ROMANIAN REVIEW OF GEOGRAPHICAL EDUCATION,
Volume III, Number 2, August 2014

pp.20-40
DOI: http://doi.org/10.23741/RRGE220142

THE DIDACTIC EXPLOITATION OF GEOMORPHOSITES STUDIES IN SĂLAJ COUNTY. EXEMPLIFICATION: THE GEOMORPHOSITE "GRĂDINA ZMEILOR" (THE DRAGONS' GARDEN)

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(Received: June 2014; in revised form: August 2014)

ABSTRACT

In this study we have analyzed the specific competences related to geography that can be formed by studying the geomorphosites of Sălaj County during the optional course entitled "Geomorphosites of Sălaj"; the learning activities organized at "Grădina Zmeilor" geomorphosite; docimological tests and the students' knowledge about the geomorphosites of Sălaj county. The content of this research was obtained by conducting an experimental research and by developing the scientific methodological work to obtain the first level teacher certification under the title "Methodical Exploitation of Geomorphosites Studies in Sălaj County". One of the purposes of presenting these results was to provide some information and examples of teacher training for the teachers of geography in Romania and for the researchers from different countries.

Keywords*: specific competences, docimological test, optional course, scientific methodological paper to obtain the first level teacher certification, experimental research*

INTRODUCTION

The research started from the observation that there are many valuable geomorphosites in Sălaj County, which are little known and promoted, both

ISSN 2285 – 939X
ISSN – L 2285 – 939X

at national and at local level. We considered that studying them directly with our students will be an opportunity for them to gain knowledge about them, to acquire some skills related to geography and some transversal competences related to environmental research.

Geomorphosites represent a "geographical laboratory", where students have direct contact with the components of the geographical cover, with the geographic phenomena and processes, where they can observe and analyze them, and can form certain representations and concepts of geography.

The overall objective of the research is the study of how students acquire knowledge and develop their specific skills by the direct and indirect study of the geomorphosites of Sălaj County.

The specific objectives of the research were the following:

1. Analyzing specific geography skills that can be formed by studying the geomorphosites of Sălaj County.

2. Analyzing the learning activities organized at the geomorphosite "Grădina Zmeilor" (The Dragons' Garden).

3. Analyzing the docimological tests and the students' knowledge about the geomorphosites in Sălaj County.

To achieve the research objectives, we engaged a group of eighth-grade students in several learning activities conducted in these geomorphosites. These activities were designed and implemented by the first author in the context of achieving pedagogical research and developing the scientific methodical paper in order to obtain the first level teacher certification.

The purpose of presenting some scientific parts from this thesis is to provide the teachers of geography in secondary education in Romania some examples and conclusions on the research conducted. We believe that this study can provide valuable information about the geography teacher training in Romania for the researchers from other countries.

THEORETICAL BACKGROUND

Panizza (2001) considered geomorphosites as "geomorphological landforms that have acquired a scientific, cultural/historical, aesthetic and/or social/economic value due to human perception or exploitation" (2001). Reynard and Pralong (2004) define geomorphosite as "a portion of the land area of particular importance in understanding the evolution of the earth, maintaining the core value on the scientific, the rest being secondary values" (2004).

In the scientific literature in Romania, there are several researchers that have conducted studies on geomorphosites: Laura Comănescu (2008), Mihai Ielenicz (2009), Camelia Bianca Toma (2012), Daniel-Nicu Irimia (2013), etc. In what concerns the geomorphosite "Grădina Zmeilor", we have identified papers written by Paul Petcu (1985) and Smaranda-Mihaela Goidaci (2010).

We found no studies in the field of geography didactics on this geomorphosite, therefore this research covers a gap in the scientific literature.

MATERIAL AND METHOD

Research hypothesis. In this research, we tested the following hypothesis: the secondary school students can form specific geography skills and can also acquire knowledge about the geomorphosites in Sălaj County through their involvement in organized learning activities and land based sources. Based on this assumption, we have also issued two secondary hypotheses:

1) students can form specific geography skills, can gain knowledge about the geomorphosites in Sălaj County in learning activities organized in the field;

2) students can form specific geography skills, can gain knowledge about the geomorphosites in Sălaj County in learning activities based on photos, maps, schematic drawings, and texts.

Research variables. The independent variable is represented by the learning activities in which the students were involved. *The dependent variable* is represented by the specific geography skills and the student' knowledge about the geomorphosites in Sălaj County.

The place and time of research. The research was conducted at "Marcus Aurelius" Middle School of Creaca, Sălaj County, Romania, in the school year 2013-2014.

Participants. The research involved 20 eighth-grade students (7 girls and 13 boys). They formed a homogeneous group as regards age, but heterogeneous as regards sex, level of knowledge in geography and cognitive development. These students met the criteria established at the beginning of the experiment (age, school attendance). In developing the curriculum for the optional subjects, in the organization of learning activities, in testing and data collection, Adrian Slevaş was involved, both as teacher and as researcher, while the analysis of the results and their processing involved the second author of this study.

Procedure. To achieve the objectives of the research, the students were involved in an experimental activity. We underwent several stages.

Stage 1. Initial testing. In the observationa test was applied to evaluate their knowledge a "Grădina Zmeilor".

Stage 2. The formative intervention. The students were involved in a learning activity with the theme "Grădina Zmeilor".

Stage 3. Final assessment. In the final stage, a docimological test was applied to evaluate the knowledge that the students acquired about the geomorphosite "Grădina Zmeilor" after being involved in learning activities.

The content of research. Data subject research were: general skills and competencies from the optional course "Geomorphosites of Sălaj"; the learning activities organized at the geomorphosite "Grădina Zmeilor"; the initial and the final test applied to this optional subject; the students' results obtained in the two tests.

Research methods. The methodology used in this research included the psycho-pedagogical experiment - as the main method of investigation, systematic observation, content analysis of the students' products, individual and collective conversation method; statistical methods for data processing, methods of presenting the results. We used the illustrative analysis and subjective analysis (Băban, 2002) when analysing the texts developed by the teacher (skills tests) and by the students (the solutions in tests and in tasks).

RESULTS

1) General competencies and geographic skills that can be formed by studying the geomorphosites of Sălaj County. These skills were detailed in the optional course "Geomorphosites of Sălaj".

1. Perception and representation of the geographical space of Sălaj and the correct location in space and time

1.1. identification of key landforms in the county

1.2. locating the local geographical area

1.3. geographical and national positioning of the geomorphosites of Sălaj

1.4. orientation in the field and on the map

1.5. use of graphical presentation for displaying the observed reality

2. Observation and description of the geographical features of the local environment; observation of the relationships between the components of the environment

2.1. directed observation of the geographical elements of the environment in Sălaj

2.2. comparative presentation of some relief elements in Sălaj

2.3. analysis of the specific elements for the studied natural areas

2.4. identification of the limits, the minimum and maximum altitudes in the geographic area of the county

3. Knowledge and use of language elements specific to geography, applicable to the geographical local plan

3.1. preparation of simple statements about observed geographical phenomena and processes

3.2. explanation of geomorphological processes

3.3. use of language elements specific to geographical science in presentations, reading and interpreting maps

3.4. analysis of the types of relief in Sălaj

4. Full perception of the elements and of the phenomena from the geographical environment of Sălaj

4.1. correlation of relief with climate, hydrographic and biopedogeographic elements

4.2. correlation of relief units with their geological evolution

5. Formation of a constructive behaviour and environmental knowledge

5.1. adoption of a civic attitude of protecting the forms as environment components

5.2. proposal of measures for the protection of the environment and some landforms.

2) The learning activities in the geomorphosite "Grădina Zmeilor"

We present the project of these learning activities.

Topic: The geomorphosite "Grădina Zmeilor"

Specific competences (SC):

SC1. locating the elements and the processes in the geographic area

SC2. orientating on the map and in the field

SC3. analyzing the natural spreading areas

SC4. developing some texts on the observed geographic phenomena and processes

SC5. explaining the geomorphological processes

SC6. promoting a landmark

SC7. proposal of environmental protection measures

Transversal competences (TC)

TC1. stating an opinion

Teaching methods: reading, conversation, exercise, the cube method, observation, explanation.

Teaching aids: texts, maps, schematic drawing, pictures.

PROCEDURE

Specific competences

SC1.	locating the elements and the processes in the geographic area
SC2.	orientating on the map and in the field

Operational objective: during the learning activity, the students will be able to locate the geomorphosite "Grădina Zmeilor" in the national area and in Sălaj

Teaching methods: reading, conversation, exercise

Teaching aids: the text in the Annex 1, the map of Sălaj County

Task: Read the text from the Annex 1. Locate "Grădina Zmeilor" nature reserve.

Observation. Look at the Sălaj County map and locate the geographical position of "Grădina Zmeilor" nature reserve on the map as compared to other geomorphosites.

Heuristic conversation:

In what form of relief is the geomorphosite "Grădina Zmeilor" situated? (… at the foot of Dumbrava Hill in the Someş Plateau)

In what part of Sălaj County is the geomorphosite "Grădina Zmeilor" located?

In what village is the geomorphosite "Grădina Zmeilor" located?

What route should be followed in order to reach "Grădina Zmeilor" from our village? (... Creaca - Prodănești – Jibou – Var - Gâlgău Almașului)

What means of transportation can be used to reach the geomorphosite "Grădina Zmeilor"? (... by bicycle, school minibus, a hike through the woods from Borza to Gâlgău Almaşului).

Annex 1. "Grădina Zmeilor" nature reserve is situated at an altitude of 290 m, on the left side of the river Almas, in the catchment area of the rivulet Dosurilor, part of Gâlgău Almașului village, commune of Bălan. It has an area of 3 ha. The access is from the national road DN 1G Sânmihaiu Almaşului - Jibou, just 700 m west of the village of Gâlgău Almaşului. It is located at relatively small distances from the cities of Jibou (10 km), Zalău (36 km), and Cluj-Napoca (71 km). The cliffs of "Grădina Zmeilor" are located at the foot of the Dumbrava Hill, in the Someș Plateau, belonging to the Transylvanian Depression.

Specific competences

SC3.	analyzing the natural spreading areas
SC4.	developing some texts on the observed geographic phenomena and processes
SC6.	promoting a landmark

Transversal competences

TC1.	stating an opinion

Operational objectives. During the learning activity the students will be able:

- to describe literarily the landscape of "Grădina Zmeilor"

- to describe scientifically the geological formations of the geomorphosite "Grădina Zmeilor"

- to compare the shapes of different relief strı

- to analyze the rocks of the geomorphosite "Grădina Zmeilor" and their arrangement

- to associate elements from the geomorphosite "Grădina Zmeilor": rocks, landforms, names, etc.

- to draw up a list of methods and means of popularizing the nature reserve

- to argue the name of the reserve and of some relief microforms

- to argue why the area is a geomorphosite

Teaching methods: reading, conversation, exercise, the cube method, observation, explanation

Teaching aids: the texts from Annexes 2 and 3, pictures.

Task: Work in 6 teams. Using the cube method, solve the following tasks:

1. *Describe* literarily, in writing, for five minutes, the landscape of the geomorphosite "Grădina Zmeilor" visible in the picture (Figure 1) or in the field. *Describe* scientifically, in writing, for five minutes, the geological formations of the geomorphosite "Grădina Zmeilor" visible in the picture (Figure 1) or in the field.

Fig. 1. Landscape in the geomorphosite "Grădina Zmeilor"

Photo: Adrian Slevaș

2. Compare the appearance of the pyramid-shaped blocks made of sandstone (Figure 2) with those formed in microconglomerates (Figure 3) (height, thickness, size, rock composition, current processes affecting them, relief microforms which have appeared on their surface).

Fig. 2. "Soldații" (sandstone)

Photo: Adrian Slevaș

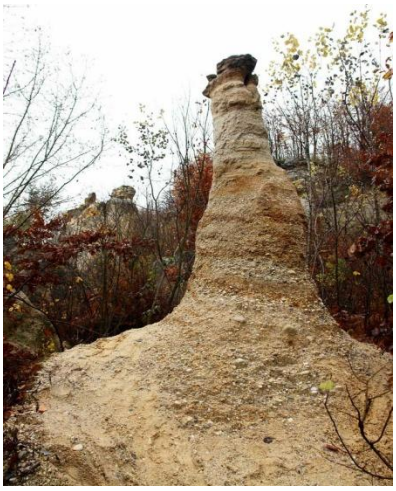

Fig. 3. "Acul Cleopatrei" (microconglomerate)

Photo: Adrian Slevaș

3. Analyze the rocks that formed the landscape of the geomorphosite "Grădina Zmeilor" and the arrangement of each other. Read the text from Annex 2.

Annex 2. "Grădina Zmeilor" is a geological and landscape nature reserve. It includes rock formations resulting from the action of air, water, and the process of gravitational sliding on a layer of red clay. The reserve is the result of a wide destructive sliding and erosion process of the so-called Sânmihaiu sandstones. This is poorly cemented sandstone interspersed with gravel and conglomerate. The rocks, derived from the structural front, under the erosion of meteorological phenomena have the shape of pillars, blocks, columns, mushrooms, bridges, towers with heights up to 12 meters. Some passages can be traversed from one end to another, whereas in others the access is denied. "Those who want to wrestle with the dragons can do it in one way: admiring and respecting these giants of rock, unique in Europe." Because "on the realm of dragons one has to play by the dragons' rules, those who come here are asked not to climb rocks. The danger of collapsing with them is increased".

(http://www.cluj.travel/gradina-zmeilor/)

4. Associate the elements of the two columr

1. Grădina Zmeilor	a. landslide
2. Acul Cleopatrei	b. Dumbrava Hill
3. Residual rocks relief	c. rock from reserve
	d. pillars, columns, blocks, towers
	e. sandstone, microconglomerates

5. Put into practice! Make a list of methods and means of popularizing the nature reserve among tourists.

6. Read the text in Annex 3 and *argue* the name of the reserve, the name of some rocks under it, and the reason why that the area is a geomorphosite.

Annex 3. *The landforms are irregular. They were named as follows: Fata Cătanei (Royal Soldier's Girlfriend), Zmeul şi Zmeoaica (The Dragon and The Dragoness), Moşu (The Old Man), Călugăru (The Monk), Căpitanul (The Capitan), Soldaţii (The Soldiers), Eva, Degetul (The Finger), Sfinxul (The Sphynx), Acul Cleopatrei (Cleopatra's Needle). The tourists are attracted by the beauty of the landscape and the legends of "Grădina Zmeilor". One legend says that Gâlgău Almașului was the shelter of the dragons who used to steal people's daughters. One day, one of them stole the sun from the sky. A brave young man confronted him, defeated him, found the sun and threw it up in the sky. The other dragons that came to help were blinded by the sudden brightness. One of the girls who had been stolen by the dragons, was freed by the brave young man, uttered a spell, and the dragons were transformed into forms of stone. The name Fata Cătanei (Royal Soldier's Girlfriend), as "Grădina Zmeilor" is also called, comes from the legend that a girl fell in love with a royal soldier. Her stepmother cursed her, turning her into a block of stone. Until the landslides of 1971, the rock on which the legend was created could be seen. It had the form of a girl with long hair, with a jug in her hand and a pail on her back.*

(http://www.cluj.travel/gradina-zmeilor/)

Specific competences

SC5.	explanation of geomorphological processes

Operational objective: during the learning activity the students will be able to explain the formation of the relief microforms from the geomorphosite "Grădina Zmeilor"

Teaching methods: conversation, exercise, observation, explanation

Teaching aids: pictures of "Grădina Zmeilor"

Heuristic conversation:

- What aspect do the relief microforms have? (…forms of columns, blocks, columns, mushrooms, bridges, towers)

-What are the rocks that formed the geomorphosite? (…sandstone, microconglomerate, sands, "layer" of red clay)

- How were the rocky geological formations formed in the reserve? (by depositing silt, sand, gravel on the bottom of the sea, by cementing these rocks, then by water withdrawal)

-What factors contributed to the formation of "Grădina Zmeilor"?

(... the geological substrate or the rock, physico-chemical processes, the gravitational geomorphological processes - collapse, subsidence, landslides, external agents, time)

- How did water act as a geomorphic agent on the relief from "Grădina Zmeilor"? (... caused by freeze-thaw disaggregation of rocks; the clay layer infiltration caused landslides; leakage to the surface – washing, runoff - has eroded, transported and deposited rocks; by combining CO_2 acted on karstic rocks forming The Miners' Cave)

- How did air act as geomorphological agent on the relief of "Grădina Zmeilor"? (... the large diurnal and annual thermal variations have caused repeated freezing and thawing of water in rock and caused their destruction, by the wind)

- How did the gravitational processes act on the relief of "Grădina Zmeilor"? (... they caused landslides, subsidence, collapses)

- How were the relief microforms in the reserve formed? (... the external factors caused the detachment of masses of rocks from the structural front on sandstones and conglomerates, and then, by sliding, to its moving off)

- In conclusion, how do you explain the formation of the natural reserve "Grădina Zmeilor"? (... the geomorphosite consists of a set irregularly cliffs positioned at the base of the massif in south-eastern Dumbrava Hill. The emergence and evolution of geomorphological processes are linked to thousands of years ago when there were collapses and landslides of sandstone packages and microconglomerates over a layer of

red clay. Through the collaboration of a number of factors such as air, water, gravity, plants, and animals a relief of residual rocks was created represented by towers, needles, "mushrooms" and prismatic columns, erratic blocks positioned at an altitude ranging between 225 and 315 m)

- How do you explain the distance in blocks of stone from the reserve and the place where they split? (... those rocks slid gravitationally towards low altitude areas.)

- How do you think the blocks of stone slip? (... the rock layer below those acted as a slide)

- Why did the underlying layer of rock act as such? (... because it is made of red clay, which, by wetting, facilitated the sliding of the layers above)

Explanation: By wetting the clay, particles increase their volume and occupy the space of the existing air particles. This phenomena is called inflation. When there are no air spaces between clay particles, water cannot penetrate the layer and the clay layer becomes impermeable.

- What are the components of the landslide from "Grădina Zmeilor"? (… the structural front of Dumbrava Hill represents the separation ditch, the blocks of sandstone and microconglomerates form the slip)

- What consequences did the landslides have on Dumbrava Hill? (... the distance in time of the prism blocks and sandstone formations from the structural front)

- Why are the cliffs near the front of detachment more impressive than the farthest ones? (... because they are "younger", namely they that have emerged more "recently" and were shortly exposed to the process of erosion and the action of external agents, as compared to the most remote ones, which were sometimes transformed into piles of gravel and sand)

-Why was "Grădina Zmeilor" declared a nature reserve? (... for the protection of the species of plants in the area, the existing geological formations, for popularizing the unique landscapes)

Specific competences

SC6.	analyzing the natural spreading areas

Operational objective: during the learning activity, the students will be able to identify other geological formations in the county and the country, comparable to "Grădina Zmeilor"

Task: Work in groups of four students. Identify other geological formations from the country, similar in appearance or way of formation with the analyzed geomorphosite.

(…in Sălaj county there are several nature reserves such as "Moșu și Baba" in Năpradea, "Stânca Dracului" - Hida, "Stanii Clițului". In other counties, we can notice "Babele" and "Sfinxul" in the Bucegi Mountains,

"Sfinxul Bratocei" in the Ciucaş Mountains, "Pietrele Doamnei" in the Rarău Mountains).

3) The initial and the final test at the optional class "Geomorphosites of Sălaj"

Initial Test Paper

I. The following text is given:

0.5p x 5 = 2.5p

"Geomorphosites represent landforms that, first of all, received scientific value, then a cultural and historical one, aesthetic and socio-economic on the basis of perception and their exploitation by man; the name geomorphosites can be given to any other portions of the land area of particular importance in understanding the evolution of Earth, climate and life."

Read the text carefully and on that basis, establish the truth of the sentences below. Circle T if true and F if false.

1. Only landforms can be considered geomorphosites.
T/F

2. The main value of a geomorphosite is the scientific one.
T/F

3. All forms of relief are geomorphosites.
T/F

4. The cave of Cuciulat is a geomorphosite.
T/F

5. Archaeological sites can be geomorphosites.
T/F

II. Read the statements below and circle the letter corresponding to the correct answer:

0.5p x 5 = 2.5p

1.The geomorphosite "Grădina Zmeilor" was carved in rocks by the external agents:

a) volcanic b) sedimentary

c) metamorphic d) is a botanical garden

2. The geomorphosite "Măgura Moigrad" does not have a value:

a) scientific b) historical

c) socio-economic d) religious

3. Geomorphosites related to water are called:

a) anthroposites b) hidrosites

c) ecosites d) geosites

4. In Creaca village it cannot be considered a geomorphosite:

a) The Monului Cave

b) "Fata cu chica-n cap"

c) limestone quarries of Prodănești

d) the sporting field in Jac

5. The connection between the native village, Creaca, and Zalău is done through the pass:

a) Ciucea Pass b) Poarta Someșană

c) Poarta Meseșană d) Gutâi Pass

III. Make arrows correspondence between elements of the two columns:

0.3p x 5=1.5p

A	B
1. Grădina Zmeilor	a. Barcău Valley
2. The limestone of Rona	b. Ortelec Valley
3. The wooden church of Borza	c. Someș Valley
4. Măgura Moigrad	d. Almaș Valley
5. Izvoarele Barcăului waterfall	e. Agrij Valley

IV. Read carefully the text below and the list of terms. Write on the test paper the corresponding letter for each blank space and, on the right, write the appropriate word from the given list.

0.3p x 5 =1.5 p

Limestone has formed a kind of relief, called ...1..., gorges and caves being formed. In Cuciulat Cave, on the Someş Valley, ...2... were identified on its walls. In the west of the county, in a karst area, from an intermittent spring river arises ...3..., which forms a picturesque waterfall. Most caves, ravines, gorges and other karst landforms are found in Sălaj territory in the relief unit called ....4..., in the north-east of the county. Most of them are considered geomorphosites, with a significant ...5.... value.

List or words: Barcău, the Someș Plateau, Agrij, literary, landscapes, karst, glacial, cave paintings, scientific, the Șimleu Depression.

V. Explain the aesthetic value of a geomorphosite.

1p + 1 point bonus

Marking Scheme

Subject I – 2.5 p., 0.5p for each correct answer: (5 x 0.5p=2.5p). 1-F, 2-T, 3-F, 4-T, 5-T

Subject II – 2.5 p., 0.5p for each correct answer: (5 x 0.5p=2.5p). 1-b, 2-d, 3-b, 4-d, 5-c

Subject III – 1.5p., 0.3p for each correct pairing: (5 x 0.3p =1.5p).

1-d, 2-c, 3-e, 4-b, 5-a.

Subject IV – 1.5p., 0.3p for each space correctly filled:

(5 x 0.3p = 1.5p). 1 - karst, 2 – cave paintings, 3 - Barcău, 4 - the Someș Plateau, 5 - scientific.

Subject V-1 p. is given for the explanation of the aesthetic function, namely for the use of any of the landscape terms, views, beautiful and attractive sights, etc.

1 point bonus is granted.

Final Test

I. Determine the truth value of the sentences below. Circle T if true and F if false.

0.5p x 5 = 2.5p

1. Only landforms can be considered geomorphosites.

T/F

2. The main value of a geomorphosite is the scientific one.
T/F

3. All forms of relief are geomorphosites.
T/F

4. The cave of Cuciulat is a geomorphosite.
T/F

5. Archaeological sites can be geomorphosites.
T/F

II. Read the statements below and circle the letter corresponding to the correct answer:

0.5p x 5 = 2.5p

1. The geomorphosite "Grădina Zmeilor" was carved in rocks by the external agents:

a) granite and andesite b) microconglomerates and sandstones

c) crystalline schists d) limestone

2. The cultural-historical value of the geomorphosite "Măgura Moigrad" is given by the presence of:

a) quarry b) Moigrad village

c) the ruins of the port Porolissum d) the volcanic cone

3. The moors of Iaz is a geomorphosite from the category:

a) anthroposites b) hidrosites

c) archaeological sites d) geosites

4. In Creaca village, it cannot be considered a geomorphosite:

a) The Monului Cave b) "Fata cu chica-n cap"

c) limestone quarries of Prodănești d) the sporting field in Jac

5. Poarta Meseșană is crossed by:

a) DJ 181 C Creaca-Zalău b) DJ 108 A Creaca-Românași

c) DN 1A Jibou- Tihău d) DN 1F Zalău –Românași

III. Read carefully the text below and fill in the blanks with the correct missing information.

0.3p x 5 =1.5 p

Limestone has formed a kind of relief, called ...1..., gorges and caves being formed. In Cuciulat Cave, on the Someş Valley, ...2... were identified on its walls. In the west of the county, in a karst area, from an intermittent spring river arises ...3..., which forms a picturesque waterfall. Most caves, ravines, gorges and other karst landforms are found in Sălaj territory in the relief unit called ....4..., in the north-east of the county. Most of them are considered geomorphosites, with a significant ...5.... value.

IV. Make arrows correspondence between elements of the two columns:

0.3p x 5=1.5p

A	B
1. Grădina Zmeilor	a. Someş Plateau
2. The limestone of Rona	b. Meseş Mountains
3. Râpa Străninoasa	c. Osteana Piedmont
4. Măgura Moigrad	d. Someş Floodplain
5. Izvoarele Barcăului waterfall	e. Culmea Prisnelului

V. Explain the scientific value of a geomorphosite.

1p + 1 point bonus

Marking Scheme

Subject I – 2.5 p., 0.5p for each correct answer: (5 x 0.5p=2.5p). 1-F, 2-T, 3-F, 4-T, 5-T

Subject II – 2.5 p., 0.5p for each correct answer: (5 x 0.5p=2.5p). 1-b, 2-c, 3-b, 4-d, 5-a

Subject III – 1.5p., 0.3p for each space correctly filled: (5 x 0.3p = 1,5p 1 - karst, 2 – cave paintings, 3 - Barcău, 4 - the Someș Plateau, 5 - scientific.

Subject IV – 1.5p., 0,3p for each correct pairing: (5 x 0.3p = 1.5p). 1-a, 2-d, 3-e, 4-b, 5-c.

Subject V-1 p is given for the explanation of the scientific function of the geomorphosite.

1 point bonus is granted.

4) The students' results in the initial and final test at the optional class "Geomorphosites of Sălaj"

In Table 1 and in Figure 4, we present the results obtained by the students in the initial and the final test on the geomorphosites of Sălaj County.

Table 1. The students' results in the initial and final test paper

Evaluation type	Number of assessed students	Marks									
		1	2	3	4	5	6	7	8	9	10
Initial Test	20	-	-	-	-	3	6	6	2	2	1
Final Test	20	-	-	-	-	2	3	5	4	3	3

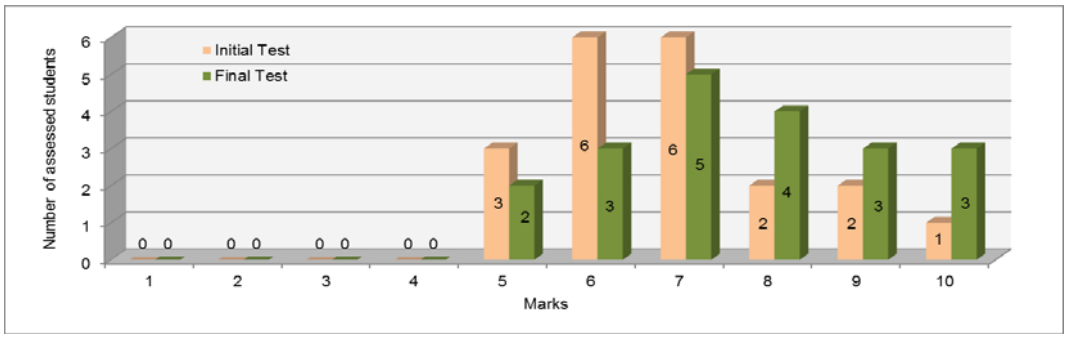

Fig. 4. The students' results in the initial and final test paper

DISCUSSIONS

1) *The analysis of the specific geographical skills which can be formed by means of studying the geomorphosites of Sălaj County*. The enunciation of the skills is similar to that from the school curriculum, from various reasons: to come close to the vision reflected from the official documents on skills; to support, through the given optional course, the development of the specific geographical skills from the core curriculum.

We chose to enunciate skills by using nouns and not verbs in the infinitive. As far as the general skills are concerned, two nouns were employed in the forms (perception and representation; observation and description; knowledge and use), reproducing thus the model of the school curriculum. The formulation of the specific skills, however, was done by using only one noun instead of two, thus rendering them more precise.

2) *The analysis of the teaching activities organised at the geomorphosite "Grădina Zmeilor" in Sălaj County*. Firstly, several specific geographical skills were selected to be shaped and developed in students by means of having them study the geomorphosite in question. In order for the skills to be as clearly described as possible, they were reformulated in a simpler and more precise form. The specific skills were added to the teaching activities header.

During the development of the activities, the targeted skill or specific skills were mentioned first, and then, the targeted operational objectives were mentioned by following some models found in the specialised literature (Dulamă, 2012). We chose to present the operational objectives to ensure the coherence of the activity. At a given stage of the planning, starting from the chosen specific skills, we formulated some derived skills. We eventually stopped using them because they have yet to be defined and exemplified in the pedagogical literature in Romania.

Each teaching activity was accompanied by the pedagogical methods and materials children had to work with. We suggested the use of several teacher-centred activities (the explanation), but also of some student-centred activities (the observation, the exercise, the cube method). We made good use of conversation with the purpose of guiding the students' cognitive processes. These activities were organised with students in the field. By means of detailing each activity, we aimed at providing children with the necessary contextual information so as to accomplish the targeted objectives and also to form within themselves the chosen specific skills.

3) *The analysis of the docimologic tests and of students' knowledge on the geomorphosites of Sălaj County*. In the content of the tests, objective items were used: dual-choice items, multiple-choice items, matching items, gap-filling. By means of using such items, one has not sought to assess specific geographical skills, but only the students' knowledge on the geomorphosites of Sălaj County. The fifth item in each test (explain in what consists the aesthetic/ scientific value of a geomorphosite) aims at assessing the students' skill to explain, dealing thus with a cross-curricular skill. The initial test was given at the beginning of the teaching activities on the geomorphosites of Sălaj County, and the final test was taken only after their development. The content of both tests was correlated with the essential data on the geomorphosites in question.

Despite the fact that these tests aimed at assessing the students' knowledge we notice, however, that they formed the targeted skills at a certain level. The proof resides in their answers to the questions and in their solving the tasks received during each teaching activity.

Based on both the analysis of the results students obtained at the two tests and the evaluation of their answers and solutions to the tasks

during the teaching activities, one can easily notice that they made progress. This result confirms the hypothesis: secondary-level students can form themselves the specific geographical skills and can obtain good quality knowledge on the geomorphosites of Sălaj if they are involved in teaching activities organised in the field, based on the existent resources.

CONCLUSIONS

At the end of this study, several conclusions have been drawn:

1) The involvement of the eigth graders in the study of the optional course ”Geomorphosites of Sălaj” offers them a favourable context for acquiring knowledge on such geomorphosites and of shaping and developing specific geographical skills.

2) Student-centred activities, done in the field and based on some maps, schematic diagrams and photographs help students acquire good quality information/ knowledge, but also specific geographical and cross-curricular skills of researching the geographical space.

3) The initial and the final docimologic tests allowed the assessment of the students’ knowledge on the geomorphosites under analysis and, to a lesser degree, the assessment of their skills. This reason motivates us to research new ways of assessing skills in the future.

4) The lesson plan/ the plan of the teaching activities organised at the geomorphosite “Grădina Zmeilor” in Sălaj County could be considered an example of micro-planning experimental activities, of the current activities during the Geography lessons and of detailing the activities at the tenure exam and those exams aimed at obtaining the permanent teacher certification and the second level teacher certification.

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