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Methodical projections and intra-subject integration synthesis in the training geography of Bulgaria under the new conditions

Stela Dermendzhieva, Tamara Draganova

„St. Cyril and St. Methodius" University of Veliko Tarnovo
E-mail: stela.dermendzhieva@mail.bg, tamara_draganova@mail.bg

Abstract: *The article presents the methodical projections and the intra - subject integration synthesis in the training on geography of Bulgaria. The preserved Bulgarian educational tradition has been developed in the application of rules/algorithms in school geographic education. The intra - disciplinary relations, interactions and mutualities in the field of geography of Bulgaria are analyzed on the basis of the normative documents. The intra - disciplinary continuity is based on the development of the geographic science and aims at improving the structure-content curriculum in studying the native country.*

Keywords: *curricula, intra - disciplinary integration and synthesis, algorithm, intra - subject links*

> *„The Geographical sciences give the content of geography as a school subject, and the content of geography training is „the food" or the factual material on which the methodic makes its research."*
> *M. Pechevski*

Introduction

The training in geography and economics in the Bulgarian school from 2015 is placed under conditions of educational reform and normative changes. The horizontal and the vertical integration are an integral part of both traditional geography training and the new operational frameworks of the law, learning plans and curricula in the Bulgarian school.

Examining the vertical links has not lost its up-to-date in the new educational realities. The need for purposeful construction and updating of the intra-subject integration and synthesis, depending on the processes in science and practice, deserves particular attention and priority for the learning process in geographic education. Applying the systemic and the complex approach to unity in order to systematize the learning content and its expanding and deepening, develops and upgrading provides continuity

between grades and stages of education. Object geographic synthesis is the vehicle of the basic geographic ideas and the overall program construction and integrated geography and economics training.

Results and discussion

The intra - disciplinary relations, interactions and interdependencies at the level of geography training in Bulgaria are object to research in this article at the level of rules and algorithms of training. The intra - disciplinary continuity is based on the development of the geographic science and purposes at improving the structure - content learning framework in studying the native country.

By applying the principle of „preserving and developing the Bulgarian educational tradition" in the system of school education using a rule/algorithm in geographic education, the intra - disciplinary integration is predetermined [1].

The aggregate of requirements for the training results for general educational preparation in geography and economics is a vehicle of the principle of the preserved geographical tradition in the algorithmism.

The identified competencies for knowledge, skills and attitudes which are expected to be the result of geography training at the end of junior high school and first high school stage clearly outline the vertical synthesis introduced as a state educational standard (DOS).

By field of competences Geography of Bulgaria for the end of the VII and the X grade in the DOS is an algorithm for characterization of the native country by means of an intra - disciplinary cyclic synthesis which in fact returns to previously studied cognitive structures with higher level upgrading – in first high school stage of the average grade.

DOS normative regulates an algorithm for characterization of: the native country and the socio - economic planning region in Bulgaria. The new step in the algorithm is „Characterizes the socio - economic planning regions in Bulgaria by algorithm" as well as in absolute values - from 5 expected results for VII grade of 7 for X grade when unfolding the topic on geography of the population and settlements, and for region planning area (Fig. 1) [2].
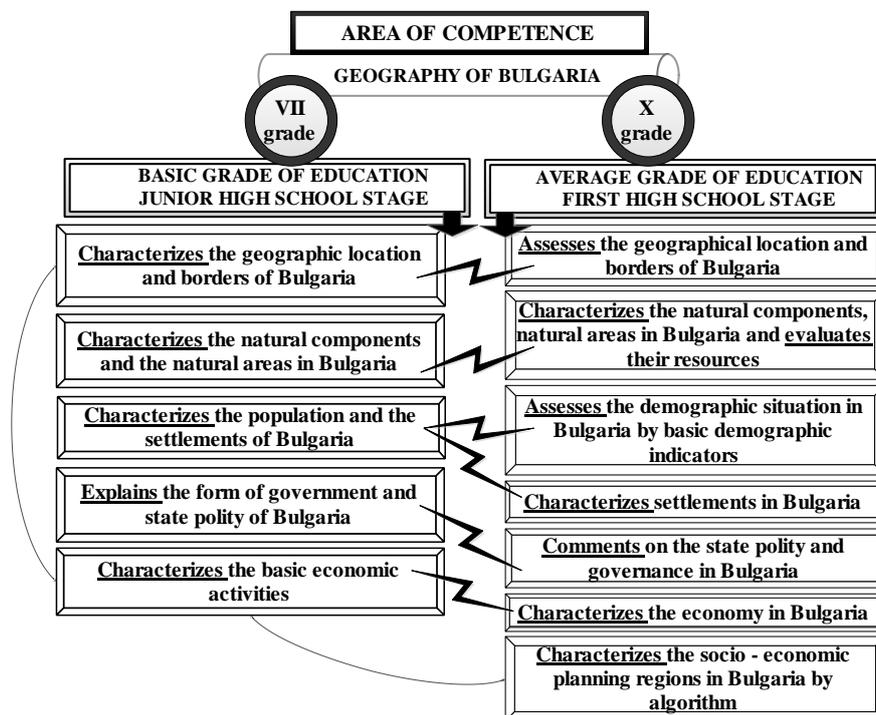

Figure 1. Expected results from the training by area on competence on geography of Bulgaria for the end of the VII and X grade of the DOS [2]

Intra - subject cyclical synthesis and integration is implicitly build in the DOS and in another area of competence of the basic grade of education, junior high school stage - Geography of the continents and countries.

The normative framework determines the sequence of steps in characterizing a continent and selected countries - geographical location and borders, nature features, political map, population, economy.

In the area of competence Geography of the regions and the countries for the first high school stage also implicitly present the sequence of steps for characterizing a country - geographic location, political changes, peculiarities of the natural, demographic and economic aspect of countries, typical representatives of regions in the world [2].

The curriculum for the VII grade is validated on 25.01.2017 and is in force since the 2018/2019 school year, and for the X grade is validated on 11.01.2018 and will be in force since the school year 2019/2020. Following the conceptual framework of the DOS of 2015, in the curricula are established the expected results from the training for achievement of general educational preparation at the end of the VII and the X grade by area of competence Geography of Bulgaria (Fig. 2).

The comparing model reveals a clear and consistent algorithmic vector between the VII and the X grade curricula and the transmission of the expected DOS results in the area of competence in geography of Bulgaria in the programs. The comparison of the expected results between DOS and curricula brings out a model of uniformity and their number in absolute values (Table 1).
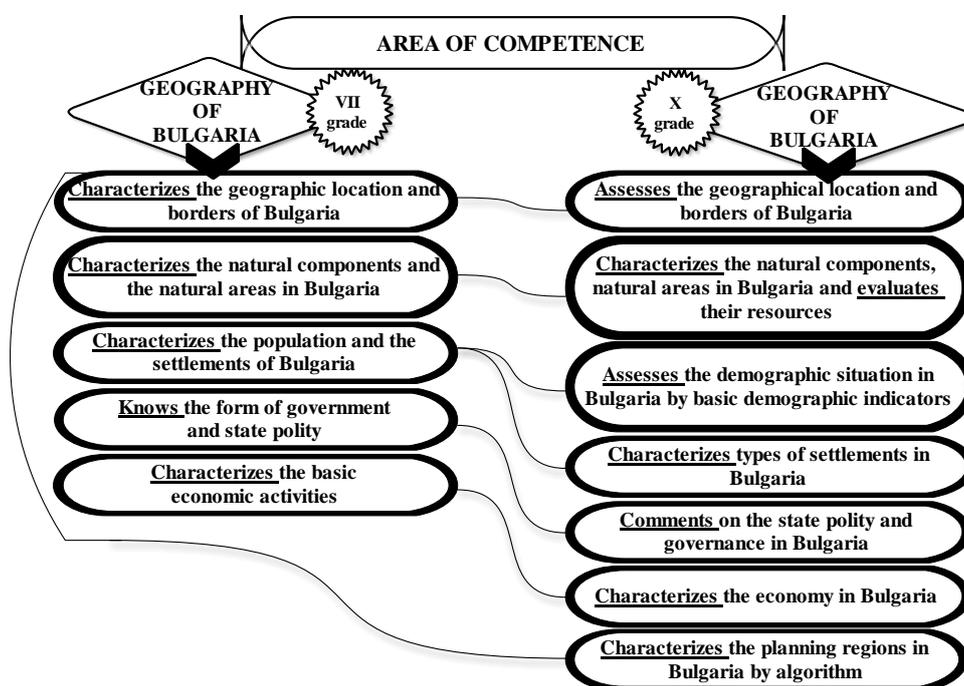

Figure 2. Expected results of the training for achievement of general educational preparation by area of competence *Geography of Bulgaria* at the end of VII and X grade on curriculum – comparative model [2, 3, 4]

Table 1. Comparison of the expected results between DOS, curricula for VII and X grade by area of competence on *geography of Bulgaria* in absolute values [2, 3, 4]

TYPE OF THE DOCUMENT	VII GRADE	X GRADE
	NUMBER OF THE EXPECTED RESULTS OF TRAINING (KNOWLEDGE, SKILLS AND ATTITUDES)	
STATE EDUCATIONAL STANDARD	5	7
GEOGRAPHY AND ECONOMY CURRICULUM	5	7

In the vertical section with respect to the active verbs used in the expected results at the level of DOS and the curricula for the VII and X grade at the end of the class there is generally proportional transmission and harmony in number, name and distribution (Fig. 3).

The two active verbs on DOS for VII grade - characterize (repeatability - 4 times) and explains (1 time) are developed and with productive direction in the first high school stage of the X grade by characterizing (4 times), evaluating (3 times), comments (1 time) [3, 4, 5].

An exception is the transfer of the expected results by active verbs from the DOS at the end of the VII grade to the curriculum in VII grade as a name, not as a number. The active verb explanation is replaced by knowledge, which leads to a decrease in the cognitive ideology of conceptual knowledge to factual knowledge at the curriculum level. The comparative analysis of expected results by number, name and distribution of DOS transmission for the end of the X grade to the expected results of the X grade curriculum reveals complete coincidence and uniformity.
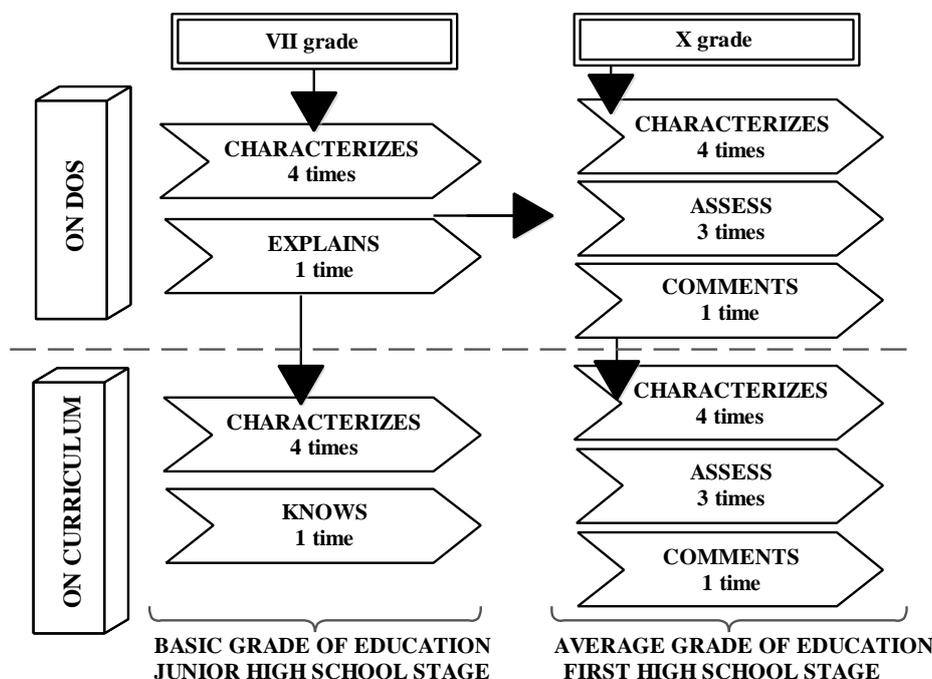

Figure 3. Graphical organizer of the expected results by active verbs by area of competence Geography of Bulgaria from DOS and curricula [2, 3, 4]

The full reference of the active verbs proposed in the DOS and in the curricula for area of competence on geography of Bulgaria have a specific model in which there are no active verbs from the procedural knowledge group that should not be accept as a condition or to be assessed as a negative side of the conceptual framework (Fig. 4).

The model can be explained by the linking of procedural knowledge in the context of other knowledge groups and in the context of only a part of the geographic and economics content on the one hand, but on the other hand the standardized and program solution has no logical explanation for the age and psychological characteristics of the pupils in X grade and the specific meatiness of geographic knowledge in studying the native country.

The vertical links in the geography and economics training for the geography training of Bulgaria between the curricula in the VII and the X grade are integrated - structured and content - bound on a topic and sub - topic level (Fig. 5). The theme and subtopics of the VII grade are developed and deepened in the X grade.

Traceability rules/algorithms for characterization of an certain object, process or phenomenon in geography training of the native country in VII and X grade show specificity in terms of number, name, distribution, type of intra - disciplinary synthesis, etc. (Table 2).

In the VII grade of the curriculum there are two rules of one type - characterization of countries by rule, which are referenced to one topic - Geography of the continents and the countries (1.10 - 1.12. Countries in Europe and 1.16. - Balkan countries) with a cyclic synthesis of manifestation [3].

In the X grade of the curriculum there are 20 algorithms of 5 basic types - characterization of state borders, economic sector, economic branch, economic sub - branch, region. Algorithms are referenced to

three topics of the learning content - topic 1) Geographic location and borders of Bulgaria; topic 7) Economy; topic 8) Regional Geography. Region of planning [4].

The specificity in the applied algorithms is related to the type of synthesis - linear synthesis is applied to theme 1, characterization of state borders, which once was applied for studying in the school subject of geography and economy in X grade, was to have a basic integration and knowledge of it from previous classes. For the algorithms of theme 7 and 8, the cyclic vertical synthesis, which realization returns to previously studied cognitive rules but applied at a higher level in the first high school stage of the school education in geography and economics, is typical.

Implicitly, in the X grade curriculum are applied requirements for expected results for the use of river characterization rules, rules for reading a climatogram, etc., which are not scheduled by the specific rules, are not imperative and are not present with the clear rule/algorithm but only as competencies as expected learning results. The application of these rules is predetermined by vertical synthesis and implies their application in the following classes. Particularity is also found in the use of the notion of rule and algorithm, which has no logical explanation, but there is a substantive - chronological difference between the two concepts [6].
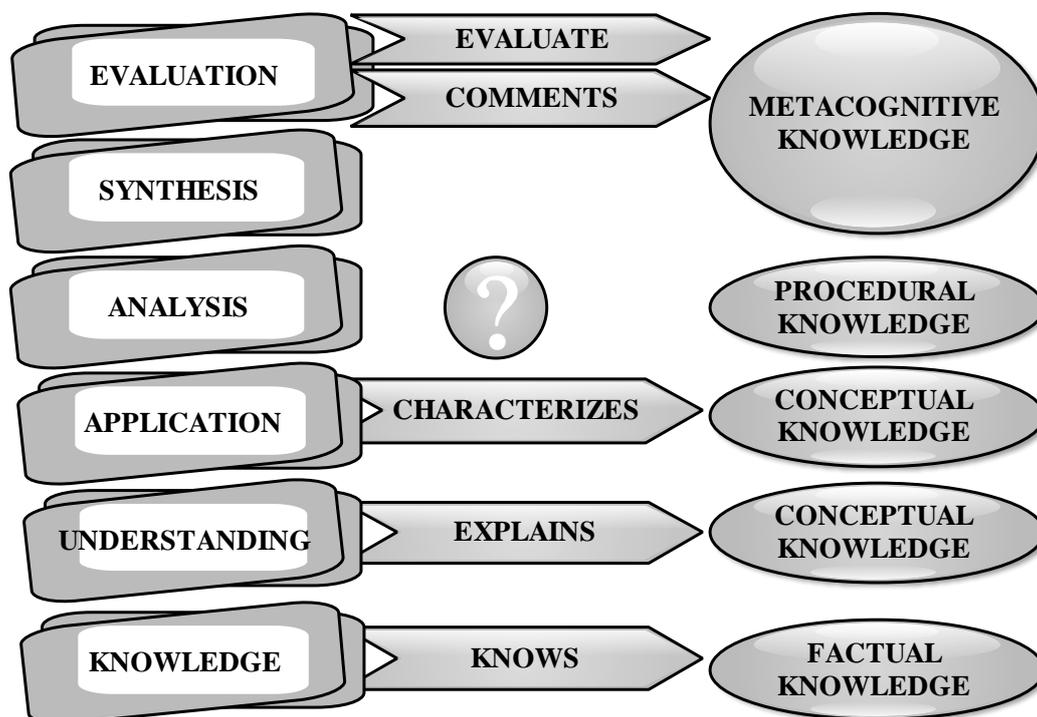

Figure 4. Graphical organizer of the overall incision of the expected results on active verbs on DOS and curricula at the end of VII and X grade - area of competence *geography of Bulgaria* [2, 3, 4]

In VII grade, the concept - *rule* is used, and in the X grade the concept - *algorithm*.

In order to present the objective picture of the intra - disciplinary synthesis, it is necessary to trace the dependencies and the integration at the level of a rule/algorithm along the whole vertical scale of V grade to the algorithms in the X grade (Fig. 6, 7).

In the V grade, 9 rules were introduced in the study of geographic objects, processes and phenomena, none of them being transformed and translated for application explicitly into the learning content on curriculum in X grade as an algorithm (Fig. 6).

The rule of country characterization is the only one that has been transferred from V grade to VII grade as a rule when studying countries in Europe and the Balkan Peninsula. In the curriculum are determines activities for the acquisition of key competencies, as a key competence the Mathematical competence and basic competences in the field of natural sciences and technologies is included „Comparison, recognition, differentiation, groping, definition of the meaning, characterization (included as a rule) of geographic and economic objects, processes and phenomena ...” [7].

Table 2. Rules and algorithms in the geography training of Bulgaria in curricula [3, 4]

RULES AND ALGORITHMS IN BULGARIAN GEOGRAPHIC EDUCATION
VII grade - RULE
Characterizes the *countries* of Sweden, Great Britain, France, Germany, Italy and Russia on a rule.
Characterizes the *countries* of Romania, Serbia, Macedonia and Greece on a rule.
X grade –ALGORITHM
Characterizes *state borders* on algorithm with the help of a geographic map.
Characterizes the *primary sector* in Bulgaria (essence, meaning, development factors and territorial location, structure) on algorithm.
Characterizes the agriculture *branch* (meaning, features, factors of development and territorial location, structure and problems) on algorithm.
Characterizes the *plant breeding* by algorithm: importance, peculiarities, factors of development and territorial location, structure (cereals - wheat, maize, rice; technical crops - sunflower, tobacco, oil rose; vegetable production - tomatoes, pepper, potatoes; viticulture; fruit growing - apples , apricots, peaches, cherries, plums) and problems.
Characterizes *livestock breeding* by algorithm: importance, peculiarities, factors for development and territorial location, structure (cattle breeding, sheep breeding, pig breeding, poultry farming) and problems.
Characterizes the *secondary sector*: essence, importance, factors for development and territorial location, structure (energy, metallurgy, machine - building, chemical industry, light industry, food industry) on algorithm.
Characterizes the *branch* of energy industry on algorithm.
Characterizes the metallurgy (black and color) and machine - building (transport, electronics and electrical, agricultural) *branches* by algorithm.
Characterizes the *chemical industry* (organic products – petrochemistry, chemical fiber production; inorganic products - mineral fertilizers, soda, acids); pharmaceutical, perfumery - cosmetics) by algorithm.
Characterizes the *textile industry* by algorithm.
Characterizes the *tertiary sector* in Bulgaria (essence, meaning, factors, structure) by algorithm.
Characterizes the *transport branch* by algorithm.
Characterizes the *tourism branch* by algorithm.
Knows an algorithm for *region* characterization: assesses the geographic location, natural resource and demographic potential, analyzes the current state of the economy in the region, names administrative areas in the region and problems.
Characterizes the Southwest algorithm *region*.
Characterizes the Southern Central *region* by algorithm.
Characterizes the Southeast *region* by algorithm.
Characterizes the Northeast *region* by algorithm.
Characterizes the North Central *region* by algorithm.
Characterizes the Northwest *region* by algorithm.

By key competences Social and civic competencies are introduced rules for prudent behaviour in different life situations and during a natural disaster (earthquake, flood).

All V class curriculum rules form and reflect on the learning of the native country as an interaction of the whole and the parts. The spiral effect reaches until the X grade as an intra - subject integration synthesis, which is a continuous process in geographic training and sets the foundations for geographic knowledge. In this context, it is possible to accept the transfer of the rule for characterization of a country from the V grade through the same grade for the VII to the X grade where a country is actually studied - Bulgaria and the country characterization rule can be applied analogously.

In the VI grade, 9 rules have been introduced in the study of geographic objects, processes and phenomena, which are total of three types - definition of geographical location, size and borders of the

continent, characterization of climatic belts and areas, characterization of countries (Fig. 6). As a title of the rule, none of the nine are present in the VII and X grade curricula in studying the geography of Bulgaria. Key competence Mathematical competence and basic competencies in natural sciences and technologies in key competence activities is defined as „comparison, recognition, differentiation, grouping, definition of meaning, characterization (including by rule) of geographic and economic objects, processes and phenomena" [8].

Towards key competence Social and citizenship competences is signed „knowledge of rules for wise behaviour in different life situations and during a natural disaster" without introducing specific rules with applied cyclical synthesis and intra - subject integrity [8].

Out of a total of 9 rules in VI grade, none has been developed as an integral cyclic synthesis of algorithms in the X grade, and in VII grade only the rule for characterizing a country is corresponding, which to a certain extent can be considered as analogue for characterization of the native country.
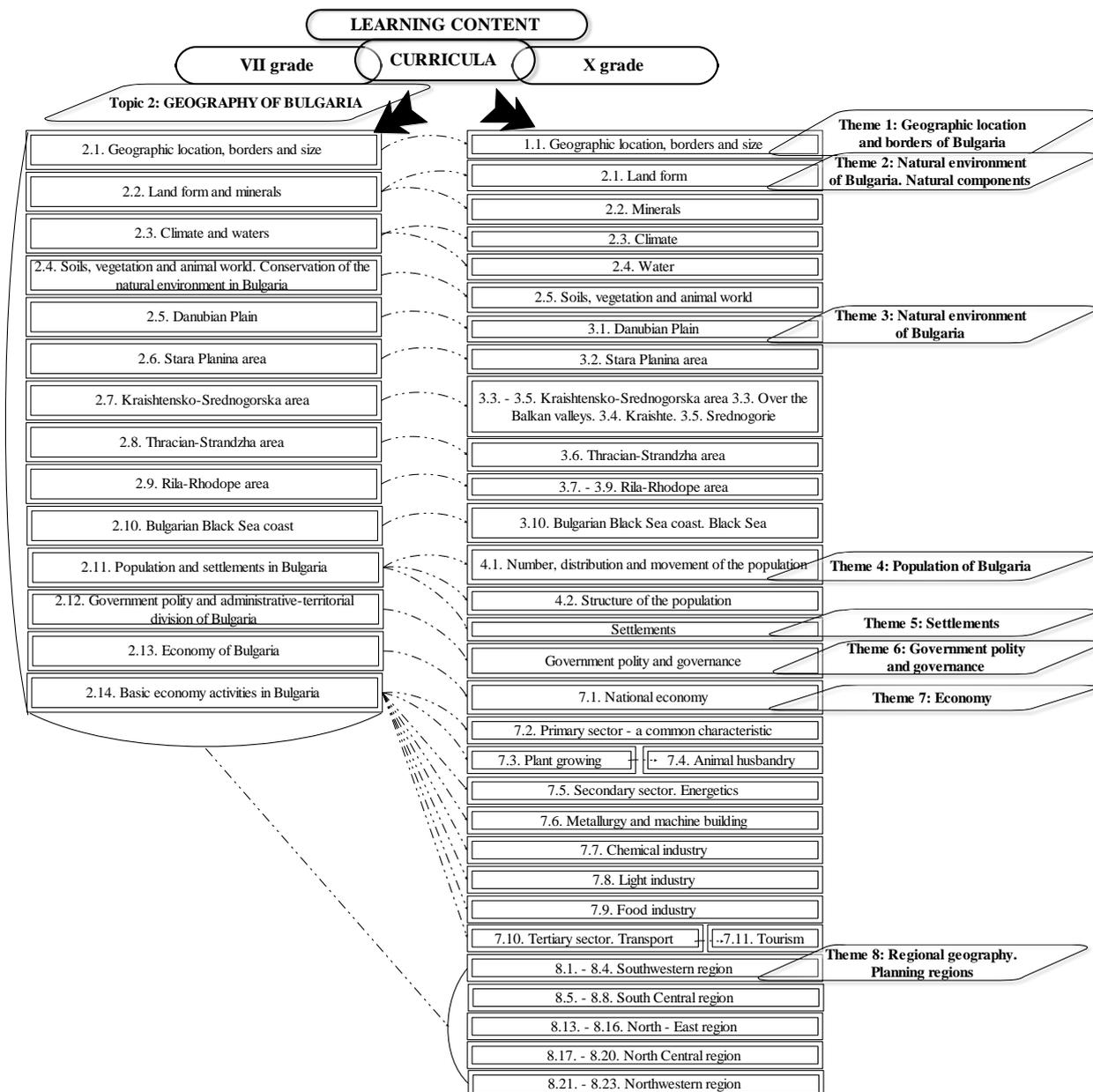

Figure 5. Graphical organizer of the vertical links on the theme of *geography of Bulgaria* in the curricula for VII and X grade [3, 4]
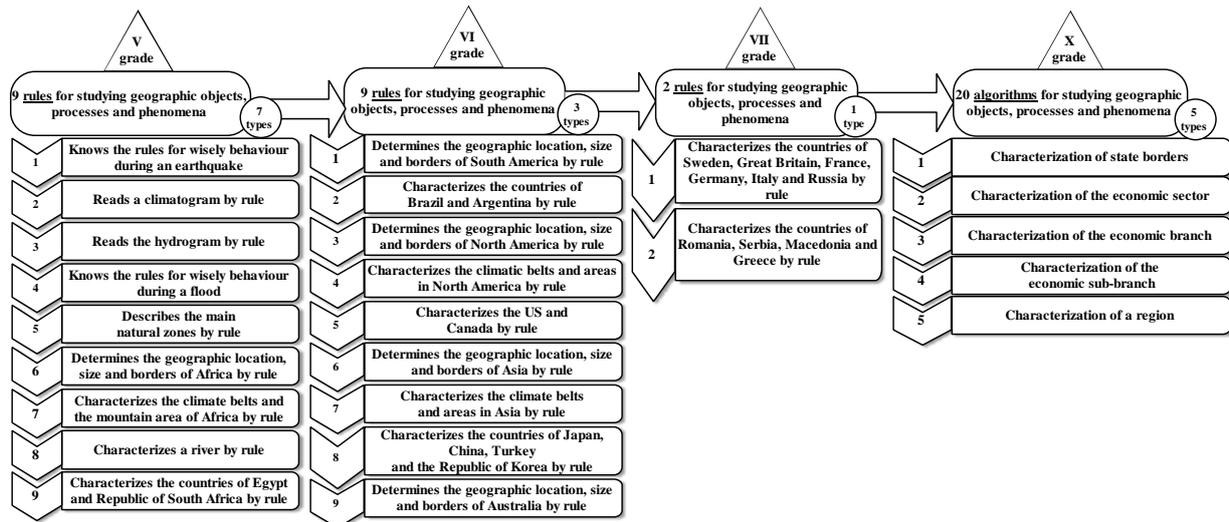
Figure 6. Rules for the study of geographic objects, processes and phenomena for V – VI - VII - X grade by curricula [3, 4, 7, 8]

In VII grade, 2 rules are introduced for the study of geographic objects, processes and phenomena, which are total of the same type - characterization of countries (Fig. 6).

Both rules as content are not present in the X class, but can be accepted as a model for characterizing the native country.

The V grade rules have a cyclone - synthesized model of application in the VI and VII grade of the junior high school stage of the basic education grade.

The rule, which is at clear and imperative in all three classes of the basic grade of the curricula in geography and economics, is the rule of country characterization [9].

In the VIII grade, there are 3 rules for studying geographic objects, processes and phenomena that are from a single type - explains the impact of adverse natural phenomena and risks on human life and rules for thunderstorm behaviour, floods and avalanches, hailstorm, icy rain, and others. (Fig. 7) [10].

The three rules as content do not present in the X grade curricula.

From the V to VIII grade, the term rule is used in curricula. In the IX grade are defined 10 rules presented by 4 types - characterization of the branch, sub - branch, region and selected countries (Fig. 7) [11].

Eight of the rules are developed and expanded as a cyclic synthesis in the X class and referenced to three of the five types of algorithms. Two of the rules are from one type - the characterization of selected countries by rule, which do not present in the system of rules in the X grade, but anologically to the thesis of a country can be accepted as a cyclic synthesis because in the X grade a country is studied - the native country (Fig. 7).

For the first time since V grade in the curriculum in IX grade it is determined to „characterize by algorithm the structure and the territorial organization of the economy", but only by area of competence - Geography of the society for the expected results of the training for achievement of general educational preparation at the end of the class. [6, 11] In the system of rules on learning content of competences as expected training results are determined by a linear character of integrative synthesis - an algorithm for characterization of state borders and characterization of the economic sector.

The overall system of intra - subject integrative synthesis at the level of rule/algorithm from V to X class in the geography training in Bulgaria encompasses a total of 53 rules/algorithms from 21 types (Table 3).

A total of 22 were projected for the two separate courses in VII and X grade in geography training of the native country. The two rules in the VII-th grade do not refer to the geography training in Bulgaria, which makes the final inclusion of 20 rules that are carriers of the geographic synthesis for the native country. They have proven their place in the curriculum as a necessary didactic tool, a tradition and a path of system for development and expansion, upgrading and deepening, complicating and complex synthesis of the intra - disciplinarity [9].
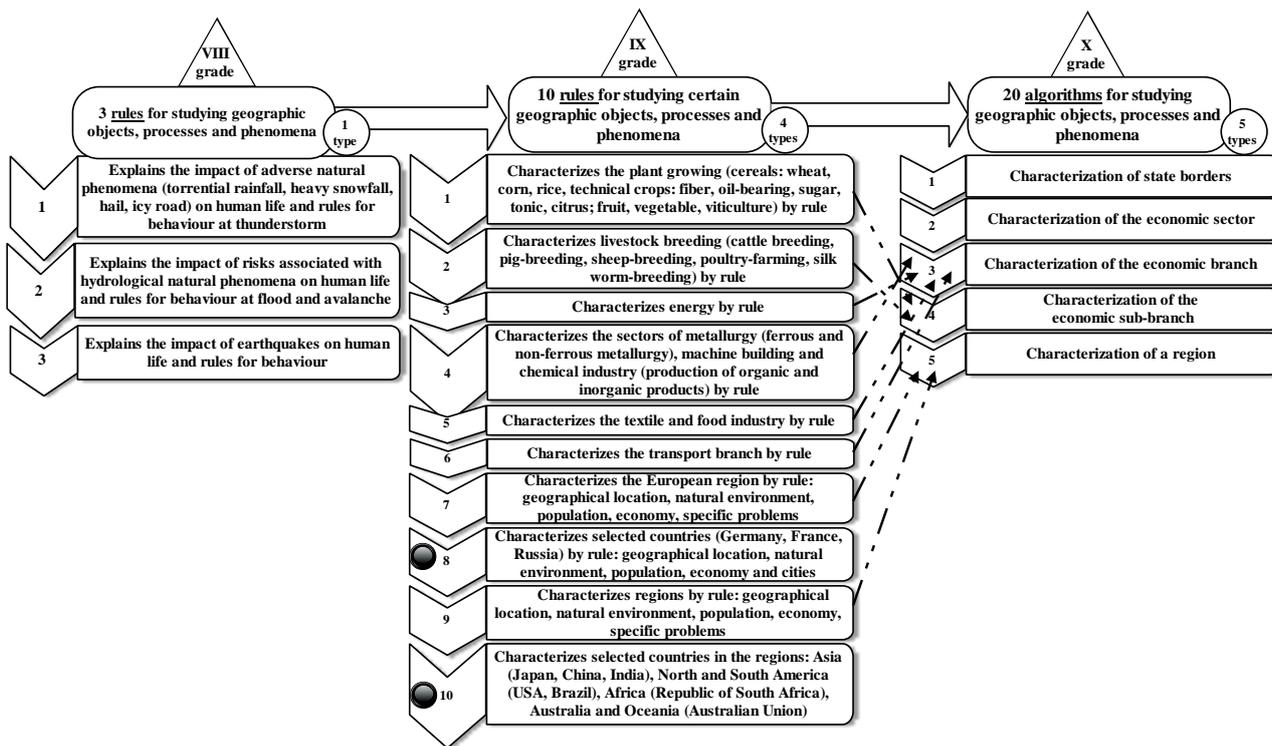
Figure 7. Rules for studying geographic objects, processes and phenomena for VIII - IX - X class on curricula [4, 10, 11]

Table 3. Systematic macro - frame of rules and algorithms as an enduring didactic tradition in *Geography and economics* training [3, 4, 7, 8, 10, 11]

GRADE	RULE/ ALGORITHM	RULES ON THE CURRICULUM PROGRAM IN NUMBER	RULES BY CURRICULUM ON TYPE IN NUMBER	RULES/ALGORITHMS
V	RULE	9	7	for wise behaviour during an earthquake; to read a climatogram; for reading a hydrogram; for wise flood behaviour; to describe the main natural zones; to determine the geographical location, size and borders of the continent; to characterize climate belts and a mountain area; river characterization; to characterize a country.
VI	RULE	9	3	to determine the geographical location, size and borders of the continent; to characterize climate belts and continental areas; to characterize a country.
VII	RULE	2	1	to characterize a country.
VIII	RULE	3	1	for thunderstorm behaviour; for flood and avalanche behaviour; earthquake behaviour rules.
IX	RULE (characterized on ALGORITHM the structure and the territorial organization of the world economy)	10	4	to characterize a branch; to characterize a sub - branch; to characterize a region; to characterize a country.
X	ALGORITHM	20	5	to characteriz a state border; for the characterization of the economic sector; to characterize a branch; to characterize a sub - branch; to characterize a region.
	TOTAL	53	21	

Integral intra – subject links provide synthesis of the learning content through the different education degrees and stages - between primary and secondary level of junior high school stage and first high school stage in *geography training in Bulgaria*.

Vertical distribution, engagements and integration of the learning content are the bearers of the idea of continuity from the basic grade of the junior high school stage to the first high school stage of the middle degree. The vertical integration and synthesis facilitate the transfer of knowledges, skills, relationships, habits, and attitudes to different situations of the new educational realities. This model refers to the three types of X class algorithms. Two of the algorithms have a linear synthesis of development in the X class - *characterization of borders* and *characterization of the economic sector*.

Intra - disciplinary integration is a low - governed result of the development of geographic science and the necessary synthetic unity of the overall vertical system designed by classes in Bulgarian school education.

The spiral synthesis of the learning content and its mixed model of construction require and impose an intra - disciplinary model of geographic integration and synthesis based on the rules and algorithms introduced in geography teaching for the native country (Fig. 8).
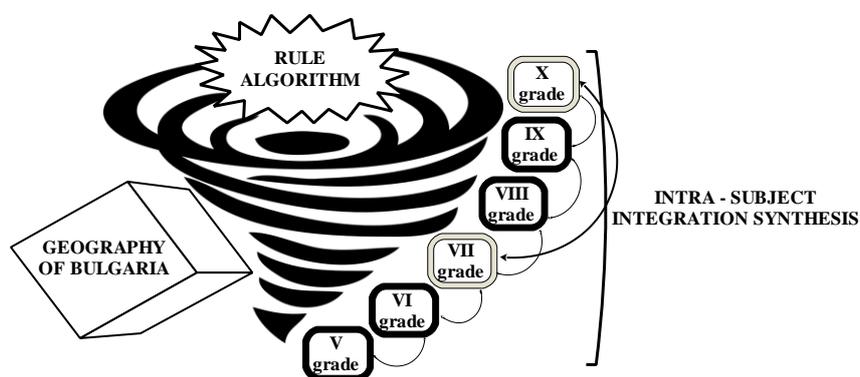

Figure 8. Model of intra - disciplinary integration synthesis

Conclusions

As a result of vertical synthesis and integration, the overall image of man and nature, of the surrounding reality is built and formed, ensuring systemic and structural knowledge, skills and relations within the scope of geography and economics. As a result of the vertical integration synthesis as a didactic tool, the aim is to optimize the learning process and to increase the quality and effectiveness of geography and economics training.

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