

# THE ROLE OF CARTOGRAPHY IN THE TEACHING OF SCHOOL GEOGRAPHY, TAKING INTO ACCOUNT MODERN TRENDS (ON THE EXAMPLE OF GEORGIA)

**Demetre Modebadze, Saba Modebadze**

PhD Student Demetre Modebadze; PhD Student Saba Modebadze  
Ivane Javakhishvili Tbilisi State University  
1-3, Ilia Tchavtchavadze Avenue, 0179 Tbilisi, Georgia  
telephone: 597 22 26 16; 579 71 17 15, e-mail: [demetre.modebadze@tsu.ge](mailto:demetre.modebadze@tsu.ge);  
[saba.modebadze618@sps.tsu.edu.ge](mailto:saba.modebadze618@sps.tsu.edu.ge)

## **Abstract**

*The era we live in is constantly filled with innovations, challenges, and modern technological achievements. All scientific and non-scientific fields contribute to these existing challenges. The modern education system can aptly be described as the “age of spatial information.” Our reality today is as follows: the primary method of visualizing spatial information is through maps—a subjective reflection of objective reality. Georgia is experiencing difficulties due to a shortage of young personnel. In school education, geography, and more specifically, cartography, is not presented in a manner that engages students to explore a field of incredible scale and great potential. Studies conducted show that the number of young people interested in advancing to the bachelor’s level decreases annually. Based on the observations and research conducted, you will gain a complete picture of the gaps in cartography and GIS education and the mechanisms to address them.*

**Keywords:** cartography, map, geoinformation technologies, school geography

## **HEADING**

We can confidently state that the era in which humanity currently exists can be called the age of spatial information. Years ago, no one could have imagined that any consumer sector would become dependent on electronic systems and that every industry or direction would become entirely reliant on digital technologies. Using technology, we receive, use, process, and transform vast amounts of information daily; therefore, we save both time and financial resources. However, even two to three decades ago, the prospect that cartography would clearly and directly become the most important resource and means of development in any field seemed completely unimaginable. Today, digital cartography is one of the most promising directions, without which proper functioning in the healthcare, entrepreneurial, infrastructural, consumer sectors, environmental, sports, and tourist-recreational fields would be impossible. It would be exhaustive to list each area that benefits from the achievements of modern cartography and achieves unprecedented success. Here, we celebrate the international conference on geoinformation systems held at Tbilisi State University, where the significant role of this field in the smooth and successful operation of all ministries, agencies, and businesses in our country was clearly demonstrated.

## **RESEARCH AND MATERIALS USED**

The primary method of visualizing spatial information is the map, which is a subjective reflection of objective reality (Aslanikashvili, 1968). Its popularity is largely due to its potential to visualize the spatial distribution of selected information, offering a completely new perspective and presenting its digitized version to interested users. The ubiquity of maps has increased so much that they can be found and accessed by various means almost everywhere, as the World Wide Web has ensured that these approaches and their application as mechanisms for building geographic information systems have become accessible to everyone. This has necessitated the societal need to become proficient map users and to develop an appreciation for maps, fostering the need for experts in this field. Here, professionalism is essential to creating a much-needed and important product.

A critical issue, which this work addresses, is determining at what stage our education system is in this direction, to what extent it supports existing challenges, and at what level interest lies in the field of school education, which should indeed inspire young people to pursue future and university education, and subsequently a profession, in cartography and geographic information technologies.

Our research focuses on the role of cartography, a dynamic and rapidly growing field, in the teaching and development of school geography. Modern cartography develops along five paths. In this aspect, it is an exceptional field within the classification system of the sciences. Cartography is an academic discipline that possesses its own subject, methodology, and a specific language in the form of map symbols. The second path of development involves military cartography, which plays a crucial role in ensuring the defense capability of a country. The third path is methodological, presenting cartography as a method in fields that study their subjects in a spatio-temporal context. The fourth path sees cartography as an art form enhanced by cartographic design. Finally, relevant to our work, cartography serves as a teaching discipline, interestingly at the school education level.

The popularity of maps, especially digital versions, and the demand for them on Android or iOS devices are actively growing worldwide. Maps are used by people of all ages, occupations, and hobbies. As a result, many countries have begun to integrate the necessary skills into school geography curricula. Developing the skills to create or use a map has become a critical component of modern school education. Moreover, students increasingly envision themselves in this profession from a young age, largely because the field and profession are introduced to them effectively, sparking their interest in pursuing this specialty. The more adept people become at using maps, the better they will interpret spatial information, both on the map and about their surroundings. Consequently, they will find it easier to understand and engage with the world; map skills are a crucial part of geographic competence that can satisfy the needs of many employers across business, government, and non-profit sectors, as well as the geospatial technology industry. Recent frequent international GIS conferences at Tbilisi State University attest to the field's growth and significant role in the operations of all public and private sectors.

What do students perceive at the initial stage of teaching geography, and what is their final impression of the subject? To what extent does the school implement pre-orientation activities that lead students to consider geography as a potential future profession? Currently, under our circumstances, it can be said that geography is taught as a general education discipline within school education. Modern school education does not present geography in a way that allows students to appreciate its role, employment opportunities, and potential across various fields. Today's students view geography primarily as a career in tourism, perceiving it merely as a means to navigate from point A to point B.

A small group of students was surveyed to determine the role of cartography in their daily lives. Where do students encounter cartography? Where have they observed cartographic images in their everyday activities? How necessary do they think these images are? It was discovered that their most frequent interactions with cartographic images occur through electronic maps, such as Google Maps, particularly when determining distances between locations. A few noted that courier services rely heavily on cartographic images to track couriers and predict delivery times. Some recalled that taxi companies utilize electronic maps. Essentially, it can be concluded that students primarily view cartography in a consumer context. However, they have not fully grasped the significance of geography and the role of cartography in various fields. By presenting the subject, especially cartography, in an accurate, engaging, and enjoyable manner, it is possible to foster professional interest in students through practical involvement. Currently, the subject is often taught through a dull, unpopular literary methodology confined to the classroom. Additionally, even if teachers desire to create an engaging environment, it is often impractical to do so due to constraints on time and resources, which prevent the delivery of the learning material in a diverse, genuinely practical geographic manner.

Let's review the seventh-grade geography textbook and discuss a topic that, depending on its interesting and correct delivery, may become a turning point in students' attitudes toward the subject.

Topic: map, plan, atlas

Cartography is the science of exploring the spatial-temporal features of real-life objects. Following this introduction, the textbook includes a section titled "Remember," featuring the following questions:

- What are a map and an atlas?
- Who is the author of the first geographical map?
- What kinds of maps exist?
- What is the difference between general geographic and thematic maps?
- What were maps used for in ancient times, and what is their importance today? When and for what do you use a map?

What can be said about these questions? Based on practice, it is observed that, with few exceptions, teachers in Georgian schools are unable to elicit answers to these questions from students, especially in classes that are new to

teaching geography. Students often do not have answers and cannot recall the questions from previous lessons. In this scenario, students may answer the last question based on personal experience rather than memory. It is evident that from the beginning, students develop a negative reaction and attitude toward the topic because they struggle with the knowledge verification tasks presented in the book according to its requirements.

If the teacher strictly follows the textbook, it is likely that they will fail to engage the student and will conduct the lesson in a monotonous manner with minimal student involvement. However, this can be easily avoided with engaging thematic exercises, which would equip students with the necessary knowledge and skills to prepare for and understand the lesson and the topic, setting the stage for the next subject.

After the aforementioned introduction, the theoretical material begins, along with the classification of maps. To spark interest and familiarize students with the topic, the textbook might offer a site that, realistically, will not capture the interest of students in this age group.

The last part will address the location plan.

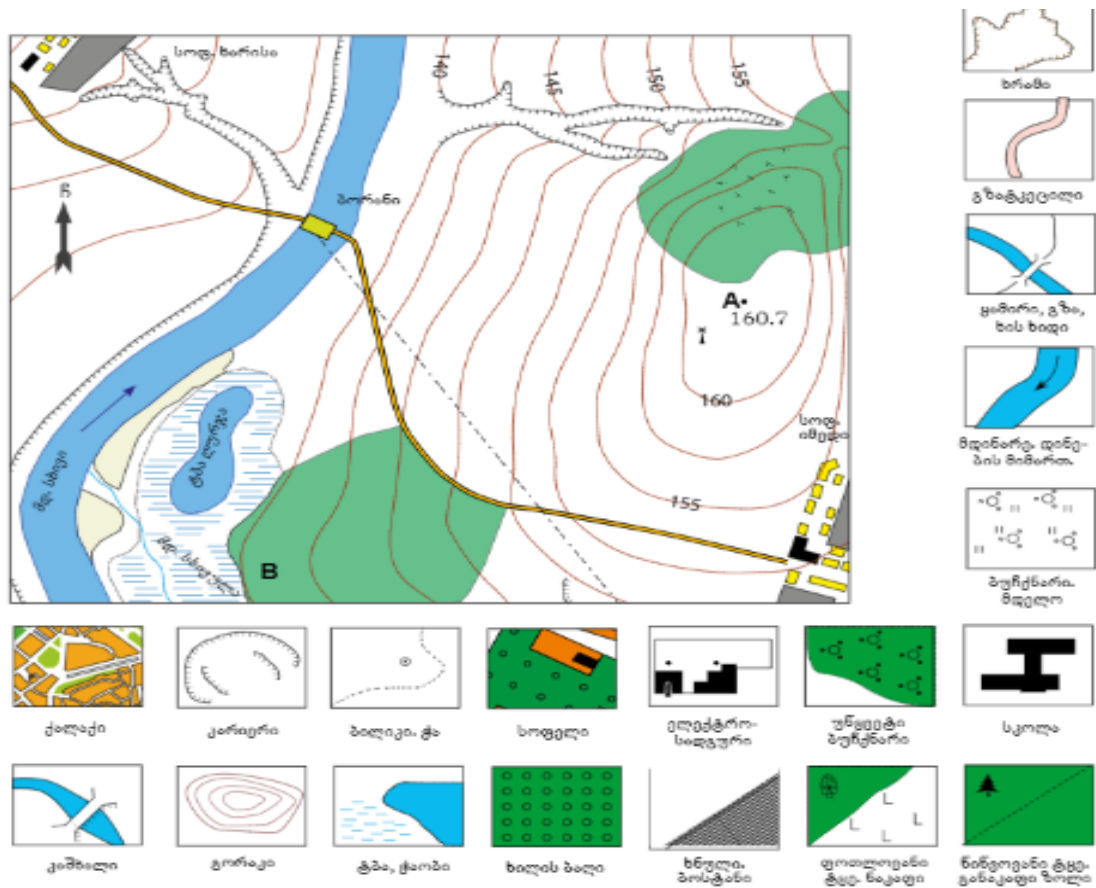


Figure 1.

Through the image of the plan, students can, for the first time, form an understanding of such an interesting topic as a location plan. While the given plan is professionally executed and serves as useful teaching material, the current topic indeed provides an opportunity to make the plan more diverse and practical in a way that engages students and involves them in the educational process, helping them receive the theoretical knowledge presented in the manual.

Specifically, the existing plan could be replaced with a plan for the school area. We could create a "treasure hunt" within the school grounds, distributing our plan to students and providing step-by-step clues to find the "treasure." This activity should integrate the theoretical material, ultimately enabling students to learn the theoretical and practical knowledge in a fun and engaging manner. This approach would generate interest in the next topic, and students would eagerly anticipate what the next interesting subject would be. The skills acquired would make it easier for students to create their own plans for their living environments.

It is easy to predict the positive outcomes such a practice-oriented, engaging activity would yield. In our modern age of technology, where students can access any kind of interesting and important information, possibly better than their teachers, through simple computer operations, it is quite challenging to captivate them with any type of theoretical information. As a result, geography has often become an uninteresting subject for students because it consists of so-called educational material. In the information age, students see no need to memorize everything when they can easily access all answers through simple means. This is where practical exercises, hands-on activities, and the need for environmental science to better adapt to its surroundings become crucial. Properly delivered questions by the teacher, correctly placed emphases, and a curriculum enriched with more pre-orientation components will ultimately lead to outcomes that foster the emergence of a sufficient number of future professionals. At a minimum, the material provided in the curriculum will be mastered to a level that finds practical application in real life.

Today, in many countries, school cartography has reached a level where students themselves are creating virtual map applications that facilitate easy navigation for visually impaired individuals. Students recognize all the positive aspects of the subject and use the knowledge they have acquired for correct orientation by assimilating at least the minimum educational material. What is the current situation in Georgian schools? Considering the teaching approaches and methods, students are unable to comprehend the role and necessity of maps, which is why, even if they have access to the simplest type of cartographic image, they cannot decipher it and use it to navigate correctly.

At this stage of life, when modern technologies have become a fundamental component of our daily lives, the teaching-learning process should strive to establish teaching approaches based on technologies, engaging methods, and components loaded with practical applications.

On the other hand, various educational theories can be identified, at least some of which support approaches that strengthen the teaching of cartography and the development of necessary skills in students that are crucial for this field. On the other hand, the cause and effect determined by such theories in the final decisions of the students, which motivate them to pursue a career in cartography-geography, deserve recognition.

"Constructivist Learning Theory": The pioneer of this theory was Jean Piaget, and later the theory was further refined by Lev Vygotsky, reaching greater depths. Their theory posits the following: Students construct their own knowledge about a particular subject, field, discipline, or theme through their experiences and interactions with the surrounding world. According to this theory, the learner is not a passive recipient in the process of knowledge acquisition but an active participant who has the right to be maximally involved at every stage. The constructivist learning methodology is based on the principle that acquiring any type of knowledge involves constructing it, simply put, by participating in the process of knowledge construction. During the study of cartography, students are actively involved in understanding geographical concepts when these are integrated into the learning process through the use of technology and illustrations. This exactly matches the constructivist approach to learning. With our learning theory, the student is provided with context from the observed, meaning they do not learn abstractly; rather, any new information received is connected to what is already known and experienced, with which they are already familiar. The fact is that a student learns best when new information is clearly connected to what has already been learned.

The Constructivist Learning Method's Use of the Role of the Teacher It is essential not to forget the teacher. The role of the teacher must be carefully and accurately considered. There are cases where the teacher's role is minimized during this type of learning, which detracts from their function and is completely unacceptable. During the study of cartography, the teacher should not and cannot be confined to typical instructional frameworks; they should not only deliver theoretical knowledge, concepts, and values. According to constructivist theory, they should assist the student in understanding knowledge, helping them find significance, make analyses, consider the components of cartography, and integrate the knowledge and learned elements they have acquired to achieve the final objective, which is called creating a map.

"Multiple Intelligences Theory": Proposed by Howard Gardner, this theory supports the idea that every student has various types of intelligences. This is significant because, usually in our educational system, a teacher perceives that only one method of explaining a material should be acceptable for all students when there are 25 individuals in the class who differ significantly from each other. Intelligence in such individuals can vary, for example, spatial, logical-mathematical, linguistic, and interpersonal. It is clear that what works for one individual, who may have linguistic intelligence, might not suit another with mathematical intelligence, especially when explaining the same topic.

"Experiential Learning Theory": Developed by David Kolb, this theory emphasizes the importance of experience in the learning process. It does not matter whether it concerns work or study; everyone remembers that any individual involved in the process becomes more credible and professional along with gaining experience. Where completed work or learned assessments are highly valued, When we try to engage students in the learning process using this type of learning theory, employing technologies and illustrations aids experiential learning. In this case, the student is given the

ability and opportunity to create maps and visualize data, thereby enhancing learning through direct involvement. We can effectively utilize this method in cartography both as a study and as a learning tool at the initial stage, as well as in activities related to the field.

## **CONCLUSION**

As a conclusion, it can be noted that the "Technological Integration Theory" states that modern technologies are continuously developing, modernizing, and experiencing new discoveries and insights every day in our lives. For this reason, the integration and use of technologies are maximized in the learning process, and the scales of their application are constantly expanding. Everyone remembers that technology is adaptable at any age, to any group of students, and can be used with any style of learning. However, anyone who intends to use this theory must be mindful that using this theory alone cannot achieve the desired result. Therefore, it is important to integrate this theory with others. Often, the technological theory is used together with constructivism, which can yield quite good results in the learning process. In cartography, technology can transform the learning experience from merely reading maps to creating digital maps and interactions, which ensures a deeper understanding of geographical concepts. Today, when the era of digital maps is ascending, any institution or company is integrating these resources into their services. Students, who are most closely related to technologies, see the significance of the mentioned cartographic illustrations clearly. By delivering the correct information to the student and integrating the correct theory, it becomes much easier for the student to compose a map, use it, and assess market demands.

Dr. Ruben Puentedura's SAMR model (Substitution, Augmentation, Modification, and Redefinition) is one of the main authors of the mentioned theory, and with the correct approach using this theory, we can move the student from recognizing a map to reading ability, and finally to the attempt to create a digital or physical map, and eventually to a professional map.

Each of the theories mentioned above supports the idea that incorporating technologies and practical methods in teaching cartography can enhance a student's understanding and retention, considering various learning styles and reducing cognitive load. Finally, it can be stated that it is inevitable to overload the student's learning process and study materials with theory-based, deeply informative content under today's accelerated living conditions. The student demands that the learning process be full of their experiences, technologies, and practical educational components.