

An ICT-based Application to Support Deaf Children's Reading Comprehension

The project **LODE** (L**O**gic-based web tool for **D**Eaf children): 2009-2011

EURAC research **EURAC**
research

Bruno Kessler Foundation (FBK), Trento



Free University of Bolzano (FUB)



ABC Onlus

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Target group and goals

Target group: Italian deaf children between 8 and 13/14 years old

Goals:

- to support deaf children's reading comprehension skills
- to offer Italian deaf children captivating stories to read in order to improve their motivation to read (deaf children = unmotivated readers);
- to stimulate deaf children's understanding of temporal relations between the events happening in the plot

Background (1)

Deaf children's unsatisfactory literacy level:

- difficulties in producing but also in understanding texts at lexical, morphological and inferential level;
- literacy skills are extremely different in deaf children's population and they do not correlate directly with age
- partly attributable to the hearing loss → limited/no precocious exposition to oral language
- educational intervention
- no specific didactic and non-didactic material in Italian language

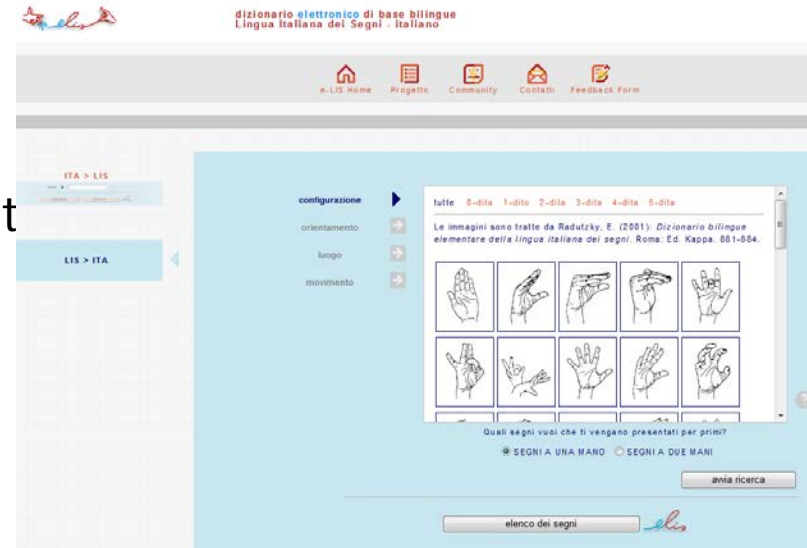
Background (2)

EURAC developed the prototype of the first online bilingual dictionary Italian sign language (LIS) - Italian (e-LIS), 2004-2007

LUB collaborated at the e-LIS project

FBK has expertise in NLP and GUI development

ABC provides services for deaf people



LODE: what and how

Software literacy tool running on the web which should support Italian deaf children's reading ability

→ the child reads a story and then does a series of exercises which help him/her to reason on the read text

- multimedia and web techniques which better suit deaf children's learner profile ⇒ visual learners
- stories: „appealing“ and suitable for the target group (content, form)

Preparing the stories

1. Selection of Creative Common licensed stories from the web
2. Division of the stories into two sets: (a) one for younger (8 to 10/11 year old) and (b) one for older children (11 to 13/14 year old)
 - (a) fairy tales whose protagonists are animals
 - (b) stories based on human characters (“identifying potential”)
3. Text simplification: subordinate clauses, pronouns, clitics were reduced, synonyms or paraphrases were used instead of those words which do not appear in the Lessico elementare (Marconi et al. 1993)
4. Three different levels of difficulties in each set of stories
5. Addition of static and animated drawings to some stories

<http://lodedemo.fbk.eu/demo/Aquila-tmp/p1.jsp>

First evaluation

March 2011: test at the Istituto dei sordi di Torino

Testing questions:

1. are simplified texts more understandable than original ones?
2. do the inserted drawings improve the readability of the stories?

Target group (DEAF children)	Control group (HEARING children)
10 children 8 to 10/11 year old (yD)	8 children 8 to 10/11 year old (yH)
8 children 11 to 13/14 (oD)	4 children 11 to 13/14 (oH)

2 sets of 3 stories each:

an original story

a simplified version of a story

a simplified version + static & animated drawings

Results

- the two hearing groups always performed better than the deaf ones
- significant difference in the yD group's correct answer mean ($F(330, 2) = 6.740$; $p < .001$), but not in the oD group's one ($F(264, 2) = 2.143$; $p = .119$)
- in both cases there is an improvement of the correct answer mean from the original story (yD = 0.79; oD = 0.57) to the simplified illustrated version (yD = 0.88; oD = 0.70)
- the regression analysis confirms that the third story (simplified with drawings) always appears to be the most comprehensible for deaf children

Future work - open questions

Story's structure (plot, event sequence, length) has to be carefully designed

Tests with one story in its three versions

Instead of text simplification → add adjunct questions/aids to the story text and evaluate their impact on the deaf reader's comprehension skills