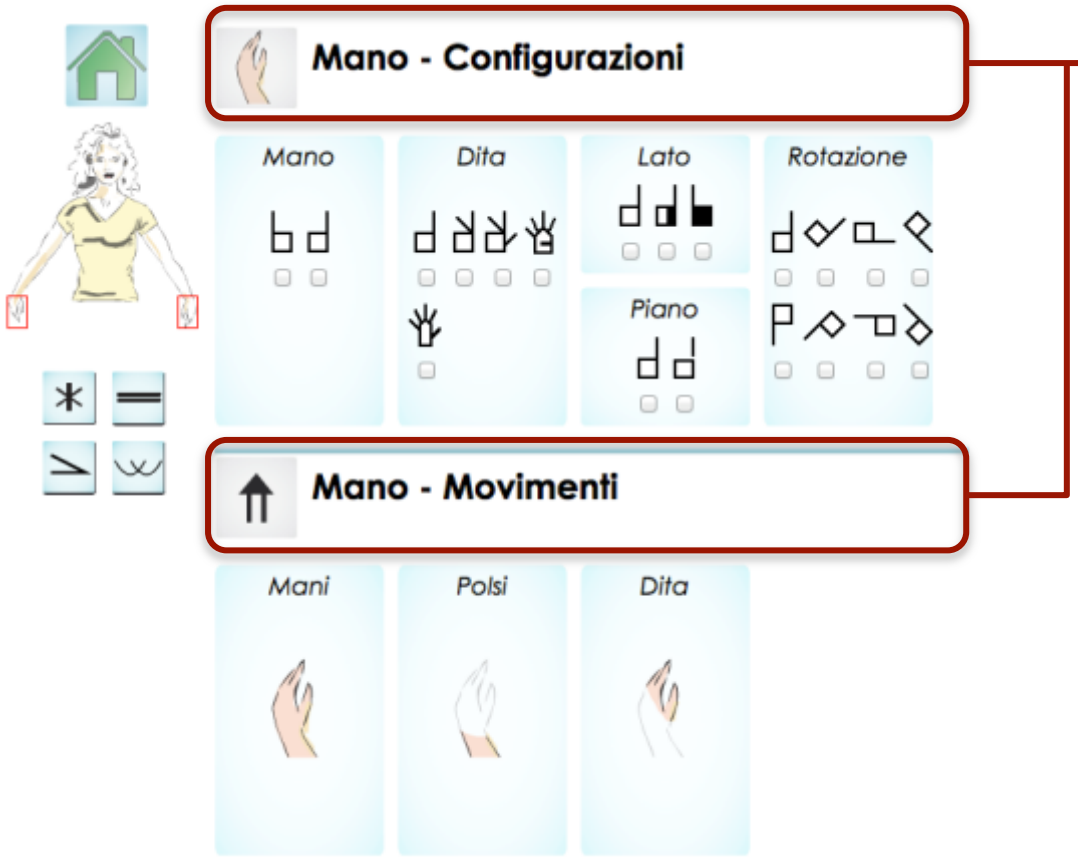
## Overview

- As the user chooses a glyph area, he/she is presented with a search interface customized for that particular area



# SWift

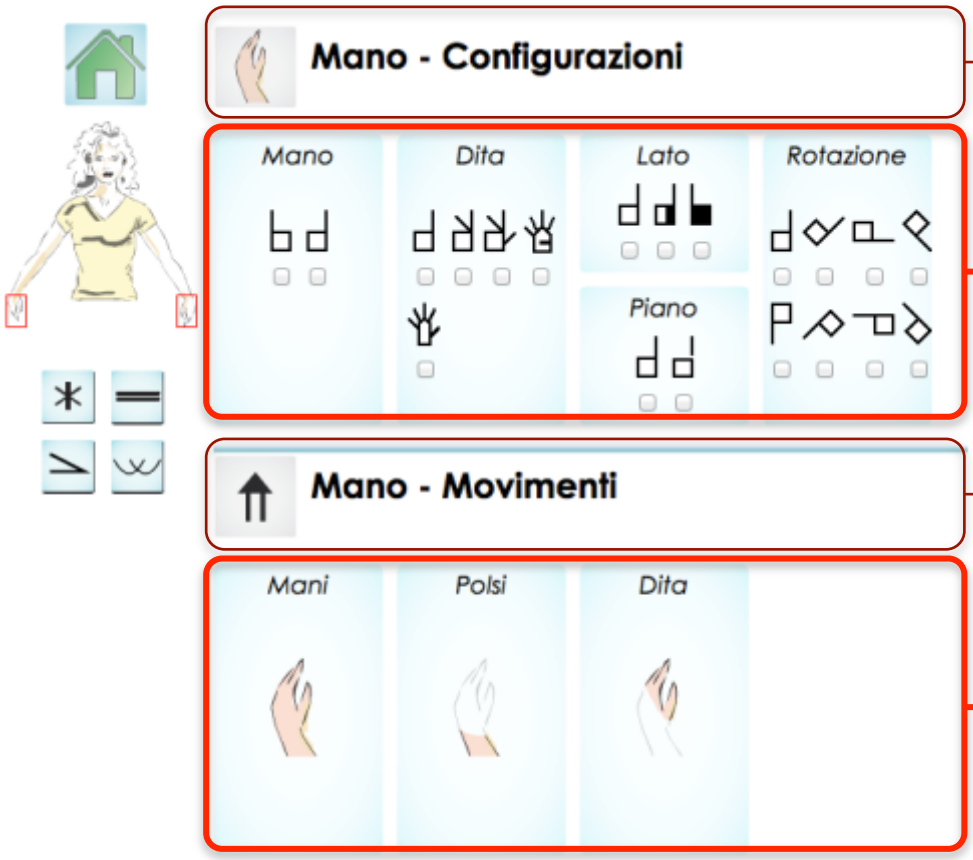
## Overview




**A label and an icon explain the user what kind of glyphs are available through the group of boxes beneath**

SWift, a user-centered digital editor for SignWriting within SWORD project

# SWift
## Overview

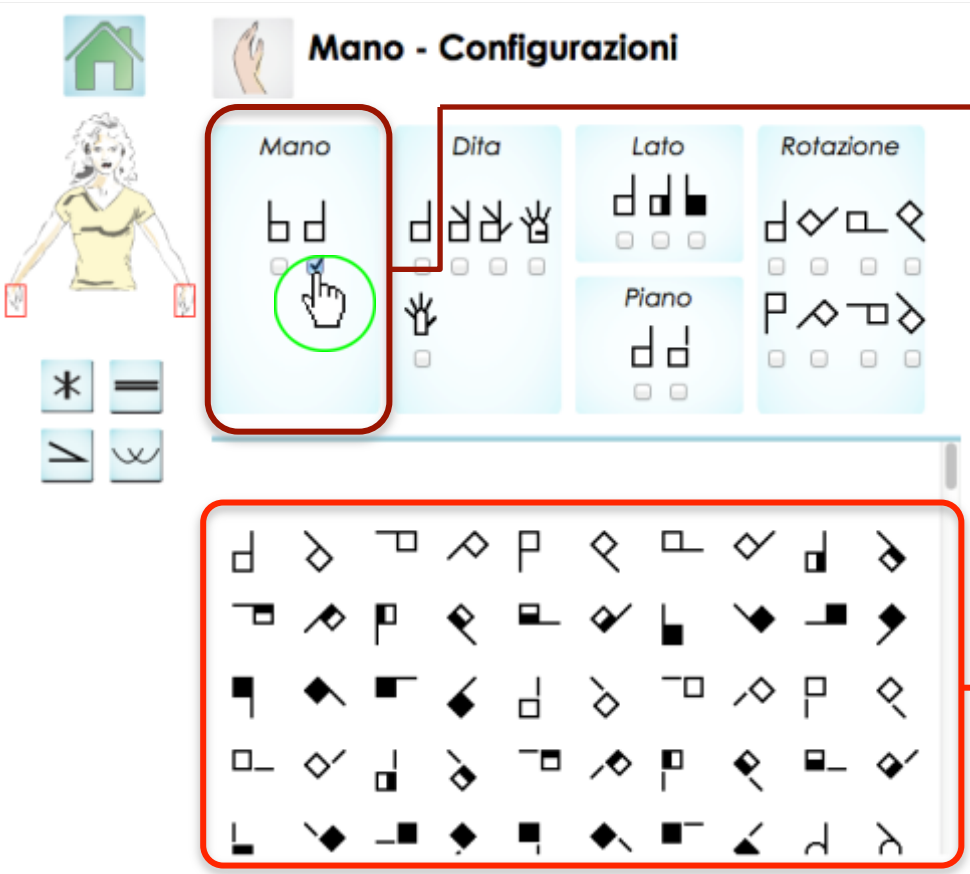



A label and an icon explain the user what kind of glyphs are available through the group of boxes beneath

**Choose Boxes:**

- **Provide independent choices for a certain glyph feature**
- **The user can use any number of combined criteria**
- **No predefined order of choice**

# SWift
## Overview

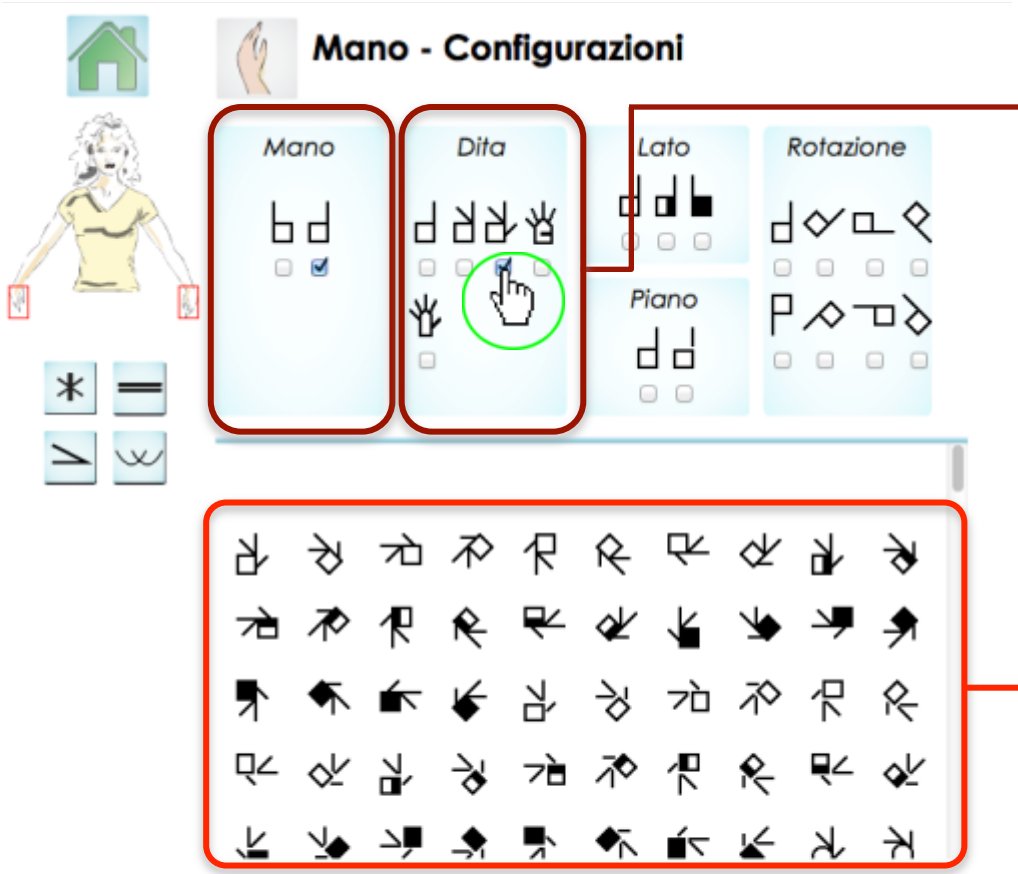



**As the user performs a choice…**

**The set of glyphs meeting the requirements of the user is updated.**

SWift, a user-centered digital editor for SignWriting within SWORD project

# SWift
## Overview



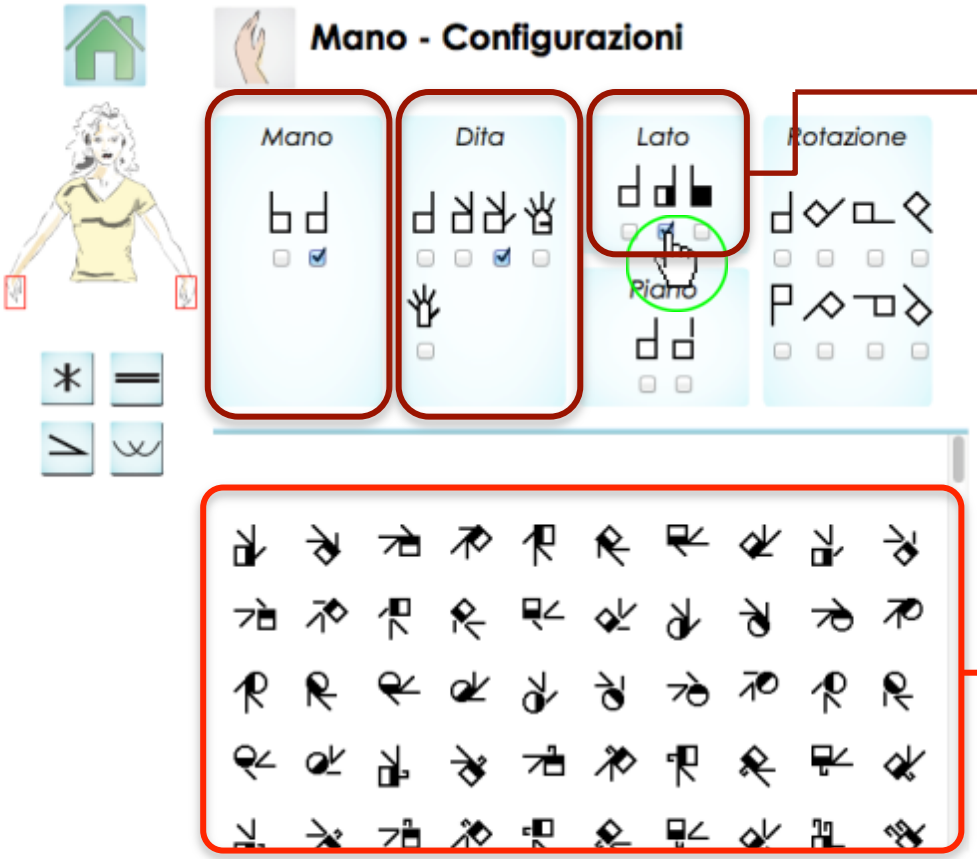

**The more choices the user makes...**

**The more accurate and restricted becomes the set of result glyphs**

SWift, a user-centered digital editor for SignWriting within SWORD project

# SWift

## Overview




**The more choices the user makes...**

**The more accurate and restricted becomes the set of result glyphs**

SWift, a user-centered digital editor for SignWriting within SWORD project

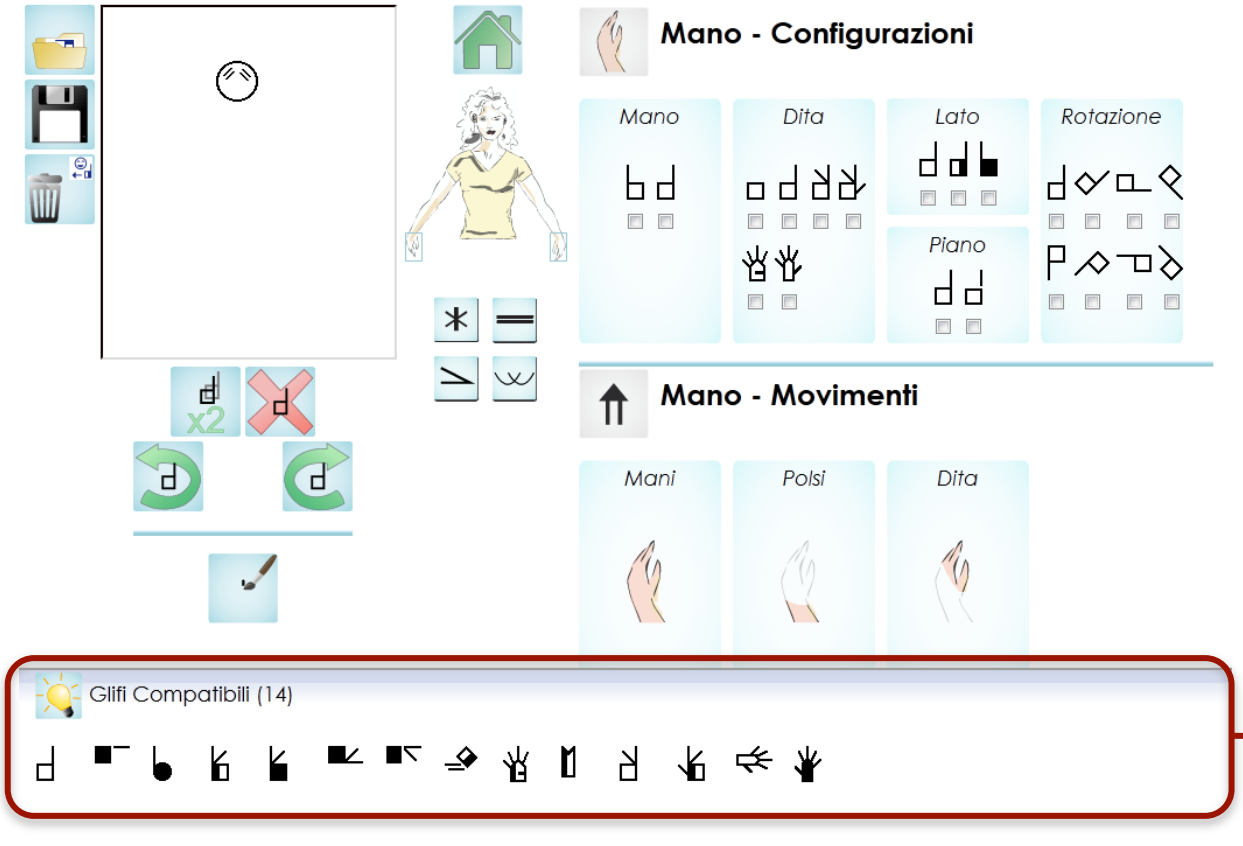
# SWift

## Advanced features

- Glyph Hint Panel
  - Shows a set of glyphs that are compatible with those the user inserted in the sign composition area.
  - The glyphs are immediately draggable on the sign composition area.
  - Hints come from an analysis based on the frequency of co-occurrences of the glyphs in the sign database.
  - Statistics are updated immediately after any sign is saved in SWift format.
  - The proposed glyph exclusively belong to the anatomical area the user is currently searching.
- Sign Hint Panel implemented but untested

# SWift

## Advanced features

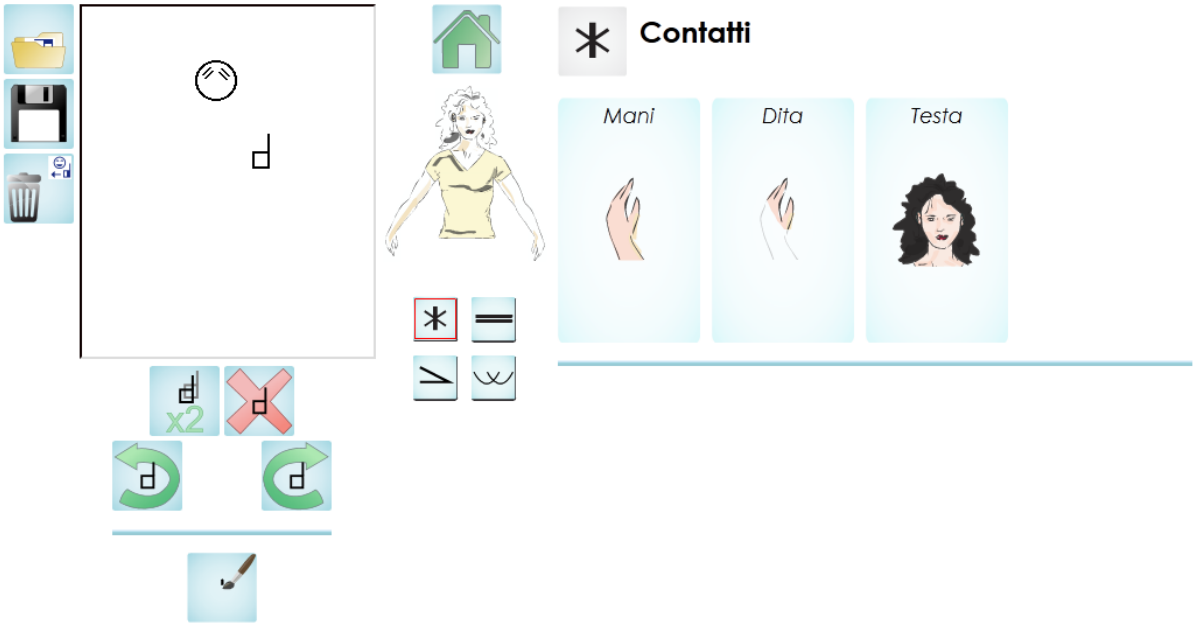



**Glyph Hint Panel**

- **Compatible glyphs belonging to the current area (hands).**
- **Immediately draggable on the sign composition area**

# SWift

## Advanced features





**Glyph Hint Panel**

- **Compatible glyphs belonging to the current area (contacts).**
- **Immediately draggable on the sign composition area**

# SWift

## Advanced features

- Custom glyphs handwriting support.
- Many SignWriting users tend to "invent" *ad hoc* glyphs during the writing process
  - This happens when the user is not able to find the glyph he/she is looking for
  - The *ad hoc* glyphs are consistent with the rules and organization of SignWriting, so they can be understood by other users
- We designed and developed a functionality to support the handwriting of *ad hoc* glyphs

# SWift

## Advanced features

- Custom glyphs handwriting support.

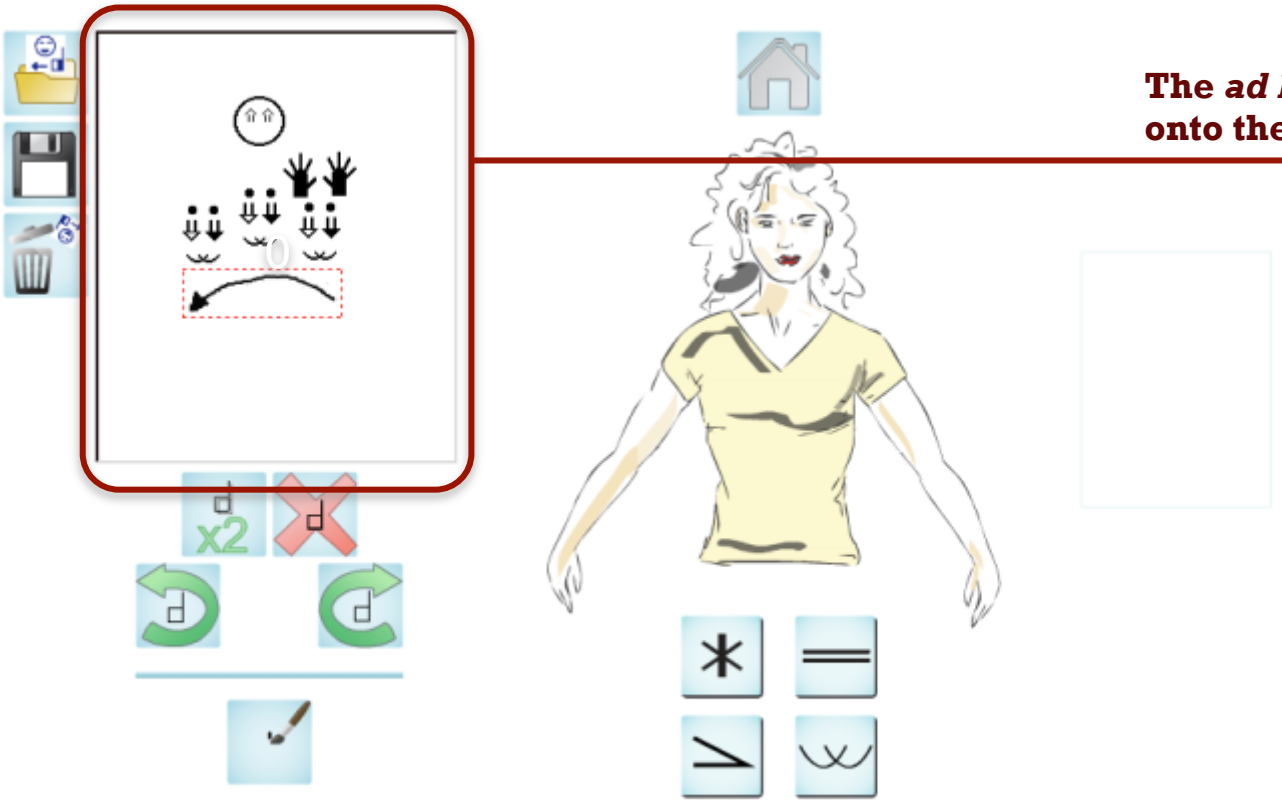

**The user handwrites a *ad hoc* glyph**

SWift, a user-centered digital editor for SignWriting within SWORD project

# SWift

## Advanced features

- Custom glyphs handwriting support.



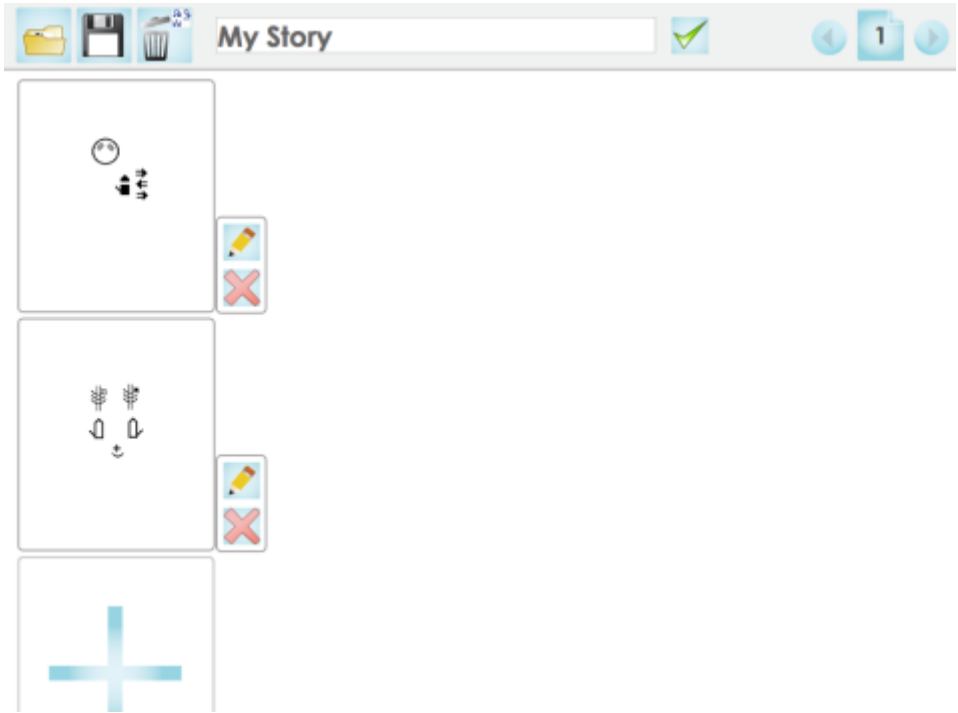

**The *ad hoc* glyph is inserted onto the sign composition area**

SWift, a user-centered digital editor for SignWriting within SWORD project

# SWift

## Advanced features

- Signed Stories Support
  - SWift can be used to compose whole signed stories, rather that single signs



# SWift

## Supporting different ISWA versions

- SWift can support multiple ISWA versions:
  - ISWA2008
  - ISWA2010
  - ISWA Bianchini

- However, the business logic of the glyph search area is based on ISWA Bianchini

# SWift
## Testing

- SWift has been tested with a number of SignWriting-proficient participants
- A deaf-oriented adaptation of the Think-Aloud Protocol (by C. Lewis and J. Rieman) was necessary in order to perform the test
- The devised test was named "Think by Signs" protocol
- The results of the test underlined a very good usability level
- Critical areas of intervention were identified within the application

# SWift
## Testing

For more information about the testing of SWift, and for detailed result, please refer to:

Bianchini, C.S., Borgia, F., Bottoni, P., De Marsico, M. (2012).
SWift - A SignWriting improved fast transcriber.
In *Proceedings of AVI2012* (Capri, 21-25 May 2012)

Bianchini, C.S., Borgia, F., De Marsico, M. (2012).
SWift - A SignWriting editor to bridge between deaf world and e-learning.
In Proceedings of ICALT2012 (Rome, 7-10 July 2012)

# Conclusions and Future

- SWift is a new digital editor with novel capabilities with respect to other digital editors
- SWift is framed within the SWORD (SignWriting Oriented Resources for the Deaf) project
- SWORD will represent a step towards full integration of deaf people in digital society