

IMPORTANCE OF EDUCATION IN CARTOGRAPHY

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Abstract

Contemporary education, apart from other things, means to acquire ability to use and read maps. The map is an indispensable means of researching and reporting the exploring results. It has an advantage over natural language because it is simpler and more encompassing for a certain kind of information due to the usage of signs which give it the universality. The language of the map is the language of graphics which stand in the same order in alphabet, numbers and articulation. That is way the map can be understood in its basic shape and independent of the written language.

The map as a model of real space has a significant role in acquiring the scientific view of the world which is one of the main goals of education and formation of personality. The map content is very complex so that its understanding takes a few steps. First of all, we must perceive its outer content given by an adequate cartographic method concretely and visually with plasticity and signs. At the higher level of education, the inner content, structural and illustrative, the essence of which is to understand the regularities of distribution and intensity of phenomena and processes of geographic environment as well as their interrelations should be studied.

The subject matter of cartography is linked, on the one side, with the general philosophic theory of knowledge, through categories of space and time, and on the other hand, with corresponding sciences of scientific disciplines, through cartographic method and language. Language of map can be considered as second language of geography. Cartographic language is much more complex than the language itself due to different ways of putting words into a sentence. In natural language that process is linear and words have grammatical forms. The process of reading maps is spatial, across the whole map, and depends only on the position of the mapped phenomena, objects and processes.

The maps are mathematical and logical models, which are not just an illustration of the contents of the real space, but also of their specific and relational traits which can't be seen at first sight. The maps are the expressions of higher creative thinking which advances the didactic process.

Introduction

The cartographic method requires knowledge not only of the subject of research but also of the graphic-cartographic principles of the content representation. It is a special “language” of representation of researching results and as such usable even for laic.

The cartographic method is characteristic for all spatial sciences. Today cartography is defined as science about transmission of graphical information and map as special information channel. The language of map is the language of graphic. Signs are only graphic expressions until they become the elements of map contents and get their connotations. The geographical map permits to study of regular distribution of objects, phenomena and processes in space system, their mutual connections and conditions, which brings to the scientific conclusions about the change of geographical look of the observed territory. It is irreplaceable means for research and scientific interpretation and presentation the reaching results.

The map is conditionally mathematically reduced, generalized and designed picture-symbols model of the appropriate spatial entity on the mathematical surface (globe) or on the mathematical plane (plan, map).

The geographical map gives not only clear picture of the geographical disposition of objects, phenomena and processes, but also enables study of regularities of the disposition itself, their correlations and interconnections which results in decision-making and gives the scientific base for elaboration of a thesis about transformation of the geographical look of the territory which is observed.

Education in Cartography as a Functional Advancement in General Education

Contemporary education, apart from other things, means to acquire ability to use and read maps. The map is an indispensable means of researching and reporting the exploring results. It has an advantage over natural language because it is simpler and more encompassing for a certain kind of information due to the usage of signs which give it the universality. The language of the map is the language of graphics which stand in the same order in alphabet, numbers and articulation. That is way the map can be understood in its basic shape and independent of the written language.

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Education in cartography means complex knowledge of and dealing with the following gnostic problems:

- a) spatial definition of objects, phenomena and processes in mathematico-geodetic systems;
- b) time correlation of processes and phenomena and their evolutionary development by fixation of certain time or location in certain time system; c)
- c) essential definition of the objects, phenomena and relations of the real world by quantification and qualitative traits.

Meaning in Cartographic Semiology

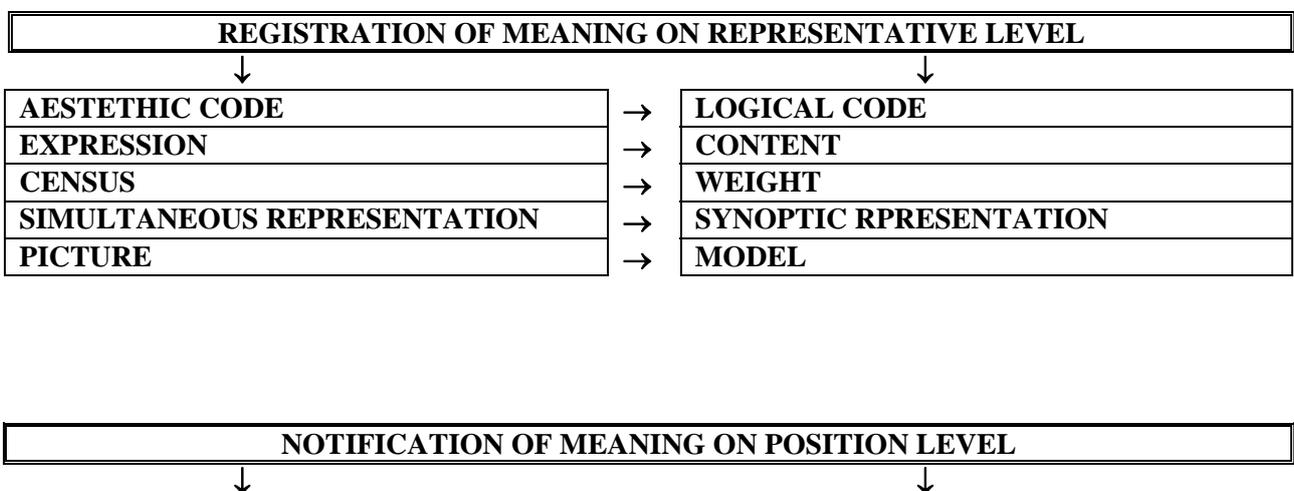
Process of meaning develops on three different levels:

1. The level of **representation** – registration of meaning,
2. The level of **position** – communication of meaning,
3. The level of **composition** – processing of meaning.

This fact clearly shows theoretically as well as methodologically that cartographic signs have all the general characteristics of the other sign systems. The undertaken researches and obtained results give possibilities for further development of the basic elements of the system, i.e. metasystem, of cartographic science and expertise. This system is based on three important suppositions:

- **Ontological**, substantial – geographical reality,
- **Gnoseological**, attributive – the theory of universal, particular and singular,
- **Semiotic**, relational – semiology, semiography.

These are three foundations on which cartography builds up its position in the global system of sciences.



REAL PERSPECTIVE	→	OPPOSITE PERSPECTIVE
EXPONENT CONTENT	→	IMMANENT CONTENT
WITHOUT OF SCALE MAPPING	→	SCALE MAPPING
COMMUNICATIVE FUNCTION	→	COGNITIVE FUNCTION
OPERATIONAL PURPOSE	→	SOCIAL PURPOSE

PROCESSING OF MEANING ON COMPOSITE LEVEL

↓		↓
THEMATIC MEANING	→	SEMANTIC ASPECT
SPATIAL MEANING	→	SIGMATIC ASPECT
SCALE MEANING	→	SEMIOMETRIC ASPECT
APPARENT MEANING	→	SYNTACTIC ASPECT
INTERPRETATIVE MEANING	→	PRAGMATIC ASPECT

Sign and Meaning

The subject matter of signs and meaning have a great importance in ontological development of man. Signs affect our vision of the world since they carry certain cultural and social heritage. In geography, it is maps through which a science development could be traced since they are a product of geographic knowledge of one time.

Each mapping starts with visual observation and object imagination. Observation means seeing prominent characters of the object in order to identify phenomena. Making visual images of an object is a specific approach to an object and seeing even invisible parts as well as investigating their contours, surfaces and textures thus making a structural pattern. Visual observation followed by mapping is not a mere mechanical illustration of reality but active process where a cartographer formulates reality consciously. That is why cartographic expressions contain a direct and potential information. An investigation on a relationship between the language and thought is an interesting problem as is the relationship between the language of cartography and thought.

The sign and meaning have their own autonomy. The sign is a sensual stimulus while meaning is a complex of intellectual and emotional relations between a certain sign and subject, sign and sign object and other signs of the same system and sign and measure in the process of studying reality. Cartographic signs are monosemic, but there is also a possibility of their polysemic meaning. For example, contour lines denote the height above sea level, but also a shape of relief.

All the cartographic signs are linked with meaning through associative and symbolic meanings. Associative connections of signs and meanings are less investigated in the theory of meaning than symbolic connections. In conjunction with them they formulate a special kind of signs called symbols. A notion of cartographic symbol is used in cartography in various meanings with no definite distinction between that notion and the notion of cartographic sign. In theory, symbols are regarded as signs of a higher level.

In cartography, in the process of mapping as sensual fixations, shapes are a starting point for establishment of notions. In addition to the shape, constant variables are the size and colour. In

creation of meaning of cartographic signs all visual variables appear, but only shape, size and colour are included in our notions. These three variables are primary characters in constitution of spatial (object), thematic (mental) and scale (metric) meaning.

The language of cartography has not evolved from the natural language but simultaneously with it as its graphic equivalent. The language in which maps are constituted, drawn and written is considered the language of cartography. It has its own structure, function and genesis. The structure of cartographic language consists of a system of cartographic signs constituted as unity of sign parts, identified through cartographic practice, with multidimensional and complex meaning. Basic functions of the language of cartography, cognitive and communicational, are derived from the system of cartographic signs.

Systematization of the structure of the language of cartography is achieved by unity and hierarchical progression of universal, particular and singular characters of each cartographic unit. A unique characteristic of each singular unit of cartographic signs is its multidimensional meaning, while hierarchical progression of the unity is expressed in the shape and colour of cartographic signs. Another organization of the language of cartography structure originates from scale (metric) equilibrium of the system of cartographic signs, i.e. from metric scales.

Apparent (linguistic) meaning and interpretative (practical) meaning is another way of playing communicational role of the cartographic language. In relation to reality, the language of cartography is analogous, illustrative, but it also has all the elements of convention, i.e. of agreement on in which way created signs will be denoted.

A connection between analogous and conventional interpretation of the system of cartographic signs is established on the basis of rules called codes. The codes may be logical and esthetic. The system of cartographic signs becomes complete when its logical and esthetic codes are defined. In old maps, the esthetic code is a principal code. When mathematical projections were invented esthetic coding gave place to logical one.

Logical and esthetic coding is also applied in defining relations between elements of signs in cartographic texts. By applying the mentioned codification a relationship between the language of cartography and reflections of cartographer and mapped object is established.

Structure of Map Content

The structure of map content, in the unity of individual and general, can be found out through the analysis by means of the dialectic dichotomy. The dichotomy of the map content consists in dividing its content into: exposed content and the immanent content. The exposed content is concretely, immediately and visually expressed on the map by an adequate cartographic method in form of plasticity and of signs: it is ostensive and plastic. The immanent content is the intrinsic property of the exposed content in the dialectic unity of diversity, many-sided connections and contradiction of factors in the spatial development of mapped objects and phenomena: it is constitutional and figurative. The immanent map content is divided into: the educative content and the productive content.

By analytico-synthetic method we can:

- 1) to distinguish the educative contents as intrinsic factors, elements, magnitudes, indexes, etc. of the mapped objects and phenomena and
- 2) to derive the productive content:
 - a) as relations, structures, intensity, frequency, dynamics, etc.;
 - b) to determine the division in zones, areas, tracts, regions etc.;
 - c) to found out the characteristics, trends, rules, laws and other deductions on spatial development of mapped objects and phenomena and
 - d) on the basis of the exposed and immanent contents is drawn a new map, the contents of which is further cyclically utilized as source of information.

Productive map content is newly created content in specific process of cartographic cognition of spatial reality as a complex and dynamic system. With small scale maps, i.e. with bigger degree of generalization, relations between exposed and productive contents are changing so that in exposed content more and more weaves productive content with scientific conclusion and, at the same time, exactness of educative content is lower.

By dyhotomous analysis of map content it can be shown its content as unity of particular and general, as well as dyhotomous comprehensive of map content as way of getting knowledge about general in particular through that particular. That treatment of map content consider process of making and functioning a different forms of cartographic information.

The dichotomous property of the map content constitutes the base for the systematic classification of its content. Dichotomous treatment of the unity of map content conditions a special methodological approach to the map with gradual conclusions: on the first degree by the interpretation method one learns the exposed content; on the second degree by the exact methods one learns the educative content; and on the third degree by combining various methods one reaches the productive content.

Conclusion

A dichotomy of denotative (or explicit) and connotative (or implicit) meaning was presented along with the contention that this dichotomy is not as discrete as often implied. Through repeated use, connotation can evolve toward denotation.

Map has an advantage over the natural language, because for particular kind of information it is considerable simple and much more perceptive. Application of signs gives map universality, because it is comprehensible in its basic shape and it is not dependent of written language.

This multiplicity can help us understand how these signs operate in geographic perception and reception, interpretation and opinion making, prognose and development of geocartographic culture. A special feature of the language of cartography is the unity of a logical and esthetical code of signs, sign systems and the language itself what makes cartography independent science.

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