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Synthetic and simplified visualisation of reality through a choreographic map

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Abstract:

Choreme is a synthetic form of cartographic representation of a given geographical area with characteristics related to complex political, demographic, economic, spatial organisation and dynamics, globalisation and other issues. The term ‘chorem’ (fr. ’chorème’) is a geographical neologism coined by Roger Brunet in 1980 (Brunet 1980), based on the Greek word ‘χῶρος - chôros’ (gr. ‘territory, extent, place, country’). Brunet defines chorematics as an ‘alphabet of space’ in which each chorem is an ‘elementary structure of space’. Using visual metaphors, choreme provides a highly effective approach to helping users discover some facts and new patterns. In addition, it effectively represents geographic knowledge, facilitates visual summaries of data, and could ultimately be used to create a new input for geographic databases. Cartographers perceived the choreme map as a decision support tool, particularly for domain experts, as such a synthetic visualisation provides quick and comprehensive answers in critical situations.

In the 1990s, choremes were used as a convenient and fast alternative to the commercial GIS in GIP RECLUS publications e.g. La Géographie Universelle (1990 - 1996), and many research papers were published in *Mappemonde*, a journal founded in 1986 by Roger Brunet and Robert Ferras (Bielecka et al. 2024). The chorematic technique is useful for providing a current diagnosis and for representing the future through a scenario, projection, or forecast. As noted by Battistoni et al. (2021) chorems are mainly used in the environmental domain, where they tend to demonstrate utmost efficacy of geographical characteristics and related phenomena and are thus appropriate for both technical and nontechnical people. Dukaczewski et al. (2024) based on the choremes available in the literature and the authors' research carried out comparative analysis of choremes aiming to establish a typology of this cartographic visualisation based on thematic scope and level of generalisation. Finally, two main groups were proposed: spatial and spatio-temporal choremes within which each economic, physiographic and complex choremes were distinguished. Each group was subdivided into subgroups based on the model, the entities and their measurement level, the visual variables, the elementary functions as well as the type of transformation of the space and generalisation operators.

Since the 1990s there has been an ongoing discussion in Poland about the direction of the country's development, and for at least a decade about sustainable development, also known as responsible development. In discussions about development directions, it is extremely useful to have synthetic, preferably visual, information about regions and places of particular importance. These include metropolitan areas and areas of influence, as well as areas at risk of social or economic exclusion or security. The goal of our research was to propose the method of designing static and dynamic choremes, taking into account our previous research on choremes typology (Dukaczewski et al. 2024) as well as investigations on entities methodology of designing of spatiotemporal animations for users from different age groups (Dukaczewski 2019). We have proposed a method, which allows to facilitate the design of choremes and avoids semiotic errors during its visualization for users from different age groups. The next stage was to test it. During this stage, our research focused on visualizing the synthetic state of Polish development, indicating chorematic functions such as specialization, gradient, closure, tropism, surface, trend surface, asymmetry, and gravity. The results allowed us to recommend a visual solution that will help the public and public administration understand the problems of spatial development in Poland by showing the spatial distribution of areas that represent strong (drivers) and weak (brakes) opportunities for necessary socio-economic changes.

The country’s area was generalised to the hexagon. Points represent cities by size and colour as graphic variables. Lines differentiated in colour, shape, size and orientation portray borders (e.g. EU), barriers (sea- socio-economic development, mountains and rivers - environmental tropism) and closure (national border). Circles represent major cities in Poland – their functions, while gradients influence the other parts of the country. Polygons (size and colour) show the area of

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interest and interline dissymmetry, such as the northern and eastern periphery, where urbanisation lag and transformation shock occur.

The map language is one of the most important means of social communication. Chorems are based on their individual map language which translates geographical data into geographical information through visualisation, albeit in a very generalised and synthesised way. Using the chorem-based paradigm, politicians and planners can effectively communicate with and involve citizens in the decision-making processes that affect their lives, ensuring that the decisions made are more sustainable and supportive of the community's well-being. As noted by Bielecka et al. (2024), today's society often uses icons and emoticons when working with applications and different devices, so chorems should be intuitive and understandable to them.

Finally, we conclude that an important principle in designing schematic visualisations is the congruence, appropriateness, and parallelism between the map and the real world.

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