Lessons from Helen Keller: How to Make the Digital Comics Accessible?

Quick Overview:

This paper addresses the lack of accessibility of the comics for deaf or hard-of-hearing readers. Comics are a major cultural object, used in many different contexts with as much as different purposes (leisure, education, advertising, etc.). We report here the results of an experimentation during a communication operation, including a regular exhibition made of panels and a digital mirroring of the contents, with extra materials and information. This digital part, accessible through our institution website, was the support of our proposition.

Introduction / Background

The context of this research was given by an exhibition on the fences of our university (Fig. 1). The subject was the release of a comic book about the life of Helen Keller [1]. Extended to the subjects of accessibility for the deaf and blind people, the exhibition presented, on one side, some of the drawings and, on the other side, made the general public aware of the handicap and the accessibility.

![Figure 1 View of the exhibition on the fences and a page from the comic book](image)

Definitely oriented towards a mobile public, seeing and literate, this exhibition could not exist without the setting up of alternative modalities. Two dematerialized (on line) versions of the exhibition were therefore considered: one accessible for the blind or visually impaired people and another for the deaf or hard of hearing ones, but who were managing the French Sign Language.

This article focuses only on the approach we have taken in designing the accessibility of a digitized comic book for the signing readers.

Most of the time, deaf people are more likely able to communicate through a signed language (e.g. American Sign Language, French Sign Language, etc.) and a signed transcription of the written contents is the most efficient way to make the comics accessible for deaf readers. If the W3C accessibility guidelines [2] present textual alternatives as a first level of accessibility (A) for deaf or hard of hearing readers, the presence of a sign language alternative allows to reach the maximum level (AAA).
The recommended way to achieve that is to add a video showing a signed translation beside the original content, like for the news on TV. The use of SMIL 1.0 or 2.0 [3] is also suggested by the W3C to mix and synchronise the streams. Usually, the video showing the sign language interpreter is positioned in a corner of the screen.

This kind of split screen and synchronised streams lead to many usability questions: is this positioning the best configuration to minimize cognitive load and to maximize efficiency? Is this configuration makes watchers able to catch all the information, both the comments and the video contents? In the comic books case, in which aesthetics are a critical part, how can we achieve accessibility needs while respecting the author work?

State of the Art

Too few content producers are now part of a systematic approach to accessibility and those who do not necessarily seek the maximum level recommended by the standard (in our case, the alternative in a sign language). However, some interesting researches has been carried out, in recent years, in the context of the accessibility of digital or digitized documents for deaf users.

Kushalnagar et al. [4] studies the accessibility of a video player for deaf and visually impaired users. It shows that, for a certain category of visually impaired people, with a very limited field of vision, subtitling is ineffective. Indeed, their absence of peripheral vision and the simultaneity of the flows systematically leads to a loss of information during the changes of context. Its proposal is to pause the flow on which the user does not pay attention, which is detected via an eye tracking device.

The same author compares in [5] the relevance and effectiveness of subtitling and transcription, which involve more or less important context breaks. As Lang [6] shows, the addition of a visual representation of a audio content systematically involves a cognitive overload for the user. It is therefore essential to design accessible devices to minimize this cognitive overload and attention dispersion [7].

The work of Ponsard et al. [8] And Ho et al. [9] Focus on the automatic analysis of the structure of comic pages. Indeed, a large number of comic strips, available in a dematerialized way, are simple scans of the original paper. Their manipulation and their visualization are therefore very constrained on the digital platforms, since the information is organized on the model of the book (i.e. the double page). His work aims at lowering the granularity at the level of the panel, or even baloons, in order to be able to propose finer and more adaptable interactions (order of reading, vocalization, scrolling, etc.)

In addition to this, even if sign language video is the preferred modality, its implementation in digital tools forces us to address important issues of usability. Hibbard et al. [10] Describes the phenomenon of vlogging (the video equivalent of the blog) as well as the new uses or appropriations realized by the signing users community. Malla Osman et al. [11] Also addresses these issues in an online forum context, also based solely on video. Content navigation, scaling (theme, discussion, message), temporality, information retrieval are paradigms to rethink with video content, especially when they are part of a consistent association of digital objects.

It is also important to emphasize the particular context of the comic strip, in which aesthetics occupies a special place. Different proposals exist around this particular medium as, for example, the automated transposition of a film into a comic book
As an artistic work, one can reasonably wonder about the most appropriate way to increase the level of accessibility while respecting the aesthetic intentions of the author(s).

**Materials and Methods**

Our proposal has been developed with the following constraints, which might seem to be antagonistic at first sight:

- Fully assume the place of the interpreter in each of the panel of the comic strip and achieve satisfactory visual comfort, even high as to the signed transcription.
- Allow the user to visualize the artistic proposal of the author, without any alteration.

A web prototype of reading, at the level of the panel, has been developed. It allows to manage sequentially the following two steps:

- The initial status of the player displays the panel as created by the author.
- The user decides to switch to video mode to benefit from the transcription in sign language.

The possible interactions with the panel are signified to the user by different means that we are currently testing, among which:

- Change the appearance of panel when the pointer flies over it
- Change the appearance of the character(s) when the pointer flies over it
- Change the appearance of the text balloon(s) when the pointer flies over it
- Presence of widgets independent of the panel

This sequencing makes it possible to avoid the cognitive overloads and/or the losses of information encountered in the case of presentation of parallel streams. We have chosen to go much further than the current proposals for sign language translation by maximizing the integration of sign language content into the work.

In order to blur the artificial presence of the lord in his medallion, we made sure that he or she originates in the context of the panel and that the transition between the two previous states is as smooth as possible.

If it is narrative text, the actor comes out, for example, from behind a tree present in the panel and positions himself in the scenery before beginning to sign. If they are dialogues, then the actors will appear in the positions and in the postures of the characters they translate, following a video fade. We have gone from sign language interpreters to sign language masters, and actor leadership has played a fundamental role in this process.

A production pipeline has therefore been defined to result in this interactive content. For each panel, it is therefore necessary to:

- Define the actor's play: possible appearance and displacement
- Define the sequence of signs used for the signed translation. As we shall see later, the sign language allows a kind of liberty, which is close to a creative approach.
- Record on a green background the previous intentions (Fig.2)
- Clean and / or adapt the original panel in order to integrate the video in sign language (Fig.3)
- Post-produce the video to isolate the actor (s) (Fig.2)
- Integrate the video to the panel and set up the transitions (Fig.4)

Figure 2 The signing actor on a green/blue background and the post production result

Results

We are recording the feedbacks and comments about the prototype. The test is running on line and everyone can apply and watch the couple of adapted panels. Even if the process is still running, we already get informal but positive feedbacks about the prototype and the implemented interactions.

Discussion

The discussion elements will follow the analysis of the results of the tests mentioned above.

But beyond the purely interactive aspects or visualization of information, this work makes it possible to address the question of the place of accessibility approach, by positioning it, in an original way, in a context of artistic creation.
Perspectives

Obviously, our approach to adapting comic strips in sign language makes it possible to make a natural access to this major cultural object, for the signing people.

An obvious prospect is the extension of our system to language learning. By proposing such a bilingual version (oral language + signed language), it is possible to have new learning materials for signing people but also for hearing people who are learning a signed language.

Even beyond this purely linguistic context, interesting perspectives emerge in other areas of learning. Proposals for the use of cartoons as a pedagogical medium appear [14,15] If these experiments prove fruitful, their accessibility will be indispensable in order not to exclude pupil populations from these educational innovations.

Our next work will be dedicated to maximize the automation of this process, which is entirely manual for now. Even if a fully automated process is not realistic, the crowdsourcing approach might be an interesting way to achieve a production level, as described in [16, 17].

We also plan to work directly with comic book authors to explore the possibility of thinking upstream about the integration of these video contents. This approach could lead to new ways of writing and to design this cultural object, or even lead to alternative/new propositions, between drawing and cinema, as turbomedia is for example [18].

References


