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### **Situational analysis of a type plan (algorithm) in the training on „Geography of countries” in the Balkan Peninsula**

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**Abstract:** *The article presents a research of the country or region characterization rules - algorithm in Geography of the countries in 11 countries. The methodological features of the plan, algorithm and rules variants are explained and justified. The algorithm models of geography education of the countries are compared.*

*The situational analysis of the education on Geography of countries by the algorithm includes the following countries – Albania, Bosnia and Herzegovina, Greece, Macedonia, Romania, Slovenia, Serbia, Turkey, Croatia, Montenegro. Simultaneously a parallel comparison to the geographic education was made in Bulgaria. The analysis covers only the obligatory training of geographical education during upper secondary level and a comparative characterization of up-to-date curricula to the new academic year was made.*

**Keywords:** *Geography of countries, curriculum, situational analysis, models of the algorithm in training on Geography of countries*

#### **Introduction**

What is an algorithm? And why does it occupy such a specific place in the process of teaching geography, is our major didactic and methodical accent in this article. All branches of science need algorithms. Perceiving it as a process involving consecutive steps or actions towards certain type of knowledge or information with the aim of obtaining the required solution or result.

The word “algorithm” is associated with the name of one of the most eminent scientists of Central Asia - Muhammad ibn Musa al - Khwarizmi - a mathematician, astronomer and geographer. A translation into Latin of a book by him begins with the words: „Dixit Algorizmi” („This is what al - Khwarizmi says”). Gradually, the distorted word ‘algorizms’ became the ‘algorithm’, we are familiar with today.

The algorithm is an exact instruction on how to resolve a problem or a certain type of problems. It encompasses a finite string of instructions, which are executed one after another and are partially repeated in a certain sequence.

The geographical algorithm is a set of rules, which determine the sequence of studying geographical sites, processes and phenomena. School geography implements rules for various sites and processes: characterization of a country, settlement, continent, region, economy branch, determining a geographical location, reading climatograms and hydrograms, describing a natural area, zone, mountain, etc[1].

In the development of school geography, there are established algorithms, one of which is used in the characterization of a country. This ensures logical connectivity, compliance with a system of consecutive actions, which result in the presentation of the complex natural, social and economic picture of a given country. The rules, as individual steps and as a set of subtopics define the scope of this complex characteristics. The perception and structuring of the training information is also accomplished. The term “algorithm” in normative documentation, scientific and methodological literature has various options of terminological application, but is unidirectional in its essence: algorithm, rule, plan, standard plan, design (scheme).

### **Materials and Methods**

The content-analysis of the rules for characterizing a region or a country was drawn up on the basis of the geography curricula (programmes of study) in the eleven countries, currently in use, as part of the compulsory training. For Bulgaria, the comparative directions (data) for the algorithms defined between the current 2017/2018 school year in geography and economics curricula, and the new curriculum, which will take effect in the new 2018/2019 school year, have been published. The models for the rules of characterization of a country are drawn up, based on the curricula, and include content for compulsory training in secondary school. The basic knowledge of the framework of a country or region characterization has been designed as models of an algorithm.

### **Results**

The implementation of an algorithm for a country characterization has a number of benefits, and depends on the approach to its accomplishment, presents a real need for geography teaching and provides a consistent presentation of the knowledge learned. This is an established practice, which ensures a more profound rationalization of the social and economic processes and phenomena, of the political changes and reveal more fully revelations of causality. To draw up comparative characteristics of countries and regions, the discovery of the similarities and distinctions between the countries on the basis of certain indicators, means an advantage in the teaching/learning about the countries which have an efficient, productive educational process. The setbacks of implementing the algorithms of a country characterization are as follows: limiting creative activity; dosing information; intensifying factologism and using trite patterns; imbalance between the small number of classes and the large number of countries; using one and the same type of teaching techniques which results in demotivation and loss of interest among the pupils with regard to studying countries; non-compliance with the syllabus – algorithm – stereotype – nature of problems system of training [2].

The situational analysis of teaching Geography of countries based on the criterion – algorithm for a country characterization, includes the following countries: Albania, Bosnia and Herzegovina, Bulgaria, Greece, Macedonia, Romania, Slovenia, Serbia, Turkey, Croatia, Montenegro. The systematization of the options for an algorithm is based on countries’ curricula and includes geography teaching in the secondary school. The vertical interconnection and the mixed model of designing the study contents based on curricula, affects the place and the formulation of the steps, structure and the content framework of an algorithm for country characterization in the secondary school [3]. Knowing the place and the framework of the structure and content in geography teaching for each country, answers the questions about the place, essence, structure and approach to the implementation of the algorithms in teaching the geography of the countries in the secondary school (Table 1).

The algorithm - as an ontodidactic process - has its place in the curricula in the countries studied, presented in various forms and type, content and approach. Each country is characterized by a specific model of algorithm, and a determinate analytical and synthetical approach to a country and/or region characterization, logically grounded and collaterally subordinated.

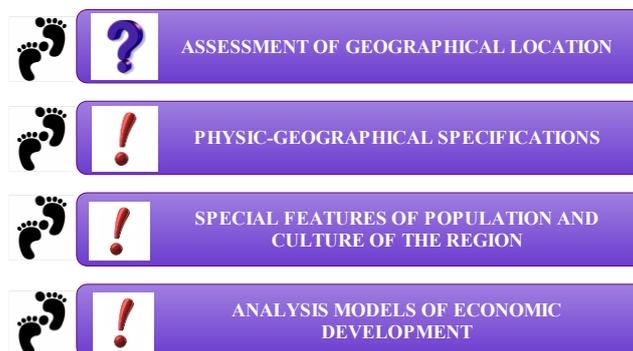
**Table 1.** The place of the training on „Geography of countries” in secondary school education – compulsory preparation on curricula and countries

№	COUNTRY	CLASS						
		VI	VII	VIII	IX	X	XI	XII
1.	Albania				SE		GC	
2.	Bosnia and Herzegovina				SE		GC	
3.	Bulgaria		SE		GC			
4.	Greece	SE		GC				
5.	Macedonia				SE	GC		
6.	Romania			SE			GC	
7.	Slovenia				SE	GC	GC	
8.	Serbia			SE		GC		
9.	Turkey			SE	GC	GC		
10.	Croatia			SE			GC	
11.	Montenegro				SE		GC	

Note: **SE** - completion of primary education; **GC** - the training on „Geography of countries”

The algorithms’ logical structure and content, based on the curricula in each country, differ considerably, which gives us a reason to group the countries by this criterion. The similarities identified, reflect inherited models of rules and historically and traditionally determined concepts in school geography teaching.

In Albania, geography teaching of countries in the eleventh grade includes study of continents and countries in Europe, America, Africa, Asia, Australia and Oceania. There is a certain algorithm for each region, which can be summarized for the individual regions in four basic steps, excluding the problems facing the characterization of a particular region (Fig. 1). No algorithm for a country characterization has been proposed in the curriculum [7].

**Figure 1.** Algorithm model for characterization of a region by curriculum in Albania

There are additional steps in the curriculum for the European region regarding characterization such as: analysis of the specific regional natural and anthropogenic characteristics; evaluation of Europe’s historical and territorial development; identification of Europe’s key regions (Western, Central, Northern, Eastern, Mediterranean, Eastern Europe); interpretation of the context and characteristics of the formation, development and enlargement of the EU; identification of some of the present-day regional issues in Europe, and the prospects for their solution [7].

A distinctive feature is the problem-based learning approach that has been brought in for each region in a different place in the traditional logical structure of the rules. For example:

- ✎ *North America* - analyzing the problems of contemporary regional development on the North American continent, and their perspectives;
- ✎ *Central America* - peculiarities of vegetation in this region (geographical distribution, species, etc.); identify the process of blending the cultures;
- ✎ *South America* - arguments in defense of the thesis that this region is known as a region of contrasts; highlighting the spatial differentiation of local and European cultures;

- ✍ *Africa* - identifying the diversity of the plant and animal world, as well as the environmental and medical issues that accompany this region;
- ✍ *North Africa/Southwestern Asia* - assessing the geographical location and natural conditions, political complexity in the Middle East, Islam, oil resources and development of the region;
- ✍ *South Asia* - natural conditions and the highest peaks in the world;
- ✍ *East Asia* - analyzing models of economic development - Chinese and Japanese models;
- ✍ *Southeast Asia* - analyzing models of economic development and the „Asian Tigers” model [4].

Geography teaching in Bosnia and Herzegovina in the second year in the secondary school is not designed on an algorithmic basis. The study content involves the study of homeland geography in one grade in the secondary school, which results in the small number of classes, and a synthesized content about the countries. Teaching the countries is polarized in bringing out the geographical distinctive features of *physic-geographical* and *social-geographical characteristics* of selected countries [8].

### Discussion

The geographical survey is based on regions and countries, typical representatives of the region through the systematic and typological approach. According to the curriculum, the problem-based learning approach does not dominate the teaching of the regions and countries. The topics in the curriculum are stereotyped and identical, with the name of the respective region being added.

In Bulgaria, there is a clear definition within the framework of Standard 2 and 4, and their corresponding topics, as well as the expected results regarding the curriculum and topics for the 2017/2018 school year (Fig. 2) [9]. The terminology of *the algorithm* has been categorically defined when characterizing a region or a country, uniting the expected effectiveness in the *nature – population - economy* system.

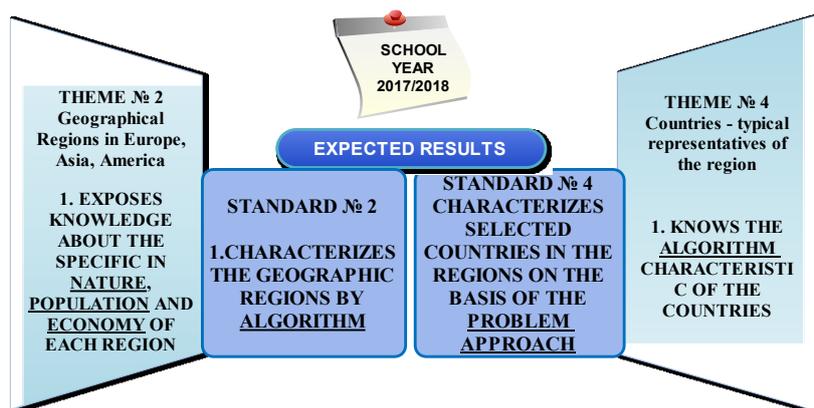


Figure 2. Place of the algorithm for region and country characterization by curriculum in Bulgaria

The curriculum brings out the problem-civilization approach as dominant when studying the countries based on an algorithm. The topical framework determines the identification of the individual countries in the global economy based on certain economic indicators; comparison between the countries, depending on the level of economic development by pointing out the general and specific features of each of them; outlining the economic specialization of the countries studied, an identification of their issues. [6]

For the 2018/2019 school year, a new curriculum will take effect, in which the term *algorithm* will be replaced by *rule*. Adopted as synonyms in the 9-th grade, geography teaching for the countries is included in topic 2, with a clearly defined action of the active verb *characterization* of a region and a country according to a rule [10]. The two representative rules differ in their final step, with the characterization of the specific issues of a region being required, and characterization of towns and cities being required for a country (Fig. 3).

There are basic geographical algorithms for the analysis of a region and a country which have a specific structure, spatial and logical organization in Bulgaria’s geography teaching at school. Over the years of the development of geography teaching, they have been put through various transformations with regard to structure and content. The contemporary model of a rule keeps the traditional presentation of a country, including the unity of the three components *nature – population - economy*.

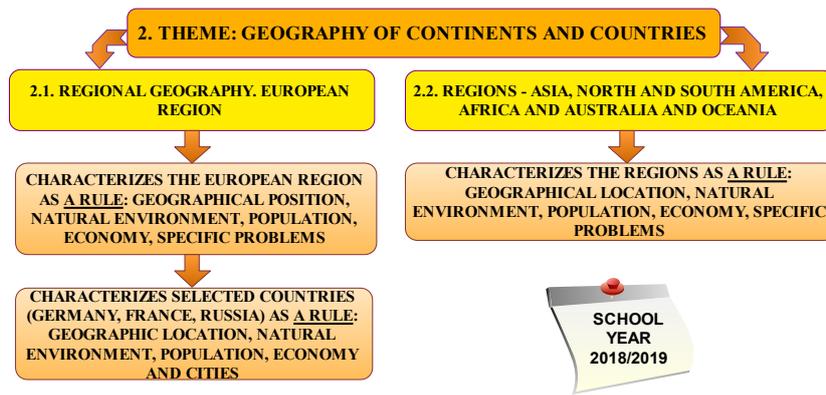


Figure 3. Rule for characterization of a region and a country in Bulgaria in force since school year 2018/2019

The traditional character of the algorithm-based study of a country is also included as an element of the content of the textbooks in geography and economics in the 9-th grade. In two of the four approved versions of textbooks for compulsory training, an algorithm for the characterization of a region has been presented (Fig. 4) [10]. The textbooks made by a team of authors - R. Penin et al (version 1) and N. Dimov et al (version 2) contain algorithms, which in their essence are identical, but dominated by a problem-based learning, comprehensiveness and thoroughness of content, as well as examples in the first version of a textbook (16 steps in the algorithm in all) [4, 5, 6]. The textbook whose authors are Penin et al, have presented a separate topic ‘Characterization of a geographical region’ (a lesson for practical work), in which through the two active verbs *defines* (2 times) and *characterize* (14 times), a detailed model for an algorithm for characteristics has been presented.

The algorithm’s sixteen steps can be referred to the six in version 2 of a textbook, and have been summarized in the formulation of the individual steps: 1, 2 – *step 1*; 3, 4, 5 – *step 2*; 6, 7, 8, 9 – *step 3*; 10, 11, 12, 13 – *step 4*; 14 – *step 5*; 15, 16 – *step 6*.



Figure 4. Models of algorithms for region characterization in *Geography and economics* textbooks for IX-th grade - compulsory preparation (Bulgaria)

Teaching the geography of the countries in Greece (in B – grade) is on the basis composed of modular model for the structure and content with the topics repeated and expanded from A – grade of the

secondary school. The curriculum contains no directions, and no algorithm has been proposed for the characterization of a country or a region. The content is developed in terms of expected results according to the curriculum, which in its essence is oriented towards bringing out the economic-geographical and geopolitical characteristics of the countries and regions (Fig. 5). The regions are an object of study not as a whole about the world, but only those facing considerable inequalities, divisions and conflicts. The teaching of regions and countries is based on the economic and problem - based learning approach.



**Figure 5.** Model of a plan for region and countries characterization in geography in Greece

The characterization of the regions and countries in Greece is organized in the curriculum by the active verbs – identifies, analyses, compares, evaluates, interprets, differentiates, discusses, etc. This fact provides the productivity of the teaching process [11].

In Macedonia, teaching *Geography of the countries* in the first year in the secondary school features a small number of classes (4 school hours), with a summarized main topic – „*Cultural-, political- and economic characteristics of the Earth*”, and with no give references an algorithm for the characteristics of the regions and countries which are contained in the curriculum. [12]. The reason for this is the fact that the basic knowledge in teaching *Geography of the countries* has been placed at the junior high school, where there is a clearly determined algorithm for characterization of a region and country, studied in a multiple number of classes.

Teaching *Geography of the countries* in Romania in the secondary schools is based on the criterion of an algorithm for characterization of a country from the basic knowledge in the VI-th grade. No algorithm for the characterization of a region or country has been determined in the curriculum for the XI-th grade [13]. In teaching *Geography of the countries*, the algorithm for characterization of a country from the junior high school appears to be the basic one: geographical location, borders, physical and geographical aspects, population and settlements, aspects of the economic development and potential for tourism [14].

The countries' presentation is based on data from encyclopedias, which results in reproductivity of the teaching/learning process when studying the countries.

Slovenia is the country which differs from all eleven countries studied, in terms of the scope of the course for teaching/learning the countries (Tabl. 1), the overall number of classes, and regarding the criterion of the algorithm, the problem-based learning approach has been implemented.

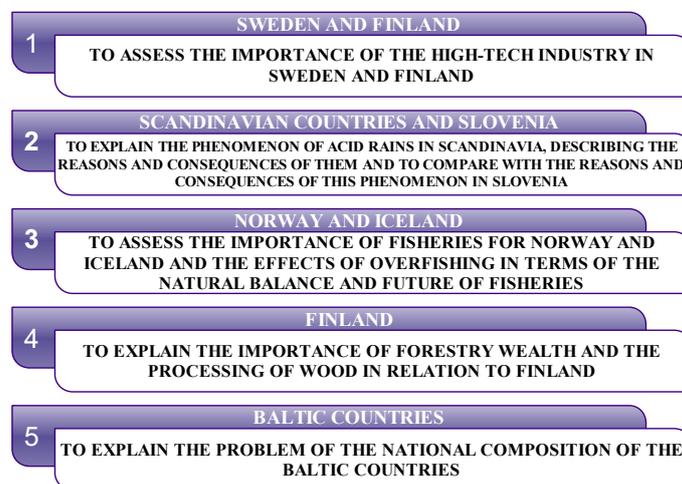
Teaching/learning the geography of the regions in the 10-th and 11-th grade differs by various sequence of the steps in an algorithm, but on the basis of the problem - based learning [15].

The curriculum of studying each region or a group of countries follows a different algorithm, complying with the natural, demographic and economic specific features of the region (Fig. 6). The stereotyping and equalization of the rule for characterization has been avoided, with the specific nature and the distinctive features of each region playing a leading role.



**Figure 6.** Model for characterization algorithm of the African region in Slovenia

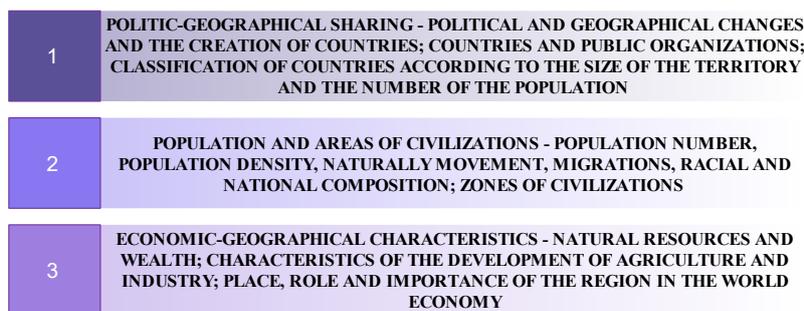
In studying the countries, the conceptual model of the problem - based learning and revelation of the specific nature of each country has been preserved. Many of the countries have been presented on the principle of comparison between two countries or a group of countries, between a group of countries and a single country. The comparative macro-framework of content includes the specific character to teaching of the countries. It has a problematic formulation of the topic. Thus the specificity is visible and the application of the active productive verb at characterization is required (Fig. 7).



**Figure 7.** Model for comparative characterization algorithm of countries in Slovenia

Teaching *Geography of the countries* in Serbia, in the second grade, in the secondary school is structured in a concise plan, characterized by a small number of steps and content, which is not based on the problem - based learning approach (Fig. 8). The plan has an encyclopedic structure and has been conceptualized on the system: *political - geographic characteristics – population – economic - geographic characteristics* [16].

The version of the plan proposed does not stress the specific character of the region.



**Figure 8.** Model of region characterization algorithm in Serbia

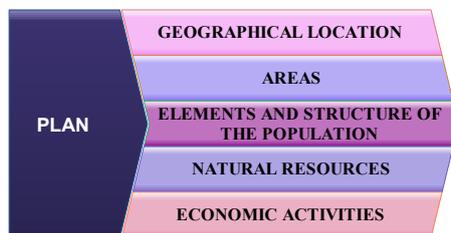
The geography curriculum involves a plan for characterizing two countries which are typical representatives of a region: ‘major economic and geographical characteristics of the natural resources, characteristics of the development of agriculture and industry, place, role and significance in the global economy and politics’. [16] In studying the topic of China, the problem - based learning approach has been implemented – ‘major economic and geographical characteristics, and role in the global economy; economic boom of the Far East and its significance’ [16].

Turkey does not put forward plans for characterization of a country or a region in its curriculum. Geography teaching of the countries is done in modules in each school year in the secondary school, with the teaching process being based on the active verbs: groups, classifies, discusses, identifies, analyses, compares, distinguishes, interprets, evaluates, etc [17]. The country study has a productive structure of designing of the content.

Teaching *Geography of the countries* in Croatia is structured in the third year of secondary school, with the problem - based learning approach being implemented in studying the regions and countries. The topics formulated on the basis of the study programme have a problem - oriented presentation and provoke productivity. For example:

- ☞ *China* – geographical fundamentals and distinctive features of China’s development. Problems of the regional development. Industrial zones and peripheral regions;
- ☞ *Italy* – regional structure. Problems of the North and South;
- ☞ *United Kingdom* – prosperous and less prosperous regions. Conurbation. Mining industry regions. The Southeast and the Megapolis of London;
- ☞ *India and the new industrial countries in Asia* - Problems of the underdeveloped countries [18].

In Montenegro, teaching *Geography of the countries* is structured in the second grade of the secondary schools; it requires the implementation of a plan for a region characterization according to the curriculum (Fig. 9) [19]. A specific feature of the plan for characterization is its non-standard formulation of the various steps and richness of content. The characterization of the economic activities is determined by the relationship between *natural resources – economy*. We do not find the implementation of the problem - based learning approach when characterizing a region from the individual steps and their formulation in the plan.



**Figure 9.** Model of region characterization plan in Montenegro

**Conclusions**

The presentation of the situational analysis of geography teaching of the countries, based on a criterion – algorithm for characterization of a region or a country, according to the curricula, identifies that each of the countries studied has a specific plan, algorithm and a rule for a region or a country

characterization. Most of the countries in the Balkan Peninsula implement an algorithm and a problem-based learning approach in studying the countries.

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