An experience about developing educational tools for revitalizing language and culture of a Colombian native community

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ABSTRACT
Revitalizing mother tongue and culture is a priority for the Nasa Colombian native people [9, 2]. Since 1970 they are running processes to revert the consequences of the persecution and punishment that the use of Nasa Yuwe, the Nasa language, suffered during earlier periods of their history. This text briefly describes a project that aims to support such revitalization efforts through Human-Computer Interaction. The intent of the authors is to take into account cultural particularities of the target population in the design of educational tools.

Author Keywords
Nasa Colombian native community, Culture revitalization through HCI.

ACM Classification Keywords
H.5.2 Information Interfaces and Presentation: User Interfaces—*User-centered design*; K.4.2 Computers and Society: Social Issues

INTRODUCTION
In some contexts, it is not needed to go beyond the boundaries of a country to face challenges related to the culture and HCI. For instance, in Colombia there are around 90 native communities that preserve 60 Amerindian languages. This diversity is particularly high in departments like the Cauca, where there are found 9 native cultures, including our target population, the Nasa people.

The Nasa people are not isolated, they are in contact with the Castilian-speaking industrialized population, the country's prevailing culture. This contact makes possible the presence of foreign technology, including personal computers, in the Nasa territories.

By their nature, cultures change as people interact with other societies. Such transformations might happen while humans use computer tools, like it occurred in Japan, when the introduction of Western word-processors led modifications in the Japanese writing system [6]. From our point of view, this happens because HCI is a communication process between designer and user, where both cultures are involved.

According to Clarisse de Souza [3], such communication process is supported by interface signs (such as words, graphics and actions, among others) that form a language, which is unfolded and learned by the user. Hence, for developing computer technology for the Nasa people, it is required to provide signs in the interface aligned to the users' culture, to trigger compatible interpretations with the message we want to send. In other words, we need to talk their language through the interface.

Nevertheless, language-centered adaptation processes are insufficient. Previous efforts have shown that common methods for translating the user interface are inoperative for the Nasa language [1].

CULTURAL DIMENSIONS
A suitable localization process must consider wider and deeper cultural variables, arising several questions: *How to study our target culture? How to identify cultural characteristics impacting HCI? How to design computer tools taking into account such characteristics?*

As suggested by Nancy Hoft [5], one of the strategies we have followed is the development of a Cultural Model, that takes into account cultural variables that may have an impact over interaction between Nasa people and computers [11]. We summarize here six variables: *Language*, *Educational context*, *Community-orientation*, *Environment and technology*, *Space structuring* and *Cultural symbols*. We will describe the Nasa culture through these variables.

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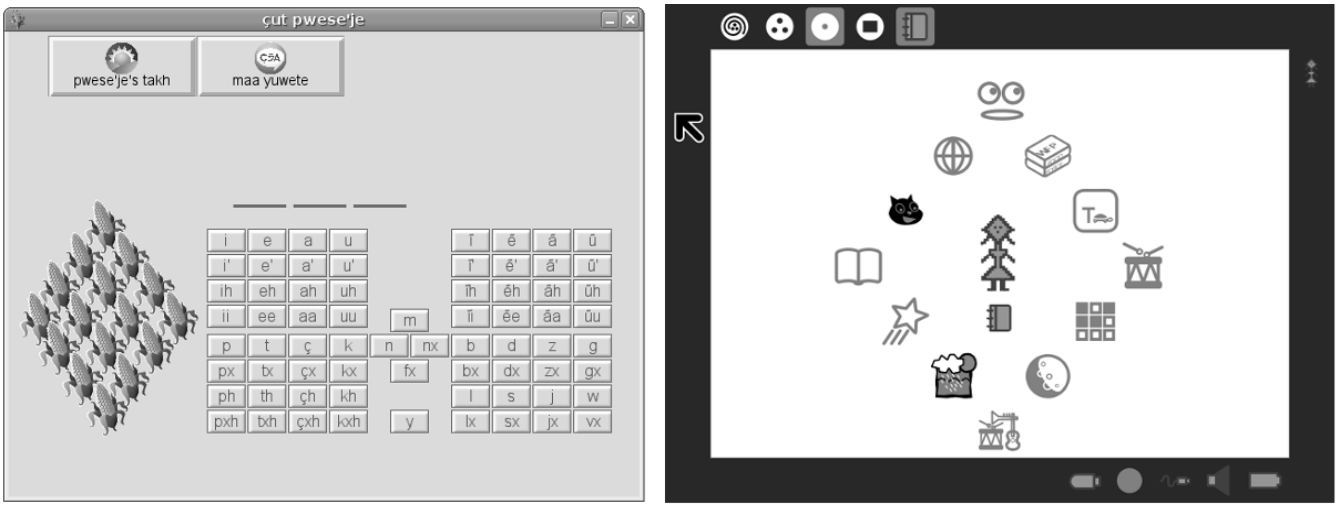

Figure 1. Prototypes of tools developed for the Nasa people: *Çut pwese'je* (left) and an adaptation of the Sugar learning environment (right)

1. *Language.*

   According to Elisa del Galdo and Jakob Nielsen [4], language is one the cultural variables more "visible", thus, it is taken into account by most intercultural development processes.

   The Nasa Yuwe is the mother tongue of the Nasa people. In the case of this language, besides the obstacles for translating basic terminology, we have found a large number of challenges. For example, to overcome the lacking of characters in available Castilian keyboards we have designed a graphical keyboard, shown at the left image in Figure 1. This keyboard takes into account the 69 graphemes [1] of the Nasa Yuwe alphabet, as well as the order how it is learned by children in schools. Its layout, in groups of 4x4 buttons, is based on the *ũhza yafx* symbol (a rhombus shape) and its relationship with the number 4 [11].

2. *Educational context*. Since we focus on Nasa children and their schools, we need to understand the particularities of the educational context. Nasa authorities aim to provide bilingual education, in Nasa Yuwe and Castilian, centered on agricultural activities and communal policies.

   We have explored strategies and tools used in the classroom, such as the use of games for teaching Nasa Yuwe. As well, we have take into account educational needs, like the necessity to promote the use of numbers in Nasa language.

3. *Community-orientation*. The orientation towards the community is at least manifested in two different aspects: territory and work. The Nasa people live in *resguardos*, communal and inalienable lands that allow collective ownership, where indigenous people can exercise their traditional activities. On the other hand, there exist three Nasa traditional types of collective work, more valued than individual ways of working [9].

   Community is involved in a wide range of aspects of the Nasa way of living, from the construction of a new classroom, until the debate about the creation of a writing system for Nasa Yuwe [10]. Consequently, we have introduced our projects publicly and worked together with community representatives through the different stages of the development process. Actually, evaluations seemed to work better when they were run with various individuals [11]. A similar observation was found by Medhi *et al* working in Bangalore slums [8].

   Likewise, we seek to highlight the communal character designing tools that prompt for a collective use of a single device.

4. *Environment and available technology*. The Nasa context is mainly agricultural, thus, files, folders, desktops, trash bins and the concept of recycling are uncommon in this rural environment. The Desktop Metaphor's foundations are inconsistent with the Nasa thought, resulting in a misunderstood metaphor by the Nasa people [1]. We base new designs on local environment and available material.

   Furthermore, available technology impose limitations. To cite two examples: the scarce equipment found in schools strengthens the need of sharing a single computer by several children, and the absence of Internet makes unsuitable to create online tools.

5. *Space structuring*. Interfaces may have an essential spatial component, like the Desktop. New metaphor interface designs are based on different levels of Nasa space structuring, such as the hearth (*tulpa*), the house garden (*tul*) and the *resguardo*.

   For instance, the three-stones Nasa hearth is the center of a collective space in our adaptation of the Sugar learning environment [2]. As its real counterpart, the hearth is intended to be a place where friends could share and work together.

[1] Grapheme: a unit of a writing system. In the case of the Nasa Yuwe, it may be a letter, a digraph or a trigraph.

[2] http://sugarlabs.org/

6. *Cultural symbols*. The rhombus and the spiral are important Nasa symbols, representing one World view and time/life development, respectively. We use such symbols as layouts or metaphors in the interface. See the rhombus present in both images in Figure 1.

DEVELOPMENT OF TOOLS

Until now, we have designed three digital tools: an educational game for supporting the learning of the Nasa Yuwe alphabet, a second game about arithmetic operations, and an interface as alternative to the Desktop Metaphor. Two of them are shown in Figure 1.

The second game, *çxuga pwese'je*, was developed taking as example the experience of Matthew Kam *et al* [7]. Its design is based on local games played by Nasa kids in their territories. This game and the adaptation of Sugar were designed and evaluated collectively, with Nasa teachers and students of two schools: Tumbichucue and Caldono.

CONCLUSION

Approaching other cultures, even through the development of computer technology, needs to be done care and respectfully. We would like to note that, in countries like Colombia, the differences between local cultures offer interesting challenges to HCI researches.

According to user's reaction, we have had positive outcomes when trying develop computer tools, while taking into account cultural characteristics. Nasa representatives, for example, agree that design strategies followed in this project would contribute to give value to the Nasa culture. Some of them have proposed the idea of building a physical keyboard based on the graphical version of the *çut pwese'je* (the game of the maize).

In the following steps, we will look for formalizing our methodology, for providing developers with tools that take into consideration different cultural variables.

Through this work, we are looking for minimizing unwanted impact of the use of computers, when their are used by people of a culture different than the Western-industrialized. Furthermore, we would like to support one of the main campaigns of the Nasa community: to revitalize their mother language and culture.

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