

Atlas Explorer: A Research Tool for Atlas Cartography

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Abstract:

Over the course of their forty-year history, electronic atlases (EAs) have evolved from experimental prototypes on CDs developed by cartographers to regularly updated, cross-platform online applications with a thematic scope that extends far beyond traditional geographical topics. The trajectory of EAs also exemplifies the democratization of cartography and the Internet: most EAs have become free of charge and accessible anytime and anywhere, and several collaborative EAs have emerged (albeit not in the numbers anticipated), allowing users to contribute content. However, the potential drawbacks of the free distribution of EAs and the priority of online access require further evaluation.

The concept of an atlas has also undergone significant changes. Some EAs replicate the concept of paper atlases, others use only a few atlas features or the metaphor of an atlas, and the rest lack atlas features at all. The implementation of EAs as end-user applications also varies considerably, with their typical concepts grouped by the author into metaconcepts (Krakovskyi, 2025). These transformations of EAs remain understudied, contributing to the atlas classification problem (Schulz, 2023).

The analysis and evaluation of EAs are necessary for (1) improving atlas theory and, consequently, the quality of new EAs; (2) tracking trends in the development of EAs and their components; (3) writing reviews and assessing the extent to which EAs correspond both to a specific design concept and to the general concept of an atlas; (4) obtaining feedback from users and developers; (5) refining typical EA use scenarios; and (6) educational purposes.

In addition to classification, the search, cataloging, and archiving of EAs remain a challenge (Nolan, 2014; Sieber & Hurni, 2023). EAs can be created by anyone at any time without registration. Unlike paper atlases, EAs still have a limited lifespan, and most EAs created before the 2010s are no longer accessible. Updates to EAs may substantially alter their interfaces, content representation, and other components, transforming them into new EAs. These circumstances necessitate the systematic monitoring and documentation of EAs to preserve and share lessons learned from both successful and unsuccessful cases.

Atlas Explorer (<https://krakovsp.github.io/atlas-explorer/>) is an interactive and evolving analytical platform for atlas cartography, presented as a web catalogue of EAs that classifies EAs by bibliographic, content, and media-cartographic attributes. The bibliographic module (15 attributes) encompasses details regarding the publisher and developers of EAs, the location and date of publication, the platform/framework utilized, etc. The content module (12 attributes) identifies the topics and thematic scope of EAs and the spatial properties of their content.

The media-cartographic module includes the characteristics of EAs as end-user applications, with an emphasis on cartographic aspects. It consists of five submodules comprising 60 attributes. The first submodule contains integral attributes that characterize an EA as a whole (metaconcept, method of page presentation, usage style, etc.). The second submodule focuses on the interface and audiovisual design of EAs. The third submodule, which is key for EAs but currently the least developed, characterizes the information architecture and navigation of EAs. The fourth submodule, the largest in scope, contains the analysis results of the EA content representation, particularly the cartographic representation. The fifth submodule examines EA functionality. All Atlas Explorer attributes are accompanied by brief descriptions. More detailed explanations are provided in the monograph (Krakovskyi, 2025). To minimize subjectivity, Atlas Explorer avoids evaluative indicators that require assessing implementation quality against a particular standard.

To be included in Atlas Explorer, a website or application must satisfy the following criteria: (1) it has the title “atlas” or is referred to as an “atlas” in publications; (2) it contains maps or (geo)spatial visualizations; (3) its content is linked to a specific territory and theme (i.e., includes thematic information); (4) it contains multiple thematic sections and classified content; (5) its content is presented within a website or application environment; (6) it is not a catalog geoportal, a collection of dashboards, an interactive map, or a (web)GIS; and (7) it represents a completed product (not a beta version) and is operational at the time of analysis.

Each Atlas Explorer module is presented as an interactive table that enables users to conduct their own comparative and trend analyses of EAs and their components. The tables support the following functionalities: full-screen mode, turning table columns on/off, sorting attribute values in ascending/descending order, filtering attribute values by keyword or a list, and adjusting column width. Selection and export functions are planned for future releases.

The number of attributes in Atlas Explorer makes it possible to address a wide range of research questions, among which synthetic questions are particularly valuable in identifying relationships and interdependencies between specific groups of EA attributes (Table 1).

Future work will involve expanding the set of content attributes and adding modules that incorporate the results of critical, semiotic, functional–technical, and software–structural analyses of EAs. The Atlas Explorer attributes also require continuous refinement, necessitating further research in cartography, data visualization, UX design, and related disciplines. However, the main challenge remains covering as many existing EAs as possible; therefore, suggestions for EAs are gratefully welcomed.

Question Types	Questions
Bibliographic	<i>Which institutions and countries are the main publishers of EAs?</i>
	<i>What percentage of atlas projects are dual projects? What percentage of EAs are reproductions of paper atlases?</i>
	<i>How many EAs have been developed using atlas platforms/frameworks?</i>
Content	<i>What is the proportion of national and statistical EAs?</i>
	<i>What are the most and least common topics and their combinations?</i>
	<i>What is the distribution of EAs by content spatiality?</i>
	<i>What is the distribution of EAs by territory (spatial coverage)?</i>
Media-cartographic	<i>What are the main EA layout patterns? How frequently are templates used?</i>
	<i>What percentage of EAs include multiple classification schemes and content filtering?</i>
	<i>What are the main organizational structures and content access mechanisms in EAs?</i>
	<i>In multi-page EAs, is search or detached navigation used more frequently?</i>
	<i>What is the primary content representation type used in EAs? What is the share of multimedia EAs?</i>
	<i>What is the prevailing map concept in EAs?</i>
	<i>What is the typical level of detail of EA basemaps? What is the share of custom basemaps?</i>
	<i>What percentage of EAs have monotonous symbolization? How often does qualitative information prevail over quantitative?</i>
	<i>How many EAs support comparisons, and what types of comparisons?</i>
Synthetic	<i>What is the predominant map interactivity in EAs?</i>
	<i>To what extent are EAs adapted to mobile devices?</i>
	<i>What are the distinctions between EAs of different generations?</i>
	<i>Does thematic focus influence the choice of EA metaconcept?</i>
	<i>Which atlas platform/framework supports the widest range of mapping techniques?</i>

Table 1. Research questions addressed by Atlas Explorer

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