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# Disaster Risk Reduction Education in Geography at Schools in Greece

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## Abstract

In Greece, the school subject of geography is used as a tool to integrate Disaster Risk Reduction (DRR) in the national school curriculum. In order to investigate the content development of DRR in the Greek school geography curricula, this study analyzed the primary and secondary geography curricula from 2003 to 2023, using the five dimensions of the DRR learning system (knowledge, reaction , action, participation and integration) as platforms and conceptual assumptions. Qualitative content analysis indicated the following: (a) the DRR-relevant content in the geography curricula used for analysis underwent minimal changes from 2003 to 2023; (b) the changes in the DRR-relevant content in the primary and secondary school curricula presented almost identical characteristics. Therefore, should the geography curriculum be revised in the future, it is necessary to understand that the term "disaster" does not only describe the natural event per se but also its impact on and the consequences for infrastructure and society. Such revisions in the school geography curriculum are bound to add more DRR-relevant content that belongs to the "action" and "participation" dimensions, and as they should systematically incorporate the DRR-relevant content of the "integration" dimension.

**Keywords:** Disaster risk reduction; School geography curriculum; Greece; Qualitative content analysis, DRR-relevant content.

## 1. Introduction

Disaster Risk Reduction (DRR) has been identified as "the concept and practice of reducing disaster risks through systematic efforts to analyze and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events" (UNISDR, 2009). In many countries struck by natural disasters, officials and policymakers have focused on developing a new approach to persuade people and make leaps in disaster risk reduction, such as training children (Torani *et al.*, 2019). However, public education should be aware of and be strengthened in disaster risk reduction (UNISDR, 2015). When students are taught both about the consequences of natural disasters and the impact of some catastrophic effects on students themselves, students' immediate community may be reduced. This is the reason why Disaster Risk Reduction (DRR) is in the school curriculum in many countries, since it has been widely acknowledged that education has a critical role in disaster risk reduction, from the declaration of the International Decade for Natural Disaster Reduction to the adoption of the International Strategy for Disaster Reduction, the Hyogo Framework for Action 2005–2015, and the Sendai Framework for Disaster Risk Reduction 2015–2030. Researchers, such as: Barakat *et al.* (2012), Shaw (2012), Tunner *et al.* (2008), Venton and Venton (2012), and Mutasa and Coetzee (2019), have stated that some benefits of the DRR curriculum include reduced deaths, injuries, and vulnerability to disaster risk throughout the community. It has also been proven that through DRR education, children will have a greater sense of confidence and security as they will be aware of activities that contribute to a reduced psychosocial impact of disasters (Bild and Ibrahim, 2013).

Selby and Kagawa (2012), have illustrated the concept of systematic, coherent, and implementable DRR in five dimensions of DRR learning, as shown in Table 1 below. Furthermore, Nurdin (2019) believes that the integration of DRR in the school curriculum may be the best way to ensure that the sustainability of DRR in schools can be sustained either as a stand-alone subject of its own or as carrier subject, such as geography, geology or civic education, or can be integrated as a different subject.

**Table-1**. Five dimensions of DRR learning

| Category | Definition |
|---|---|
| Knowledge | This dimension is about how an understanding of science and mechanisms of natural hazards, such as cyclones, tsunamis, and volcanic eruptions can be developed. |
| Response | This dimension engages learners how to get familiarized with hazard early warning signals; how to get instructed in evacuating or sheltering procedures, drills and exercises; how to get familiarized with basic first aid and the contents of a first aid kit, health and safety measures; and, finally, how to get guided so that one stays safe after a hazard has subsided. |
| Action | This dimension seeks to encourage learners to act and be proactive in mitigating risk through a thorough examination of the elements at work in the fundamental disaster risk formula, which is: *Disaster Risk = Natural Hazard _ Vulnerability/Capacity of Societal System.* |
| Participation | This dimension engages learners how to build resilience in their own community through grassroots level initiatives, how to identify hazards, how to develop resilience action plans and how to implement those plans. |
| Integration | This dimension puts emphasis on blending the structural elements, such as school buildings and facilities, and non-structural elements, such as school disaster management and school policy development, so that the school becomes a DRR learning community or an organization oriented towards building a culture of safety and resilience. |

**Source:** Selby and Kagawa (2014)

Due to its complex geological and climate conditions, Greece is one of the countries that has experienced the most frequent and severe natural disasters (e.g., earthquakes, floods wildfires, droughts, heatwaves, etc.). Most Greeks live in areas prone to serious seismic and weather-related disasters; for example, due to the frequency of its earthquake activity, Greece is ranked sixth in the world and first in Europe as a country with the most severe damage caused by earth seismicity. The increased seismicity of Greece is due to a few specific geological characteristics which are caused by the movement of the tectonic plates in the Eastern Mediterranean region. In recent years, apart from the intense seismicity, Greece has been affected by other natural disasters such as flash floods (in Mandra, in 2017, with 24 fatalities; in Thessaly, in 2023, with 16 deaths and damage hundreds of thousands of livestock along with over of 700 $km^2$ farmland) and wild fires (in Peloponnese in 2007, in Mati in 2018, and in Evia in 2021 with 78, 102, and 3 deaths respectively). Understanding the role of people's perception of climate change and their environmental views, particularly in relation to natural disaster occurrence, are critical and necessary for effective prevention, risk mitigation, and climate change adaptation initiatives (Diakakis *et al.*, 2021). Therefore, the people of Greece should acquire the attitude, knowledge and skills required for disaster awareness in order to lower material and immaterial risks (Winarni and Purwandari, 2018).

Although Greece integrated DRR in all levels of the national school geography curricula in 2003 and 2012 (Pedagogical Institute, 2003a;2003b; Photodentro, 2012a;2012b;2012c), the UNESCO (United Nations Educational, Scientific and Cultural Organization) and the UNICEF (United Nations Children's Fund), when having conducted research on the integration of DRR in the school curricula of 30 countries, did not include Greece (Selby and Kagawa, 2014). In addition, although there have been various studies on the school geography curriculum in Greece, their analyses have not been made from the perspective of DRR. Given the aforementioned situation, this paper aims to explore how DRR is communicated in the Greek school geography curricula both through geography education and through the investigation of its content development and integration approach. Meanwhile, it tries to clarify how DRR is anchored in the national geography curriculum and how it is contextualized within the specific context of Greece. This study hopes that these outcomes will contribute to the enrichment of the DRR literature, which so far contains little empirical research in Greece.

## 2. Research Methods and Materials

Qualitative Content Analysis (QCA) is a method that systematically describes the meaning of qualitative material (Schreier, 2012). In general, qualitative material includes all kinds of texts such as newspaper articles, interview transcripts, photographic descriptions and memoirs (Bos and Tarnai, 1999). Moreover, QCA is a well-known method to analyze documents (Elo and Kyngäs, 2008). It is therefore a suitable method to describe qualitative material that requires continuous interpretation (Schreier, 2012). The description is made by classifying parts of the qualitative material as instances of coding framework categories (Schreier, 2012).

As far as the basic materials are concerned, this research used the geography curricula for primary and lower secondary education and geography content in environmental studies curricula for grades 1- 4 in primary education, which were published in 2003a, 2012a, 2021a and 2023a. The geography curriculum published in 2003 has been implemented nationwide from 2003 to 2023 (Pedagogical Institute, 2003b). The geography curriculum published in 2012 (Photodentro, 2012b) was implemented for 2 years only in 90 pilot schools nationwide, and the geography curricula published in 2021 (it was implemented only for one year only in pilot schools) (IEP, 2021b) and the new revised environmental studies curriculum (1-4 grades) and geography curricula (5-8 grades (Official Government Gazette of the Hellenic Republic, 2023a;2023b;2023c)) are going to be implemented nationwide from the school year 2024. In Greece, curriculum standards are uniformly applied to the whole country, and play a crucial role in pedagogical practice as they provide the basis for compilation of textbooks, guidance for teachers' teaching, and the criteria for examination assessment. Geography is a compulsory subject in Greece's primary and lower-secondary

(i.e. junior high) schools. Geography in the first four grades of primary schools has been integrated in environmental studies, while geography from 5th to 8th grades in primary and lower-secondary schools is an independent subject.

Now, in order to investigate the question of how DRR is transmitted through geography education in Greece, this study used the five dimensions of the DRR learning framework (as expressed in Table 1) - which was extracted from comprehensive mapping and analysis of DRR curricula globally co-sponsored by the UNESCO and the UNICEF (Selby and Kagawa, 2014) - as a platform and a conceptual premise to review the geography curriculum standards of primary and secondary schools in Greece from 2003 to 2023. Furthermore, qualitative content analysis was conducted. Based on the theoretical framework, 5 primary deductive categories were hooked up, as shown in Table 2 below, and, then the geography curriculum requirements were deductively coded for analysis.

**Table-2.** Geography and Environmental Studies curriculum for analysis

| School Stage | Geography Curriculum | Issue time |
|---|---|---|
| **Primary School** | a) CROSS -THEMATIC CURRICULUM FRAMEWORK for Studies of the Environment | 2003a |
| | b) CROSS -THEMATIC CURRICULUM FRAMEWORK for Geography | 2003b |
| | a) Curriculum for Studies of the Environment for the "New School" | 2012a |
| | b) Curriculum for Geography for the "New School" | 2012b |
| | a) Curriculum for Studies of the Environment for 1st-2nd-3rd and 4th grades | 2021a |
| | b) Geography Curriculum for 5th and 6th grades | 2021b |
| | a) Curriculum for Studies of the Environment for 1st – 2nd- 3rd and 4th grades | 2023a |
| | b) Geography Curriculum for 5th and 6th grades | 2023b |
| **Lower-Secondary School (i.e. Junior High School)** | CROSS -THEMATIC CURRICULUM FRAMEWORK for Geology-Geography | 2003b |
| | Curriculum for Geography for the "New School" | 2012b |
| | Curriculum for Geology-Geography | 2021c |
| | Curriculum for Geology-Geography | 2023c |

# 3. Results

## 3.1. Integrating DRR in the Geography Curriculum

The geography curricula of primary and secondary education from 2003 to 2023 in Greece were analyzed following the five (5) dimensions of the DRR framework (as shown in Table 1).

### 3.1.1. (a) The Primary Dimension or "Knowledge" Dimension at Primary Schools

Our evaluation of the primary dimension ("knowledge" dimension; see Table 3 below) is that it has the biggest share amongst the 5 dimensions. The DRR-applicable contents in the 2003 environmental studies curriculum (grades 1-4), which belong to the 'knowledge' dimension, were best suited for the 4th grade (Pedagogical Institute, 2003a), while the DRR-applicable contents accelerated the dimension of "knowledge" in the geography curriculum of the 5th and 6th grade, which was mainly concerned with geological hazards (i.e. earthquakes, volcanoes, landslides, etc. in Greece and other parts of the world). Additional problems - including weather changes, storms, floods, etc. - were also examined (Pedagogical Institute, 2003b). As far as the 2012 version (Photodentro, 2012a) is concerned, there were not always the DRR-applicable contents in research of the environmental curriculum in all grades (1st-4th), whereas, at the same time, the DRR-applicable contents belonging to dimension "knowledge" and the problem of seismicity (an issue that best and extensively examined in Greece) was in 5th grade of primary geography curriculum 2012 version (Photodentro, 2012b). In the curriculum of the 6th grade, there was no DRR-applicable content. In the 2021 version of the primary education environmental studies curriculum of the 3rd grade, the DRR associated content material referred to natural hazards that happen in Greece, including: how to identify, describe, find information about floods, and how to deal with damaging climate situations such as Cyclone Ianos, etc. IEP (2021a), whereas the DRR-applicable content material tried to make the 4th-graders aware of natural risks at the planet of IEP (2021a). The DRR-applicable content in the 2021 version of the primary geography curriculum (IEP, 2021b) for the 5th and 6th grades mentioned how to understand risks and disasters that regularly happen in Greece, such as earthquakes, fires, floods, volcanic activities (e.g. the Greek volcanic arc of the SE Aegean), extreme climate phenomena (i.e., storms, hail, snowfall, etc.), and other risks due to climate change (IEP, 2021b). In the revised curricula of 2023 (Official Government Gazette of the Hellenic Republic, 2023a;2023b) the DRR content about "knowledge" dimension is exactly the same as in curricula of 2021a;b.

### 3.1.1. (b) The Primary Dimension or "Knowledge" Dimension at Lower Secondary Schools (or Junior High Schools)

In the 2003 edition of the lower secondary school geology-geography curriculum, the DRR-relevant content for the 1st grade included endogenic forces (such as, volcanoes, earthquakes) and exogenic forces (such as, weathering, erosion, and deposition), the geographical distribution of volcanoes and zones of high seismicity in the world, and the impact of these natural disasters on human life, whereas in the 2nd grade its content focused on seismicity in Europe and Greece (Pedagogical Institute, 2003b). In the 2012 edition, the DRR-related content that be classified under the "knowledge" dimension was only found in the 1st-grade geography curriculum, including earthquake-tsunami formation and consequences, volcanoes (i.e. description of volcanic eruptions and identification of their

locations on a map of the world), hurricanes (i.e. description of how hurricanes/typhoons are formed, location of where hurricanes form on the map latitudes and description of their consequences), monsoons and floods (Photodentro, 2012b). The DRR-relevant content in the 2021 edition of the geology-geography curriculum was only found in the 1st grade, whereas the topics were not only the same as those in the 2012 curriculum but also included the description and formation of landslides and volcanic rocks, the description of the greenhouse effect, its importance, and its negative consequences, the description of the economic and social consequences of droughts and floods in the world, and identification of the differences between poor and rich regions of the earth when they have to deal with the effects of a flood (IEP, 2021c). In the revised curricula of 2023 (Official Government Gazette of the Hellenic Republic, 2023c) the DRR content about "knowledge" dimension is exactly the same as in curricula of 2021c.

**Table-3.** "Knowledge" dimension in the geography curriculum

| **Issue Time** | **Primary School** | **Lower Secondary School (or Junior High School)** |
|---|---|---|
| **2003** | Geological disasters (earthquakes, floods, storms, landslides, etc.) Problems that arise after natural disasters.<br>The concept of climate – Differences between weather and climate. The pupils recorded problems that extreme weather conditions can create in everyday life.<br>The role of volcanoes and earthquakes in nature changes.<br>The pupils collected articles from the press and other materials that referred to natural disasters, made comments on their causes and classified them into categories.<br>Natural disasters in Greece. The pupils investigated the seismicity of Greece, studied relevant maps and recorded the largest earthquakes in Greece.<br>Natural disasters and their consequences in human life.<br>The pupils read in-class texts about the eruption of Thera volcano, Krakatoa, and modern similar phenomena and concluded about their impact on people's lives.<br>The pupils observed a world map that showed the seismicity of each region, read texts about disasters caused by earthquakes. | Structure, weather, Geographical distribution of climate, winds, rains<br>Impact on life and especially on people<br>Distinction of extreme cases of positive and negative effects of the above factors on human life (i.e. monsoons, areas of long drought).<br>Endogenic forces (i.e. volcanoes, earthquakes) and exogenic forces (i.e. weathering, erosion, and deposition)<br>The pupils observed the geographical distribution of volcanoes and zones of high seismicity on maps and correlated them with the positions and movements of the lithosphere plates.<br>The pupils collected information about the value of volcanic soils and made comments on the impact of earthquakes on human life.<br>Seismicity in Europe.<br>Seismicity in Greece.<br>The pupils observed the relative positions of the lithospheric plates on Europe in a suitable map, and, with the help of a geomorphological map of the continent, interpreted the locations of its largest volcanoes (e.g. Santorini, Vesuvius, Etna, Ekla).<br>The pupils did the same for the volcanic arc of the Aegean. With the help of previous maps and a map of epicenters, the pupils also concluded about the causes of great seismicity in the Mediterranean, especially in Greece. |
| **Issue Time** | **Primary school** | **Lower Secondary School** |
| 2012 | (Instructions/Guidelines)<br>• Observe a map of Greece and locate areas with intense seismic activity<br>• Read an information leaflet about earthquakes | Earthquakes – Tsunami<br>Tsunami formation and consequences<br>(Instructions/Guidelines)<br>• Study a world map with plate boundaries, seismic centers, and volcanic locations.<br>• Observe and describe images after earthquakes, the consequences on people's lives.<br>• Observe a map of Greece where most seismic centers are located.<br>• Compare and discuss the outcomes of two major earthquakes in a developed country and a developing country.<br>• Look for information about the biggest tsunami in human history.<br>• Observe and describe images of volcanoes.<br>• Observe and identify locations with most volcanoes on a world map and a map of Europe. |

| | | |
|---|---|---|
| | | • Study a geological map of Greece with active and extinct volcanoes.<br>• Record from photos the outcomes from volcanic eruptions.<br>• Describe a blueprint showing how hurricanes /typhoons are formed.<br>• Locate on the map latitudes where hurricanes are formed.<br>• Observe photos of areas affected by hurricanes and describe the consequences.<br>• Study a blueprint that shows how monsoons are formed.<br>• Search for information about or analyze and comment on a text about the effects of monsoons on the lives of millions of people.<br>• Record precautionary measures against hurricanes, typhoons, monsoons, and accompanying floods.<br>• Study water scarcity (Cyprus) / consequences of over-pumping (e.g. Aral Sea).<br>• Study desertification (in the Sahelian countries) and deforestation (in the Amazon Forest) |
| **Issue Time** | **Primary school** | **Lower- Secondary School** |
| **2021&2023** | (Instructions/Guidelines)<br>• Identify natural changes that have taken place in your country either recently or over time. Describe ways to deal with them.<br>• Natural hazards on the planet I live (Conduct group internet research for data related to natural hazards, such as earthquakes, volcanoes, strong winds, strong storms, hurricanes, and cyclones, and produce a text with the main characteristics).<br>• Present your work in the classroom.<br>• Investigate in groups specific problems arising from the negative effects of human activities on the planet (e.g. climate change), and present the results of their research in the classroom (describe characteristics, causes, effects on the planet, and how to deal with them)<br>• Volcanoes and earthquakes in Greece.<br>• Interpret the scientific model of volcano formation, study the volcanoes of Greece, and distinguish the Greek volcanic arc of the Aegean and the active volcanoes.<br>• Digitally explore areas with active volcanoes.<br>• Develop the concept of | Earthquakes – volcanoes<br>Earthquakes – tsunami.<br>(Instructions/Guidelines)<br>• How an earthquake is formed. Earthquake epicenter, seismic waves.<br>• Richter scale (size), Mercalli scale (intensity).<br>• Seismogram.<br>• Creation of tsunamis and their consequences.<br>• Landslides.<br>• Volcano shape.<br>• Active and extinct volcanoes.<br>• Formation of the Greek volcanic arc. Volcanic rocks.<br>• Hydrosphere.<br>• The water cycle.<br>• Groundwater.<br>• Oceans, seas, and sea currents.<br>• Rivers.<br>• Report the positive and negative effects of rivers on people's lives.<br>• River floods<br>• Discuss river floods and their causes.<br>• Lakes.<br>• Relate floods to anthropogenic interventions and climate change.<br>• Describe the greenhouse effect and its importance.<br>• Identify the negative consequences of the outbreak of the greenhouse effect.<br>• Floods – Lightning.<br>• Hurricanes.<br>• Monsoons. |

| | | |
|---|---|---|
| | earthquake through myths<br>• Other hazards (geological, hydrological, climatic, wildfires) and how to protect yourselves against them.<br>• Recognize hazards and natural disasters. | • Identify the areas of the Earth where hurricanes and monsoons occur and report their effects.<br>• Define what lightning is and describe how it is created.<br>• Describe the economic and social consequences of floods and the measures taken to reduce the damage they cause.<br>• Identify the differences between poor and rich areas of the Earth as to how they deal with the effects of a flood. |

## 3.1.2.(a) The Second Dimension or "Response" Dimension at Lower Secondary Schools (or Junior High Schools)

We then analyzed the second dimension ("response" dimension, as shown in Table 4). The "response" dimension ranked 2nd in terms of proportion, but the DRR-relevant content was much less than that of the "knowledge" dimension - that is, it was only a quarter of the DRR- relevant content of the "knowledge" dimension - and it appears only in the primary geography school curriculum.

**Table-4.** "Response" dimension in the geography curriculum

| **Issue Time** | **Primary school** | **Lower Secondary School** |
|---|---|---|
| **2003** | (Instructions/Guidelines)<br>• Know how to act in case of earthquakes or fires and realize the importance of setting and keeping certain rules in case of emergency (i.e. earthquakes, fire, etc.)<br>• Participate in an exercise for proper behavior in case of an earthquake and learn how to react without panic.<br>• Do "correct behavior" exercises during an earthquake. | (Instructions/Guidelines)<br>• Collect and process information about the consequences of major volcanic eruptions and major earthquakes on Greece and surrounding countries. |
| **Issue Time** | **Primary school** | **Lower Secondary School** |
| **2012** | (Instructions/Guidelines)<br>• Know how to react in case of an earthquake<br>• Practice correct behavior during the event of an earthquake. | (Instructions/Guidelines)<br>• Search for information about or analyze and make a comment in a text on the effects of monsoons on the lives of millions of people.<br>• Record precautionary measures against hurricanes, typhoons, monsoons, and accompanying floods |
| **Issue Time** | **Primary school** | **Lower Secondary School** |
| **2021 & 2023** | (Instructions/Guidelines)<br>• Adopt measures for protection against volcanic eruptions.<br>• React correctly in case of an earthquake. Summarize earthquake protection instructions.<br>• Understand and adopt measures to prevent and protect yourselves against disasters (i.e. landslides, fires, floods, severe weather phenomena, such as stormy winds, storms, hail, snowfall, frost and heat).<br>• Climate crisis.<br>• Recognize the concept of climate crisis and identify factors that amplify the phenomenon and its consequences on the planet.<br>• Correlate the impact of natural processes and human activities with the global climate crisis. | (Instructions/Guidelines)<br>• Describe the economic and social consequences of floods and the measures. taken so that the damage they cause is reduced. |

## 3.1.2.(b) The Second dimension or "Response" Dimension in Primary School Geography Curriculum and All Lower-Secondary School Curriculum Editions

The DRR-relevant content in the ***primary school geography curriculum*** that could be classified under the "response" dimension - that is, how to conduct an exercise for proper behavior in case of an earthquake and how to

learn to react without panic (Pedagogical Institute, 2003b), do "correct behavior" exercises during an earthquake, and how to practice correct behavior in the event of an earthquake (Pedagogical Institute, 2003b; Photodentro, 2012b) - appeared in the 2003, 2012, 2021 and 2023 editions. It should also be noted that only in the 2021 & 2023 editions the following guidelines were included: (1) how to adopt measures to protect against volcanic eruptions; (2) how to adopt measures to prevent and protect against landslides, fires, floods and severe weather phenomena such as stormy winds, storms, hail, snowfall, frost, and heat; and (3) how correlate the impact of natural processes and human activities on the global climate crisis (IEP, 2021b; Official Government Gazette of the Hellenic Republic, 2023a).

The DRR-relevant content belonging to the "response" dimension in ***all lower-secondary school curriculum editions*** included the following instructions: (1) how to collect and process information about the consequences of major volcanic eruptions and major earthquakes in Greece and surrounding countries (Pedagogical Institute, 2003b); (2) how search for information or analyze and comment on a text about the effects of monsoons on the lives of millions of people; (3) how to record precautionary measures against hurricanes, typhoons, monsoons and accompanying floods (IEP, 2021b); and (4) how to describe the economic and social consequences of floods and the measures taken to reduce the damage they cause (IEP, 2021c).

### 3.1.3. The Third Dimension or "Action" Dimension in Primary School Geography Curriculum and at Lower Secondary Schools

Afterwards, we analyzed the third dimension ("action" dimension, as shown in Table 5). In contrast with the "response" dimension, the "action" dimension was even less than the former and was included only in the primary school geography curriculum in the 2003 edition (Pedagogical Institute, 2003b), in both the primary and lower-secondary school geography curricula in the 2012 edition (Photodentro, 2012a), and only in the lower-secondary school geology-geography curriculum in the 2021 and 2023 edition (IEP, 2021c; Official Government Gazette of the Hellenic Republic, 2023c).

Now, as far as the DRR-relevant contents to the "action" dimension in the ***primary school geography curriculum*** are concerned, the following guidelines were given: (1) how to draw conclusions about the need to support victims of natural disasters (Pedagogical Institute, 2003b); (2) how to make a guide (collage board) on the wall with actions to take before, during and after an earthquake in various places; and (3) how to present the guideboard in all the classes of the school and place it somewhere visible to the entire was found that school community (Photodentro, 2012b). As for the 2021and 2023 editions (IEP, 2021b; Official Government Gazette of the Hellenic Republic, 2023b), no DRR-relevant content could be found that belonged to this dimension.

Concerning the DRR-relevant content that belonged to the "action" dimension in the ***lower-secondary school geography and geology-geography curriculum***, it was found only in the 2012, 2021 and 2023 editions (IEP, 2021c; Official Government Gazette of the Hellenic Republic, 2023c; Photodentro, 2012b), respectively), and include the following instructions: (1) how to create simple sketches with precautionary measures for earthquakes and tsunamis and display them in the classroom (Photodentro, 2012b); and (2) how to raise awareness and adopt solidarity behaviors in order to offer assistance to others in the event of a natural disasters (IEP, 2021c; Official Government Gazette of the Hellenic Republic, 2023c); as shown in Table 5, too.

**Table-5.** "Action" dimension in the geography curriculum

| **Issue Time** | **Primary school** | **Lower Secondary School** |
|---|---|---|
| **2003** | (Instructions/Guidelines)<br>• Comment on the material and psychological consequences of natural disasters on people's lives, and draw conclusions about the need to support those who have suffered from natural disasters | None |
| **Issue Time** | **Primary school** | **Lower Secondary School** |
| **2012** | (Instructions/Guidelines)<br>• Make a guide (collage board) on the wall with actions to do before, during, and after an earthquake in various places.<br>• Present the guideboard in all the classes of the school; and<br>• Put it in a place so that it can be viewed by the whole school community. | (Instructions/Guidelines)<br>• Create simple sketches with precautionary measures for earthquakes and tsunamis; and<br>• Display them in the classroom. |
| **Issue Time** | **Primary school** | **Lower Secondary School** |
| **2021 & 2023** | None | Raise awareness and adopt solidarity behaviors so you can offer assistance in the event of a natural disaster. |

From the aforementioned sub-sections, it becomes evident that the proportion of the "action" dimension was ranked third among all the five dimensions, whereas its DRR-relevant content was reduced by one quarter compared with the "knowledge" dimension.

### 3.1.4. The Fourth Dimension or "Participation" Dimension in the Lower-Secondary School Geography Curriculum and in the Primary School Curriculum

The DRR-relevant content found in the 2003 edition of the ***lower-secondary school geography curriculum*** (Pedagogical Institute, 2003b) that could be classified under the "participation" dimension was the instruction how to discuss and argue for the need to jointly deal with major natural disasters, whereas the relevant content for the ***primary school curriculum*** was to realize the importance of setting and keeping certain rules in cases of emergency (earthquakes, fire, etc.). There was no DRR-relevant content that belonged to the "participation" dimension in the 2012 edition of the geography curriculum (Photodentro, 2012b), while the only DRR-relevant content in the 2021 edition (IEP, 2021c; Official Government Gazette of the Hellenic Republic, 2023c) that belongs to the "participation" dimension was how to make proposals on the prevention of disasters from river floods, as shown in Table 6 below.

**Table-6.** "Participation" dimension in the geography curriculum

| Issue Time | Primary school | Lower - Secondary School |
|---|---|---|
| 2003 | None | Discuss and argue for the need to jointly deal with major natural disasters |
| Issue Time | Primary school | Lower - Secondary School |
| 2012 | None | None |
| Issue Time | Primary school | Lower - Secondary School |
| 2021 & 2023 | None | Make proposals on the prevention of disasters from river floods |

No presence of the fifth dimension or "integration" dimension in the primary and secondary school curricula

During the research, it was found that there was no DRR-relevant content that belonged to the "integration" dimension in any editions of the primary and secondary geography curricula, as it becomes conspicuous in Table 7 below.

**Table-7.** "Integration" dimension in the geography curriculum

| Issue Time | Primary school | Lower Secondary School |
|---|---|---|
| 2003 | None | None |
| Issue Time | Primary school | Lower Secondary School |
| 2012 | None | None |
| Issue Time | Primary school | Lower Secondary School |
| 2021 & 2023 | None | None |

## 3.2. Development of DRR-Relevant Contents in the Geography Curriculum

It can be seen from the analysis of the coding results that both the primary and lower-secondary school geography curricula of the 2003 edition contained DRR-relevant content. After revision of the primary and lower-secondary school geography curricula in 2012, no DRR-relevant content was included in the primary school environmental studies, while the DRR-relevant content in the primary geography curriculum was greatly reduced. The DRR-relevant content in the 2012 lower-secondary school geography curriculum, was enriched. The curriculum revision of 2021 and 2023 ensured that the DRR-relevant content in the primary school and lower-secondary school geography curricula was as much as that in the 2003 edition of the primary and lower-secondary school geography curricula. The analysis of the development of the DRR-relevant content in the geography curricula at different school stages (see Tables 8 and 9 below), emphasized that much of the content belonged to the "knowledge" dimension, a little less to the "response" dimension and the least of the content to the "action" and "participation" dimensions, but none was classified under the "integration" dimension.

### 3.2.1. Some Observations

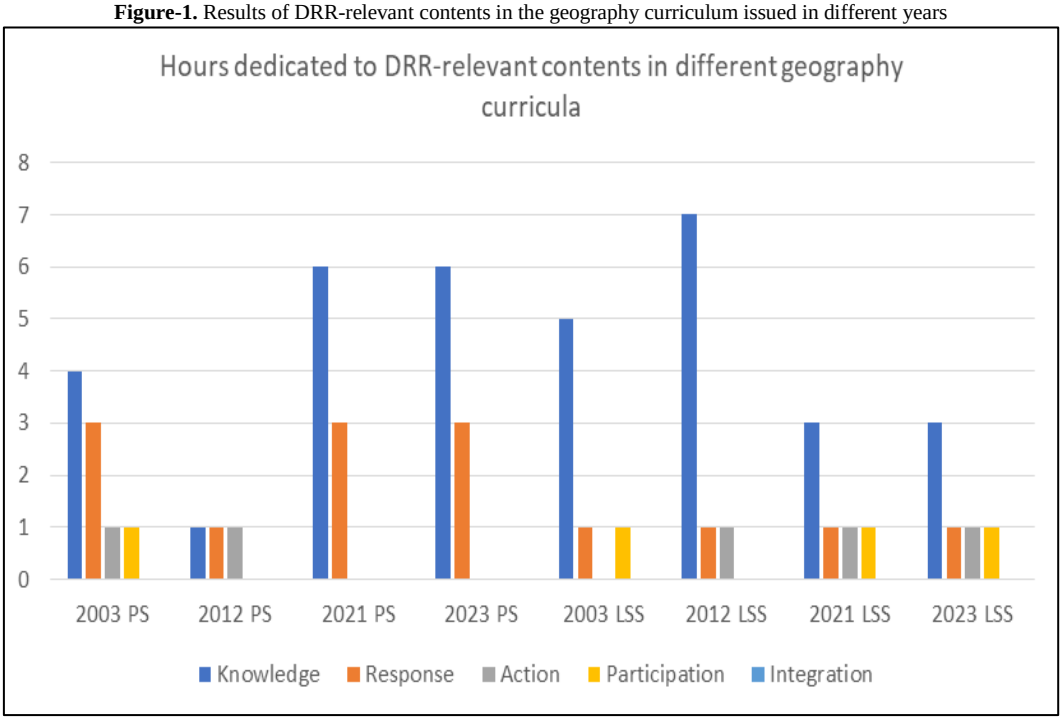
The changes in the DRR-relevant content in the primary school and lower-secondary school curricula present similar characteristics. All changes focused mainly on earthquakes. The DRR-relevant content in the primary school geography curriculum was less than that in the lower-secondary school geology-geography curriculum. The 2012 edition of the primary school geography curriculum contained less DRR-relevant content than the 2003 and 2021, 2023 editions of the geology–geography curriculum. In addition, it was observed that: (1) there was no DRR-relevant content in the primary and lower-secondary school geography curricula for some grades; (2) there was no DRR- relevant content in the 2012 and 2021, 2023 editions, of the lower-secondary school geology -geography curriculum of the 2$^{nd}$ grade; (3) there was no DRR- relevant content in the 2003 edition of the environmental studies curriculum for grades 3 and 4, in the 2012 edition of the environmental studies curriculum for grades 1-4, and in the 2021, 2023 editions of the environmental studies curriculum for the 1$^{st}$ and 2$^{nd}$ grades; and (4) there was no DRR-relevant content in the 2012 edition of the primary school geography curriculum for the 6$^{th}$ grade.

**Table-8.** Hours dedicated to DRR-relevant content in the geography curriculum per dimension

| | Issue Time | Knowledge | Response | Action | Participation | Integration |
|---|---|---|---|---|---|---|
| *Primary School* | 2003 | 4 | 3 | 1 | 1 | - |
| | 2012 | 1 | 1 | 1 | - | - |
| | 2021 2023 | 6 | 3 | - | - | - |
| | | 6 | 3 | - | - | - |
| *Lower Secondary School* | 2003 | 5 | 1 | - | 1 | - |
| | 2012 | 7 | 1 | 1 | - | - |
| | 2021 | 3 | 1 | 1 | 1 | - |
| | 2023 | 3 | 1 | 1 | 1 | - |

(**Source:** Authors)

**Figure-1.** Results of DRR-relevant contents in the geography curriculum issued in different years



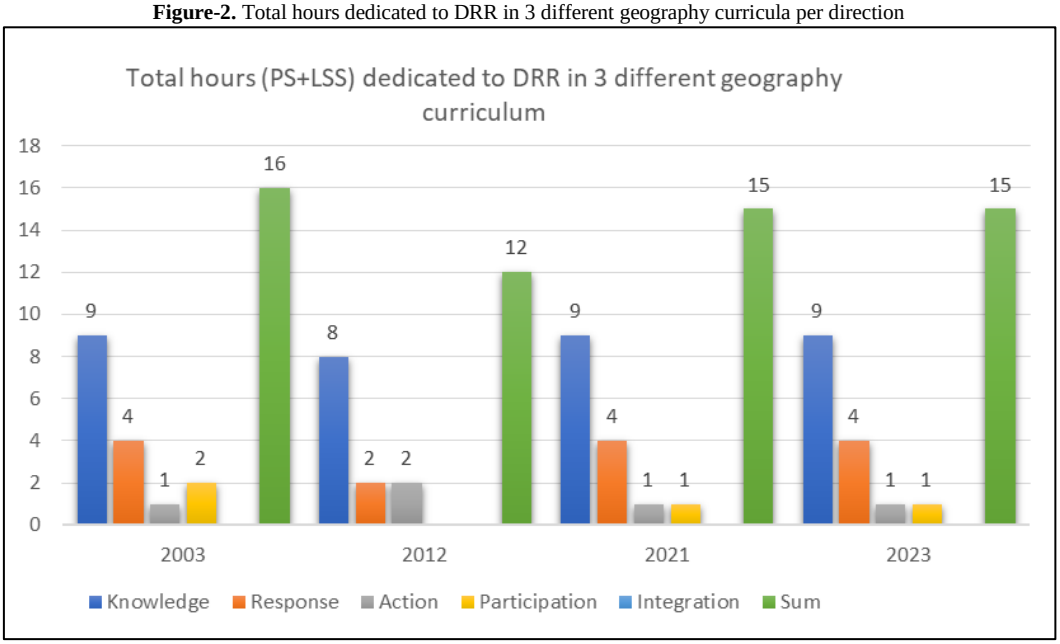

**Source:** Authors

**Table-9.** Total hours dedicated to DRR in 3 different geography curricula/orientation

| Year | 2003 | | | 2012 | | | 2021 & 2023 | | |
|---|---|---|---|---|---|---|---|---|---|
| Stage, but | PS | LSS | Sum | PS | LSS | Sum | PS | LSS | Sum |
| **Knowledge** | 4 | 5 | **9** | 1 | 7 | **8** | 6 | 3 | **9** |
| **Response** | 3 | 1 | **4** | 1 | 1 | **2** | 3 | 1 | **4** |
| **Action** | 1 | - | **1** | 1 | 1 | **2** | - | 1 | **1** |
| **Participation** | 1 | 1 | **2** | - | - | - | - | 1 | **1** |
| **Integration** | - | - | - | - | - | - | - | - | - |
| **TOTAL** | 9 | 7 | **16** | 3 | 9 | **12** | 9 | 6 | **15** |

(**Source:** Authors)

**Figure-2.** Total hours dedicated to DRR in 3 different geography curricula per direction




**Source:** Authors

## 4. Discussion and Concluding Remarks

To investigate the content development of DRR in the school geography curricula in Greece, this research used the five dimensions of the DRR learning framework (Table 1) as a platform and a conceptual premise to review the primary and lower - secondary school geography curricula from 2003 to 2023. Greece has integrated DRR in the national school geography curricula at the basic education levels. Therefore, geography as a carrier subject has been a tool for integration of DRR in the national curriculum in Greece.

Qualitative content analysis has yielded the following results: (1) the DRR-relevant content in the geography curriculum has undergone minimal changes from 2003 to the present; (2) at the primary school stage the DRR-relevant content was found mainly in the geography curriculum that was for grades 5 and 6 and emphasized primarily the "knowledge" dimension, especially relevant to earthquakes; (3) at the lower-secondary school stage, the DRR-relevant content in the geography curriculum has also emphasized the "knowledge" dimension, but also with details of other risks; (4) the DRR-relevant content in the geography curriculum became more comprehensive and balanced, after the curriculum had been revised, nevertheless the total teaching hours kept being diminished with each revision. In short, DRR in Greece has ensured equal access to appropriate training and educational opportunities for children and vulnerable regions.

Within the context of DRR, training has been a crucial motivating force as it conveys the critical basis for risk-aware and risk-mitigating movements of a number of the population. Those responsible for education and research in the field of disaster education can be served to improve the level of education (Torani *et al.*, 2019). Geography aims to integrate the study of both natural and human realities and their interactions, focusing on spaces, places, and regions, and addressing, and questioning both short-term and long-term processes and their resultant patterns (Meadows, 2020). In this sense and with relation to DRR training at school, geography has an integrated "advantage" over most subjects, and is vital to know-how of processes, patterns, and trajectories that symbolize the disrupted earth system. When disasters are investigated within the context of geography, attention ought to be unavoidably paid between the area of overlap between physical and human geography. It is thus necessary not only to perceive nature and culture merely as fields of objective investigation but rather to shift one's focus to the specific societal relationships and developments in which the meanings of the terms are formed and changed (Moenter and Otto, 2018). Through the previous evaluation of the geography curricula in Greece, although they have undergone continuous changes, the DRR-related content has a relatively stable state, which is too thin overtime. This content focuses too much on the description of natural phenomena and their effects on the earth's surface changes and little interest in understandings of social vulnerability and resilience, which is the social part of DRR.

A poor understanding of community resilience and the social dimensions of risk, the lack of a methodology to engage all stakeholders (such as, schools, pupils/students, parents, community) and empower resilience in society, and business-as-usual limit the implementation of effective DRR and resilience-building strategies (Imperiale and Vanclay, 2021).

The participation of children (as one of the stakeholders) is a valued proposition as it brings real and necessary benefit to DRR and resilience-building policies, programs, and strategies (Amri *et al.*, 2018; Apronti *et al.*, 2015; Johnson *et al.*, 2014; Saizen and Sasi, 2015; Tatebe and Mutch, 2015). DRR education is effective at all stages of the crisis, but its impact is even more on preparation (Torani *et al.*, 2019). DRR education should be taught not only using textbooks but also through practical and experiential learning activities (Cerulli *et al.*, 2020; Nakano *et al.*, 2020; Pascapurnama *et al.*, 2018; Robielos *et al.*, 2020; Shoji *et al.*, 2020). The received understanding needs to be implemented every day in the real environment. Additionally, teaching about DRR knowledge should be taught as part a comprehensive package with disaster prevention and preparedness (Wisner, 2006).

Finally, geography literacy provides students with good disaster response skills and offers a solution for natural damage so to reduce its negative side effects (Kamil *et al.*, 2020).

Keeping the analysis of the DRR-relevant content in the Greek school geography curriculum in mind, more DRR-relevant content that belongs to the "action" "participation" and specially "integration" (which is completely missing) dimensions should be added, especially at the primary and lower-secondary school levels.

Without political will and a strong engagement of key stakeholders (such as, schools, pupils/students, parents, community) in drafting policies, the prospects of implementing disaster risk reduction integration in the Greek education curriculum are very weak (Hoffmann and Blecha, 2020; Mutasa and Munsaka, 2019; Ruane and Babb, 2020; Sawaneh and Fan, 2021). In view of all the aforementioned, it is important, first, to increase the teaching hours of the subject and, second, to incorporate systematically the DRR-relevant content of the "integration" dimension in the school geography curriculum in its next revision.

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