



Aalto University  
School of Engineering

ICA European Symposium on  
**CARTOGRAPHY**



VIENNA, 10–12 NOVEMBER 2015

# Design Guidelines for Pictographic Symbols: Evidence from Symbols Designed by Students

*Jari Korpi, Paula Ahonen-Rainio*

*Dept. of Real Estate, Planning and Geoinformatics*

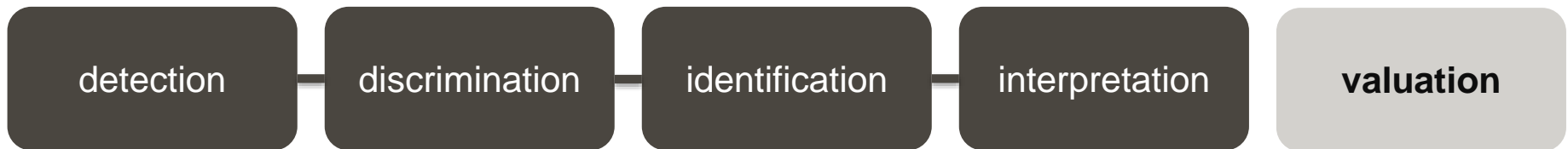
*10.11.2015*

# Pictographic symbols



**Pictographic symbols convey information efficiently  
But only when the symbols are properly designed**

**Problem: How to design proper pictographic map symbols**



# Aim and approach

## 1) Symbol qualities:

### From literature survey

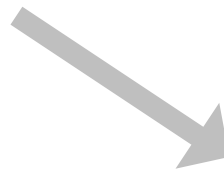
18 sets of guidelines/goals from different disciplines

## 2) Design difficulties:

### From map symbols designed by Master's level students

Symbols from 27 students, 216 symbols

Symbols represent ten referents (areas of regional planning)



**Symbol design guidelines**

# Methods: Symbol qualities

- **Procedural guidelines and context-specific guidelines were excluded**
- **The rest were sorted according to their contents**
- **Duplicates and closely described guidelines were combined, and the remaining guidelines were categorized**
- **Category of “others” was considered to consist of rarely mentioned guidelines that do not have significant contribution to overall quality of symbols**

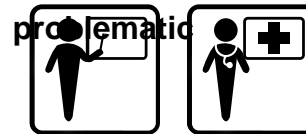
# Results: Symbol qualities

## Qualities of individual symbols

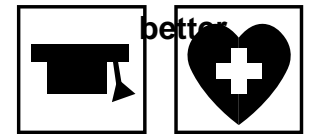
Graphic

Semantic

## distinctiveness

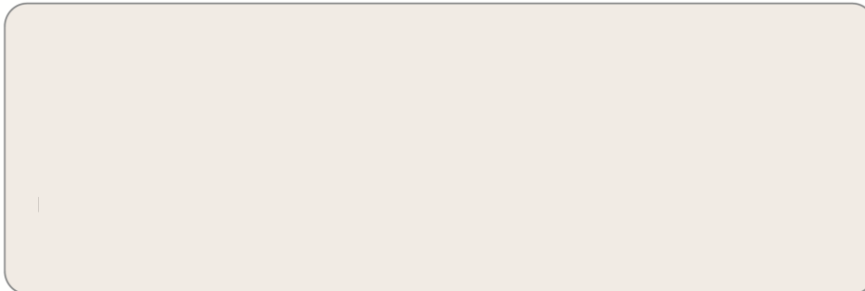


problematic



better

## Qualities of symbol sets



# Methods: Design difficulties

- **Symbols were analysed by three independent reviewers**
- **Individual problems were generalized from the reviews**
- **Individual generalized problems were collected in a table and frequencies for different problems were recorded**

*In total, 48 different problems were identified*

- **Similar problems were further categorized**
- **Comments that appeared only once were excluded**
- **Remaining problems were categorized under different symbol qualities**

# Results: Design difficulties

<b>Simplicity</b>	<ul style="list-style-type: none"><li>• <b>Complex design idea used (i.e. design idea requires detailed representation)</b></li><li>• The pictogram consists of several redundant elements (i.e. several pictograms in one symbol)</li></ul>
<b>Clarity</b>	<ul style="list-style-type: none"><li>• <b>Unnecessary details that do not contribute to the recognition</b></li><li>• The visual representation lacks detail/visual characteristics that would have been needed in consistent recognition</li></ul>
<b>Visibility</b>	<ul style="list-style-type: none"><li>• <b>Thin lines used in the frame or in the pictogram with respect to the planned size of the symbol</b></li><li>• The luminance or color contrast between the pictogram and the frame is too weak for efficient communication</li></ul>
<b>Consistency</b>	<ul style="list-style-type: none"><li>• Visual weight: over- or under-emphasized symbols in the set (e.g., darker vs. lighter);</li><li>• Complexity: very detailed and very simple designs in the same set</li><li>• Style: symbols look stylistically different (e.g. different line weights used)</li></ul>
<b>Aesthetic appeal</b>	<ul style="list-style-type: none"><li>• Misplaced elements: the pictogram is not in the center of the frame</li><li>• Not enough space between the pictogram and the frame</li><li>• Elements placed uneconomically resulting in empty areas</li><li>• Unrealistic proportions in elements or between different elements</li></ul>
<b>Concreteness</b>	<ul style="list-style-type: none"><li>• Visually abstract and unfamiliar design idea used</li></ul>
<b>Semantic closeness</b>	<ul style="list-style-type: none"><li>• Unidentified connection between the pictogram and the referent</li><li>• A single sub-concept is used so that the symbol gets understood too narrowly</li><li>• The pictogram can be connected to an unplanned referent in the context</li></ul>
<b>Familiarity</b>	<ul style="list-style-type: none"><li>• Too local, i.e., not generally well-known, design ideas for symbols used</li></ul>
<b>Acceptability</b>	<ul style="list-style-type: none"><li>• Culturally dependent design ideas used (i.e. objects referring to a certain culture are used)</li><li>• Abnormal or weird design ideas used</li></ul>
<b>Distinctiveness</b>	<ul style="list-style-type: none"><li>• Two or more symbols in a set look too similar (i. e. varied only by small detail)</li></ul>

# Conclusions

## **Pictographic symbols can fail to deliver the intended message in many ways**

Understanding different quality factors of symbols is important

Giving precise guidelines instead of general goals or qualities can be helpful

## **Limitations of the study**

Only ten referents used

Symbols evaluated against white background



# Thank You!

Any questions?

