UDC – 912.4

Nigmatov A.N., Doctor of Geographical Sciences.
Professor of Ecology and Geography Department of Gulistan State University
Abdireymov S.J., Candidate of Geographical Sciences
Assoc. Prof. of Geodesy, Cartography and Natural Resources Department of Karakalpak State University named after Berdakh
Embergenov N.J., Candidate of Geographical Sciences
Assoc. Prof. of Economic and Social Geography Department of Karakalpak State University named after Berdakh
Tursinov M.J.
Senior Teacher of Economic and Social Geography Department of Karakalpak State University named after Berdakh

SOME THEORETICAL AND PRACTICAL PROBLEMS OF MODERN CARTOGRAPHY

Annotation: *The article provides a detailed analysis of the current state of the science of "Cartography" on the example of Uzbekistan, identifies problems and offers suggestions for their theoretical and practical solutions.*

Keywords: *Cartography, education, analysis, problems, solutions*

Introduction. Paragraph 1 of the Decree of the Cabinet of Ministers of the Republic of Uzbekistan dated 15.03.2018 "On the development and publication of the National Atlas of Uzbekistan" No. 204 raises the issue of creating a fundamental scientific-lexical work in order to have a full imagination of the socio-economic potential and natural-geographical situation of the Republic. In order to carry out the National Atlas, which is accepted as a symbol of the state, at the level of modern requirements, it is necessary to conduct appropriate scientific research. Scientific research, on the other hand, encourages clarification of the concept, purpose, and methodological aspects of the science of Geography, including Cartography.

“Cartography is a science that teaches how to describe and use it as a source based on research methods, mathematical reduction and generalization of

the location and relationship of events and phenomena in nature and society, as well as their properties that change over time, mathematical representation of them in a mathematical way using special models of images and their use as a source of research" described the cartographer, prof. T.Mirzaliev [1]. This definition is very complex, it includes words such as "the interdependence, characteristics and change of events and phenomena in nature and society". But Cartography may not always reflect the unity, location, interdependence, characteristics, and change of nature and society. The science of cartography studies not only the unity of nature and society, the event and phenomenon in it, but also the state of their separate or interrelated.

Main part. Modern cartography is a system of scientific knowledge related to study of the design, creation, reproduction, transmission, modification, and implementation of maps that reflect nature, society, community and state, situations, events and the process between them in an offline or online mode. Simplified, modern cartography is a system of scientific knowledge of maps of a social nature. At the same time, we have not dwelled on the type, shape, scale, type of dynamic maps, and there is no need for it in the interpretation of science. After all, the concept of "map" needs a theoretical basis and is a separate object of major scientific debate [2].

The science of cartography is the ability of people to understand, know and comprehend the science of cartography. Derived from the Annotated Dictionary of the Uzbek Language [3], the words used in cartographic science can be described as follows: **comprehension** - to understand how much the science of cartography is necessary for the development of man, society and community; **to know** - to know the content and essence of the science of cartography; **to understand** - to correctly assess the theoretical and practical significance of the science of cartography.

In the explanatory dictionary of the Uzbek language, research is used in two different senses. The first is research work, verification, study. The second was seen as the result of scientific research. Unfortunately, this dictionary does

not reveal the true meaning of the word research. In S.I. Ozhegov's dictionary [4] the word research is considered as scientific research and observation. But observation is a method or method of learning. In Wikipedia, research is, in a broad sense, the systematization of research in order to search for new sciences or to identify facts. In the narrow sense - a scientific method of studying something. There is no certainty in this either, as not everyone pays attention to or understands the “systematization” in determining the zero facts. It is also impossible to say that it is a "scientific method" because it is not a research method, but an analysis and synthesis (generalization) of any facts. It uses different research methods. The methods selected will be either scientifically based or applied in practice. In our view, scientific research is the process of studying, discovering, creating, and describing a situation, event, phenomenon, or process by humans using clearly structured methods. Methods of scientific knowledge systematized in science are methodology.

Cartographic research is the process of studying, discovering, creating, and describing in writing the situations, events, and processes that are or should be reflected in maps by people using clearly structured methods. Then:

✓ Systematization - the process of breaking down a situation, event and process into parts for a specific cartographic research and placing them on a hierarchical level;

✓ Method - empirical (practical) and theoretical (logical) methods of conducting cartographic research;

✓ Learning - mastering and possessing cartographic research

✓ Create - the creation, invention and solution of a problem or an innovative approach to a problem through cartographic research;

✓ Discovery - the discovery of a particular law or laws through cartographic research

✓ Written statement - a written statement or statement of the results obtained through cartographic research.

Dozens of words in the scientific literature on the concept of science methodology [5], such as reality, objective being, process, principle, tool, method, doctrine, theory, practice, organization, do not allow it to be applied in practice and easily understood by students. For example, in the general education block of the entire 1st stage master's curriculum of higher education there is a 36-hour training module "Scientific Research Methodology". However, when studying masters on the subject "Questionnaire", the level of mastery of this course did not increase by 15-20% (Table 1). Therefore, in order to assess this credit module in the curriculum of the master's specialty "Geodesy, Cartography and Cadastre" of the university, we consider it expedient to conduct a sociological survey of them through the following questions and assignments: What do you mean by "Subject of cartography"? What do you mean by "Science of cartography"? Explain the general and specific aspects of "Subject of Cartography" and "Science of Cartography"! What do you mean by “cartographic scientific research”? Explain the research methodology and its place in cartographic research! Systematize cartographic research methods from a methodological point of view!

Table 1. Indicators of mastering the course "Scientific Research Methodology" by masters of higher education

The name of the experienced university	***The direction of the master's degree surveyed***	***Number of masters involved in the experiment***	***Those who gave an incomplete answer***	***Those who could not answer***
			In %	
National University of Uzbekistan	Ecology and environmental protection	23	20	80
Gulistan State University	Methods of teaching geography	6	15	85

Tashkent State Pedagogical University	Methods of teaching geography	16	18	82

Give a scientific understanding of the term "methodology"? Explain the content and essence of the research methodology in cartography! Are you satisfied with teaching the subject "Methodology of Scientific Research" in the general methodological block of the master's degree? Your suggestions on how to teach the subject "Methodology of Scientific Research" in the master's degree! What would you like to know about this course?

Methodology is a set of teachings on scientific methods of knowledge, or rather a system here [6]. Cartographic methodology in the broadest sense is the selection, fragmentation and systematization of cartographic methods based on the current political situation, social conditions, economic opportunities, institutional situation in the conduct of cartographic research. In the narrow sense - a system of teachings on cartographic methods of scientific knowledge. Then:

✓ Cartographic science - people's ability to understand, know and comprehend the science of cartography;

✓ Cartographic research - the process of studying, and the process of describing them in writing, creating, discovering the situation, event, event and process reflected in the maps by people using clearly structured methods;

✓ Cartographic methodology - the selection, fragmentation and systematization of cartographic methods based on the current political situation, social conditions, economic opportunities, institutional situation in the conduct of cartographic research.

Summarizing all three concepts, the methodology of scientific research in cartography - the ability to understand, know, comprehend, choose cartographic methods based on the current political situation, social conditions, economic

opportunities, institutional situation for the study, discovery, disclosure and description of cartographic research, disassemble and systematize them.

✓ It is advisable for each cartographer to follow the following systematic approach in conducting research methodology:

✓ Mastering the system of scientific knowledge related to the design, creation, reproduction, transmission, modification, implementation of maps depicting nature, society, community and the situation, event and process between them offline or online;

✓ Conscious understanding, knowledge and understanding of the current situation, event, process occurring in the science of cartography;

✓ To determine the level of study of problems in the science of cartography and issues related to its solution;

✓ Be able to clearly imagine the goals and objectives of the research and to define the topic in terms of its object and subject matter;

✓ Identify methods used in cartographic research on the selected topic;

✓ Distinguish the identified cartographic research methods in accordance with public policy, social conditions, economic opportunities, institutional (sustainable integration) situation;

✓ Systematization of isolated methods according to the research process, i.e. their vertical placement in a certain sequence (according to importance) on a hierarchical level;

✓ To make additions and changes to the selection and systematization of methods in accordance with the situation that has arisen in the course of the research;

✓ Follow a systematic approach in writing the obtained methodological results.

In the methodology of cartographic research, it is very important to take into account the political situation in society, the state, the international community, forward-looking sources of international law, laws, concepts, programs, plans, strategies or roadmaps. For example, the Law of the Republic

of Uzbekistan "On Geodesy and Cartography", adopted on July 2, 2020, and the concepts given in Article 3, to apply in the research process or to express your attitude to it, i.e. to make suggestions and scientifically substantiate.

In choosing the methods of cartographic research, it is necessary to take into account the social conditions, i.e. whether society needs it, the possibility of mastering the system of knowledge, norms and values. This means that "Philosophy" is based on scientific knowledge, "Sociology" is based on the development of social associations (for example, the development of nations and countries according to their social conditions), "Psychology" is based on the mental state of people, "History" is based on periodic changes, "Ethnography" should not be left out of consideration of the law and regulations in the life of the local people. Otherwise, the research methodology may not yield positive results and practical results. For example, in the selection of methods for a cartographic object, one of the most effective tools is a quantitative and qualitative assessment of the social situation within it.

In the process of methodological approach to cartographic research, consideration of economic opportunity is reflected in its positive results. However, at a time when market relations are becoming more pronounced, it is important to know whether the researcher and his or her research institution have the opportunity to use selected research methods. Suppose there are not enough financial and material resources to purchase, launch and use them. In this case, it is better to abandon the choice of this method. For example, in cartography, you chose methods for the digital economy. The digital economy is an economic activity based on digital technologies, i.e. the development of digital goods and services related to e-business and commerce. But the author keeps the innovative methods secret. While you are currently unable to purchase these technologies, you will have to temporarily abandon their use in scientific research methodologies.

Another issue is to take into account the institutional situation in scientific research methodology, i.e. the researcher has to “sustainably unite” with

practitioners, scientists and experts to apply cartographic methods on their own. In doing so, it is important to find an answer to the pertinent question of who should have a sustainable merger and what methods will work for you. Taking into account the institutional situation and applying it throughout the research will undoubtedly yield effective results.

In the systematic analysis of the written expression of scientific research methodology - imagining a hypothesis> creating a concept> creating a framework (program and plan)> developing a theoretical basis> requires a certain hierarchy (step by step) of methods for practical application.

In conclusion:

The rise of cartographic practice to a new online stage requires a reconsideration of its scientific and theoretical foundations;

Cartography can be defined as a system of scientific knowledge related to the design, creation, reproduction, transmission, modification, implementation of maps that reflect nature, society, community and the state, situation, event and process between them offline or online;

cartographic science is the ability of people to understand, know and comprehend the science of cartography;

cartographic research - the process of studying, creating, discovering and describing in writing the situation, event and process reflected in the maps by people using clearly structured methods;

cartographic methodology - selection, division and systematization of cartographic methods based on the current political situation, social conditions, economic opportunities, institutional situation in the conduct of cartographic research;

In general, the methodology of scientific research in cartography - the ability to understand, know, comprehend, select, divide cartographic methods based on the existing political situation, social conditions, economic opportunities, institutional situation for the study, discovery, disclosure and written description of cartographic research and is to systematize them;

the hierarchical passage of a 9-step hierarchical approach in the conduct of any research cartographer's research methodology dramatically increases the effectiveness of the results.

References:

1. Mirzaliev T. Cartography. Textbook - T .: "Publishing House of the National University of Uzbekistan", 2002. 6 p. (in Uzbek)

2. Ilm, fan. Explanatory dictionary of Uzbek language 1–4-iss. – T.: "UzME DIN", 2006-2007 y. (in Uzbek)

3. Nigmatov A.N., Ibragimov O.A. EPRA International Journal of Environmental Economics, Commerce and Educational Management. Journal DOI: 10.36713/epra0414 Volume: 7| Issue: 2| September 2020.

4. Research. Dictionary of the Russian language. Ozhegov S.I. - M.: "Onyx 21st century", 2004. - P.299. (in Russian)

5. Shermuhamedova N.A. Methodology of scientific research. Textbook. – T.: "Fan va texnologiya", 2014. 512 p. (in Uzbek)

6. Nigmatov A.N., Allanov K.A. Methodology of Natural Geographical Sciences. International Journal of Multicultural and Multireligious Understanding ISSN 2364-5369 Volume 8, Issue 5 May, 2021. Pp. 201-206 p.

7. Address of the President of the Republic of Uzbekistan Shavkat Mirziyoyev to the Oliy Majlis (UzA , http://uza.uz/oz/ 25.01.2020).