

# How can eye - tracking complement a distributed, web - based testing environment (MUTEP)?

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This presentation is co-financed by the European Social Fund and the state budget of the Czech Republic.



european  
social fund in the  
czech republic



EUROPEAN UNION

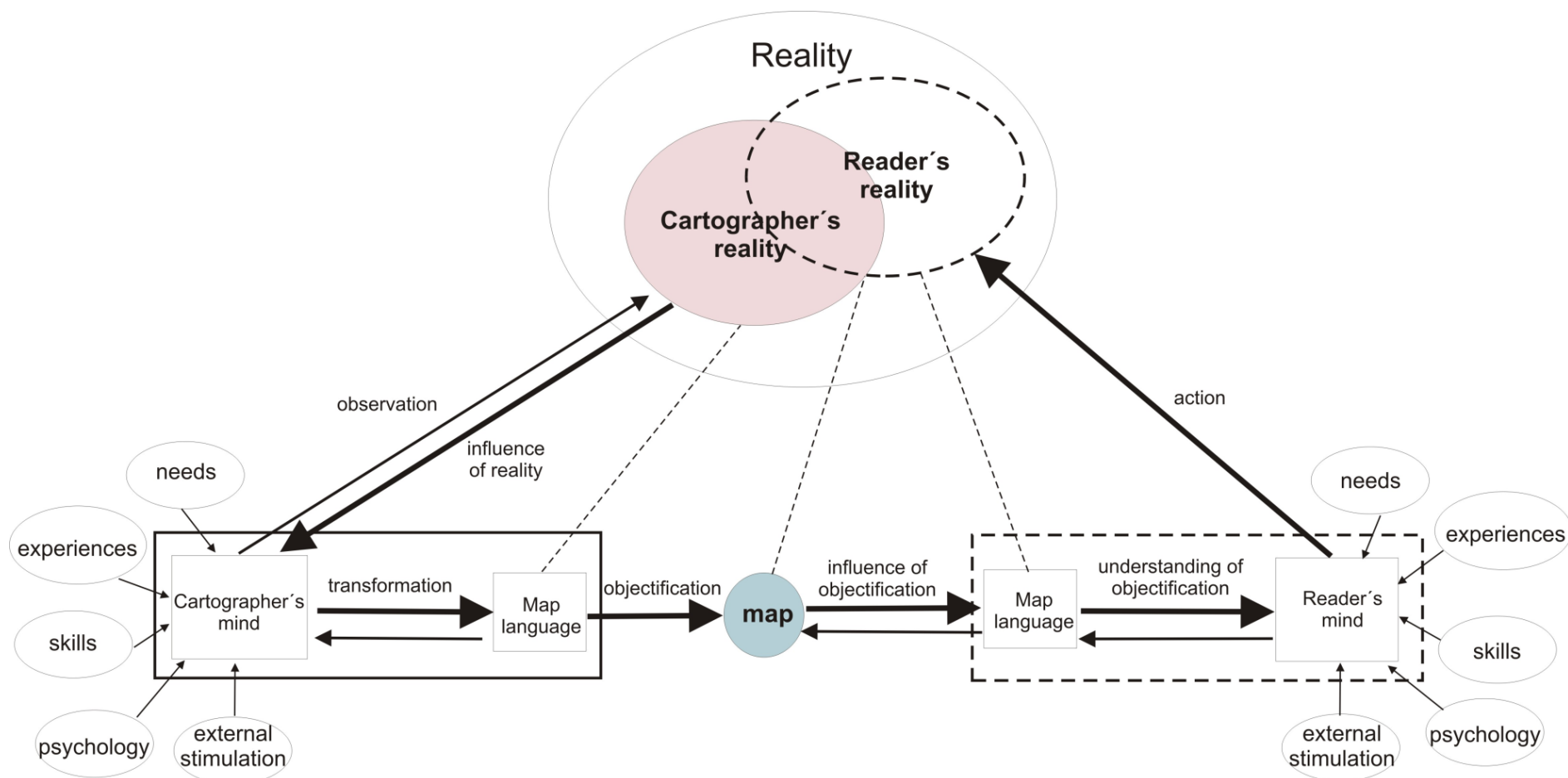


MINISTRY OF EDUCATION,  
YOUTH AND SPORTS

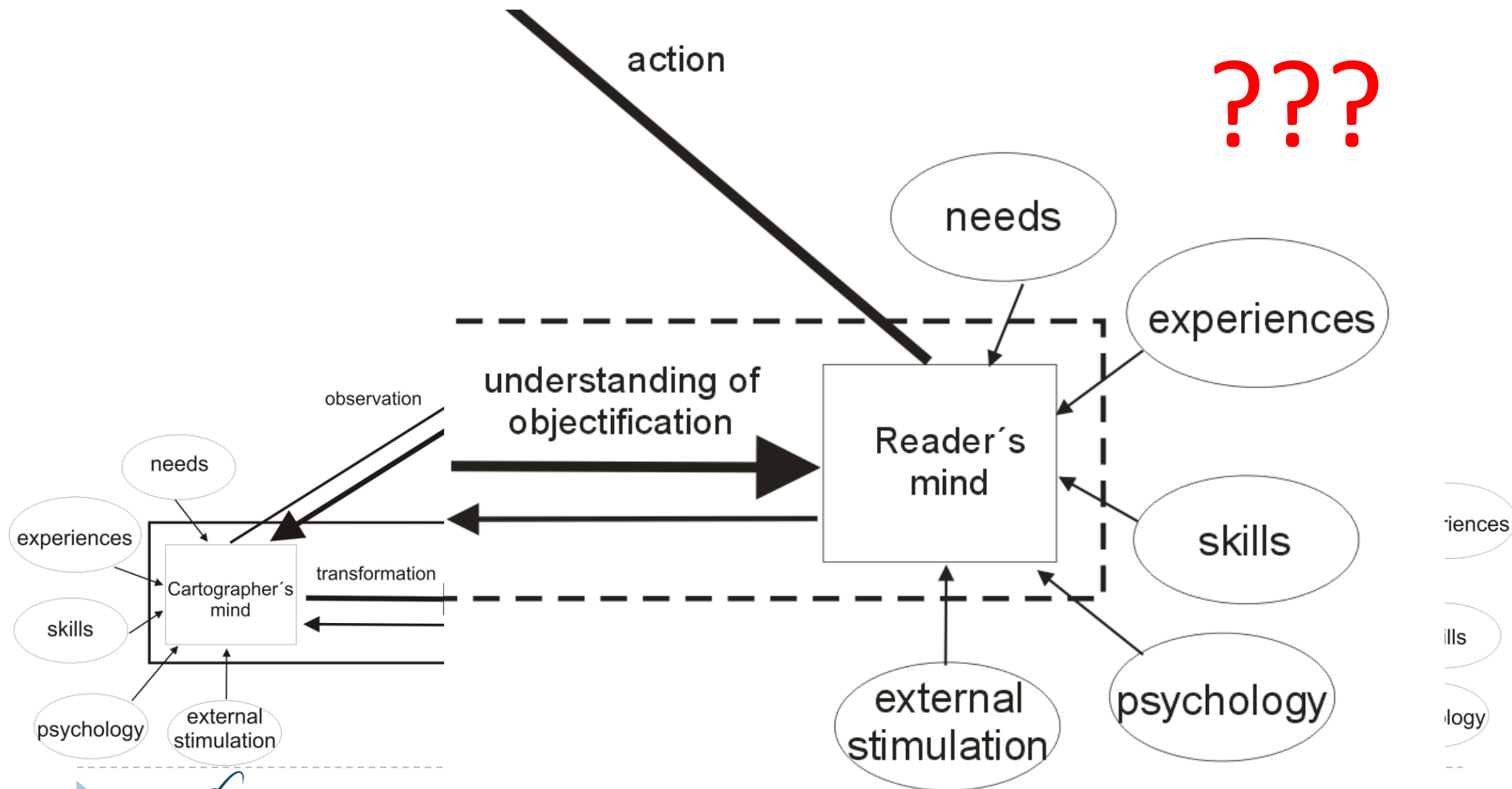


INVESTMENTS IN EDUCATION DEVELOPMENT

# Motivation



# Motivation



# Testing environment prototype

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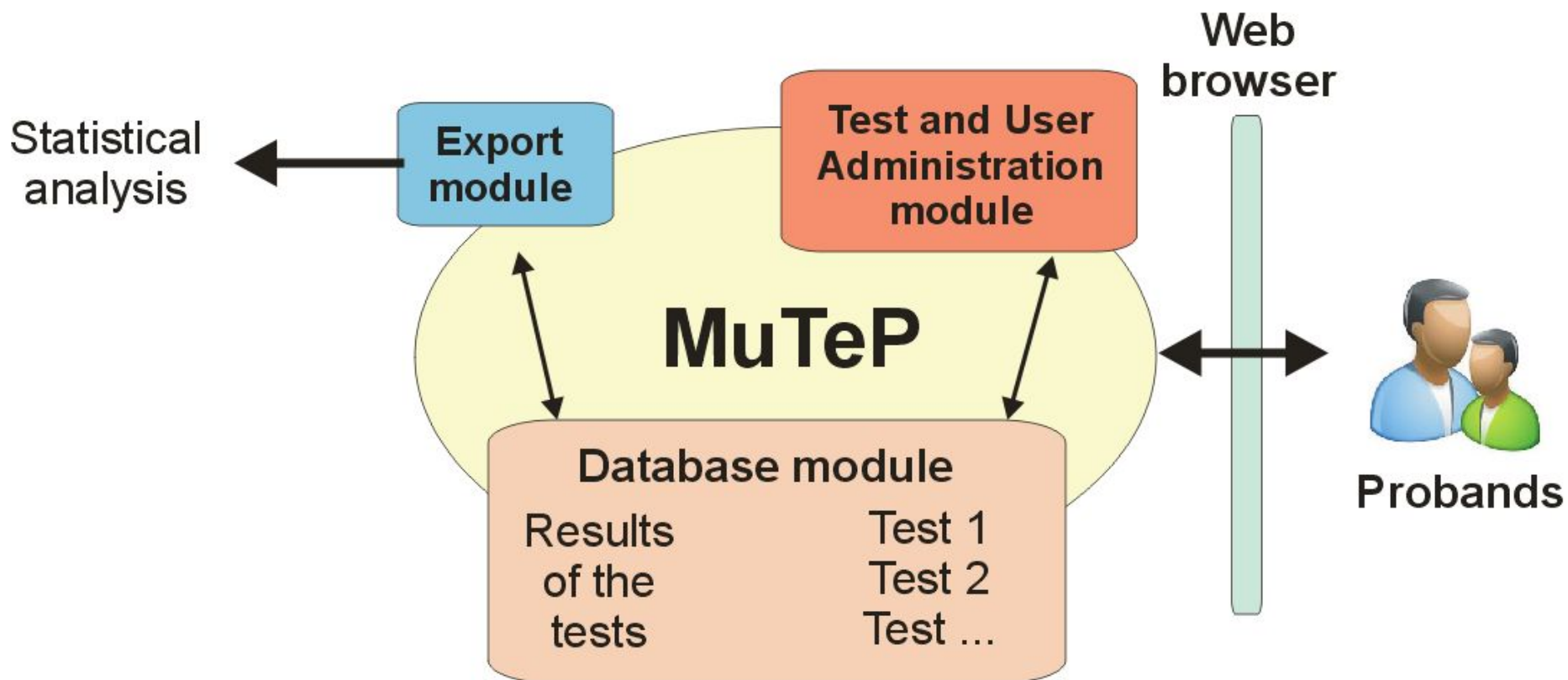


INVESTMENTS IN EDUCATION DEVELOPMENT

- ▶ MUTEP (MULTivariate TEsting Programme)
- ▶ interactive web based testing tool
  - ▶ Web browser, controlled environment
- ▶ Wide variety of inputs
  - ▶ Suitable for variety of scientific studies
  - ▶ Cartography
    - ▶ - from isolated cartographic symbols or symbol sets to complex map composition both static and interactive.
  - ▶ Technologically based on Google Web Toolkit
  - ▶ The cartographic part relies on Open Layers libraries.



# MUTEP



# Content example

```
<?xml version="1.0" encoding="UTF-8"?>
<SlideContent TemplateUID="FB78F786-6BC1-11DE-8E4B-12A656D89593">
  <ComponentBindings>
    <ComponentBinding ComponentId="2">
      <Properties>
        <Property Name="Html" Value=""/>
      </Properties>
    </ComponentBinding>
    <ComponentBinding ComponentId="6">
      <Properties>
        <Property Name="Url" Value="images/Test/luloha.png"/>
        <Property Name="Extent" Value="0 -675 900 0"/>
        <Property Name="Size" Value="900 675"/>
      </Properties>
    </ComponentBinding>
    <ComponentBinding ComponentId="8">
      <Properties>
        <Property Name="Titles" Value="'623,2-635,1','635,2-649,1','649,2-731,1','731,2-799,1'"/>
        <Property Name="ButtonsTextSizePercentage" Value="300"/>
      </Properties>
    </ComponentBinding>
  </ComponentBindings>
  <Evaluation>
    <Evaluate>
      <Actuator Type="Button" Id="8_1"/>
    </Evaluate>
  </Evaluation>
</SlideContent>
```

# Task examples

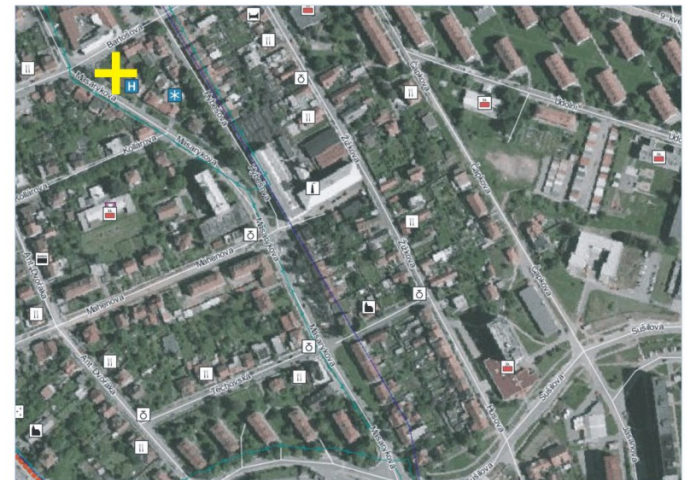
## ► Symbol identification

Point out:

**Hospital**

NEXT

Point out: **Hospital**



# Task examples

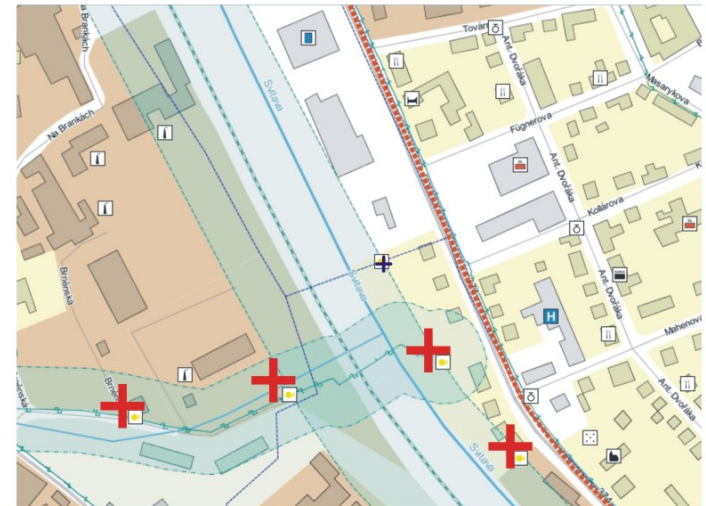
## ► Multiply symbol identification

Point out all:

**Water hydrants**

NEXT

Point out **all**: **Water hydrants**



# Task examples

## ► Line selection

Choose the described path:

**Path description....**

NEXT

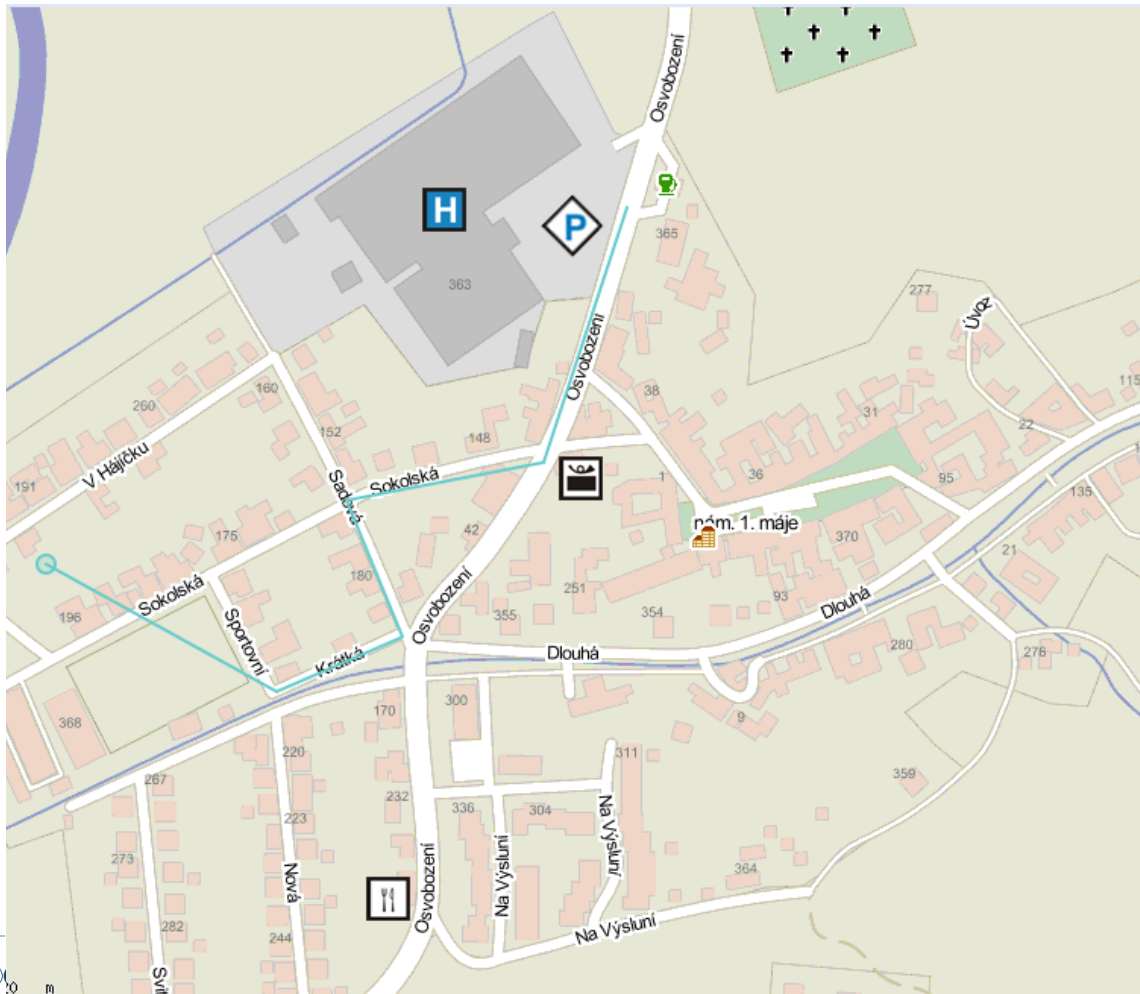
Path description....









# Task examples

## ► Line editing



-  pošta
-  restaurace
-  nemocnice
-  parkoviště

# Test examples

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## ▶ Subjective evaluation

Evaluate how sure are you about your answer. (1 – sure, 5 – not sure)

1	2	3	4	5
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# Generic concept - Psychological testing (NAVON, mental rotation...)

Try to imagine the continuation of story and how the boy could react in this situation. Describe it in detail.



comics

Next slide>

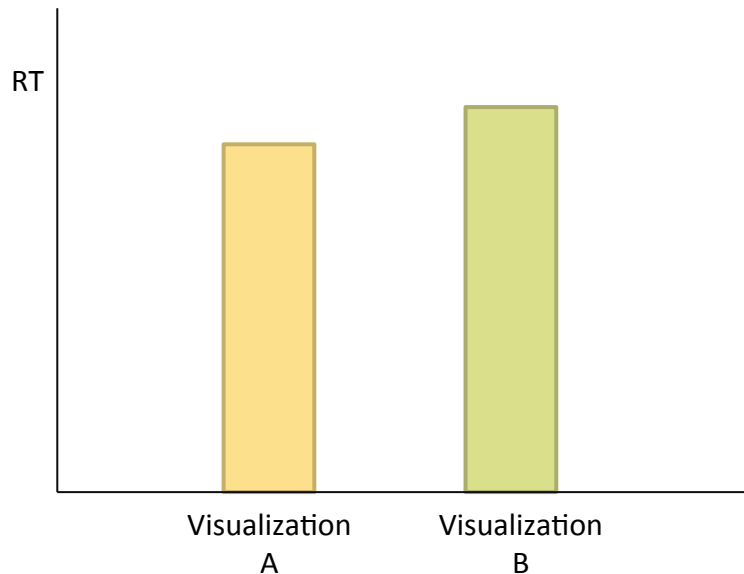


# MUTEP + Eye tracking ??

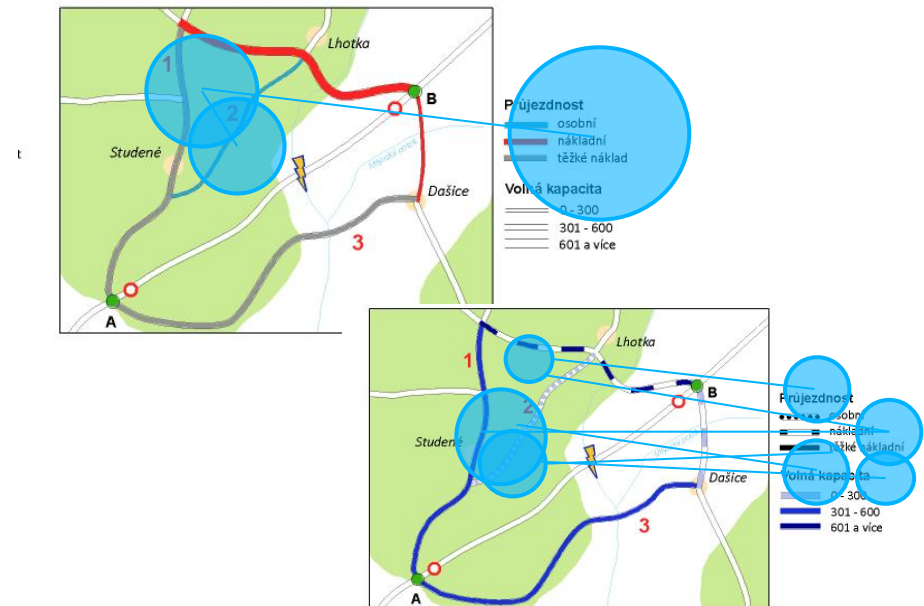
# Mixed research design

- ▶ Combination of quantitative and qualitative research methods

Quantitative approach  
(verification of hypothesis)



Qualitative approach  
(exploration of cognitive strategies)



# Eye-Tracking as a tool for qualitative analysis

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Possible strategies:

- ▶ **Use of eye-tracking for a pilot study**

Eye-tracking → Definition of hypothesis  
→ Quantitative method and data collection

- ▶ **Use of eye-tracking in case of unexpected findings**

Quantitative method → Unexpected findings by several items → eye-tracking

## Combination of SW MuTeP and SMI eye-tracker

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- ▶ Preparation of experiment on the platform MuTeP
- ▶ Use of RED-m Eye-tracking (SMI ) and SW Experiment Centre
- ▶ Webpage recording
- ▶ Split to single scenes

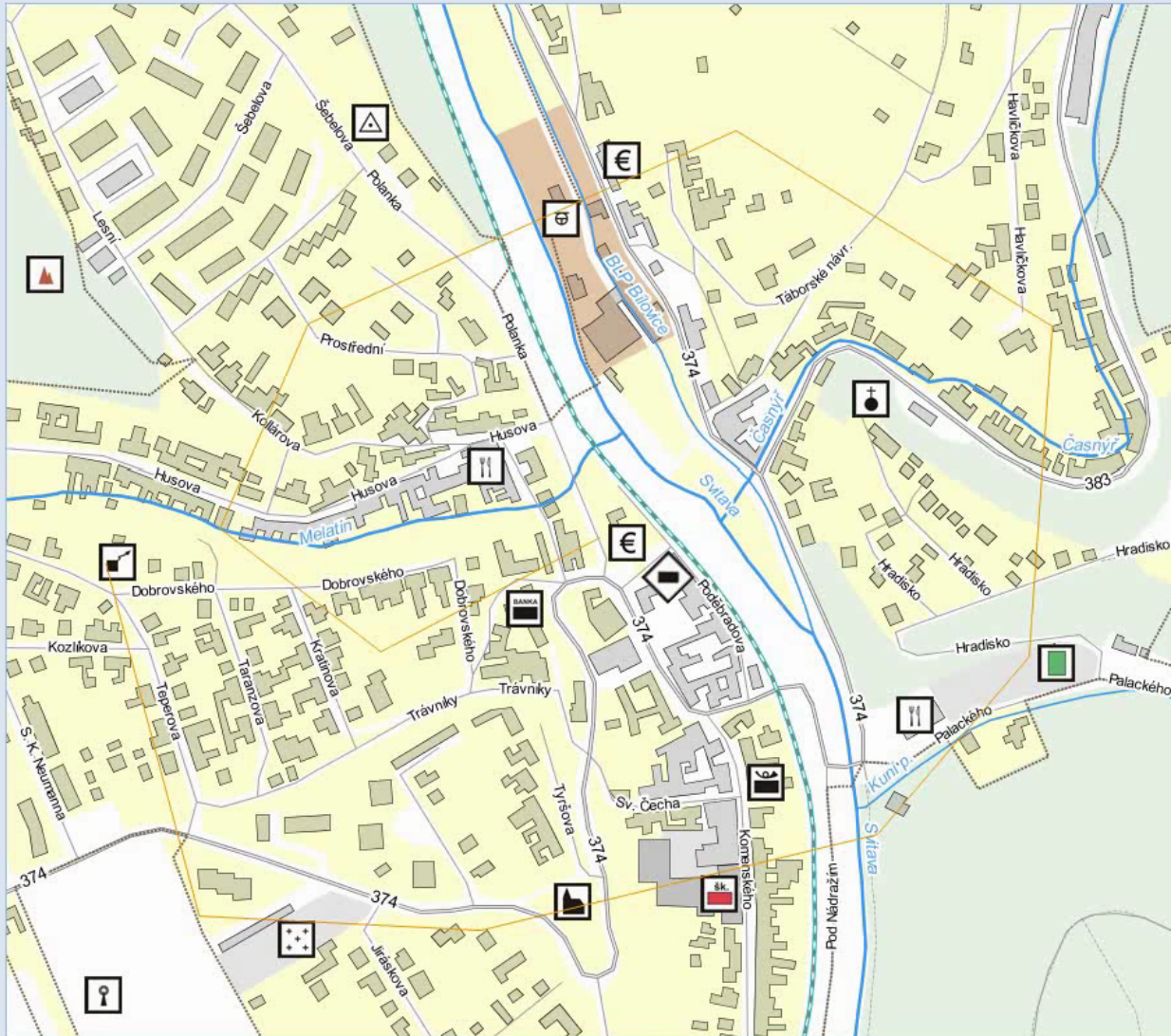
**GPTest**  
Nahrává se...

**Přihlašte se**

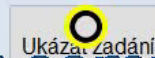
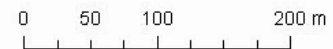
Jméno:

Heslo:

Zakreslete do mapy popsanou cestu.



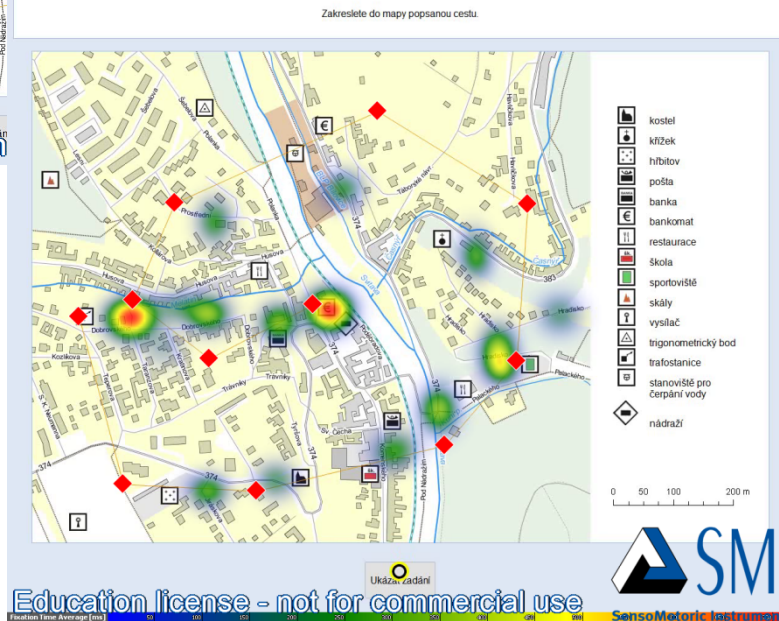
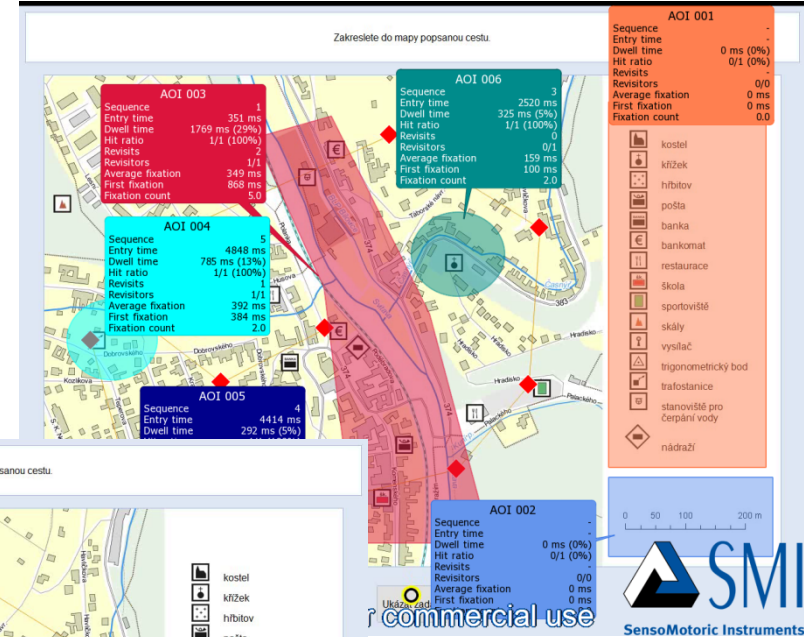
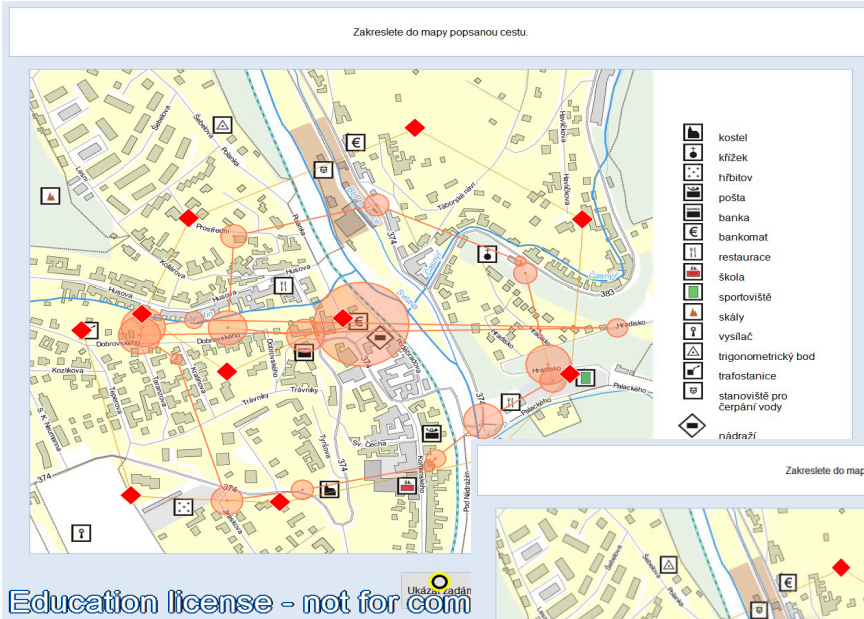
-  kostel
-  křížek
-  hřbitov
-  pošta
-  banka
-  bankomat
-  restaurace
-  škola
-  sportoviště
-  skály
-  vysílač
-  trigonometrický bod
-  trafostanice
-  stanoviště pro čerpání vody
-  nádraží



Ukáza, zadání



# Basic methods of results visualization



# Future events

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- ▶ January 2014 – release of new platform Hypothesis
- ▶ Computer adaptive testing, interlinking with E-T...
  
- ▶ **Workshop „Applying of principles of cognitive psychology in practice,,**
  - ▶ **Masaryk University, Brno, Czech Republic, on 5.-6.6. 2014**
  - ▶ Focused on usage of Eye-Tracking systems and introducing of SW Hypothesis
  - ▶ Topics: cognitive cartography, forensic psychology, neuromarketing, traffic psychology, reading disability, HCI...



The screenshot shows a Mozilla Firefox browser window with the title 'Aplikace GPTest - Mozilla Firefox'. The address bar contains the URL 'gptest.geogr.muni.cz/GPTest.html?locale=en'. The browser's menu bar includes 'Soubor', 'Úpravy', 'Zobrazení', 'Historie', 'Záložky', 'Nástroje', and 'Nápověda'. The toolbar shows various icons including 'počasí', 'amazon', 'meteogram Aladin', 'Google Maps Mania', 'V3: The Solution for M...', 'JavaScript Reference', 'https://www.google.c...', and 'https://developers.go...'. A central dialog box titled 'Please log in' is displayed, featuring two input fields for 'User name:' and 'Password:', and two buttons at the bottom: 'Log in' and 'Cancel'. The Windows taskbar at the bottom shows icons for Internet Explorer, Firefox, File Explorer, Word, Excel, Skype, and a camera. The system tray on the right indicates the time as 17:47 on 22.8.2013.