

Cyberphotoatlassing – Synthesis of Concepts and Technologies

Alexander Wolodtschenko (Dresden), D. R. Fraser Taylor & Romola V. Thumbadoo (Ottawa)
<alexander.wolodtschenko@tu-dresden.de>

The 20th century will remain a landmark age for cartography. In the second half of this century, the transition from analogical to digital cartography began; some have described it as the digitality or digitalization epoch. This development was characterized by the introduction of new technologies and trends on the one hand, and by conceptual semiotic transformations on the other. Mainstream cartography prioritized geo-informatization; a separate stream of cartography developed and examined semiotic, theoretical and epistemological transformations. The 21st century can become not only the century of digitalization, geo-infotechnology, democratization and socialization in cartography but also the century of carto/atlas semiotization of modern society, inclusive of a competent mastery of elements like knowledge, language and textual and visual communication skills. This article presents a new interdisciplinary concept – cyberphotoatlassing. It is a new theoretical, epistemological and technological conceptual synthesis and analysis of cartography/cartosemiotics and atlasgraphy/atlassemiotics, which incorporates some selected processes of 1970s-2020s, such as geo-informatization, socialization, semiotization, ubiquitization and cybercartography.

Keywords: cybercartography, atlassing, photoatlasgraphy, concept synthesis

1. Cartography in the 1970s–2020s: Digitalitization, Socialization and Semiotization

Modern cartography, largely influenced by geomatics, has become, (increasingly), technical. Location with maps as focus is now central to all aspects of society, accelerating the spatial management of all information, in the prioritization of technology. Today, e-maps are indispensable for navigation and location.

However, without mastering elements like carto/atlassemiotics in map language and atlas language, knowledge management can tend to be superficial. The socialization, arts, carto/atlassemiotics, epistemological and photoatlassing approaches to mapping have developed some very interesting directions in this respect, distinct from the technological approaches of mainstream cartography.

There have also been substantive changes in both cartosemiotic theory and atlas-related practice, development and analysis, and change is ongoing. Ubiquitous photoatlases of the 2010s-2020s have become a new format for the presentation of the semiotic-epistemological knowledge of cybercartographic atlases, with a focus on events presented in photographs and storytelling narrative. (Wolodtschenko 2021).

2. Selected Scientific Structures and Concepts of Cartography

The time of contrasts and identity of cartography. A comparative analysis of the trends in cartography over the past 50 years (Wolodtschenko 2011, 2020) clearly shows striking contrasts or contradictions in approaches as the "driving forces" of modern cartography. The last three decades of the 20th century and the two decades of the 21st century were not particularly easy times for European-continental cartography. It was a time of renewal of the higher education system and professional reorientation and market-economy conditions in university/academic knowledge transfer.

In the 20th century, cartography argued for its "independence" from geodesy and geography. In the 21st century, however, mainstream cartography moves towards "dependence" on geoinformatics or geomatics. This was challenged by European-continental approaches. Table 1 shows some contrasts in cartography over the past 20 years, which have been reflected particularly strongly at some European universities. The opposition of "technology vs. theory" was regarded as a paradox of "one-sided cartography" (Wolodtschenko 2011). The table 1 sheds light on the new and old problems between technological and theoretical cartography in the 20th and 21st centuries.

20 th century	21 st century
Contradictions of Cartography	
Cartography	Geoinformatics/ Geomatics
Map	Geovizualisation
Theory/Methodology	Technology
Science	Management
Authority	Anonymity
Diploma	Bachelor/Master
Traditions	Conjuncture
Personalities	Top-Managers Hierarchy
"Striving for Independence" (from Geodesy and Geography)	„Striving for Inclusion“ (of Geoinformatics or Geomatics)

Table 1. Contradictions of modern cartography (after Wolodtschenko 2011)

These problems and associated challenges are also reflected in the "Conceptual Barometer" (after Wolodtschenko, 1994) in the new "oppositional phase" in the development of theoretical cartography in the 2010s-2020s (Fig. 1 and Fig. 1a).

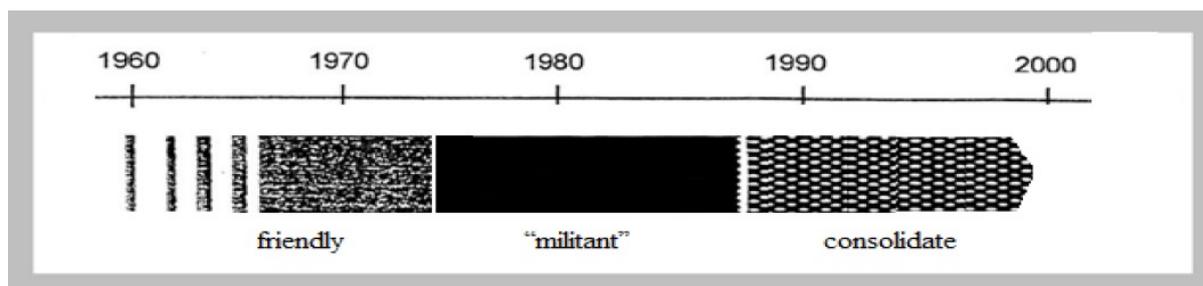


Figure 1. „Concept barometer“ of the development of theoretical cartography (Wolodtschenko 1994) with friendly, “militant” and consolidate phases

From the point of view of the theoretical-conceptual tendencies in European cartography of the 1960s-1990s, three phases of the development of theoretical cartography can be distinguished (Wolodtschenko 1994). These phases (see Fig. 1) are particularly characteristic of the European cartographic space, which was free of ideology and without conceptual polarization from the early 1990s.

In the theoretical discussion in the 1970s to 1980s, two phases can be distinguished - "friendly" or "peaceful" and "militant" or "combative". It was surprising that at this time the "polarization methods" in cartography gave impetus to theoretical and conceptual thinking (Wolodtschenko 1996). The 1990s are marked by the consolidation of theoretical cartography. But that does not mean that a "reconciliation" is agreed between representatives of different theoretical views.

Factual discussions and definitions regarding the priorities of this or that theoretical or technological field of research can serve as a conceptual "drive" for theoretical cartography. Unfortunately, in the 1990s there were only a few studies on the conceptual basis of cartography in German-speaking countries. This was shown, among other things, by the 1996 Cartography Congress in Interlaken, where the topic of "New Theories and Concepts" did not appear.

The consolidation phase in theoretical cartography continued until the early 2010s. The further development of theoretical cartography in the 2010er is characterized by its semiotization without mainstream cartography (technological cartography) and by its crisis in the ICA. In the 2010er, the oppositional phase dominates (Fig. 1a), in which theoretical cartography is not accepted by technological cartography.

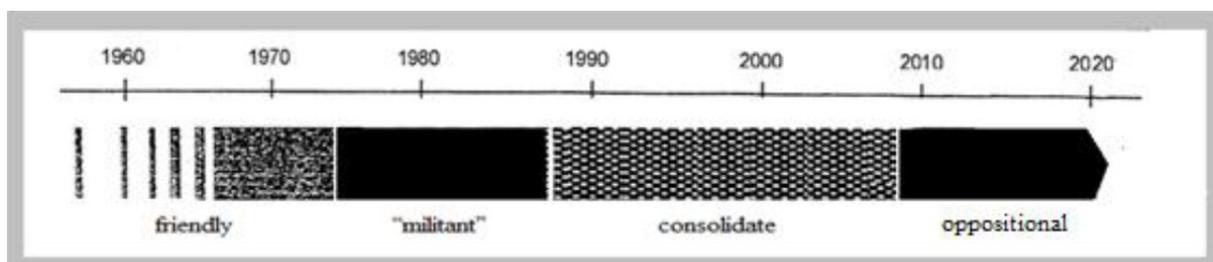


Figure 1a. „Concept barometer" of the development of theoretical cartography (Wolodtschenko 1994, updated 2022) with friendly, "militant", consolidate and oppositional phases

2.1 Structure of Neocartography

The dominance of geospatial data and technology is particularly characteristic of modern cartography. According to Gartner & Schmidt (2010), technological cartography (with five "geo-techniques": internet cartography, neogeography, ubiquitous cartography, Location Based Services/ LBS and augmented reality) forms the structure of modern cartography or neocartography (Fig. 2).

Neocartography		
Technological cartography		Theoretical cartography
geospatial techniques:	geospatial data	theoretical and methodological fundamentals
internet-cartography, neogeography, ubiquitous cartography, LBS and augmented reality		

Figure 2. Structure of Neocartography (Gartner & Schmidt 2010)

2.2 Pentagram–Model

Here, cartography can be seen as a pentagram of potentials (Fig. 3) with scientific-technical (science, technology, production), professional (education, scientific qualification, work activity), social and individual (associations, societies, individuals, executives), cultural and historical (cultural heritage or cultural heritage, art, etc.), and multimedia communication (various media: Internet, TV, press, etc.) forms of appearance or presentation.

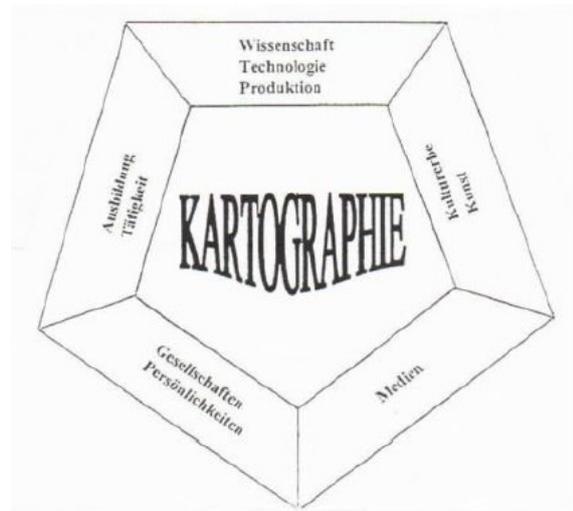


Figure 3. Pentagram-Model (after Wolodtschenko 2002)

2.3 Structural model of the ICA

In 2017, an analytical article on the ICA was published (Kraak, Fabrikant 2017). Fig. 4 shows the structural model of 28 ICA commissions and working groups in the period from 2015 to 2019. The model presented three areas of cartography - art, science and technology - as tools; and two - creation and use of maps – as processes. The map data related tools and processes of 28 commissions and working groups are presented in a row format; it is notable that there is only one atlas related commission (a making process).

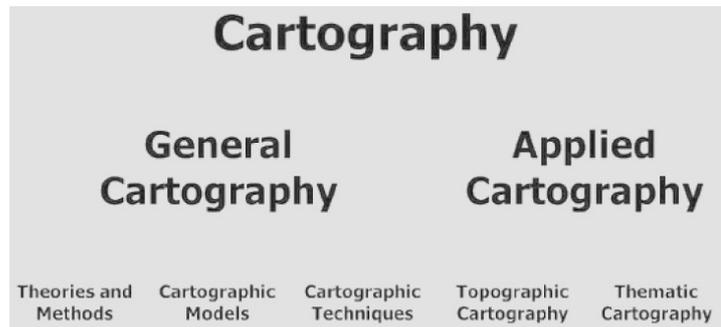
art	science	technology	making	using
Art and Cartography	Toponymy	Open Source Geospatial Technology	Atlases	Use, User and Usability Issues
Mountain Cartography	SDI & Standards	Location Based Services	Map Projections	Ubiquitous Mapping
Planetary Cartography	Generalization & Multiple Reprs	Maps and the Internet	Topographic Mapping	Cartography and Children
Map Design	Cognitive issues in GeoinfoVis	Maps & Graphics for Blind	Map Production & Geoinfo Management	GI for Sustainability
	Geospatial Analysis & Modelling	Cartographic Heritage into the digital	Sensor-driven Mapping	Early Warning and Crisis Management
	Visual Analytics	History of Cartography	Marine Cartography	Education and Training

Figure 4. Structure model of ICA commissions and working groups (Kraak, Fabrikant 2017)

2.4 Structure of modern cartography

The structural analysis presents general and applied cartography (Fig. 5). Cartography is presented solely as a spatial discipline and a part of GIScience.

Figure 5. Structure of modern cartography (after Kainz 2020)



2.4 Structure of modern cartography

In the article (Fairbairn, Gartner & Peterson 2021) a graphical model of the "core" of cartography was proposed. The map is the heart of cartography, surrounded by a "belt" of theoretical cartography and two hemispheres (Fig. 6). The upper hemisphere includes map exploration and the lower hemisphere map production and cartographic modelling. There is a graphic intrusion of medial components between the hemispheres (interactivity, multimedia, 3D/4D, AR/VR). This map-centric and core model of cartography has no inclusion of the conceptualization of atlases and atlas cartography.

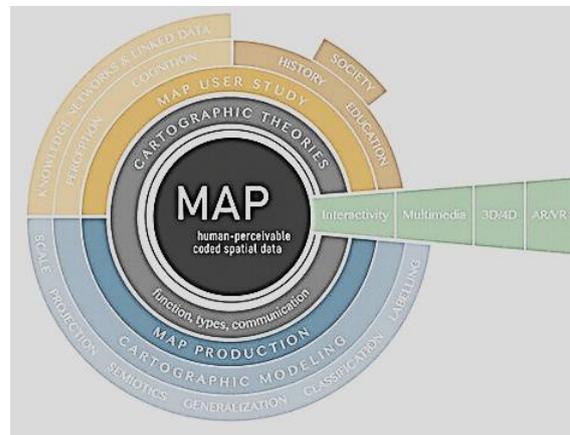


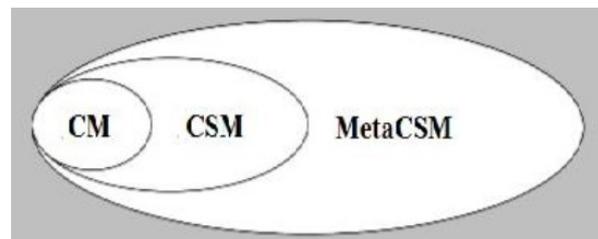
Figure 6. Core-model of cartography (after Fairbairn, Gartner, Peterson 2021)

2.5 Metacartosemiotics

Wolodtschenko (2021a) describes three options for the possible use of this term *metacartosemiotics*:

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Figure 7. Semiotic development of the concept of metacartosemiotic (Wolodtschenko 2008)



1) A conceptual construction in cartography on the basis of "new cartosemics". The conceptual development of the "new cartosemiotics" in the late 1990s included a system of language maps (s), which was based on a four-component (sublinguistic) basis, as well as a structural division of

cartosemiotics into general and applied. By the end of the 2000s, the concept included three types of models and methods in their study: cartographic models (CM), cartosemiotic models (CSM), and metacartosemiotic models (Fig. 7). The beginning of the 2020s is characterized by the evolution of metacartosemiotic models (Meta-CSM) in meta-cartoatlas-semiotics models (Meta-CASM). It is suggested that metacartosemiotics can become a new conceptual "beacon". This concept has great interdisciplinary potential and is capable of forming a new generation of cartosemiotic concepts in geoinformation and outside geoinformation space.

2) a new discipline that studies applied cartosemiotics (environmental, atlas, tourism, etc.) with cartographic and non-cartographic traditions.

3) an electronic journal on theoretical cartography and cartosemiotics (in English and German). Founded in 2008 by A. Wolodtschenko (Germany) and F. Hruby (Austria): <http://ojs.meta-carto-semiotics.org/index.php/mcs>

2.6 International schools of cartographic thought

In 2021 an analytical diploma thesis (master thesis) analyzed the development of the international schools of cartographic thought (Ignateva 2021). Fig. 8 (after Ignateva 2021a) shows the course of theoretical thinking in cartography over 70 years up to 2010 (adapted from Berliant 1994). In fig. 8. the legend only distinguishes three schools: Russian, French and German-American schools, while the remaining schools are not referenced in the theoretical thinking of cartography.

A remark: until 1990, there were a Soviet Cartography School and two German Cartography Schools (GDR and FRG). Further, other theoretical concepts of the 2010s (e.g. cybercartography, metacartosemiotics, atlassemiotics, etc.) are not represented. The concepts and theoretical thinking in cartography are "frozen" at 2010 levels, and concepts for 2010s - 2020s are missing.

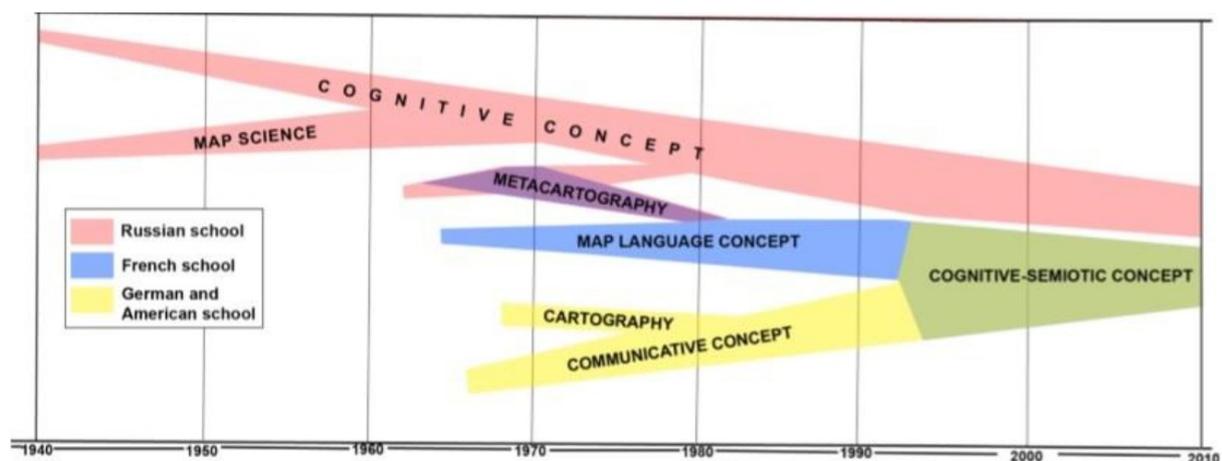


Figure 8. Internationale Schools of cartographic thought (Ignateva 2021a)

4. Cybercartography: A Canadian Conceptual Model of Interactive Digital Atlas Cartography Presenting Theoretical–Technological Integration

At the 1993 International Cartographic Association (ICA) conference, (Fig. 9), a new concept of “Cartography Visualization” was presented (Taylor 1993). In this model, Taylor (1993) suggested linking the conceptual framework model of cartography to visualization (Fig. 9a).

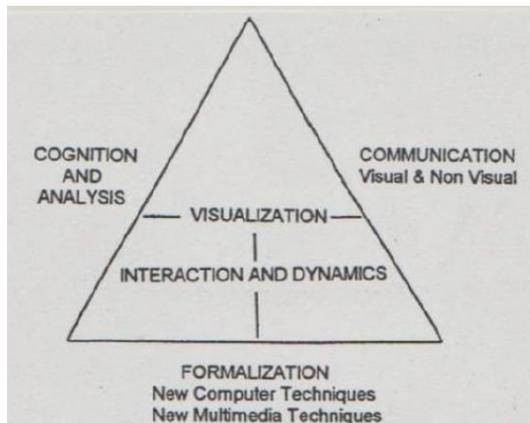


Figure 9. Concept model of cartography (Taylor 1993)



Figure 9a. Fraser Taylor (right), Alan Mac-Eachren and Hansgeorg Schlichtmann at the ICC 1993

A few years later, the concept of cybercartography was introduced at the 1997 ICA Conference (Taylor, 1997); and shortly after, in 2002, the Geomatics and Cartographic Research Centre (GCRC) was launched at Carleton University, Ottawa, Canada.

Here, cybercartography of the 2000s evolved as a multimedia, multisensory and interactive online cartography developed on the innovative Nunaliit Atlas Framework Platform, an innovative open source technology that facilitates participatory atlas creation (Taylor et al 2021).

As such, cybercartography is viewed as much more than a web-based mapping technique. It involves imagination, foresight, as well as a holistic approach that includes bridging science and art, and Indigenous and non-Indigenous perspectives. It is also a part of the paradigm shift towards critical approaches to cartography, presented in an iterative, evolutionary manner. It has a strong qualitative element and includes art, theatre and a range of human activities, emotions and topics not usually ‘mapped’” (D. R. F. Taylor: Cybercartography Revisited. In: Taylor, D. R. F., Anonby, E. and Murasugi, K. Further Developments in the Theory and Practice of Cybercartography. San Diego, Elsevier 2019, p.6).

The integration of the concepts in the “Core-model of Cartography” (Fig 5) (Fairbairn, Gartner, Peterson 2021) with the concepts articulated in cybercartography are presented in an adaptation of the “Core-model”: here, a grey transparency layer emergent from the map foundational level and incorporating the green graphic intrusion of medial elements, is overlaid over the image; and the conceptual elements of cybercartography are presented in the outer circles, with semiotic/storytelling/interactive features noted in the upper hemisphere and technical features in the bottom hemisphere, consistent with the structural analysis in the original model.

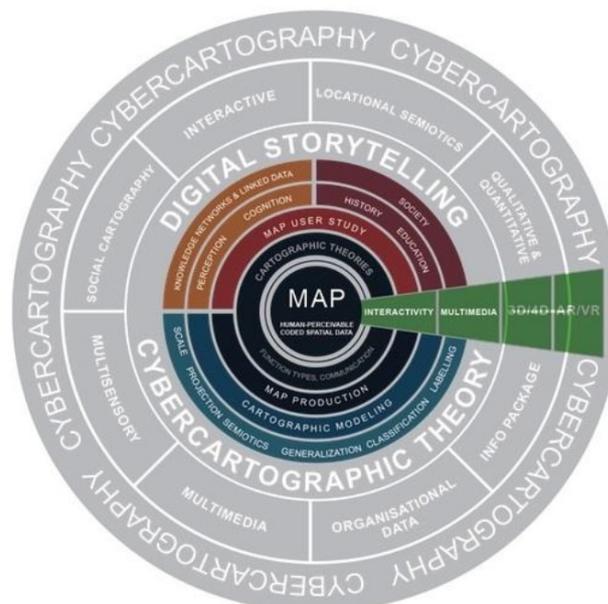


Figure 10. Graphic model of cybercartography, after Fairbairn, Gartner and Peterson 2021 (Thumbadoo, Taylor, GCRC 2022)

This model was developed to show how cybercartography also evolved from the pivotal map description; and the gray transparency over all the text indicates that it incorporates the elements of the Fairbairn, Gartner and Peterson, 2021 model, but also includes the elements of the cybercartography, all also impacted by the medial elements.

5. Semiotic-related Atlasing and Photoatlases

5.1 The History of Atlasing

In the 2010s, the articulation and development of atlasing began as new interdisciplinary, conceptual-semiotic research integrating analysis, creation and use of all kinds of atlases with both cartographic and non-cartographic traditions. Atlasing includes all three generation of atlases (classic or print atlases, digital atlas information systems and digital ubiquitous atlases).

The first structural model of atlasing (after Wolodtschenko 2012) included two new atlas-related topics: semiotic analysis and creation (Fig. 11), forming the two subdisciplines of atlassemiotic and atlasgraphy (atlascreation). Atlassemiotics deals with theoretical, methodological and analytical tasks; atlasgraphy deals with atlas creation (e.g. map-/photo-/text-related atlases).

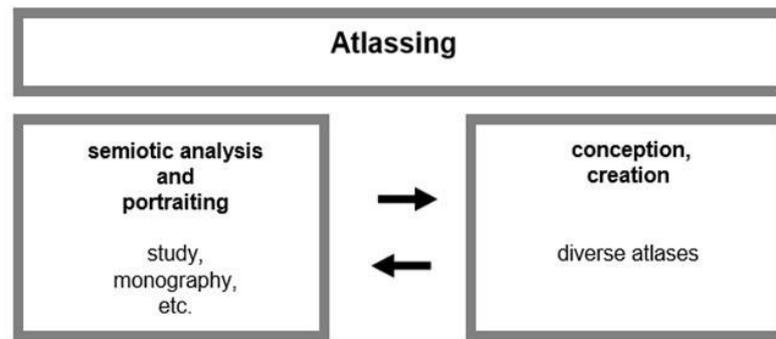


Figure 11. Two structure blocks of atlassing (after Wolodtschenko 2012)

The second structural model of atlassing presented implementation and photoatlassing (Fig. 12) and included three function-related blocks: creation, semiotic analysis and collection of photoatlases.

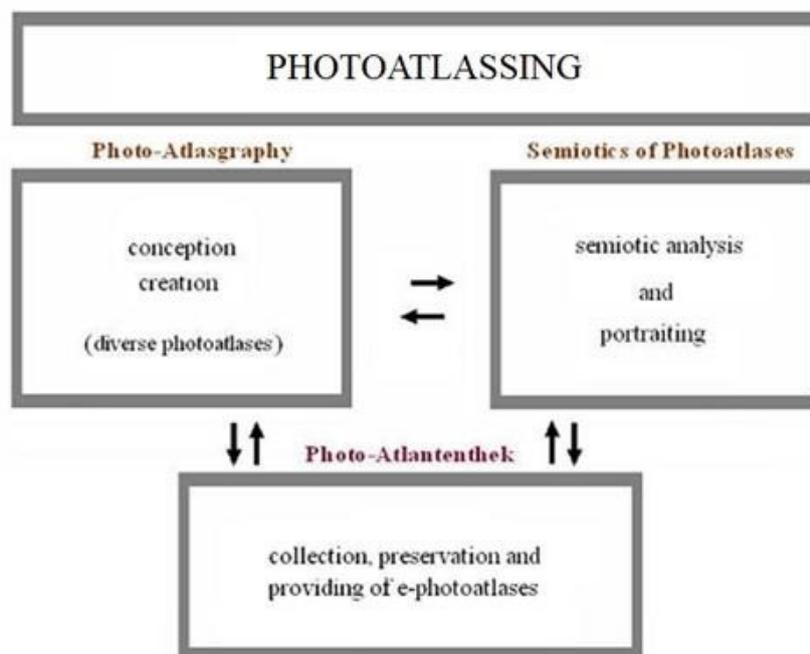


Figure 12. Three structure blocks of photoatlassing (after Wolodtschenko 2020)

Atlassing (with two letters s) is a new interdisciplinary direction in the creation and research of diverse atlases (with cartographic and non-cartographic traditions). Atlassing as a trend has European cartosemiotic roots.)

Atlasing (with one s) is the activity of creating and analyzing digital atlases on specific questions of integration of neuroanatomical images, gene expression data and other signals. Photoatlassing, one of the components of atlassing, is a new applied and epistemological direction in the study and creation of photoatlases (with cartographic and non-cartographic traditions) based on their semiotic classification and in a semiotic coordinate system.

5.2 Semiotic Atlas Classification

The semiotic classification of atlases (Wolodtschenko 2012) includes all kinds of atlases (with cartographic and noncartographic traditions) based on the semiotic information load. The classification of all atlases as semiotic models includes the following four main groups (Fig. 13):

- a) Map atlases (variable MAP dominates with > 50%)
- b) Text atlases containing text (the variable TEXT dominates with > 50%)
- c) Photo atlases (the variable PHOTO/BILD dominates with > 50%)
- d) Atlases with mixed content (without dominance of a variable with > 50%).

The first three groups (map atlases, image atlases and text atlases) are characterized by the dominance (> 50%) of metavariables (map, image, text). The fourth group of mixed atlases includes atlases without information dominance of a metavariable.

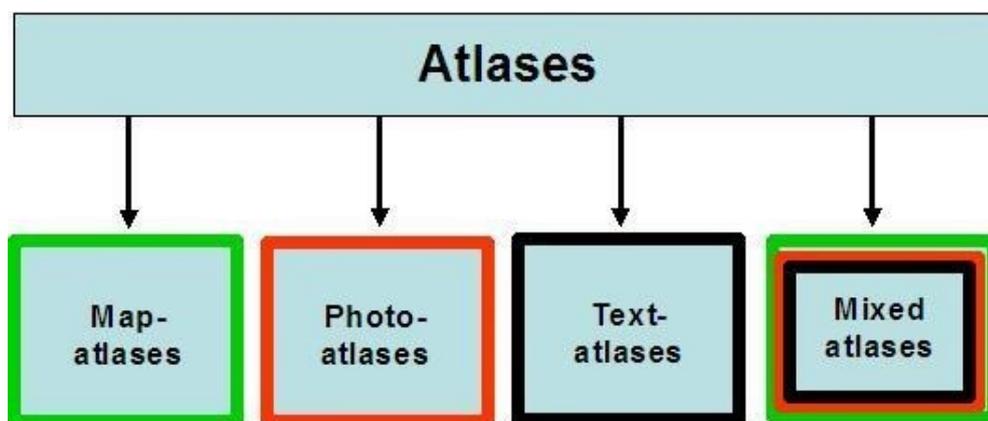


Figure 13. Three structure blocks of photoatlasing (after Wolodtschenko 2020)

Four title pages of selected and semiotically classified atlases: (a) map atlas, (b) picture atlas, (c) text atlas and (d) mixed atlas, demonstrate their semiotic-quantitative potential in the three-axis system model of metavariables (Fig. 14).

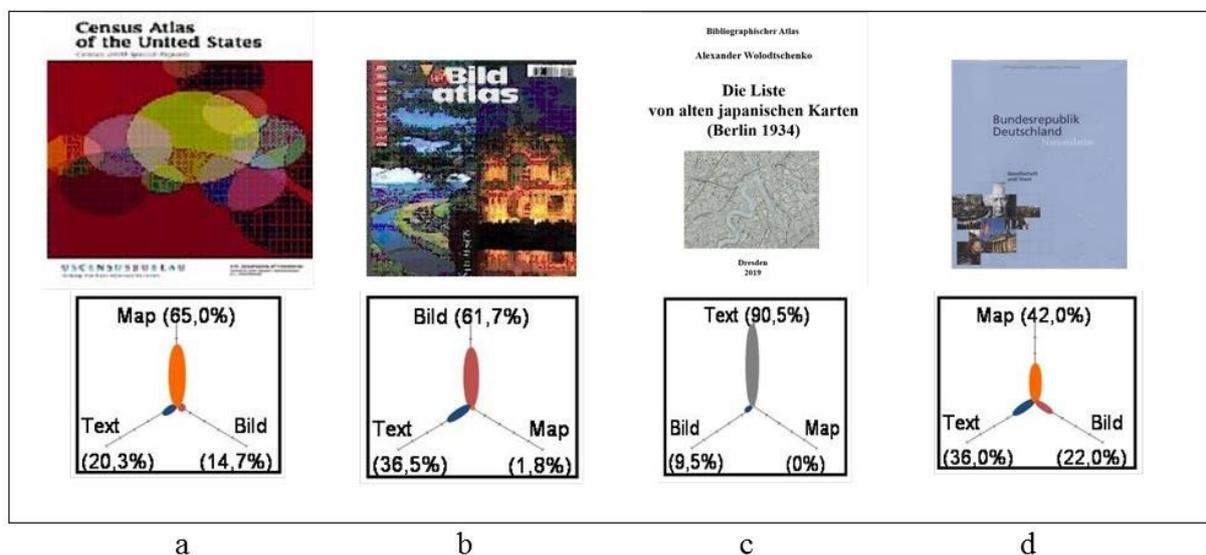


Figure 14. Four examples of atlas classification (Wolodtschenko 2021)

This classification of atlases specifies semiotic meta-variables and separates cartographic and non-cartographic traditions when creating any atlases. Classification makes it possible to unite and simultaneously subdivide all atlases into groups, streamline knowledge about atlases, speed up orientation in the semiotic coordinate system, and implement a quantitative analysis of atlases.

5.3 Ubiquitous Photoatlas-related “Comfort”

Semiotic evolution processes in cartography and atlasgraphy are reflected particularly by ubiquitous photoatlases. The model of information characteristics and meta-variables (text-photo-map) as communication categories or 4M-categories of “comfort” of ubiquitous mini-atlases is shown in fig. 15.

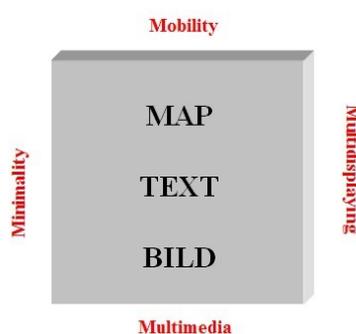


Figure 15. Model of “comfort” and meta-variables (Wolodtschenko 2013)

Table 2 presents four categories of “comfort” of ubiquitous photoatlases. 4M “comfort” – four characteristic conditions for the realisation of ubiquity by photoatlases.

Mobility	Ability to use the atlas while moving
Minimality	Maximum-optimal dimensions of the atlas, for example, using smartphones and tablets
Multimediality	Combination of several types of visual information, such as textual, map and illustrative information in static and/or dynamic form. Visual information can be supplemented by an acoustic component: music, rustles, separate sounds-signals, etc.
Multi-displaying	Presence of two or more screens for visualization and information management

Table 2. Categories of 4M“comfort” of ubiquitous photoatlases (Wolodtschenko 2013)

Several student mono-, two-, three- and four-display photoatlases (fig. 16) for smartphones/tablets demonstrate methodical photoatlas projects with display-related limits (potential) and creative possibilities (Wolodtschenko 2021). Ubiquitous photoatlases implement and contribute the transition from atlas cartography to photo atlasgraphy.



Figure 16. Examples of ubiquitous photoatlases (2008-2010)

5.4 Ubiquitous thematic photoatlases

The history of the ubiquitous thematic image atlases started in the 2000s at the TU Dresden, Institut für Kartographie and was connected with student projects. From the 2010s onwards, pictorial atlas-semiotic and pictorial atlasgraphic research was further realized within the framework of section for eco- and carto/atlassemiotics (ECS) of the German Society for Semiotics (GSS). The GSS is unique support in Germany for photoatlasing (analysis and creation). By mid-2022, more than 200 thematic photoatlases were available for use on the website: <https://atlas-semiotics.jimdofree.com/bild-atlantothek/>

An interesting future awaits the image atlases with new forms of appearance (e.g. ubiquitous storytelling photoatlases). In the 21st century, the pictorial form of thinking (iconic thinking) will dominate over the linear-textual. It is still difficult to say where this thinking will take us.

5.5 Examples of concept synthesis.

Over the last two decades (2000-2020) different resources have evolved and they demonstrate the potential of a synthesis of cartography in Canada and Germany (Tab. 3). The cybercartographic and carto/atlassemiotic accumulation of knowledge and products has reached a level to enable the discussion of the formation of a new integrative conceptualization.

2000-2009	
Concepts	Comments
Cybercartography	<ul style="list-style-type: none"> • In 2003 a major investigation was made at Carleton University, Ottawa and the Geomatics and Cartographic Research Center (GCRC) was established. Prof. Taylor became the founder and director of the GCRC. • Book "Cybercartography: Theory and Practice" (2005)
Meta-cartosemiotics	<ul style="list-style-type: none"> • At the beginning of 2000, an optional course "Cartosemiotics" was set up at the Institute for Cartography, TU Dresden. • Since 2008 the international e-journal <meta-cartosemiotics> (in German/English) has been published • e-lexicon "Cartosemiotics" (2009) • Cartosemiotic seminars and workshops with the ICA Commission Theoretical Cartography

2010-2019

Cybercartography	<ul style="list-style-type: none"> • Book: "Developments in the theory and practice of Cybercartography: Applications and Indigenous mapping".(2014) • Cybercartographic atlases dominate in GCRC.
Meta-cartosemiotics or Meta-carto/atlassemiotics	<ul style="list-style-type: none"> • new section "Eco- and Cartosemiotics" (2015), 2017 renamed Section "Environmental and Carto/Atlas Semiotics" • a new multidisciplinary research direction

2020s

Cyber-Photoatlassing	<ul style="list-style-type: none"> • Book „Semiotische Evolution in Kartographie und Atlassing“ (2020). • First German-Canadian project: photoatlas „10 Selected Indigenous Cybercartographic Atlases“ (2021) - Presentation „Cartography in the Social Media Era: A New Balance and Synthesis“, ICC 2021 in Florence, Italy • Circle of All Nations CAN Photoatlases Projects (2022)
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Table 3. Selected facts of concepts synthesis (Wolodtschenko 2021)

The photoatlas "10 Selected Indigenous Cybercartographic Atlases" (Fig. 17, left) was the first German-Canadian project of 2021, by Fraser Taylor, Romola V. Thumbadoo, (Geomatics and Cartographic Research Centre/GCRC, Department of Geography and Environmental Studies, Carleton University, Ottawa, Canada) and Alexander Wolodtschenko (Section "Environmental and Cartographic Atlas Semiotics", German Society for Semiotics/DGS). The photoatlas is designed for smart phones and tablets. It is compact (up to 25-35 slides with a file "weight" of 10-20 MB), ubiquitous (usable anytime and anywhere), and it presents generalized thematic information about ten selected Indigenous cybercartographic atlases. Fig. 17 (right) shows our second photoatlas "Cybercartography and Photoatlassing Projects" 2022.

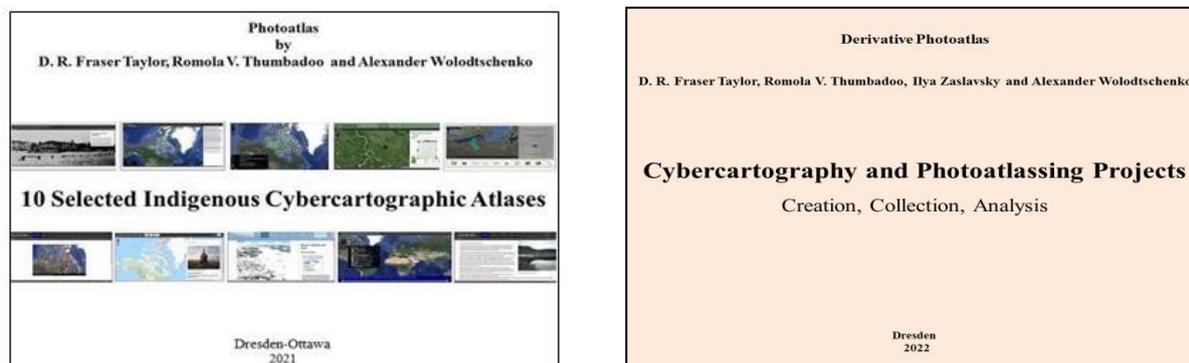


Figure 17. Two title slides of the photoatlas „10 Selected Indigenous Cybercartographic Atlases“(left) and “Cybercartography and Photoatlassing Projects”(right)

5.6 Examples of Selected Photoatlas Projects: Circle of All Nations (CAN) Series

The initiators of the series of photoatlases are Romola V. Thumbadoo (Ottawa) and Alexander Wolodtschenko (Dresden). Our series of photoatlases “Circle of All Nations” (CAN) is dedicated to William Commanda (1913-2011), Indigenous Elder, Political Algonquin leader, chief the North American Indigenous Nations Government, Founder of the Circle of All Nations (a global eco-peace community dedicated to advancing environmental stewardship and racial harmony), Officer of the Order of Canada and recipient of two honorary doctorate degrees.

Over the past two decades, Circle of All Nations (CAN) work has remained focussed on five priorities: Training, Education, Advocacy, Communications and Healing, and hence uses the acronym CAN TEACH to brand its work and efforts. The reflexive text, visual imagery and semantic design employed in the construction of the book aim to bridge incommensurabilities of diverse knowledge streams.

The first photoatlas, a memory photoatlas “William Commanda CAN TEACH Calendar 2022” is based on the William Commanda Calendar 2022 (Thumbadoo, Wolodtschenko 2021).

The second project, the photoatlas “From Circle of All Nations Landing Page to Derivative Photoatlas” is based on the innovative Circle of All Nations Landing Page which introduces the new and old websites and other online work on one platform. The thematic photoatlases “From Day One to Day Thirteen” is the third project which deals with creation of derivative photoatlases, and one of a series of three on the book, “Learning from a Kindergarten Dropout”. The fourth and fifth projects are storytelling, methodical and commemorative photoatlases; the methodical focus is a semiotic analysis of the book. The sixth project is a derivative atlas including five photoatlases and one atlas collection or Bildatlantenthek (in German). All photoatlases (fig. 18) are available from: <https://atlas-semiotics.jimdofree.com/bild-atlantothek/> and <https://circleofallnations.ca>

The list of the six photoatlases follows:

1. Thumbadoo, R.V., Wolodtschenko A. William Commanda CAN TEACH Calendar 2022. Memory-Semiotic Photoatlas. Dresden-Ottawa, 2022
2. Thumbadoo,R.V., Wolodtschenko,A.(2022): From Circle of All Nations Landing Page to Derivative Photoatlas. Derivative Photoatlas, Dresden-Ottawa 2022
3. Thumbadoo,R.V., Wolodtschenko,A.(2022): From Day One to Day Thirteen (From e-book „Learning from a kindergarten dropout“ to Photoatlas). Derivative Photoatlas, Dresden-Ottawa 2022
4. Thumbadoo,R.V., Wolodtschenko,A.(2022): Semiotic Analysis of the Book
5. „Learning from a kindergarten dropout“ (Part 1). Derivative Photoatlas, Dresden-Ottawa 2022
6. Thumbadoo,R.V., Wolodtschenko,A.(2022): Semiotic Analysis of the Book
7. „Learning from a kindergarten dropout“ (Part 2). Derivative Photoatlas, Dresden-Ottawa 2022
8. Thumbadoo,R.V., Wolodtschenko,A.(2022): Indigenous Elder William Commanda in e-book, calendar, web-site, photoatlas collection ... Meta-Photoatlas, Dresden-Ottawa 2022.

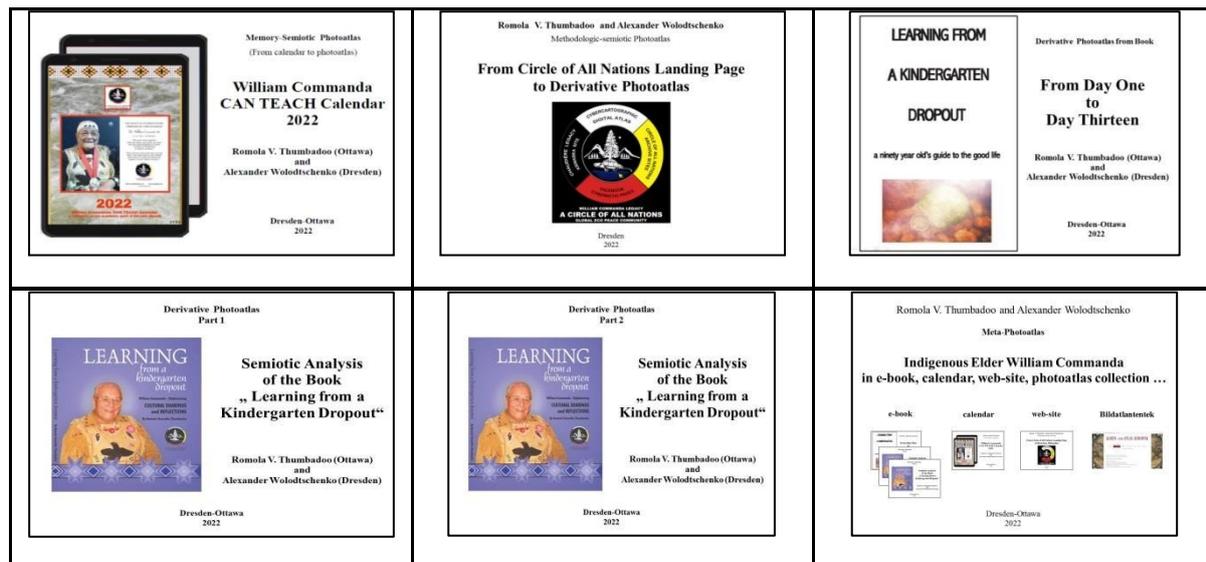


Figure 18. Six title slides of photoatlas projects (Circle of All Nations/CAN Projects)

6. Conclusion

In the 2000-2020 years, two conceptions in cartography were independently developed: one technologically-oriented “cybercartography” in Canada (Taylor 1997, 2005, 2019) and the other theoretically-oriented “metacartosemiotics” in Germany (Wolodtschenko 2011). By 2020 a cybercartographic and carto/ atlasemiotic accumulation of knowledge and products reached a level to discuss the formation of a new integrative concept (Interview with Fraser Taylor, 2020).

What does the new synthesis concept of “Cyber-Photoatlassing” offer for cartography and atlasgraphy? The concept offers new balance for technology and theory. The concept offers methodological synthesis of cybercartography and carto/ atlassemiotics, mapping and atlassing, cartology (Kartenkunde) and atlasology (Atlaskunde). The concept notes also two user-focuses of interests: map atlas-centric focus and photoatlas-centric focus with cartographic and noncartographic traditions.

The Circle of All Nations atlases projects demonstrate the growing integration of the semiotic analysis of photo-narrative locational and cognitive mapping products.

The synthesis of cybercartography and photoatlassing (after Wolodtschenko 2021) characterizes a new phase of multidisciplinary cooperation in technology, theory, methodology and practice in the evolution of innovative approaches to cartography and atlasgraphy.

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