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THE TRAINING OF SOME GEOGRAPHY-SPECIFIC COMPETENCES. APPLICATIONS ON THE THEME ”ICELAND”

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ABSTRACT

The study analyzes the impact of specific learning activities that are using student-centered methods, focusing on various aspects of Iceland. In the sixth grade, the lesson on the topic „Iceland” features an activity called "Famous Icelandic Places," based on a teaching game. In the ninth grade, an activity related to glacial relief is described, in which storytelling is combined with the use of images. In the tenth grade, a case study on the development of tourism in Iceland is presented, along with an activity regarding the Cod War, which employs the jigsaw method. These activities highlight the importance of students grasping the specificity and uniqueness of Iceland within Europe. This country provides an optimal context for students to acquire knowledge (northern lights, geysers, fumaroles, solfataras, active volcanoes, basalt columns, geothermal energy, ice caps, rifts) and specific competencies in geography. The results of the study indicate that the learning activities were effective.

Keywords: tourisms, didactic game, cod war, case study, mosaic method, storytelling, glacial landforms, Iceland

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INTRODUCTION

The study of geography contributes to the „free, comprehensive, and harmonious development of the human individuality” (Romanian Parliament, 2023, p. 2), to the formation of students' competencies necessary for their active participation „in social, economic, political, and cultural life” (Romanian Parliament, 2023, p. 33) and to educating students for environmental awareness and sustainable economic development (Ilovan et al., 2019). By studying geography, students become familiar with the world they live in (Dulamă, 2011), become aware of environmental and social issues (Dulamă, 2010b), and they develop their critical thinking (Dulamă, 2017).Through geography-related activities, students develop and form their competencies and progressively acquire knowledge throughout their entire education (Dulamă, 2010b), starting with the exploration of their immediate surroundings (Dulamă, 2010a) and expanding their study to the entire planet.

In Romania, middle school students are allocated one hour per week for geography studies (MEN, 2017). Similarly, in high school, most classes do study geography, also in one hour per week (MEN, 2017). Due to these limited time resources, students cover few topics related to geographical space and the study of these topics is not conducted in depth; as a result, students have reduced

opportunities to learn about the world they live in through formal, mediated contexts (Vygotsky, 1962) by teachers. Often, they obtain specific geographical information from the internet (Dulamă et al., 2015), watching videos on YouTube channels that are not created by scientists, but by „YouTubers”, which raises concerns about the objectivity and credibility of the information being conveyed (Boy et al., 2020).

Given the easy availability of diverse online sources offering specific geographical information, Generation Z students should receive fundamental and structured knowledge in school that acts as a foundation for their media interactions. Additionally, they need to enhance their abilities to analyze and interpret both verbal and visual content while cultivating critical thinking skills. Recent studies in Romania have focused on investigating the competence to analyze and interpret photographs (Antal et al., 2020; Drăghici et al., 2020), to use web sources (Ilovan et al., 2018) and various applications and devices in searching for information (Rus et al., 2019).

Environment or geographical space knowledge based on discovery learning, coordinated by the teacher, can be achieved in the field, directly (Rus et al., 2020), using textbooks (Buda et al., 2020) and various visual materials (Magdaș et al., 2018). In the context of studying geography, students develop the competence to analyze and interpret diagrams (Dulamă, 2011) and to create diagrams (Osaci-Costache et al., 2013), as well as to create virtual portfolios (Conţiu at al., 2021). Students acquire specific geographical knowledge and develop their written communication skills by reading literary texts (Conțiu et al., 2022), newspaper articles (Dulamă, 2005), either individually or in groups (Dulamă, 2005).

Iceland is studied very little in geography classes in middle and high school, even though the approach to regional geography content is essential for understanding the world and for developing various and necessary skills (Dulamă & Ilovan, 2010). According to the school curriculum, Iceland could only be studied in the sixth grade, in the content area of Europe – geographical identity, specifically in the geographical characterization of certain states (at least one state from each geographical region) (MEN, 2017). This allocation of study hours can be compensated by examples from the geography of Iceland that can be explored over many other geography lessons. Our study addresses some geographical examples regarding Iceland that can be included in geography lessons at both middle and high school levels. The study of Iceland, a country with remarkable uniqueness, helps to increase students' interest in geographical knowledge.

The natural phenomena and elements specific to Iceland, which are unique in Europe (geysers, glacial lagoons, ice caps, tectonic rifts etc.), provide the context for a true outdoor geography laboratory. The distinctive features of the natural environment are intertwined with socio-economic characteristics that give this country enormous tourism potential and make it a model to follow in many regards. In this study, we aim to analyze the effects of certain student-centered learning activities (Pahome, 2022) on the knowledge of students from several classes, where teaching methods such as educational games (Dulamă, 2008a) and the Mosaic method (Dulamă, 2008b) were used, focusing on specific aspects of Iceland.

METHODOLOGY

Procedure. In our study, we present four research-action projects conducted in a middle school class at „Serafim Duicu” Gymnasium School and in two classes at „Gheorghe Șincai” Technological High School from Târgu Mureș, Mureș County. In each class, a research-action was carried out - that went through three stages: the pre-experimental stage in which a pre-test was administered; the formative intervention stage during which the learning activity took place; the post-experimental stage in which a post-test was administered.

Participants. A total of 69 students participated in the research: 25 students from the sixth grade, 23 students from the ninth grade, and 21 students from the tenth grade.

Teaching activities. In the **sixth grade**, during the lesson with the topic „Iceland”, a teaching activity based on games is conducted with the students, with the theme „Famous places in Iceland”. This activity contributes to the development of the competences „3.1. Using geographical information obtained with the help of ICT/GIS tools and elements from mathematics and science” and „4.2. Characterizing elements, phenomena and processes according to a given algorithm” (MEN, 2017).

The following sequence of steps is followed: communication of the task, presentation of the famous site, visiting the famous site (Dulamă, 2008). The students work in groups of 5-6. Each group has the task to prepare a presentation of a famous site, a special place in Iceland. To avoid the situation where two groups present the same site, there will be a selection of the touristic objectives. Their names will be written on slips of paper and a student form each group will make a draw. The slips will have a few places that attract tourists to Iceland, such as: the Blue Lagoon, the Þríhnúkagígur volcano, the Strokkur geyser, the Katla volcano, the basalt columns at Vik, the Jökulsárlón glacial lagoon, the puffins in Iceland, the Gullfoss waterfall, the Svartifoss waterfall, the Seljalandsfoss waterfall, the Hallgrímskirkja church, the cave in the Langjökull glacier and others.

The students will make a research by consulting online websites and they will prepare a short presentation lasting 3-4 minutes about their touristic attraction. In the allocated space in the classroom, they will display posters, models, brochures, images etc. about it. In the following activity, each group will present their touristic attraction, while the other students will „visit” each area and ask questions to the team that made the presentation.

In the **ninth grade**, the students will study glacial landforms using images from the natural landscape of Iceland. During the formative assessment, the teacher will tell a short story, and in the same time some photographs will be projected. The story will have the title „A walk on an Icelandic glacier”. Students will be tasked with recognizing several elements of glacial landforms and some characteristics of the natural environment related to glaciers in Iceland, which will be labeled with letters on the photographs projected on the screen. This activity aims to develop competencies „1.1. Using specific scientific and disciplinary terminology (concepts, notions) to present relevant information” and „5.4. Using simple methods and techniques specific to different scientific disciplines to analyze elements of relief in the context of the surrounding environment” (MEC, 2004).

While going through the photographs from Fig. 1, the teacher narrates: „In one of the days spent in Iceland, I climbed a glacier. The glacier is called Mýrdalsjökull. I did not climb the main body of the glacier itself, but a lateral extension of it (A), called Sólheimajökull. At the beginning, I walked along the marginal area of the glacier (B). Then I put on crampons to avoid slipping on the ice and actually ascended the glacier. The surface had many small cracks (C). The glacier’s surface was not white because we climbed it in the summer, when there is no snowfall, so a thin layer of dark color (D) can be seen on the glacier. When leaving the glacier, we descended through a glacial landform (E). Along the way, eroded rocks typical for areas with low temperatures (F) could be frequently observed”.

The solutions that the students must provide are as follows: A – glacier tongue, B – lateral moraine, C – crevasses, D – volcanic ash and dust, E – glacial valley, F – gelifraction. The professor then discusses each identified element with the students, defining each identified element and process, presenting their characteristics etc.

Figure 1
Glacial landforms and other glacial characteristics of Iceland (Hobai R., July 2015)

In the **tenth grade**, within the chapter about the economic activities, during the lessons related to tourism, students are presented with a case study on the development of tourism in Iceland. This activity supports the development of the following competencies: „1.2. Justifying an explanatory approach”, „3.2. Identifying sequences of social and economic phenomena and processes” and „5.8. Understanding the functional relationships between natural and social elements (through case studies)” (MEC, 2004).

Students are informed about the purpose of the activity: analyzing the role of tourism in the economy of Iceland. The activity will be divided into two parts. In the first part, students will create a diagram based on data from a table, and they will analyze and interpret the diagram. Students receive a set of data regarding the annual number of tourists and the population of Iceland from 1996 to 2015 (Table 1). Based on this data, students will make a diagram (Fig. 2) showing the evolution of the population and the number of tourists in Iceland. To facilitate their task and to enable them to complete the activity within a single class period, students may receive graphs that

already display the trend of the total population of Iceland, and they will only include the trend of the number of tourists in the diagram.

Table 1

The number of inhabitants and the number of tourists in Iceland, during the period 1996 – 2015)

No.	Year	Tourists number	Inhabitants number	Nr.	Year	Tourists number	Inhabitants number
1	1996	200.835	269,727	11	2006	422.280	299.891
2	1997	201.654	272.069	12	2007	485.000	307.672
3	1998	232.219	275.264	13	2008	502.300	315.459
4	1999	262.605	278.717	14	2009	493.940	319.368
5	2000	302.900	282.849	15	2010	488.622	317.630
6	2001	296.000	286.275	16	2011	565.611	318.452
7	2002	277.900	287.373	17	2012	672.773	319.575
8	2003	320.000	288.471	18	2013	807.349	321.857
9	2004	360.392	290.570	19	2014	997,556	325.671
10	2005	374.127	293.577	20	2015	1.289.140	329.100

Source: *http://www.statice.is/*

Based on the created graph, students will discuss how the two indicators have evolved: the increase of both the number of inhabitants and the number of tourists. The teacher will talk to the students about the factors that have led to the massive increase in the number of tourists.

In the second part of the activity, to highlight the positive impact that the development of tourism has had on the economy of the entire country, students will read two excerpts from two articles from an Icelandic daily newspaper, "Iceland Monitor."

Excerpt no. 1

Tourists to thank for Iceland's economic growth

> „Tourist are to thank for the very strong growth currently enjoyed by the Icelandic economy, with tourist numbers expected to almost double over the next three years.
> Latest estimates from Icelandic bank *Landsbankinn* point to an enviable 6.1% rate of economic growth for 2016. Without the growth generated by tourism this year, that figure would be a considerably lower 1.2%.” (Iceland Monitor, December 14, 2016)

Excerpt no. 2

Tourism in Iceland: “We need more hotels”

> „At present numbers, all hotels in the Greater Reykjavik area will likely be full to capacity as early the first quarter of next year, according to a new study on tourism in Iceland performed by analysts from Arion Bank. […].
> „If we are going to welcome all of these tourists, they need somewhere to stay and things to do,” says Erna Björg Sverrisdóttir, one of the analysts presenting the study today.
> The extra tourists expected between now and 2018 will create 10-11,000 new jobs. This is effectively doubling the amount of new jobs generated by normal economic growth – placing huge demands on a labour market already with very low unemployment.” (Iceland Monitor, September 21, 2016)

After a student reads aloud each passage, the teacher discusses with the students the conclusions that can be drawn from these texts.

In the **tenth grade**, there will also be an activity within the theme „Current major issues in political geography”, focusing on the resources of the ocean or types of conflicts. This educational activity about the code war contributes to the development of the competence „1.1. Use of specific scientific and disciplinary terminology (concepts, notions) for presenting information related to political geography” (MEC, 2004).

Students will be informed about the purpose of the activity and how it will be developed. The students will form four „home” groups; from each group, one student will move to another group to form four expert groups; each expert group will receive a topic to be discussed within the group; each „expert” will return to their „home” group and present to their group members the information gathered from the expert groups. Each expert group will receive a printed text about an episode of the code war. Students will extract essential information about this war. The texts given to the students are from the volume „History of Iceland. From the Settlement to the Present Day”, written by Hjálmarsson J.R. (Hjálmarsson, 2014, p. 181-186).

Excerpt no. 1

„Fishery Limit from Three to Four Miles, 1952”

> „At least since the early fifteenth century fishermen from abroad have travelled to fish in the rich Icelandic waters. In the course of time the foreign fishing effort grew constantly, especially after steam trawlers came into use near the end of the nineteenth century. This fishing from abroad stopped during the two world wars, but when peace had been restored again, the trawlers from Britain, Germany and many other countries returned in great numbers, constantly depleting the most vital resourse of the Icelandic people.
>
> The fishery limit was not clearly defined in old times, but from the seventeenth to the nineteenth century it was usually sixteen miles out from the coast. This would not have been unreasonable, had the waters been properly patrolled. But the situation changed suddenly when Denmark made a treaty with the United Kingdom in 1901 about the territorial waters around Iceland, stipulating a fishery limit of only three miles off the coast for the next fifty years. As a result, more fish than ever before were taken, and it soon became clear that the once rich grounds near the coast were being practically ruined by flagrant overfishing. Iceland recognized that action had to be taken, but for a long time was bound by the treaty. The first step was new legislation in 1948 on scientific protection of the fishing grounds around the country. Next was an extension of the limit [...] to four nautical miles all around the contry in 1952 [...].
>
> All nations, in fact, acknowledged this new limit, except the Britsh. They protested strongly and retaliated by boicotting fish from Iceland from years. Initially this had a bad impact on Icelandic fishermen who were used to selling their fish in British markets. But new markets were found in the United States, the Soviet Union and elsewhere for frozen seafood, so in the long run the boycott was not harmfull as the Birtish may have thought.”

Excerpt no. 2

„From Four to Twelve Miles, 1958”

> „After the middle of the century a major international debate developed about territorial waters and fishery limits. In 1958 the United Nations called an international convention in Geneva on the issue. No common and final

agreement was reached, but the majority of nations seemed to favour a twelve-mile limit for coastal states. Determined to wait no longer because of the obvious urgency of protecting stocks, Iceland extended its fishery limit from four to twelve miles on September 1, 1958. On the stipulated day all foreign fishing vessels sailed outside the new limit, except the British. Besides staying inside, they were joined by British naval vessles from prevented the Icelandic coastguard patrol vessels from arresting the British trawlers and taking them to the nearest harbour.

An almost warlike situation developed on the seas around Iceland, which earned the common nickname of the Cod War. Conflicts took various forms, for example when British marines took the crew of a coastguard patrol vessel prisonier to stop one of the British trawlers from being arrested. [...] This cod war lasted until 1961, when a treaty was finally made in which the British acknowledged the twelve-mile limit, but were granted the right to fish in certain areas between six and twelve miles for the following three years.”

Excerpt no. 3

„From Twelve to Fifty Miles, 1972”

„Around 1970, Icelandic politicians began seriously discussing the need to extend the fishery limit even farther [...]. The new government that took office in 1971 then decided to extend the limit from twelve to fifty miles the following year. With this action, Iceland had taken the leadership in protection of territorial waters, since most coastal states had stuck to a twelve-mile limit up until that time. Britain and West Germany protested, maintaining that the treaty of 1961 was still in force, which required the sanction of the International Court for further extensions [...].

On September 1, 1972, the fishery limit was extended to fifty miles. Both the British and the Germans refused to acknowledge the new limit and continued to fish inside id. To protect their trawlers from Iceland’s coastguard patrol vessels, they brought in reinforced tugboats and other vessels, and confrontations began again. Then the Icelanders produced a „secret weapon”: clippers to cut away the trawl nets of offending vessels. [...]

Irritated by constant disturbances, the foreign trawlermen called on their governments for more protections, and in the summer of 1973 the British finally send frigates to defend their fishing vessels inside Iceland’s fifty-miles limit.

With the arrival of this naval force a new code war began, althought both sides avoided direct shooting. The British harassed the Icelanders and even rammed coastguard vessels, which were badly damaged but never sunk.

The commanders og the frigates ordered the trawlers to stay in small groups while fishing, so they would be easy to protect [...]

Shortly after this, in September 1973, the Icelandic government threatened to recall its ambassador in the UK if the warships were not removed from the Icelandic waters. [...] Negotiations began [...].”

Excerpt no. 4

„From Fifty to Two Hundred Miles, 1975”

„In 1974 the United Nations called a new international convention in Caracas on the law of the sea, where it soon become obvious that many of the nations supported the principle of a two-hundred-mile jurisdiction for coastal states.

> Encouraged by this message, Iceland declared that its territorial limit would be extended from fifty to two hundred miles [...].
> [...] A new cod war was ensued, in which the British sent tugboats and warships to protect their trawlers and prevent the Icelandic coastguard from intervening. But about the same time Iceland reached terms with Belgium, West Germany and other nations [...]. The British refused to yield [...]. When negotiatons broke down, Iceland recalled its ambassador and cut off all diplomatic ties with Great Britain. Despite the intensity of this cod war, the Icelandic coastguard crews refused to be provoked into aggresion, and continued to show uncanny skill in avoiding collision and cutting the nets of British trawlers, which irritated the seamen most of all. It was no wonder that the coastguard captains and crews were regarded [...] almost as national heroes in Iceland.
> [...] finally when the European Community, of which Great Britain was by now a member, decided to extend its oqn fishery limit and move out to two-hundred miles [...], the British had no choice but to acknowledge Iceland’s own limit and call the cod war to a halt. [...] On December1, 1976, the last British trawler sailed out of Icenland’s territorial waters and total victory had been achieved.
> [...] the unflinching action of the coastguard had perhaps played the greatest part, together with the solidarity on the issue shown by the Icelandic nation. International trends in marine law also helped, and the sympathy and support which Iceland enjoyed as a small country confronting a great power were constantly of great importance.”

To consolidate knowledge and assess their understanding, the teacher will discuss the code war with the students. The students will answer questions such as:

- How do you explain the fact that no human sacrifices were recorded? (Iceland is traditionally a non-military country and in this war there was no use of military weapons; the only „weapon” used was the tool used for cutting fishing nets)
- What is the motivation behind a small country opposing a large one? (… the drastic reduction of fish resources, which were the basis for the main economic activity of Iceland)
- What event halted this war? (… the United Kingdom's entry into the European Union)
- What is the main reason why Iceland enjoyed sympathy from other countries? (… a small country, without an army, fought against a great power and won) etc.

Instruments. The research data were collected through four pre-tests and four post-tests. Each test has a maximum score of 10 points. The pre-test applied in the 6th grade consists of 10 True of False items. The post-test applied in the 6th grade consists of 10 fill-in-the-blank items (table 2). The pre-test applied in the 9th grade consists of 10 short answer items (10 questions). The post-test applied in the 9th grade consists of 10 multiple choice or discrimination items (table 3). The first pre-test and first post-test applied in the 10th grade consist of writing a mini-essay. The second pre-test applied in the 10th grade consists of writing an essay based on five questions. The second post-test applied in the 10th grade has 5 True or False items (table 4).

Table 2
The pre-test and the post-test for the 6th grade

Pre-test	Post-test
Encircle the letter T if the statement is true	Complete the sentences with the correct

and the letter F if the statement is false. 1.The basalt columns are a tourist attraction of Iceland. **T**/F 2.Hallgrímskirkja, the most famous church in Iceland, is located in the city of Akureyri. T/**F** 3.Puffins can be observed on the islands around Iceland. **T**/F 4.Iceland is home to the waterfalls Gullfoss and Svartifoss. **T**/F 5.There are no volcanoes in Iceland. T/**F** 6.Iceland has the only extinct European volcano that can be entered through its conduit. **T**/F 7.Icelanda is the only European country where geysers can be seen. **T**/F. 8.There are ice caps in Iceland. **T**/F 9.The Blue Lagoon is a glacier lagoon. T/**F** 10. The glacier lagoons are a feature of Iceland. **T**/F *Scoring: One point is awarded for each correct answer;*	information: 1.The volcanic rock that solidifies forming columns is called .... (basalt). 2.Hallgrímskirkja Church is located in the city of … (Reykjavik). 3.The emblematic birds of Iceland are called ... (puffins). 4.One of the famous waterfalls of Iceland is called ... (Gullfoss/Svartifoss). 5.One of the most famous volcanoes in Iceland is .... (Katla). 6.Thrihnukagigur volcano is known for the tourist activity named …. („Inside the volcano”). 7. The ascending and intermittent hot springs are called ... (geysers). 8. The two types of glaciers are: mountain glaciers and ... (ice caps). 9. The most famous thermal lake in Iceland is .... (the Blue Lagoon). 10. One of the tourist attraction in Iceland is represented by the ... (glacier) lagoons. *Scoring: One point is awarded for each correct answer;*

Table 3

The pre-test and the post-test for the 9th grade

Pre-test	Post-test
Answer the following questions: 1.In which European island country can glaciers be observed? (Iceland) 2.What is the predominant type of climate in Iceland? (subpolar/cold climate) 3.What are the glaciers found in polar regions called? (ice caps) 4.What are the extensions of a glacier called? (glacier tongues) 5.What are the accumulations of rock that form in areas with mountain glaciers called? (moraines) 6.What are cracks in the surface of a glacier known as? (crevasses) 7.What is called the landform that results from the melting of the glacier tongue? (glacial valley) 8.What are the two main processes that lead to the disintegration of rocks in glacial areas? (freezing and thawing)	Encircle the letter that corresponds to the correct answear: 1.Iceland has a: **a. subpolar**; b. polar; c. temperate climate. 2.Myrdalsjökull is a: **a. volcano**; b. glacier; c. river. 3.The extension of a glacier is called: **a. glacial tongue**; b. glacial valley; c. moraine. 4.The accumulations of rocks resulting from the erosion of the relief by glaciers are called: a. glacial valleys; **b. moraines**; c. glacial cirques. 5.Glacial valleys have the profile of the letter: a. V; b. S; **c. U**. 6.The cracks that appear in the body of the glacier are called: a. moraines; **b. crevasses**; c. fractures. 7.The disintegration of rocks in glacial areas is called: **a. gelifraction**; b. freeze; c. thaw. 8.Gelifraction occurs due to repeated processes of: a. melting; b. evaporation; **c. freezing and thawing.**

9.What volcano do you know in Iceland? (Katla/Laki/Hekla) 10.What is the main cause that led to the appearance of volcanoes in Iceland? (the presence of the rift) *Scoring: One point is awarded for each correct answer;*	9.In Iceland, there are: **a. ice caps**; b. mountain glaciers; c. alpine glaciers. 10.On the territory of Iceland, the tectonic plates: **a. converge**, b. diverge, c. overlap. *Scoring: One point is awarded for each correct answer;*

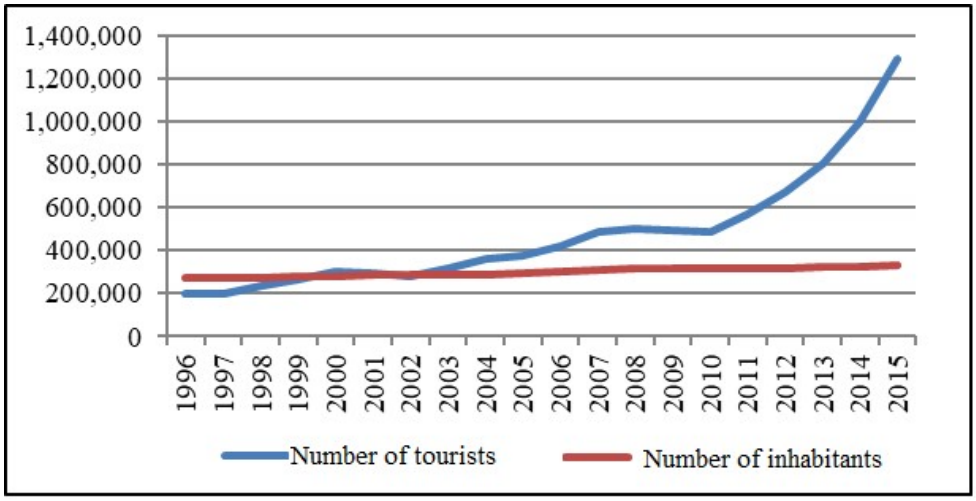
Table 4
The pre-test and the post-test for the 10th grade

Pre-test 1 (the first activity)	**Post-test 1 (the first activity)**
Write a mini-essay of no more than 15 lines briefly presenting five factors that contributed to the massive increase in the number of tourists in Iceland between 1996 and 2015. *Scoring – 10 points;*	Write a mini-essay of a maximum of 15 lines in which you briefly present five arguments showcasing the importance of tourism in Iceland's economy. *Scoring – 10 points;*
Pre-test 2 (the second activity)	**Post-test 2 (the second activity)**
Write a mini-essay in which you present the code war. In the essay, answer the following five questions: What are the countries involved in this war? What is the main feature of this war? What is the reason why Iceland gradually extended its territorial waters limit? What is the secret weapon used by the Icelanders? What was the event that stopped this conflict? *Scoring – 10 points;*	Encircle the letter **T** if the statement is true and the letter **F** if the statement is false. 1.The fish resources are the main economic resource of Iceland. **T**/F 2.The Cod War is the only war in which no one lost their life. **T**/F 3.The main illicit predator of Icelandic fish resources was Germany. T/**F** 4.The Icelanders fought in the cod war with military weaponry. T/**F** 5.The event that stopped the cod war was the United Kingdom's accession to the European Union. **T**/F *Scoring: Two points are awarded for each correct answer;*

RESULTS

In figure 2, the graph created by the students can be observed. The diagram depicting the evolution of the population and the number of tourists in Iceland is very suggestive for observing the differences in the evolution of these two parameters. During the analyzed period, both the population and the number of tourists increased, but the growth in the number of tourists is much more evident compared to the population. In 2015, the number of tourists surpassed the country's population by five times.

Figure 2
Evolution of the number of residents and the number of tourists in Iceland, from 1996 to 2015



Following the evaluation of tests administered before and after the learning activity, the differences between the averages obtained by students in the pre-tests and those obtained in the post-tests are statistically significant (Table 5).

Table 5
The pre-tests and post-tests results

Grade	Average grade pre-test	Average grade post-test
6th grade	1,7	8,5
9th grade	2,5	8,8
10th grade – the first activity	2.0	8,7
10th grade – the second activity	1,2	9,1

DISCUSSION

The 6th Grade. The significant difference between the average obtained by students on the pre-test (M = 1.7) and the average obtained by students on the post-test (M = 8.5) demonstrates the high effectiveness of the learning activity. Through this activity, students enriched their knowledge about Iceland, developed their research skills, described the essential geographical characteristics of a location, creatively presented a tourist attraction and engaged in self-assessment by comparing their exhibited materials with those of their classmates.

The 9th grade. The significant difference between the average scores obtained by students in the pre-test (M = 2.5) and the average scores obtained in the post-test (M = 8.8) demonstrates the high effectiveness of the learning experience. Students have reinforced their knowledge about glacial relief (formation processes, landforms) as well as other features of the Icelandic natural environment (volcanism, climate, tectonics). They have also developed the ability to correlate theoretical information with that from photographs, to recognize geographical features in images, and to scientifically analyze images of geographical landscapes.

In **the 10th grade**, at the activity about tourism, the significant difference between the average scores obtained by students in the pre-test (M = 2) and the average scores obtained in the post-test (M = 8.7), indicating the high effectiveness of the learning activity. Students utilized

mathematical skills to create a graph, developed their ability to conduct comparative analysis of two indicators (one demographic and one economic) and enhanced their capacity for geographical reasoning and discovering causal connections. Thus, students identified the natural features that contributed to the development of Icelandic tourism, as well as the fact that Iceland has natural tourist attractions that are rarely found in mainland Europe, such as geysers, glaciers, hot springs, glacier lagoons, active volcanoes, in addition to the presence of whales, puffins, etc.

Additionally, the students have developed the ability to extract information from written press articles regarding the development of tourist infrastructure, which is constantly being improved to support the impressive number of tourists. They have learned that Icelanders are consistently focused on creating new tourist attractions (such as artificial caves in glaciers, outdoor activities that showcase the traditional lifestyle of the Vikings and the staging of stories from the Icelandic sagas etc.). The students have enhanced their capacity to analyze the correlations between economic activities, specifically the significant contribution of tourism to economic growth, and the fact that tourism can bring economic prosperity.

The students discovered correlations between geography and cinematography. They discussed the fact that in Iceland, a natural hazard, although it had negative economic effects, led to a boost in tourism. The eruption of the volcano beneath the Eyjafjallajökull glacier in 2010 resulted in the blocking of air traffic between Europe and North America. News about this event brought Iceland into the spotlight and drew attention to the country. Filmmakers turned their focus to Iceland, resulting in a number of blockbuster films being made in the Icelandic natural landscape, such as: „Star Wars: The Force Awakens” (in 2015), „Star Trek Into Darkness” (in 2013), „Prometheus” (in 2012), „Interstellar” (in 2014) and others.

The second activity conducted in the 10th grade shows a significant difference between the average score obtained by students on the pre-test (M = 1.2) and the average score obtained by students on the post-test (M = 9.1), indicating the high effectiveness of the learning activity. This difference is primarily due to the fact that the Cod War is little known among students. The Cod War is considered to be the only war in which no one died in direct conflict (Hjálmarsson, 2014). However, the invasion of Iceland's territorial waters by ships from the United Kingdom, through severe and ongoing violations of cod fishing regulations, the limits of Iceland's territorial waters, and the agreements established between Iceland and other countries, represents a theme in political geography that is necessary to be understood. The Cod War is in fact a series of four conflicts in which Iceland, against all odds, defeated Great Britain.

The students greatly improved their level of knowledge about this war, discovering the stages that were undergone from its outbreak to its resolution, the positive implications of the diplomatic way of conducting a conflict it has for the population and for the entire country etc.

CONCLUSIONS, LIMITATIONS AND RESEARCH DIRECTIONS

The results of this study demonstrate the effectiveness of the learning activities carried out on the volume of students' knowledge and the specific competencies they have developed.

In the sixth grade, the presentation of tourist attractions in Iceland as part of the activity „Famous Icelandic Places” helped familiarize students with the natural conditions of the island. In the ninth grade, recognizing glacial landforms through images from Iceland and storytelling helped students in consolidating their knowledge and developing specific skills in physical geography. In the tenth grade, the case study on tourism demonstrates and helps students realize that tourism should be viewed as an economic activity that generates economic growth, as long as it is accompanied by a continuous concern for the development of tourism and communication infrastructure. Also in the tenth grade, studying the cod war represents a way for students to research peaceful methods a

country can use to achieve its goals, starting from the protection of the natural environment, which was at that time the country's main economic resource.

The limitations of action research can be considered the small sizes of student groups, the small content samples, and the small number of learning activities included in the formative intervention. Although the statistical results from the action research support the effectiveness of the learning activities, the generalizability of the conclusions is relatively low. Overcoming these limitations can be achieved by organizing experimental activities across multiple classes in both urban and rural settings, by using a greater variety of content elements, and by implementing more learning activities in the formative intervention. Action research can be organized by the same teacher or by different teachers.

As research directions for teachers, Table 6 suggests a set of information related to Iceland that can be discussed with students during various geography lessons conducted in middle school and high school.

Table 6

Example of geographical information about Iceland, correlated with the grade and the theme of the lesson where it can be used

Geographical information	Grade	Theme/Chapter
Tundra vegetation – partially secondary, having anthropogenic origin, emerged after the deforestation of the birch forests that are believed to have covered a large part of the island in the past	6th	Vegetation in Europe
	12th	Vegetation in Europe
The Gulf Stream – creating one of the best known climate anomalies on Earth	6th	Climate in Europe
	12th	Climate in Europa
The Discovery of America - Christopher Columbus or Leif Ericson?	7th	America
The interactions between tectonic plates – the Mid-Atlantic Rift superimposed with a hot spot	9th	The Earth's crust as support for the relief
Volcanic landforms: volcanic cones, pahoehoe, pillow lava, lava tubes, lava plateaus, necks, dykes, hornitos, volcanic crates, calderas	9th	Landform types
Petrographic landform – on basalts: basalt columns	9th	Landform types
Post-volcanic phenomena: geysers, solfataras, fumaroles, hot springs	9th	The Earth's crust as support for relief - Volcanism
Natural hazards: volcanoes, flooding caused by the eruptions of subglacial volcanoes – negative effects as well as ways to benefit from them	11th	Natural hazards
	11th	Resources management, economic development, and sustainable development
Aurora borealis: causes and visibility	9th	The composition and structure of the atmosphere
Population density: value, valoarea, the unequal distribution of the population	6th	Europe population
	10th	Population density
	12th	Europe Population
Midnight Sun: period of occurring, causes of the phenomenon	9th	Earth’s revolution movement, the occurring of polar days and nights

Turf houses – adapting buildings to the natural environment	6th	Rural settlements
	11th	Resources management, economic development, and sustainable development
Measures to protect the Icelandic natural environment – hovering trails to avoid trampling on moss, fines for driving off marked roads etc.	11th	Protection and conservation of the natural environment
The use of geothermal energy: for heating homes, swimming pools and greenhouses, for the hot water network and for electricity generation	10th	Natural resources
	11th	Resources management, economic development, and sustainable development
Anthropic modification of natural vegetation – the invasion of lupine *Lupinus nootkatensis*, brought from North America, starting from 1945 (Benediktsson, 1945)	9th	The interactions between humans and the terrestrial environment
	11th	Protection and conservation of the natural environment

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