“Specification of Symbols Used on Audio-Tactile Maps for Individuals with Blindness”

Konstantinos Charitakis
University of Macedonia
kcharitakis@uom.edu.gr

Konstantinos Papadopoulos¹, Konstantinos Charitakis¹, Eleni Koustriava¹, Lefkothea Kartasidou¹, Efstratios Stylianidis², Georgios Kouroupetroglou³, Suad Sakalli Gumus⁴, Karin Müller⁵, Engin Yilmaz⁶

¹ University of Macedonia, Thessaloniki, Greece
² Aristotle University of Thessaloniki, Thessaloniki, Greece
³ National and Kapodistrian University of Athens, Athens, Greece
⁴ Mustafa Kemal University, Antakya, Turkey
⁵ Karlsruhe Institute of Technology, Karlsruhe, Germany
⁶ Association of Barrier Free Access, Istanbul, Turkey
Audio-Tactile Maps

• **Tactile maps** - include raised graphic patterns that are recognizable only by touch.

• **Touchpad devices** - are touch sensitive pads that can simultaneously provide users with tactile and audio information, while they explore tactile graphics by their fingers.

• **Audio-Tactile Maps** - information is represented by audio, tactile symbols, audio-tactile symbols (combined) and Braille labels.
Audio-Tactile Map reading
Tactile Symbols examples

- **Point Symbols**
  - ●
  - ○
  - □
  - ○
  - □
  - □
  - □

- **Linear Symbols**
  - ———
  - ———
  - ———
  - ———

- **Areal Symbols**
  - [Images of various areal symbols]
Audio-Tactile map challenges

• Challenging task for designers of AT-Maps
  – Restriction on the number of tactile symbols
  – Restriction on the extended use of Braille labels
  – Need for additional tactile legend
  – What information to include for different types of maps?
  – What tactile symbols to use?
  – In which format information should be included?

• Lack of a unique list of tactile and audio-tactile symbols specified for each type of AT-map
Aims

• The specification of audio-tactile symbols to be used in Audio-Tactile Maps for education and training of individuals with blindness.

• Based on different types of maps: 1) Indoors, 2) Neighborhood - Residential area, 3) Campus, 4) City center, 5) Political map, 6) Physical map, 7) Historic map, 8) Thematic map

• Training of end-users
Objectives

• Derive a user centered, research-based, specification of audio-tactile symbols.

• Promote the use of a specified unique “audio-tactile language” that will govern the construction of Audio-Tactile Maps.

• Simplify map construction procedure

• Improve the curricula and promote multimodal education of individuals with blindness.
Implementation phases

• Phase 1: Elicitation of user requirements
• Phase 2: Specification of audio-tactile symbols
• Phase 3: Construction of a multilingual web-based library of audio-tactile symbols
• Phase 4: Construction of a political-physical audio-tactile atlas of Europe
• Phase 5: Training activities for end users
• Phase 6: Update relevant bodies
User Requirements

Phase 1: Elicitation of user requirements

• Research study
  – What information should be included in each type of AT-Maps, based on
    • Significance of information
    • Frequency of occurrence
  – In which format the information should be presented

• Outcome - Lists of information to be included in different types of AT-Maps
Specification of Symbols

Phase 2: Specification of audio-tactile symbols

• Development of tactile symbols
  – Point, Linear, Areal

• Production of pilot tactile Maps
  – Evaluate symbols as stand-alone symbols but also when included in maps

• Evaluation of tactile symbols
  – Legibility based on parameters (e.g. time, errors)
Specification of Symbols (2)

• Audio-tactile symbol specification activities
  – Final lists of the optimal point, linear and areal tactile symbols for the representation of the information on different types of AT-Maps.
  – Associate tactile symbols with audio information as acquired from user requirements
  – Functional information and guidelines in order to use AT-symbols in AT-Maps.
Library of audio-tactile symbols

Phase 3: Construction of a multilingual web-based library of audio-tactile symbols

• Searchable, will present the specified symbols and associated information.
• The users of the library will be able to download and use the stored symbols in order to develop their own AT-Maps.
  – Vector format
  – Raster format
  – Text description of information
EU political-physical atlas

Phase 4: Construction of a political-physical audio-tactile atlas of Europe

– Will include a variety of spatial information
– Content translated in English, Greek, German and Turkish languages
– Procedure
  • Design digital base map
  • Cartographic generalization (readable for active touch)
  • Tactile symbols addition
  • Tactile printout (microcapsule paper method)
  • Add Audio part of symbols (audio descriptions)
Training activities

Phase 5: Training activities for end users

• Production of training material
• Training activities for end-users on the construction of Audio-Tactile Maps and on the use of audio-touchpad devices.
  – Train the trainers
  – Teachers of visually impaired children
  – Rehabilitation specialists
  – O&M specialists and designers of O&M aids
  – Individuals with blindness
Update relevant bodies

Phase 6: Update relevant bodies

– Electronic index of relevant organizations
  • Register and get involved!
Thank You!

The ATMAPs project (543316-LLP-1-2013-1-GR-KA3-KA3MP) has been funded with support from the European Commission. This publication [communication] reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein."