



FP7 - Information and Communication Technologies

Collaborative Project

Dicta-Sign

**Sign Language Recognition, Generation and Modelling
with application in Deaf Communication**

Grant Agreement Number 231135

Deliverable D8.2

Evaluation of the Sign Wiki

Leading Partner: WebSourd

May 2012 v1.0



Table of Contents

1.	INTRODUCTION	3
2.	EVALUATION PROTOCOL	3
3.	THE EVALUATORS	5
4.	OBSERVATION OF SOME EVALUATIONS IN A STUDIO	9
4.1	TUTORIAL ON THE SIGN WIKI	9
4.2	VIEWING ONE SIGN LANGUAGE UTTERANCE	10
4.3	VIRTUAL SIGNER COMPREHENSION	10
4.4	CONTENT EDITING	10
4.5	WRITTEN INFORMATION	12
4.6	TRANSLATION FUNCTION	12
5.	QUANTITATIVE RESULTS	13
5.1	VIRTUAL SIGNER COMPREHENSION	13
5.2	ANSWER TO THE QUESTIONNAIRE	14
5.3	VIRTUAL SIGNER APPEARANCE	15
5.4	SIGNING FLUIDITY	15
5.5	ANIMATION SETTINGS	15
5.6	STRUCTURE OF THE DOCUMENT	15
5.7	NAVIGATION WITHIN THE SIGNED DOCUMENT	16
5.8	TRANSLATION FROM ONE SL TO ANOTHER SL	16
5.9	CREATION OF NEW CONTENT	17
5.10	SAVING WORK	17
5.11	AREAS TO BE IMPROVED	17
5.12	VARIOUS POTENTIAL USES OF THE WIKI	18
6.	ANALYSIS OF SENTENCES CREATED BY THE EVALUATORS	19
6.1	CREATION OF NEW CONTENT FROM SCRATCH	19
6.2	CHANGES TO THE INITIAL SENTENCE	20
7.	CHANGES TO BE MADE TO THE WIKI INTERFACE	20
8.	CONCLUSION	21

1. Introduction

This report deals with the evaluation of the Sign Wiki. We evaluate the following aspects:

- The comprehensibility of the signing avatar in the context of the sign wiki,
- The visual acceptability of the sign wiki interface,
- The editing functions of the sign wiki,
- The possible uses of such a wiki.

Our evaluators are both hearing and deaf signing people. The evaluation can be performed either in a dedicated room or over the Internet.

The evaluators have to perform the following tasks:

- Understand a short sentence,
- Reorder four signs,
- Create a short sentence from scratch,
- Save it
- Answer a questionnaire.

The test can be performed in less than 30 minutes and does not require any specific computing knowledge. The wiki version runs on Safari, so that Mac users can run it on their machine without installing any additional libraries.

2. Evaluation protocol

The evaluation is based on the following web pages:

- <http://signwiki.cmp.uea.ac.uk/dictasign/documents/36/0> for the tutorial and the questionnaire,
- <http://www.dictasign.eu/Questionnaire> for the evaluation platform.

All evaluators were invited to take part in the evaluation by means of Dicta-Sign newsletters or posts on forums. In parallel with the online evaluations, we observed a few evaluators in a studio in order to be able to identify some interface issues that would not be observable using the questionnaire statistics alone. However, those evaluations followed the same protocol as the online ones and the evaluator was left alone with the wiki website, the tutorial and the questionnaire.

We provide below a short description of the tutorial, the questionnaire and the wiki content. More detail about them is available by connecting directly to the following addresses: <http://signwiki.cmp.uea.ac.uk/dictasign/documents/36/0> for the tutorial and <http://www.dictasign.eu/Questionnaire> for the questionnaire.

The tutorial contains several sections that give the following information using text, pictures and SL:

- The definition of a sign wiki,
- The way of visualizing the wiki structure (show or hide details),
- The wiki modes (viewing, editing),
- The translation function,
- The reading functions (speed, point of view),
- The process of inserting a new sign,
- The process of deleting an existing item,
- The process of exchanging two signs,
- The process of saving an edited document.



After watching the tutorial, each tester can then perform the following tasks:

1) The first one consists in watching a short sentence made of the following signs: [TOPIC] [FRANCE] [POSSIBLE] [VISIT] [VILLAGE] [TRUE] [BEAUTIFUL] [break¹] [BUT] [OPINION] [ADVICE] [TOWN] [PARIS] [INCREDIBLE] [break] [YESTERDAY] [CHILD] [CHILD] [GO] [WHERE] [LIBRARY] [NATIONAL] [BOOK] [CHOOSE] [DICTIONARY²] [TEXT] [READ] [CHILD] [CHILD] [JOY] [HAPPY] whose meaning is “In France, one can visit really beautiful villages. However, I recommend the incredible town of Paris. Yesterday, I went to the national library with my children. I chose a book and read them that book. The children were really happy”.

2) The tester then has to answer the following questions:

Which town is being discussed?

- Paris,
- Marseille,
- Lyon.

In France, there are beautiful:

- Prairies,
- Horses,
- Values,
- Villages,
- Mountains.

What did the narrator and their children do?

- Went to the cinema,
- Went to the library,
- Bought a dictionary at a book shop,
- Bought a map,
- Went to the ice rink.

How did the children feel?

- Disappointed,
- Happy,
- Angry,
- Sad,
- Ill.

The testers whose first sign language was LSF could directly answer the questions. The other testers should use the translation function in order to get the signed message in their own sign language.

3) The second task involves no linguistic skill and only consists in reordering the numbers 1, 2, 3 and 4. Our aim is just to test whether or evaluators can use the reordering function properly.

¹ The sign [break] is only a rest posture to divide the sign stream into sentences.

² The sign does not mean “dictionary” in this sentence, but « open a book ».



4) Then, the evaluators have to create a free sentence in using the sign browser. No other instruction is provided.

5) Finally, the work has to be saved.

6) Then, the evaluator is asked a set of questions about himself:

- How old are you?
- Have you seen virtual signers before?
- Are you Deaf, hearing become Deaf?
- How is your level of LSF (French Sign Language)?
- How is your level of BSL (British Sign Language)?
- How is your level of GSL (Greek Sign Language)?
- How is your level of DGS (German Sign Language)?
- Are you comfortable working with computers?

At the end of the questionnaire, there is a range of question about the Wiki:

- Does the avatar look ok?
- Does the avatar sign fluidly?
- Was the avatar understandable?
- Were the animation settings (speed, angle, etc.) suitable?
- Was the structure of the document clearly visible?
- Was it easy to navigate the sign language document?
- Was it easy to change from one language to another?
- Was it easy to create a new phrase?
- Was it easy to insert new signs?
- Was it easy to change the sign order?
- Was it easy to save your work?
- What is/are the priority/priorities?
 - Facial expressions
 - Ability to change the sign placement
 - Ability to create content with structures (questions, lists...)
- What do you think this wiki could be best used for
 - Information resource
 - Educational use
 - Collaborative use (creating content in teams)
 - Anonymization

3. The evaluators

We could measure how many time our questionnaire was visited by the evaluators by means of the sign wiki statistics. The questionnaires received 462 visits between 15 December 2011 and 15 January 2012. This huge number of visits reveals the interest of the Deaf community to such a prototype and is the consequence of an intense dissemination through Facebook, blogs, newsletters and Deaf networks.

In contrast with this high interest for the wiki, the amount of evaluator that really participated to the evaluation is lower than expected for several reasons:

- Only 20% of the website visitors use a Mac (using Windows would require installing additional plugins to run the wiki)
- Only 20% of the visitors navigate through Safari.

The test page was modified and saved 39 times during the evaluation period. Although we don't know how many times each evaluator saved their work, we decided to group the wiki versions that were close to each other (less than 15 minutes between two saved sessions) and might have been created by the same evaluators, so that we only retain 18 sessions.

This hypothesis is compatible with the 20 responses that we got from the online questionnaire because not all the users saved their online evaluation (2 evaluators answered in the questionnaire that it is not easy to save a wiki page).

The statistics from the questionnaire analysis provide several attributes of the wiki evaluators. We present them in the following graphs and tables.

Language of the questionnaire	
French + SL	80%
English + SL	20%

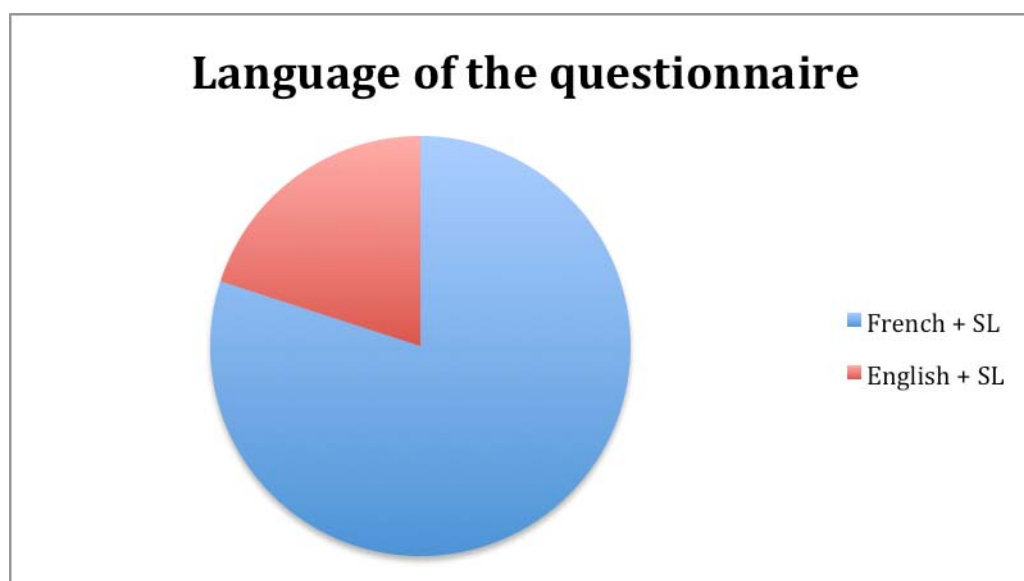


Figure 1: Language of the questionnaire used by the evaluators

Age of the evaluator	Total number
From 0 to 19	0
From 20 to 29	7
From 30 to 39	9
From 40 to 49	4
More than 50	0

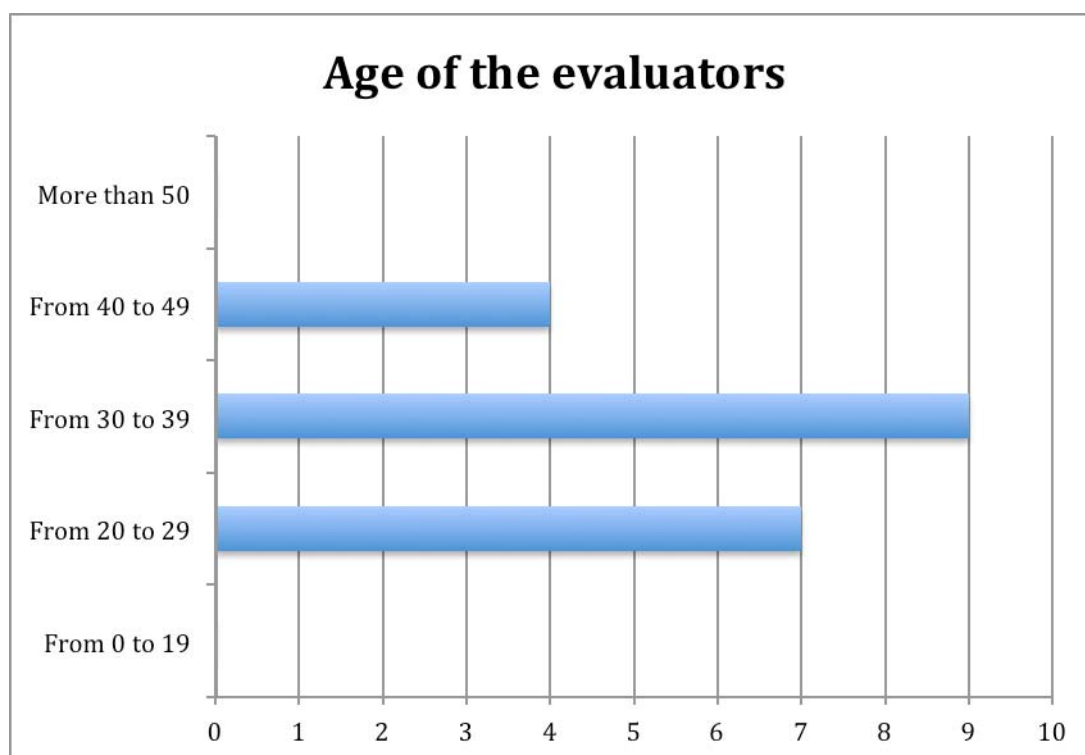


Figure 2: Age of the evaluators

Deaf / Hearing proportion in the evaluator panel	
Hearing	40%
Deaf	60%

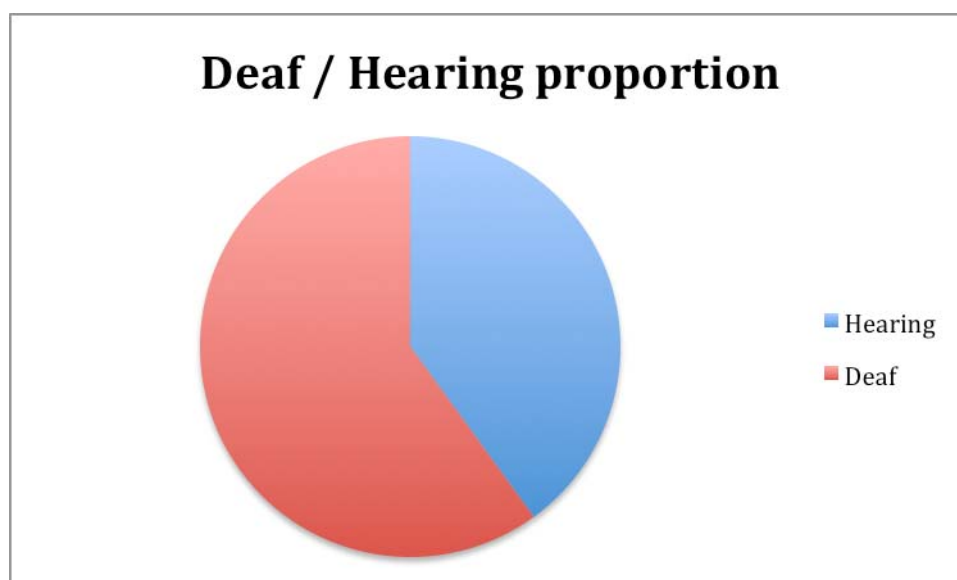


Figure 3: Proportion of hearing and deaf evaluators

Level in the sign language		LSF	BSL	GSL	DGS
	Good	40%	5%	0	5%
	Medium	30%	5%	0	10%
	Beginner	10%	25%	5%	15%
	Don't know the SL	20%	65%	95%	70%

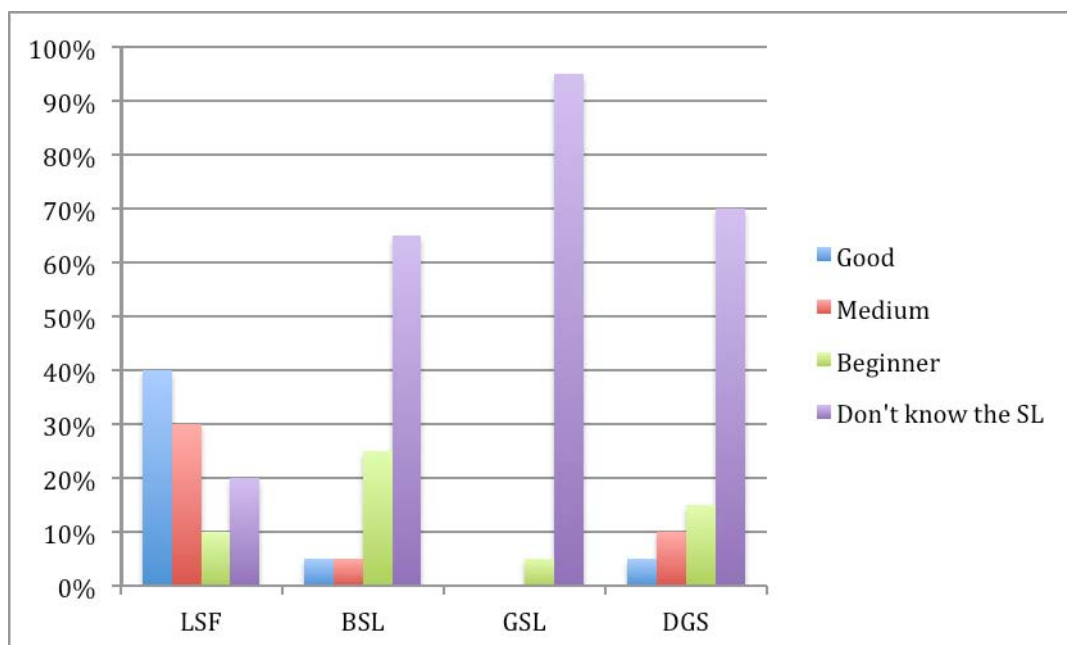


Figure 4: Sign language level of the evaluators

Feel comfortable with computers	
Yes	75%
No	20%
Didn't answer	5%

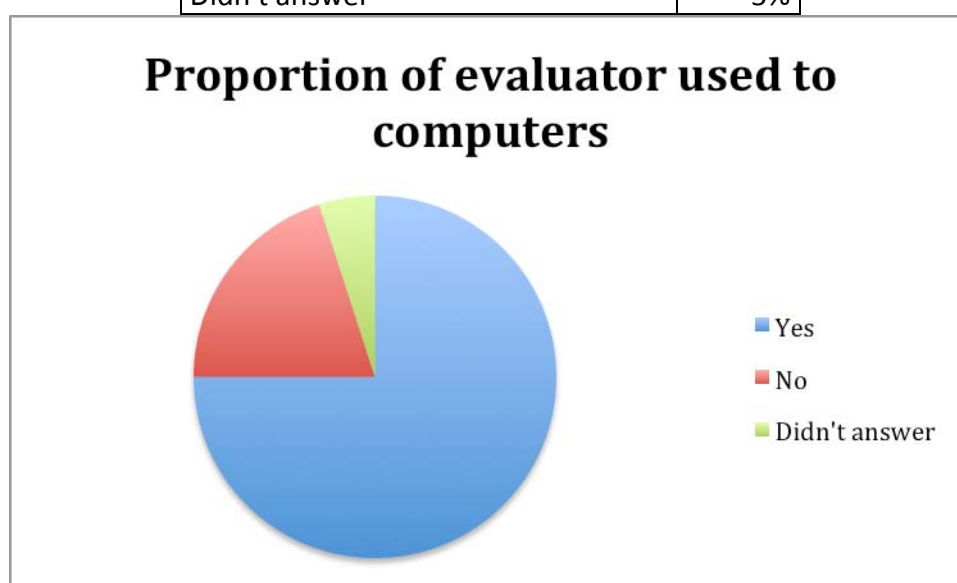


Figure 5: Proportion of the evaluators used to computers

All evaluators had already seen a virtual signer.

4. Observation of some evaluations in a studio

Some evaluators came to WebSourd and were observed during the evaluation. We noticed several issues related to the evaluation protocol, software bugs and the global interface design. We report them in the following sections. The use of several modalities to explain how the wiki works was appropriate for our evaluators.

4.1 Tutorial on the sign wiki

According to their preferences, the evaluators watched either the video tutorial, or the text, or both. During the evaluation part, some of them came back to the text tutorial in order to remember some specific procedures related to the wiki.

In spite of all our efforts to make the entire tutorial accessible by adding many illustrations and explanations in sign language, several evaluators said that this part was hard to understand. One of them claimed that it was not easy to watch the sign language explanations and the illustrations at the same time. Another could not understand the aim of the wiki prototype that was detailed at the beginning of the tutorial.

Moreover, our Deaf evaluators noticed several issues in the translation. The most important one is that the illustration space and the signing space were different in several explanations.

After watching the video tutorial, some evaluators got lost, because they were not told that they had to follow the rest of the questionnaire to continue the evaluation.

Other evaluators underlined that the first instruction of the evaluation is quite ambiguous. In the sentence “*On the starting page, click on the button to [view only the sections], then select the first section by clicking on it.*” the word “*page*” can refer either to the tutorial page or to the wiki page.

All those observations may explain why so few evaluators watched the tutorial and went on to undertake a real evaluation of the Dicta-Sign wiki.

In practice, it was challenging to provide so much information in such a short tutorial. The wiki is totally new for every tester. The situation could be compared to teaching someone that is not familiar with using a keyboard to use some text processing software ... in less than 6 minutes! It is entirely understandable that several evaluators felt uncomfortable with new functionality.



4.2 Viewing one sign language utterance

In the first task, the evaluators were asked to “*click on the button to view only the sections, then select the first section by clicking on it. Click play and watch the animation as often as you require (without reading the subtitles). Next, answer the questions below*”.

Unfortunately, most of them didn’t find the button “*view only the sections*” and directly watched via the glosses. For that reason, the answers about the meaning of the signed sequence are hardly interpretable.

Instinctively, the evaluators clicked on the *play* button without selecting any part to be displayed. The current interface does not show any animation when nothing is selected. It would be helpful to modify the interface in order to display the whole animation when the user clicks on the *play* button without selecting anything.

There was also confusion about the meaning of the “1st sentence” because the title is labelled as a sentence in the interface. Consequently, some evaluators played the title instead of the first real sentence.

Several evaluators tried to slow down the animation in order to better understand the signs. Afterwards, they wanted to use the “*faster*” option to speed up the animation. Unfortunately, this function does not work in the current version of the prototype.

A play/pause function would be useful to be able to play one animation step by step instead of watching it always from the beginning.

4.3 Virtual signer comprehension

3 to 5 successive viewings were necessary to understand the sentence. Two evaluators laughed while seeing the virtual signer for the first time. The majority of them criticized the lack of chest mobility, of facial expression and of a rest position between sentences. For all these reasons, the meaning of the sentence can be rather ambiguous. Moreover, there are some issues related to the comprehension of movements that involve a change in depth.

At the opposite extreme, one evaluator was astonished by the smoothness of the articulation between consecutive signs.

4.4 Content editing

We observed no problem in switching from viewing mode to editing mode or in changing the sign order.

On the other hand, we noticed a lot of problems in use of the search function based on written search text (we could not expect all our online evaluators to have a Kinect

sensor at home). The first issue was related to the default English language of the editing mode; the evaluators had first to change the language by clicking the flag corresponding to their SL.

Even after selection of their preferred SL, it was not easy to find signs because the search process is sensitive to accents (é,è,ê), the case of letters (a,A) and word agreement (plural, conjugation).

Moreover, the link between the input and the output of the sign browser is sometimes hard to understand (see Figure 6: Search for lexicon).

There is also a minor issue related to the precision of the position in the signed sentence when a new signed is being inserted in a sentence. Most evaluators first inserted the sign take from the 1000 concept list, and then had to put them in the right order.

Several evaluators clicked on “*finish*” instead of clicking on the binoculars. It might be better to put the binoculars on a button.

Although evaluators were told not to do so in the tutorial, some clicked on the star and on the pen in order to create a new item or to modify it. Unfortunately, the contextual menu does not appear close to the sign that should be created or modified (Figure 7: Modification of the sign [MAIS]). Consequently, they received no feedback from the interface.

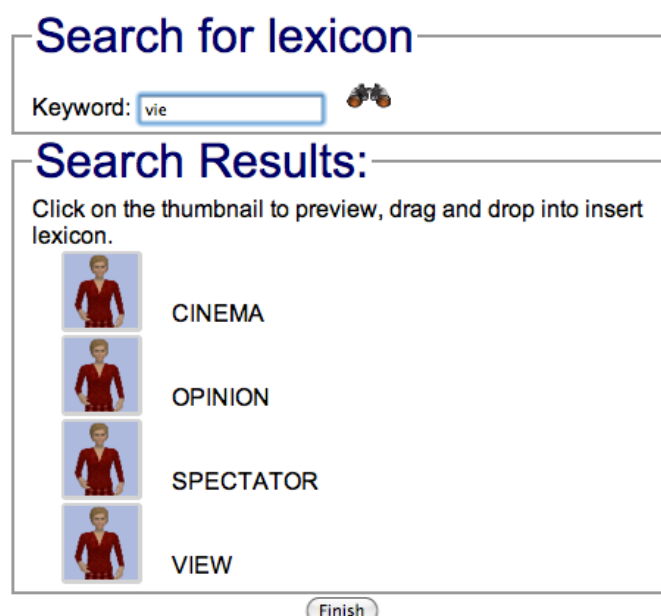


Figure 6: Search for lexicon



Figure 7: Modification of the sign [MAIS]

4.5 Written information

Some of the evaluators that have been observed during the test didn't understand the written English. They could barely understand the messages that are displayed when saving their work or removing an item from the list. Those messages should be replaced by an explicit illustration.

One evaluator regrets that the sign list in the left column only conveys written information. He suggests replacing the still images of the avatar by small videos or sign pictures. WebSourd recommended such a design in the initial wiki specification.

Other details related to the structuring element are systematically written in English (sentence, title, section). A picture should replace those elements.

4.6 Translation function

Many evaluators did not understand that they could change the sign language, in spite of all explanations in the tutorial. As a result, they were not able to understand the signed sequence or to search for a new sign.

It would be helpful to add some flags near the isolated sign icons in order to remind of the sign language in use. The SL information should also be duplicated near the binoculars so that the user can type the word in the appropriate language.

When using the translation function, the global content layout is systematically reset. All the content (details about the sign list) is displayed and the beginning of the content is displayed (the user has to scroll down to see the rest of the content).

5. Quantitative results

5.1 *Virtual signer comprehension*

The observation of several evaluators proved that some of them read the glosses before answering the comprehension questions. We must be careful when interpreting the following results:

- 1) Which town is being discussed?
 - Paris: 90%
 - Marseille: 0%
 - Lyon: 0%
 - No answer / or else: 10%
- 2) In France, there are beautiful:
 - Prairies: 0%
 - Horses: 0%
 - Values: 0%
 - Villages: 90%
 - Mountains: 5%
 - No answer / or else: 5%
- 3) What did the narrator and their children do?
 - Went to the cinema: 5%
 - Went to the library: 85%
 - Bought a dictionary at a book shop: 5%
 - Bought a map: 0%
 - Went to the ice rink: 0%
 - No answer / or else: 5%
- 4) How did the children feel?
 - Disappointed: 0%
 - Happy: 0%
 - Angry: 0%
 - Sad: %
 - Ill: 100%
 - No answer / or else: 0%

In the following graph, we show the comprehension rate for each question.

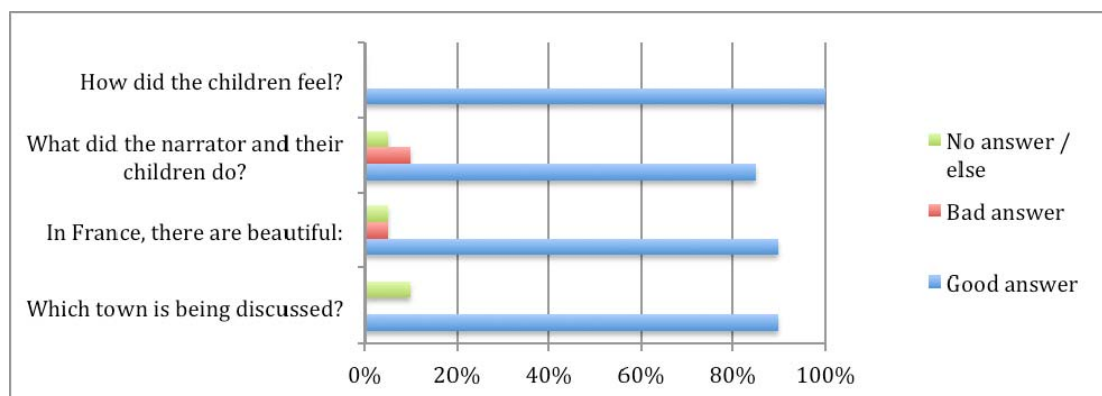


Figure 8: Comprehension rates

Only the last question received 100% correct answers. This high comprehension rate can be related to the iconicity of the sign [TO SMILE].

In spite of these high comprehension rates, only 75% of the evaluators said that the avatar was comprehensible. It is also important to keep in mind that the observed evaluators needed from 3 to 5 sentence viewings in order to understand the sentence.

In addition, one evaluator mentioned, “he focussed on the virtual signer’s hands instead of looking at the whole body because of the lack of face expression. Moreover, the sign were effectuated in a clumsy way. It is hard to understand.”

5.2 Answer to the questionnaire

In the following graph, we provide the answer to the questionnaire. All that answers are examined analysed in the following sections.

	Yes	No	No answer
Does the avatar look ok?	50%	35%	15%
Does the avatar sign fluidly?	30%	70%	0%
Was the avatar understandable?	75%	15%	0%
Were the animation settings (speed, angle, etc.) suitable?	60%	25%	15%
Was the structure of the document clearly visible?	75%	20%	5%
Was it easy to navigate the sign language document?	85%	15%	0%
Was it easy to change from one language to another?	60%	20%	20%
Was it easy to create a new phrase?	65%	35%	0%
Was it easy to insert new signs?	45%	55%	0%
Was it easy to change the sign order?	85%	15%	0%
Was it easy to save your work?	90%	10%	0%

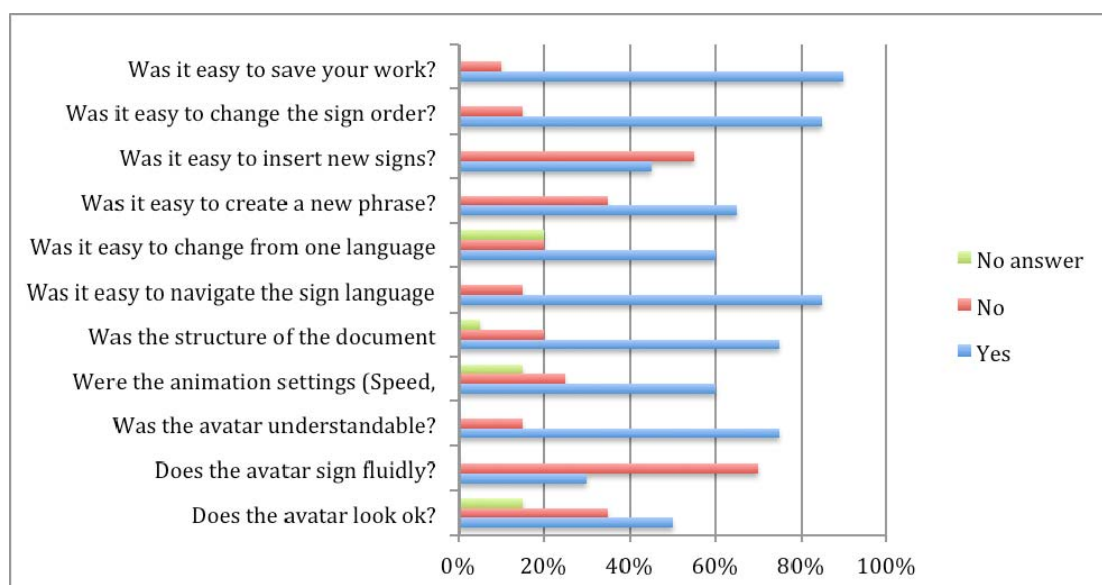


Figure 9: questionnaire about the interface user-friendliness

5.3 Virtual signer appearance

When asked about the virtual signer look, 50% of the evaluators answered that the virtual signer has a good appearance, 35% said that it has poor appearance and 15% didn't answer.

The problems of Anna's skinning are already known and have been investigated in previous evaluations. *Françoise*, the virtual signer that solves most of the identified issues, will replace the current one.

5.4 Signing fluidity

Only 30% of the evaluators answered that the virtual signer signs fluidly. The issues are probably related to a bad co-articulation between the signs and to rather rigid performance of signs. We need more accurate phonological and prosodic models in order to solve this issue but this work is out of the Dicta-Sign project scope.

5.5 Animation settings

Only 60% answered that they were satisfied with the animation settings (Speed, Angle etc.), 25% were not satisfied and 15% didn't answer. This result can be explained by several software limitations such as the issue related to the speed setting.

5.6 Structure of the document

75% of the evaluators think that the document structure is clearly visible, 20% do not agree with this statement and 5% didn't answer. At this stage, it is important to point out several issues related to the document structure presentation:



- The structure is labelled with English words (page header, sentence, section etc.) that are not easily understandable by all evaluators,
- The evaluators didn't understand easily how to use the three buttons to adjust the granularity of the article layout.
- When opening the evaluation page, all the content of the wiki article was displayed. Thus, the evaluators could not appreciate its whole structure easily.

5.7 Navigation within the signed document

85% of the evaluators think that it is easy to navigate through the SL document (the other 15% have the opposite opinion). The layout with the structure in a left column and the avatar on the other side seems to be a good solution.

5.8 Translation from one SL to another SL

Only 60% of the evaluators think that it is easy to translate the content from one sign language to another. 20% don't think so. It is important to mention the 20% of the evaluators that didn't answer to this question.

Although the tutorial accurately describes how to use the translation function, most evaluators that we observed didn't find easily how to use it.

One evaluator added the following comment:

"These signs in LSF cannot be translated into another SL. I don't understand some signs in LSF. I don't know French language. It was not helpful. There is not any list of signs to find one? Good idea about this sign wiki."

It was unfortunately not possible to translate the content of the predefined utterances from LSF to another sign language because the sign language was frozen. There was also no option to remove the frozen option from the signs that composed this utterance.

In fact, this issue must lead to another reflexion about what should or shouldn't be frozen when using a scheme of sign-to-sign translation³:

- The most iconic gestures could be frozen as long as the hand shape that they involve represents the same concept in the four SLs.
- Even if some signs can be classified as being standard signs, their placement in signing space must remain the same after translation if the source and target sign can both be located in the same way in signing space. Such a consideration requires a representation of signs that accommodates several parameters such as the location in signing space.

These questions of what parameters should be kept when translating from one SL to another is a linguistic problem that could be addressed in another project.

³ We do not argue for a sign-to-sign translation because the structure of the message is different from a sign language to another even if a sign-to-sign translation may be suitable in the simplest utterances.



5.9 Creation of new content

85% of our evaluators state that it is easy to change the sign order (We actually checked that 85% of the evaluators put the figures 1, 2, 3 and 4 in the right order during the test). At the opposite extreme, only 45% think that it is easy to insert a new sign in an existing utterance. As we already mentioned in the previous section, there are several issues when inserting a new sign. Among them, the issue of language (by default in BSL) caused most of the evaluators not to find any LSF sign when using the *search* function.

65% of the evaluators answer that it is easy to create a new sentence. There are actually two ways to create it (in our evaluation): either using the signs that are already in the wiki content, using drag and drop to change the sign order, or inserting new signs that are taken from the lexicon. Hence, it is logical to get a score corresponding to the average of those two tasks ($65\% = [45\% + 85\%] / 2$).

5.10 Saving work

90% of the evaluators answered that it is easy to save a wiki page. This high score is logical because the save icon with a floppy is similar to the icon of most well-known software.

5.11 Areas to be improved

The following proposals are scored according to the ratio of evaluators that chose them as a priority.

Area to be improved in priority	Yes	No
Facial expressions	95%	5%
Ability to create content with structures (questions, lists...)	70%	30%
Ability to move the sign placement	65%	35%

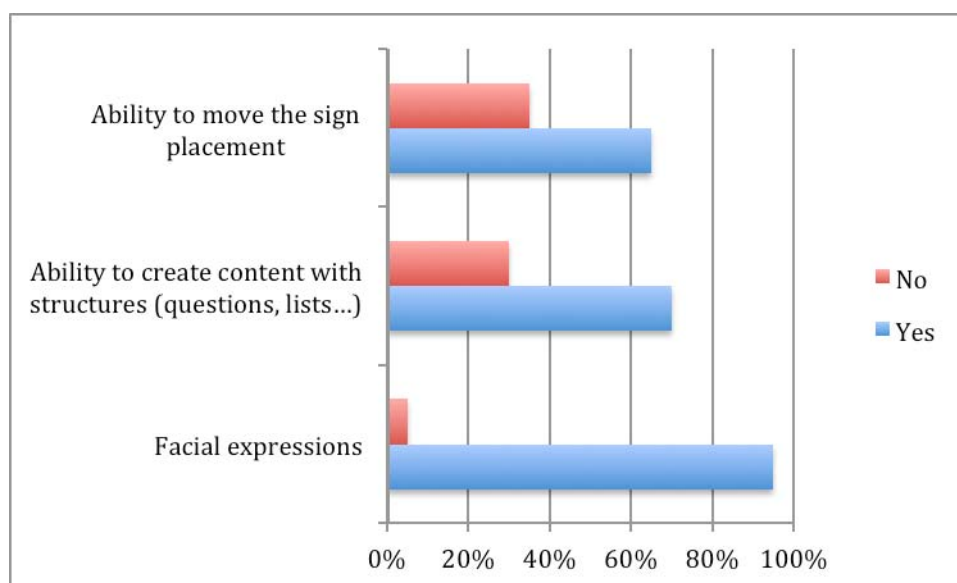


Figure 10: Areas to be improved in priority according to the evaluators

Some evaluators indicated that it was not possible to choose “No” to answer the question about linguistic structure priorities.

One evaluator mentioned that 90% of the intended signs were missing from our 1000 concept database. Consequently, she wasn’t able to create the sentence she wanted to write. The answers confirm all previous evaluations of the Dicta-Sign avatar that underlined the lack of non-manual features and facial expression. Hopefully, this aspect of the avatar expression will be addressed with the linguistic models.

One evaluator added as a comment that this fun platform should be enriched to make editing and creation easier. This remark both refers to the need for a larger lexicon and to the possibility of inflecting the existing signs (this option was present in the wiki, but has not been used during this evaluation in order to keep it as simple as possible).

5.12 Various potential uses of the wiki

The following proposals are scored according to the ratio of evaluators that chose them as a potential use.

	Yes	No
Anonymization	95%	5%
Educational use	85%	15%
Collaborative use (creating content in teams)	85%	15%
Information resource	80%	20%

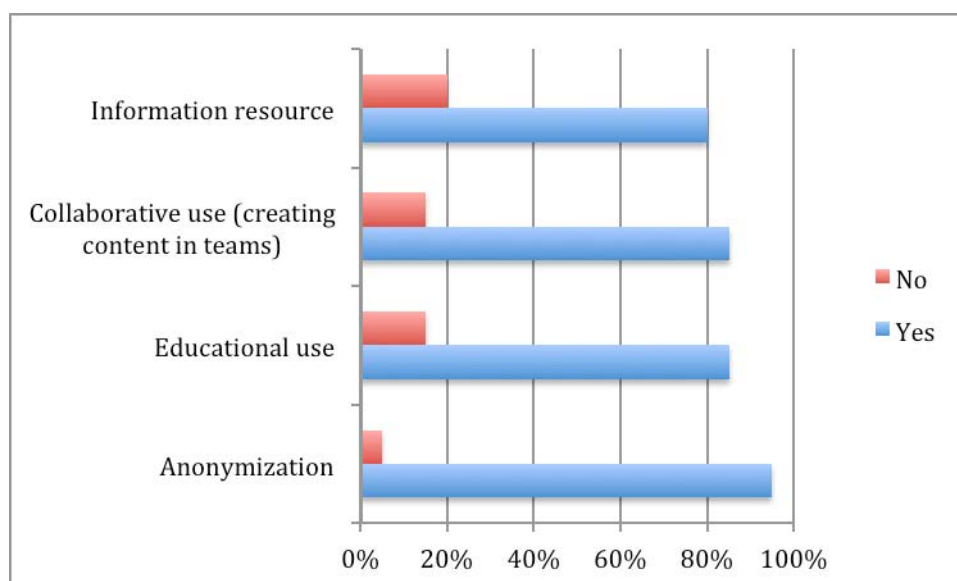


Figure 11: Potential use of the sign wiki according to the evaluators

Use as an information resource is the first use of a normal wiki, but is not the first use quoted by the evaluators. Several issues relating to creation of new content may have led to this result: lack of useful signs, lack of linguistic structures that would allow the creation of complex information for instance.

At the opposite extreme, the highest-rated choice is anonymization. Such an interface for creating simple sign content may be interesting in a forum. For instance, the forum users could share their reactions in an anonymous way.

An evaluator imagined that the tool could be used in order to prototype some avatar sequences, before recording them with the motion capture.

6. Analysis of sentences created by the evaluators

We analysed all the sentences created by our evaluators. Only two of them didn't manage to create any new content and two others created meaningless content. Even though they were asked to create new content from scratch, some decided to modify existing content in order to change its meaning.

6.1 Creation of new content from scratch

Hereafter, we list all the sentences that have been created by our evaluators. It is really hard to understand them because of the following issues:

- There is no sign placement
- There is no facial expression
- There is no rhythm variation

Consequently, the translations in English that are provided in this evaluation may be inaccurate.



The evaluators created the following sentences:

- The owner was working hard in typing on the type machine.
- I want to go to France.
- In Paris, there are beautiful cinemas in the underground.
- Here, there are handsome villages.
- You have three weeks vacations.
- Animals are not allowed in the shop.
- Nice house!
- Good news: I bought a new apartment! In two months, I will move there to live.
- We want to go to London this WE.
- Information about the Berlin ships.
- I met a nice boy in London. We visited the town together. It was wonderful.
- The child goes to the library and chooses a book. He is free and happy.

It is important to mention that the evaluators were not forced to create long sentences. Several sentences contained more than ten signs, which tends to suggest that the evaluator really enjoyed using the wiki to create content.

6.2 Changes to the initial sentence

Here are the two variations of the first sentence prepared by our evaluators:

- In England, there are really nice villages, but I recommend London, the capital. Yesterday, I went to the national library with the children. I read them a really important book and they were happy.
- In France, it is possible to visit really nice villages. But I recommend Paris that is an incredible town. Yesterday, the children went to the book celebration. The children were happy of all those texts.

Although we didn't expect such a contribution in our evaluation protocol, these results definitely illustrate the interest of a wiki for a collaborative work.

7. Changes to be made to the wiki interface

It is important to point out that this wiki is the first real sign editor available to the Deaf community. The huge number of visits to the tutorial page accounts for a dramatic interest of the Deaf community in this kind of application.

There is a small number of people that undertook the evaluation because the wiki doesn't run on every platform with every browser.

Some modifications to the interface are necessary to provide a more user-friendly wiki:

- Replace the English sentences by pictures that represent the software functionality,
- Repeat the information giving the current SL in several places (near the binoculars, close to the small sign icons,
- Replace the current sign icons (in the rest position) by short videos or pictures that represent a key posture of the sign,



- Give the user an option to freeze or unfreeze the sign's language (a sign that is frozen cannot be translated to another SL)
- Insert at least a basic linguistic model,
- Make the avatar return to the rest position between two consecutive sentences,
- Make the search option less sensitive to the accent, case of letters and agreements,
- Change the icons that select the layout functionalities (display only the sections / sentences / signs),
- Add a play/pause option to the animation player

8. Conclusion

The Wiki has been evaluated by at 18 hearing and deaf evaluators practicing LSF, DGS, GSL and BSL at different levels. The main results of this evaluation performed on the web are the following ones.

- The comprehension rate of the content has been evaluated by means of four multiple-choice questions on the wiki content. It is near to 75% after several viewings.
- The evaluators that have been observed during the evaluation needed 3 to 5 viewings of the content.
- The main criticisms of the evaluators concern signer fluidity (75%) and the issues around inserting new signs (55%).
- The most important focus must be on the virtual signer's facial expression. 95% of the evaluators agreed on that point.
- According to the evaluator votes, the most interesting use of such a sign wiki would be the anonymization (95% of agreement), followed by educational and collaborative use (85%) and informative use (80%).