ICC 2017
WASHINGTON
JULY 02-07, 2017

The Usability of a GeoVisaul Analytics Environment for the Exploration and Analysis of Different Datasets

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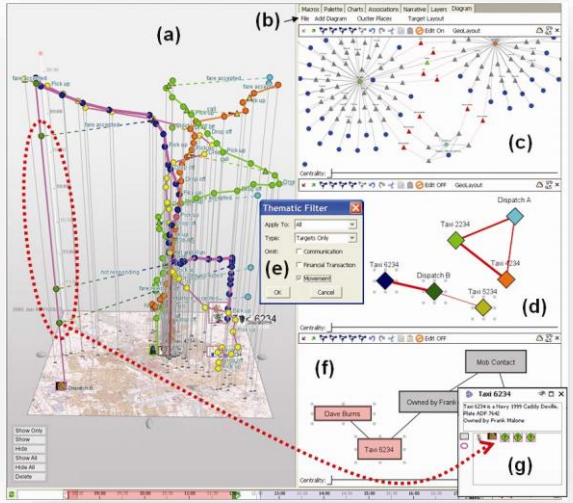
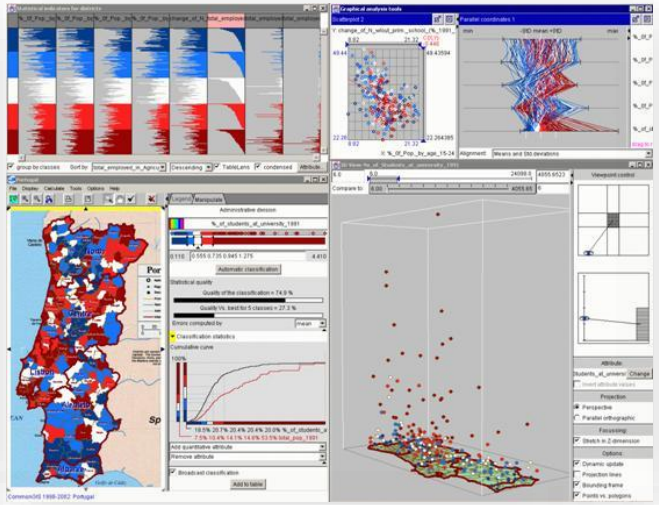
Session: Evaluating Map Quality

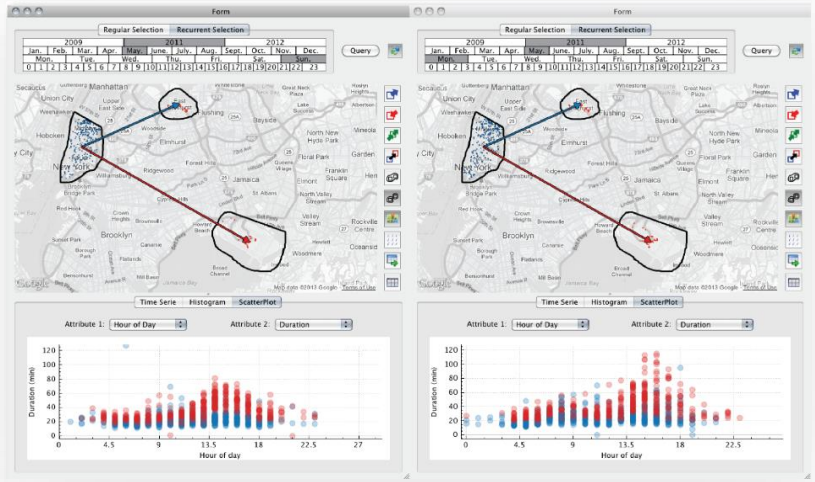
GeoVisual Environments



Kapler, et al. (2008)

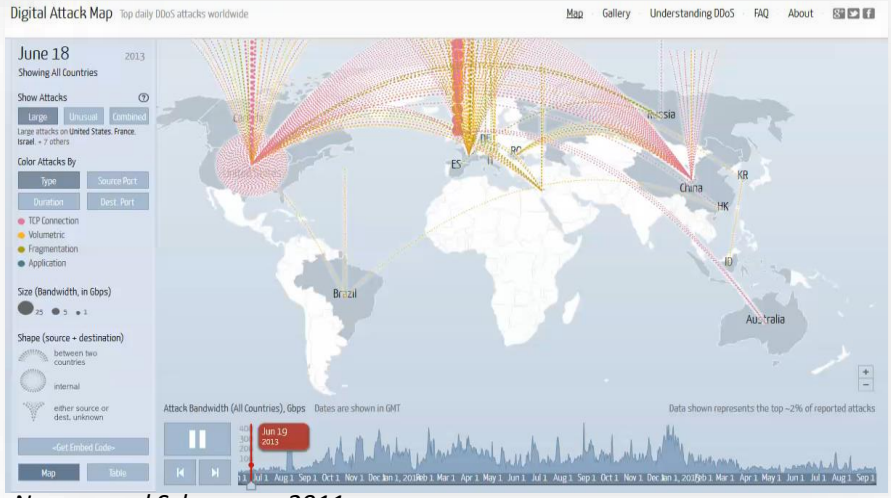


Andrienko and Andrienko (2004)



Ferreira, et all. (2013)

http://www.digitalattackmap.com/#anim=1&color=0&country=ALL&list=0&time=16692&view=map



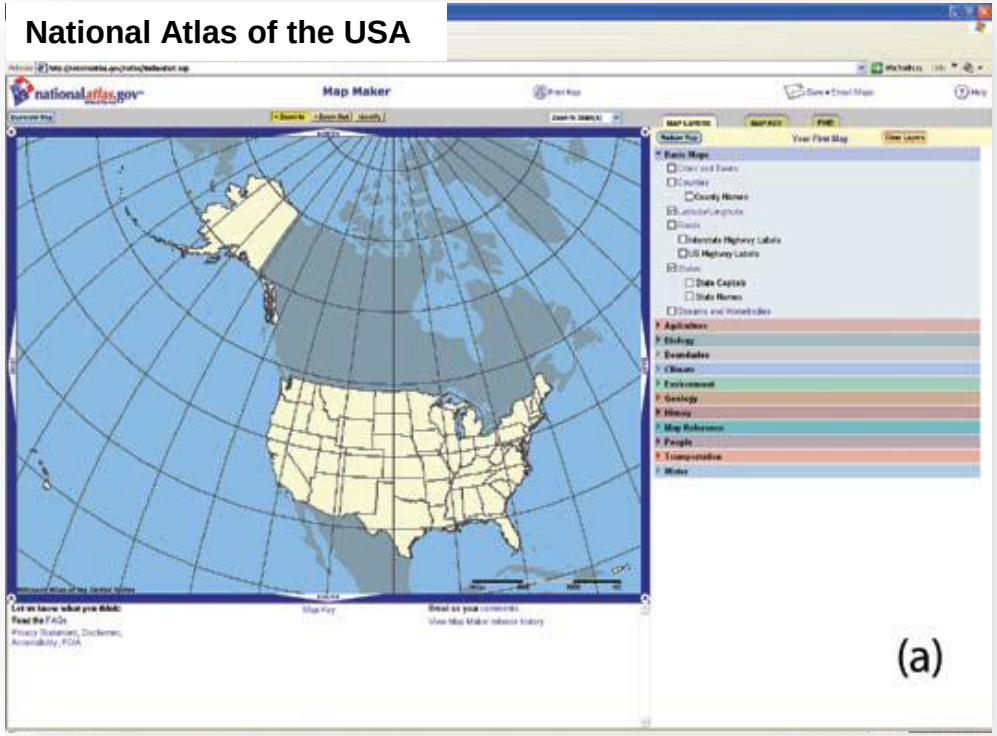
Nguyen and Schumann, 2011

What do we know?

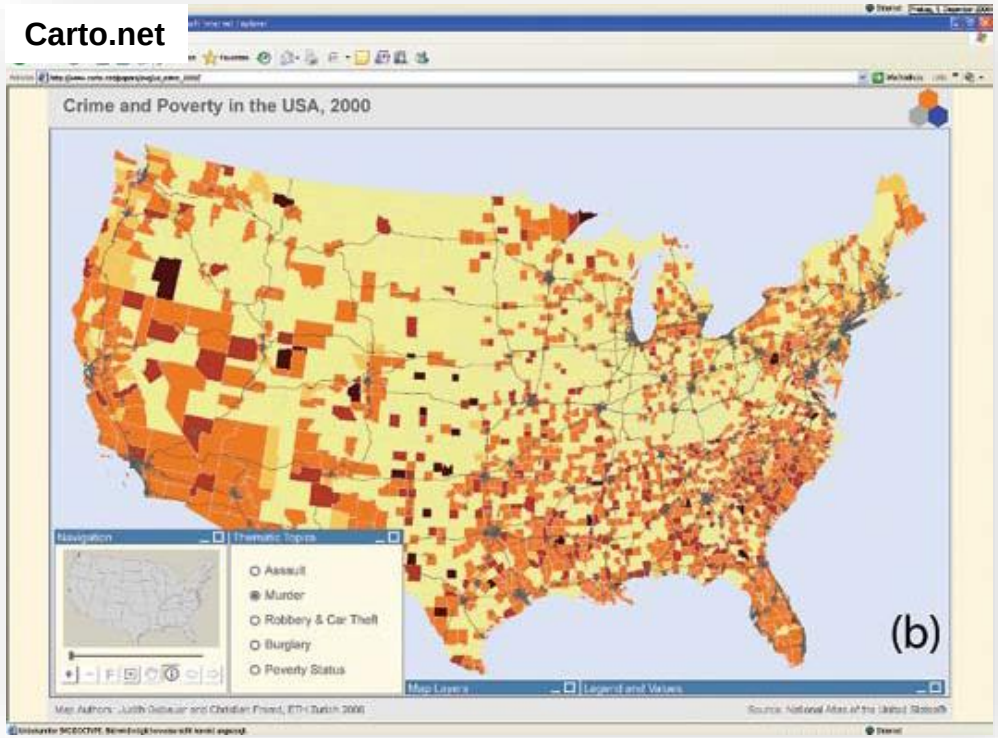
Usability perspective

Compare two interactive online map interfaces

National Atlas of the USA



Carto.net



Çöltekin, et al. (2009, 2010)

Questions remain

GVA environments are often designed to solve only one particular problem, however, the question is whether the same environment can be suitable to tackle similar problems with different datasets?

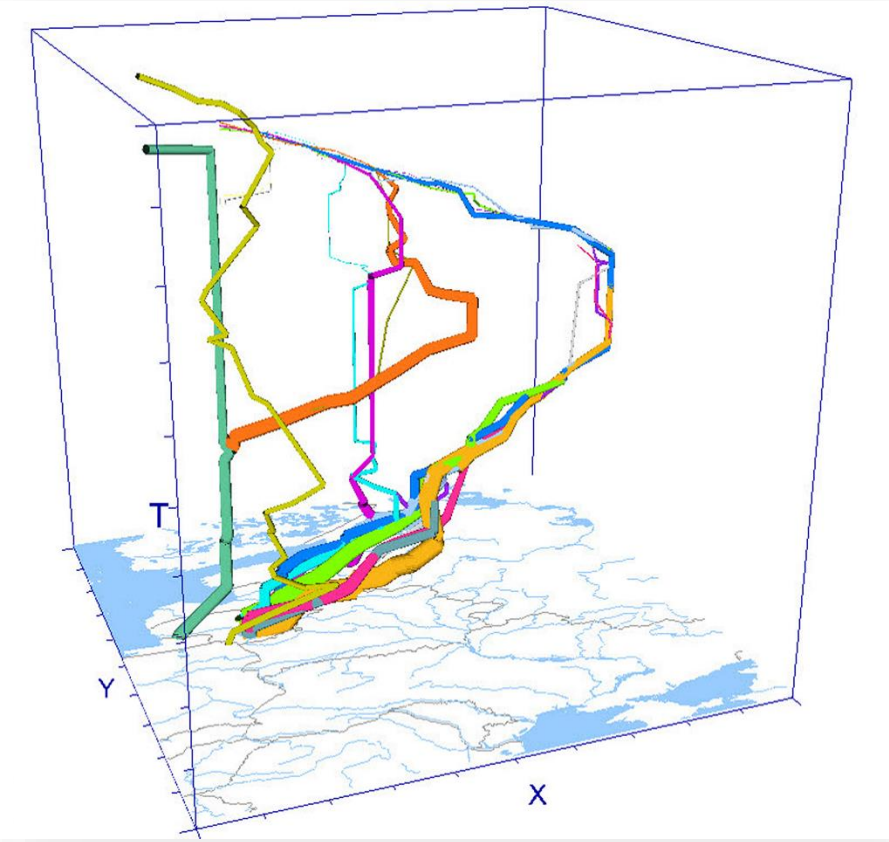
The main objective of this research is to understand:

- **How well GVA tools within this environment are utilized by the test participants to execute similar tasks with different use cases / datasets**
- **If so, what makes them useful**
- **if not, what are the issues to be considered**

Use case studies

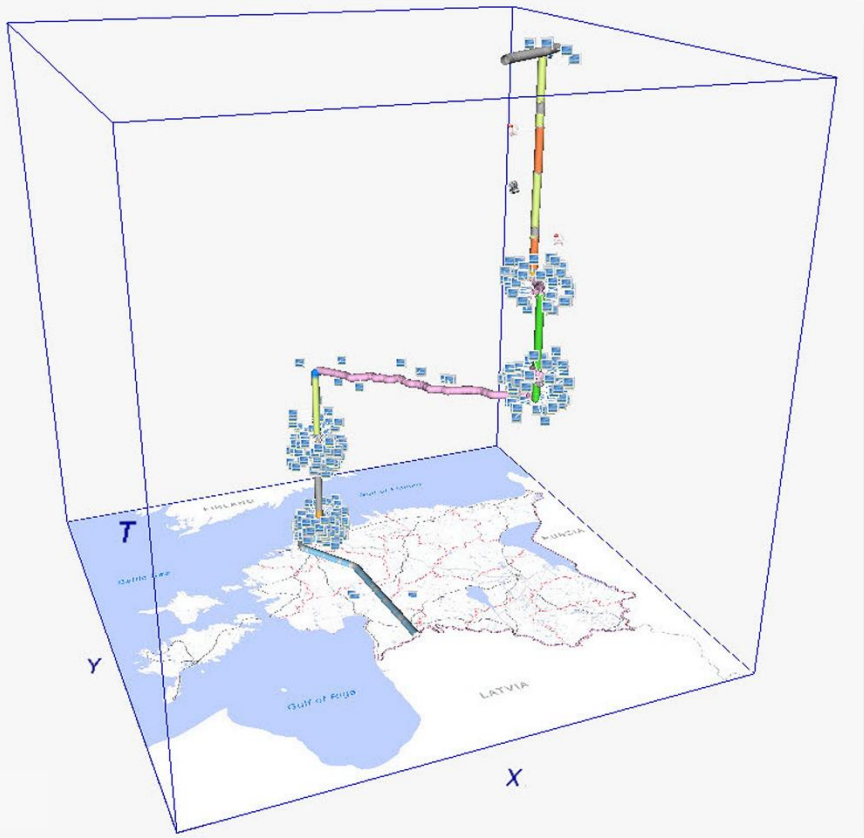
Simple dataset

Napoleons Russian Campaign

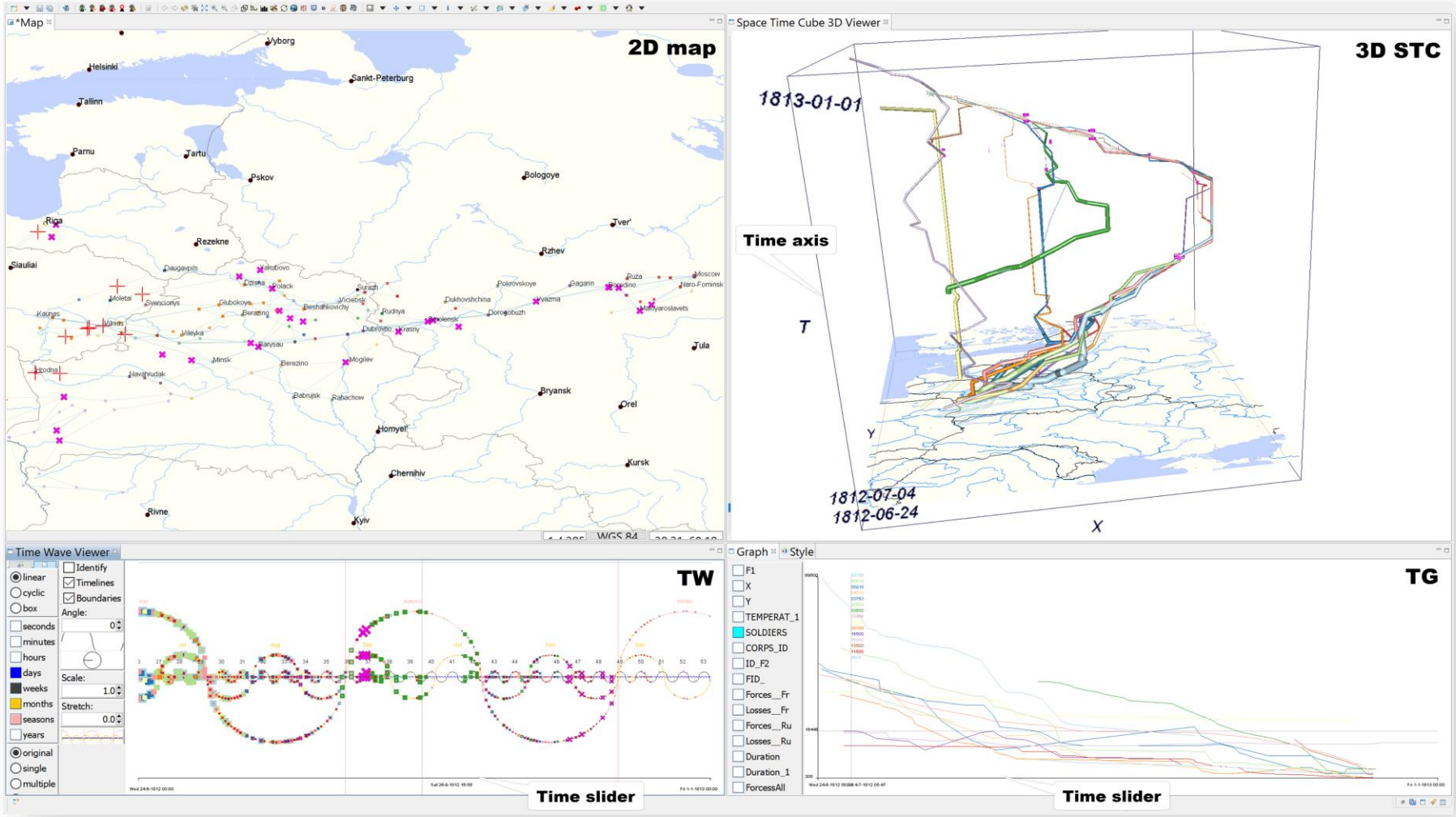


Complex annotations

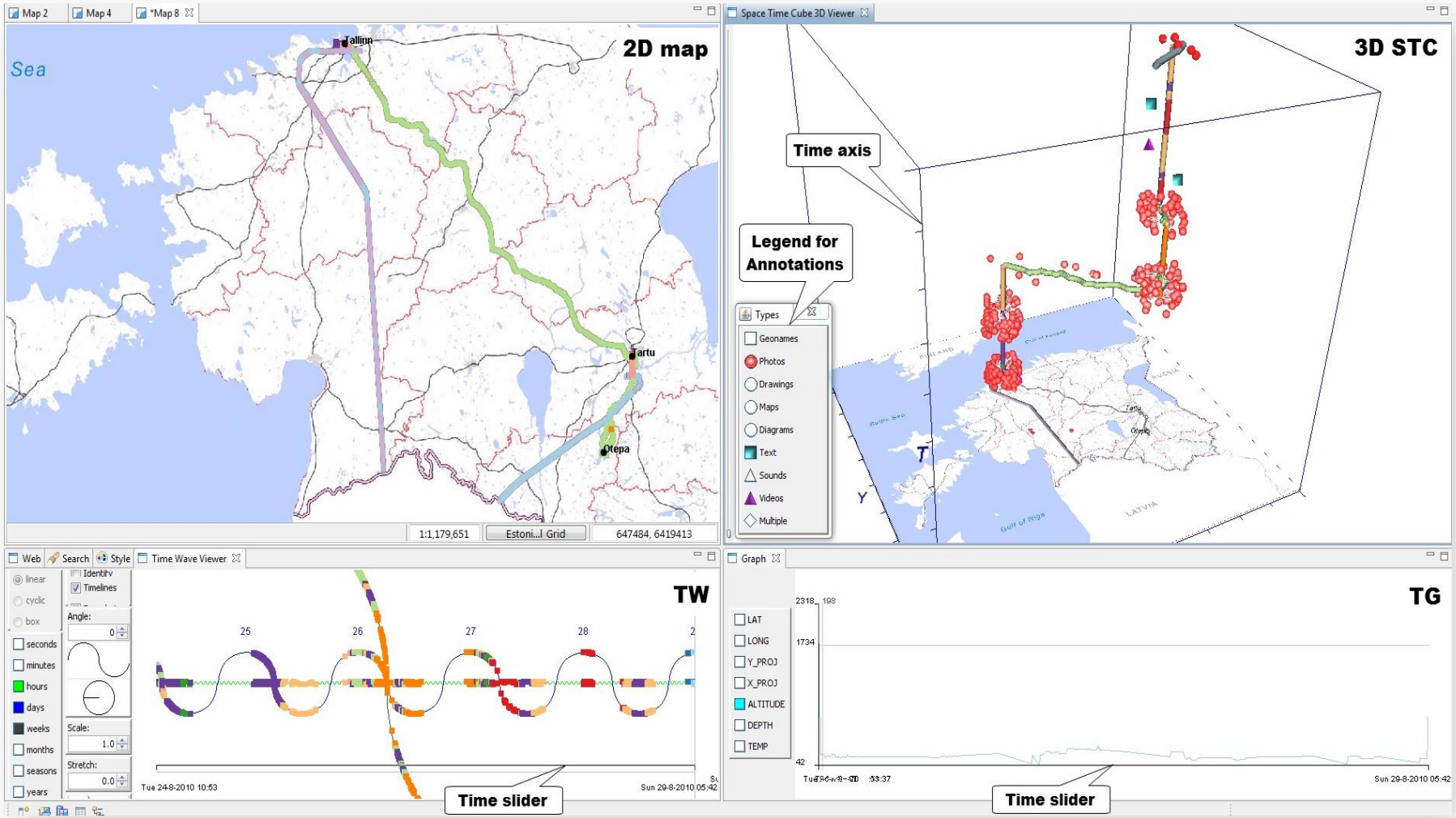
Travel log of a trip in Estonia



GeoVisual analytics environment



GeoVisual analytics environment



User task

Napoleon's march to Moscow

TASK 1	**Please describe how long different corps were traveling to Moscow and back?**
EXPECTED TASK EXECUTION	Participants should ***locate*** the 2D base map of the STC at the point of intersection between Moscow and the trajectories to find the time of arrival. Then continue to move the 2D base map up to the time axis of the STC to ***identify*** the time of departure from Moscow and the end of the campaign.
TASK 2	**Please look at the STC and TG and compare the difference between the beginning and the end of the campaign. Characterize the factors / reasons that influence the strength of the Grande Armée.**
EXPECTED TASK EXECUTION	The participants are expected to ***compare*** the number of soldiers at the beginning and at the end of the campaign through the TW and STC. Then they should look at information on temperature on the TG to ***characterize*** change.

Travel log data of Estonia

TASK 1	**Please describe how long the traveler stayed at different places? What do you think was the purpose of the stay / visit?**
EXPECTED TASK EXECUTION	Expected participant behaviour is to ***locate*** the base map at the places of the long stops (stations) to ***identify*** their temporal duration. Then focus on TW, TG and the 2D map to ***characterize*** the purpose of the stay.
TASK 2	**Please observe the types of annotations and find the area / place where the most diverse materials / information were collected?**
EXPECTED TASK EXECUTION	Participants should ***compare*** different annotations in the STC to find the place with the most diverse information.

Experiment Design

- Test participants
- Materials
- Setup
- Procedure

User test environment

Evaluation methods

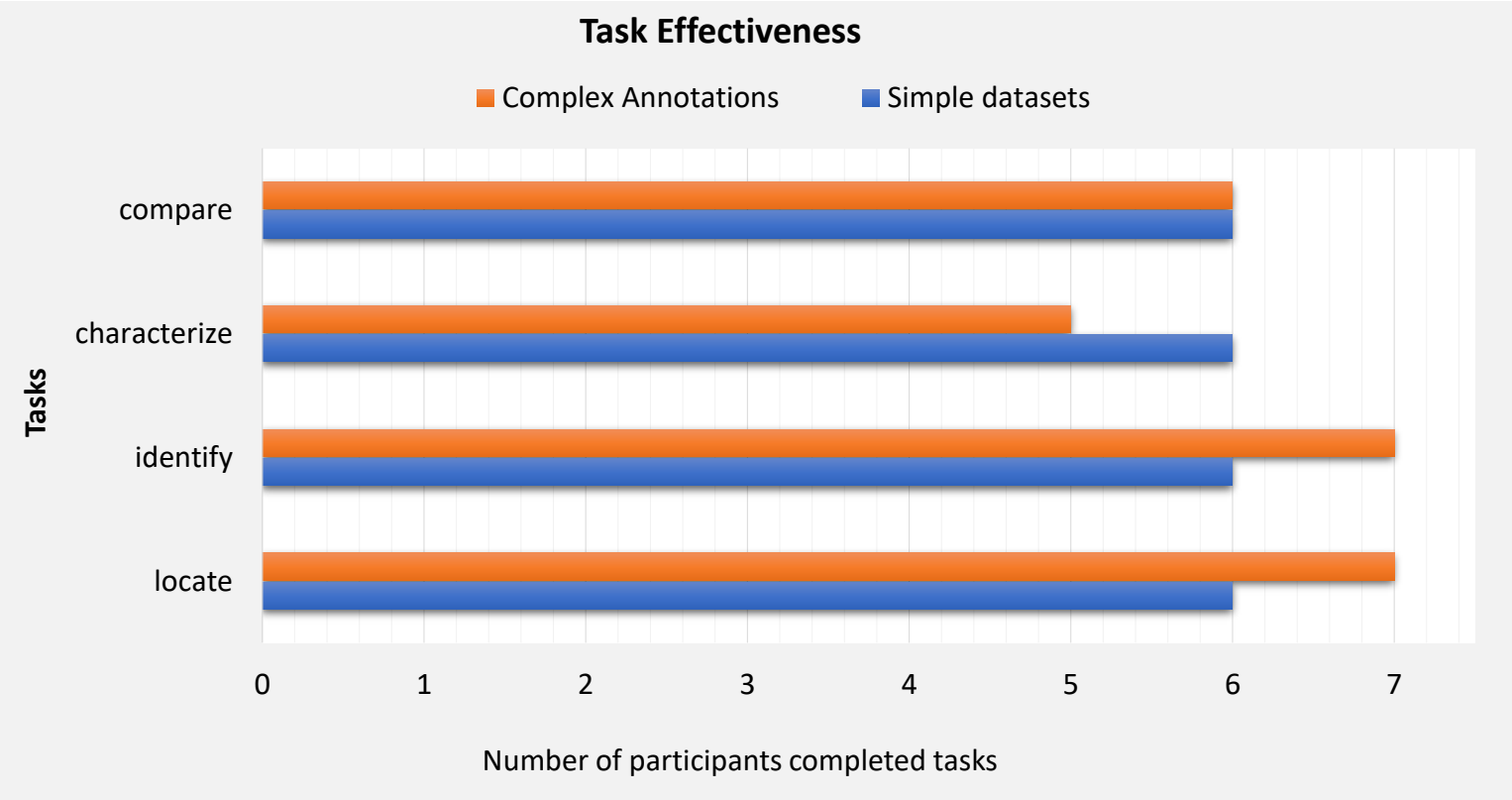
Qualitative

- Think aloud
- Video / audio recording
- Screen recording
- User interview

Quantitative

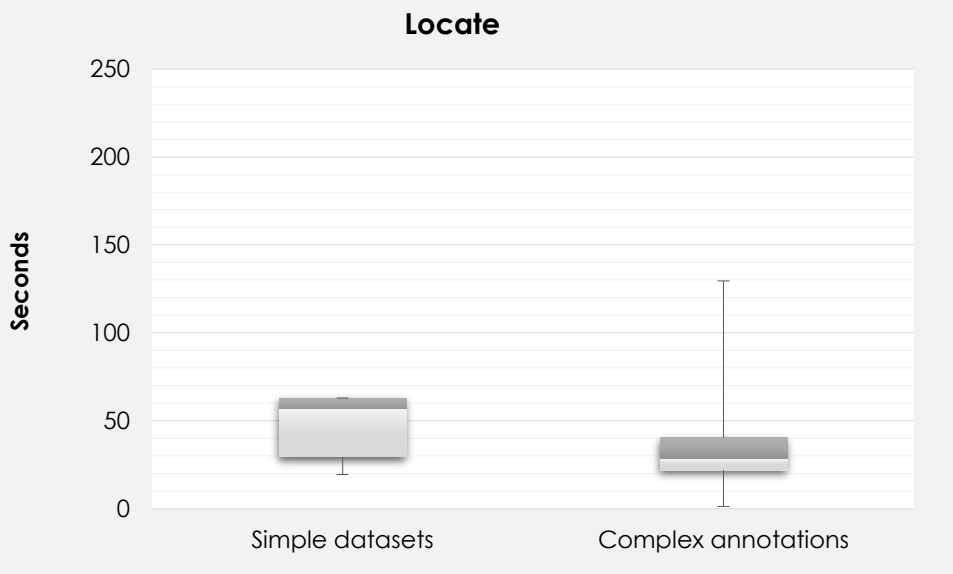
- Questionnaire
- Task execution
- Eye tracking

Task performance

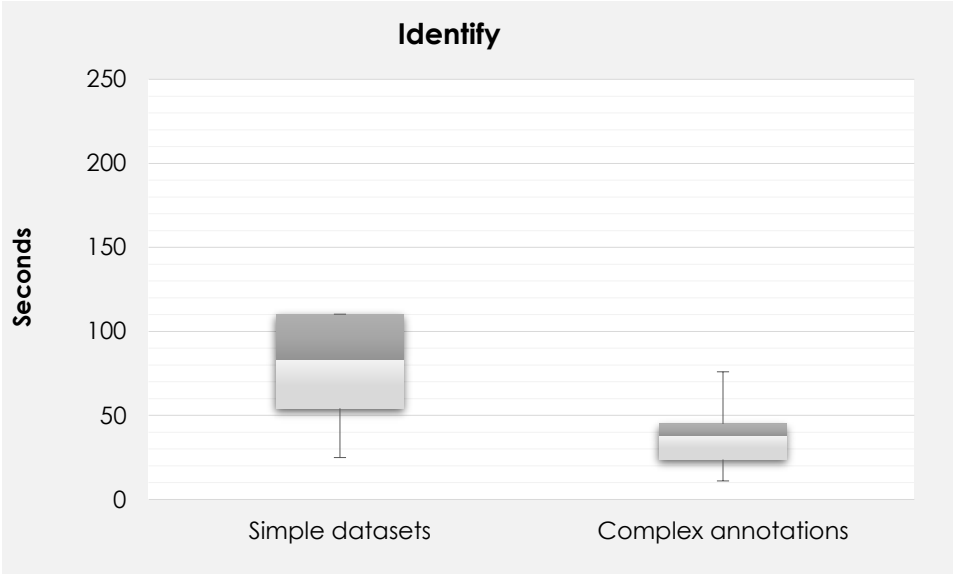


Task performance

Locate the map

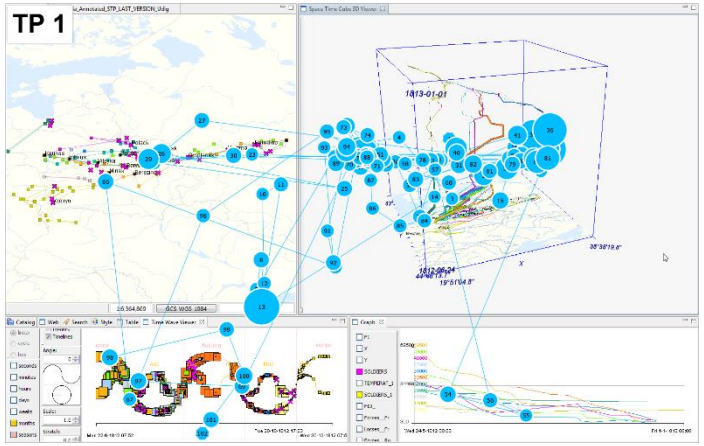


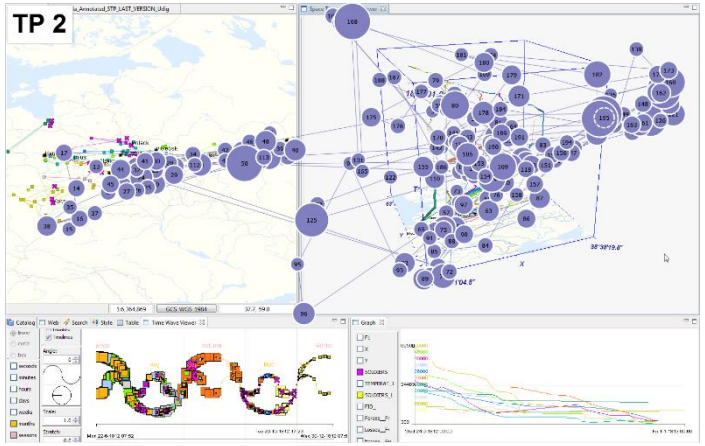
Identify time

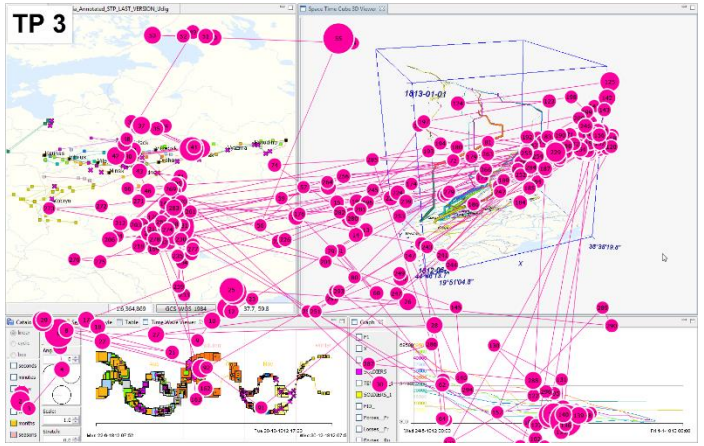


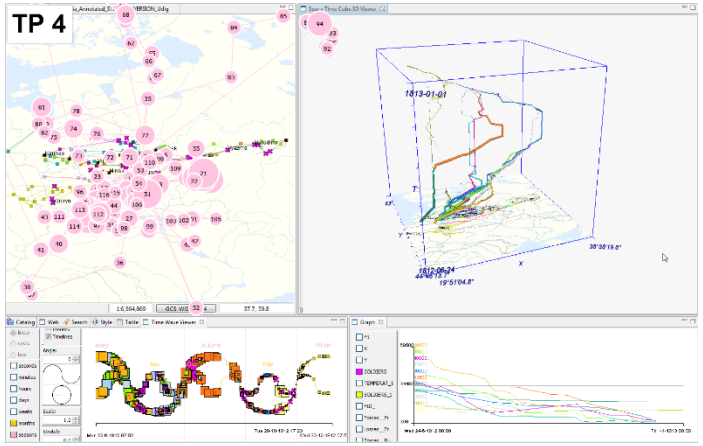
Different use of the GVA environment

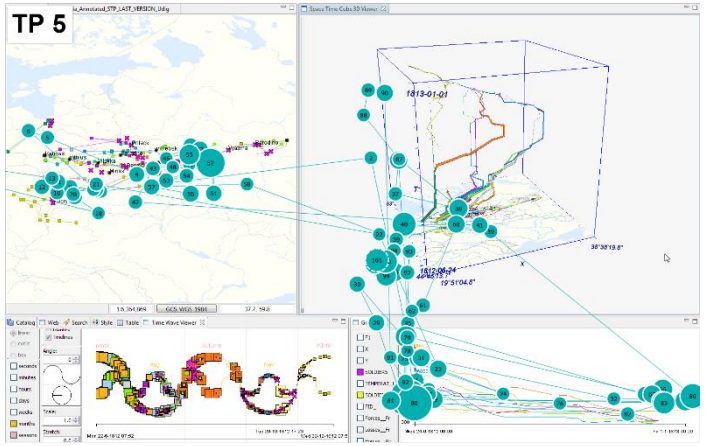
Locate the map

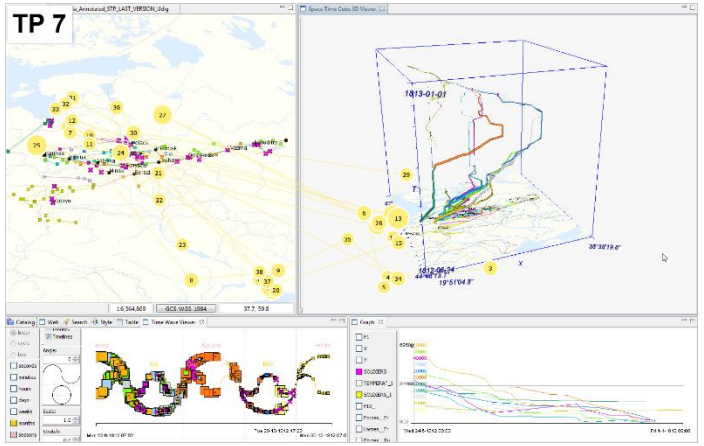






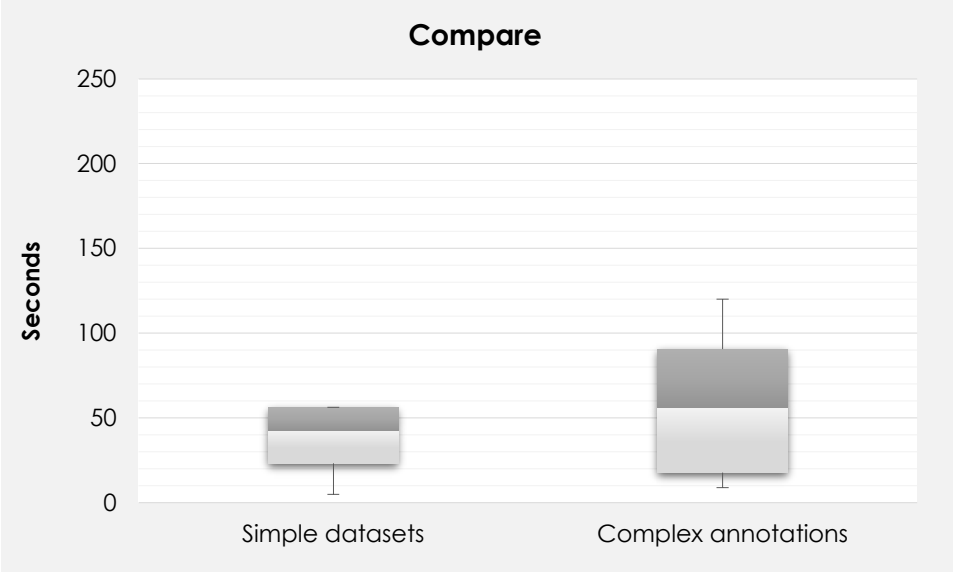




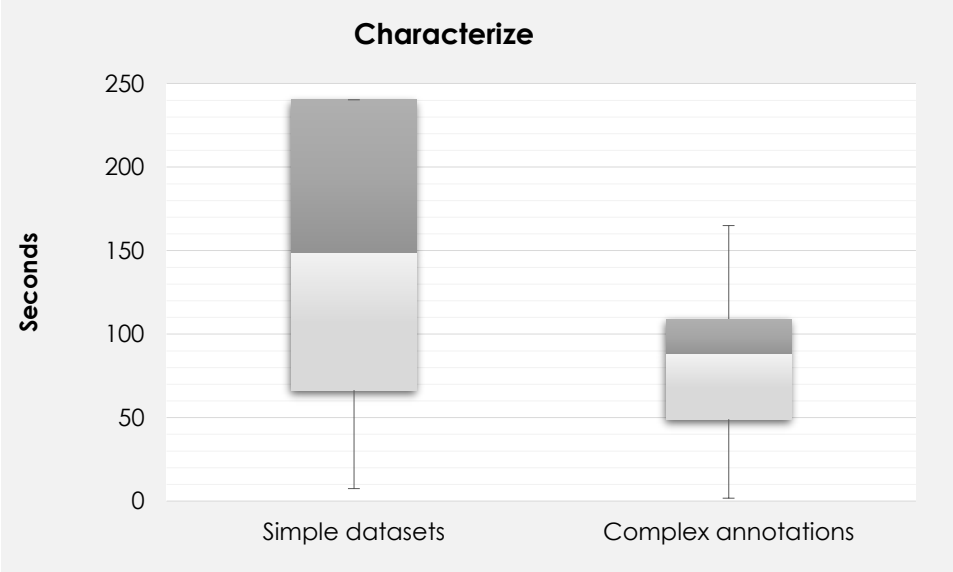


Task performance

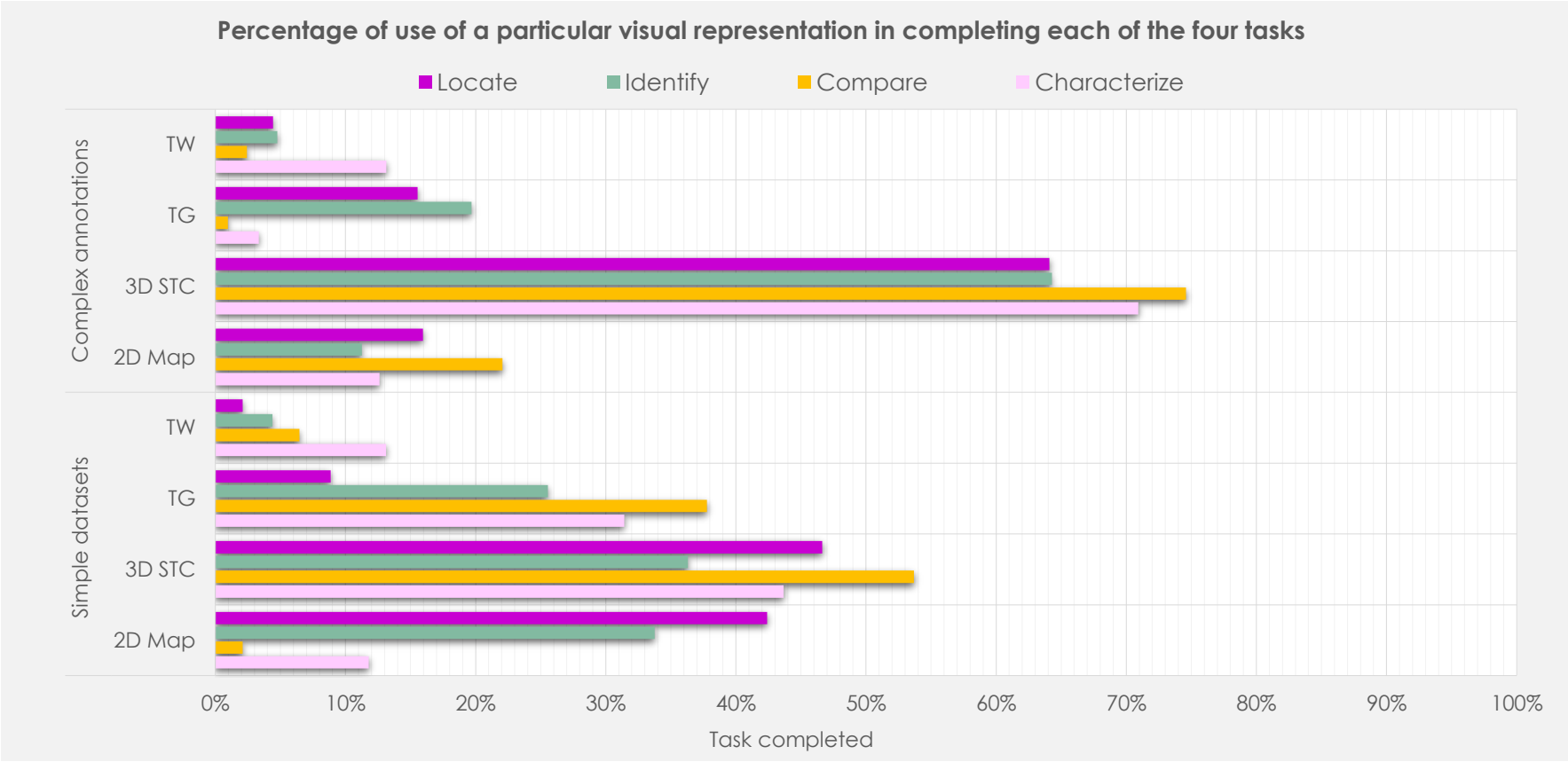
Compare difference



Characterize change



Use of the visual representations



Conclusions

- The coordination between views appeared to be very useful for exploration.
- Representations implemented for one dataset are not completely useful for other datasets.
- The participants could use tools and manipulate the GVA environment better at every new task due to the learning effect during the experiments.
- Some usability aspects and research questions on efficiency metrics with a bigger group of users would still need to be done.
- We suggest and encourage others to execute evaluation studies to better understand the complex user-interface aspects of GVA environments.

Thank you!