

MapLogger: A Client-Side Tool for Logging User Interaction in Web Map Usability Studies

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Keywords: Human–map interaction; behavioural analytics; interaction data collection; browser-based experimentation; cartographic user studies

Abstract:

Interactive web maps are highly dynamic systems, and usability cannot be adequately assessed from task outcomes or post-test questionnaires alone (Vanicek et al., 2026). In such environments, it is also necessary to understand how users actually interact with the interface: which controls they activate, how they navigate, and how their actions unfold over time. This contribution introduces MapLogger, a lightweight client-side tool developed to support usability studies of existing web-based cartographic applications by systematically recording user interactions (and potentially linking them with eye-tracking or other data).

MapLogger was designed to reduce the technical barrier to behavioural data collection in cartographic experiments. Rather than requiring a bespoke back-end or manual modifications to individual pages, the tool enables researchers to upload an existing web map project as a ZIP file, define participant tasks, and generate a ready-to-run study directly in the browser (Figure 1). The resulting study package preserves the original project structure while adding a task interface, interaction logging, and CSV export. The logged data include timestamps, task context, event types, selected interface-element attributes, cursor coordinates, viewport dimensions, and other interaction-specific parameters. A companion Analyser then supports rapid inspection of the resulting logs through summary statistics and visual analytics.

The practical value of MapLogger is demonstrated through a case study focused on the web application 3D-Geo-Vis, which presents seven methods for interactive 3D visualisation of air temperature data (Zejdlik & Vozenilek, 2025). In this study, MapLogger was deployed alongside eye-tracking and the User Experience Questionnaire (UEQ) with 54 participants completing five tasks. The case study shows how interaction logs help interpret gaze behaviour more robustly, particularly in situations where eye-tracking alone cannot determine whether a user merely considered an interface element or actually activated it.

MapLogger provides a transferable, privacy-conscious workflow for cartographic usability research. Because the entire pipeline runs locally in the browser, it is easy to deploy and avoids server-side data handling. At the same time, the paper discusses current limitations, especially the reduced semantic interpretability of interactions occurring inside canvas- or WebGL-based environments. Overall, MapLogger broadens the methodological toolkit for evaluating interactive cartographic visualisations and supports richer integration of behavioural and visual-attention data.

The MapLogger tool is freely available at: <https://vanicektomas.github.io/maplogger/>

MapLogger Builder

Turn your interactive map into a ready-to-run usability study. Everything happens in your browser.

1) Add your map files

Upload one ZIP that contains your map (HTML, JavaScript, CSS, images, data, fonts). We keep the folder structure and prepare every HTML page for logging. Anything that already loads from the web (e.g., map tiles) can stay as it is.

Drop your ZIP here, or

Choose ZIP

Files (0) - 0 B Remove ZIP

Add a ZIP file with your map.

2) Write participant tasks

Add short tasks in the order you want people to do them (e.g., "Find the nearest pharmacy in Olomouc"). Participants will see them in a fixed bar at the top of the study, and they will be saved to the log.

Take a moment to explore the map and familiarise yourself with the interface. X

Tasks: 1 + Add task

Welcome message (shown once at the start):

Thanks for taking part. Please read the instructions, then click Start to begin.

This is your short intro. After the participant clicks Start, Task 1 begins.

Preview

Task 1 — Take a moment to explore the map and familiarise yourself with the interface. Next → END

Task 1

This shows the basic flow. The final look depends on the MapLogger client CSS.

☒ Create an entry page (index.html) if it's missing

The entry page shows the task bar and opens your pages inside an iframe. The internal session key is derived from the Output name.

3) Download the study ZIP

Output name:

MapLogger-instrumented

We'll generate a ZIP with your pages plus a ready-to-run entry page and CSV logging.

Create ZIP

This can take a moment — please click once and wait for the download.

Figure 1. Preview of the MapLogger Builder environment.

Acknowledgements

The work of both authors was supported by the project "Analysis, modelling, and visualisation of spatial phenomena by geoinformation technologies V" (IGA_PrF_2026_010) with the support of the Internal Grant Agency of Palacký University Olomouc.

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