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Content Analysis of Disaster Risk Reduction in Secondary School Geography Textbooks in China and the United States: Promoting Disaster Resilience through Geography Education

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Abstract: Geography education plays an important role in the promotion of disaster resilience; however, the relationship between geography education and disaster resilience has failed to attract systematic attention in China and the United States (US). This study compares the contents regarding disaster risk reduction in secondary school geography textbooks in China and the US to explore the contributions of geography education to promoting disaster resilience. These textbooks are analyzed using content analysis based on the Sendai Framework with four actions. This study finds that geography textbooks in China and the US include disaster risk reduction content; however, the contents are unevenly distributed, with "understanding disaster risk" and "enhancing disaster preparedness" accounting for a higher proportion, whereas "strengthening disaster risk governance" and "investing in disaster risk management to enhance resilience" account for a lower proportion. The results indicate that geography education plays an important role in enhancing disaster resilience and can strengthen students' understanding and preparedness for disaster risks. Meanwhile, this study points out the shortcomings in current disaster risk reduction education and provides a reference for improving educational practice and policy formulation.

Keywords: disaster risk reduction; disaster preparedness; resilience; geography education; secondary school textbooks; content analysis; China; the United States

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1. Introduction

In recent years, the number of natural disasters worldwide, such as earthquakes, floods, and droughts, has continued to increase, significantly impacting socioeconomic development, human life, and health. Disasters restrict countries from achieving the goals outlined in the 2030 Agenda for Sustainable Development (2030 ASD) and also exacerbate existing inequalities between countries. Considering the growing risks of disaster, each country requires separate, tailored, and context-specific disaster risk reduction (DRR) strategies, and educational initiatives that respond to their particular situation and population [1]. These must address the unique challenges faced by the given country, promoting the realization of the United Nations' Sustainable Development Goals (SDGs).

The Sendai Framework for Disaster Risk Reduction (SFDRR) for 2015–2030 highlights education as a key driver of DRR strategies [2], important in promoting a culture of resilience, building knowledge and skills to reduce disaster risks, and empowering communities to take action [3,4]. One study found that education should be increased and developed to support greater individual, community, and national resilience to disasters [5]. The United Nations Educational, Scientific, and Cultural Organization (UNESCO) and the United Nations International Strategy for Disaster Reduction launched the campaign, which mobilized governments, schools, and communities to ensure that DRR education (DRRE) is included in national school curricula [6], increasing the awareness of such issues

and building resilience throughout society. In particular, geography is an appropriate subject for the discussion of disaster risks [7].

Geography's core distinguishing feature is the parallelism and interweaving of natural and social science issues, content, and methods. It aims to study humans and their environment, how humans affect the environment or vice versa, and how the environment affects human survival. A study has noted that guided behavior and actions related to DRR must be viewed as essential competencies that must be present in geography education to promote a basic understanding of the subject matter [8]. Geography is better suited to cultivating students' DRR literacy, that is, their ability to consciously take actions to reduce disaster risks. The value of geographical education, the power of geographical thinking, research perspectives, geographic application areas, and the critical role of the geography curriculum in preparing students to face complex challenges all make important contributions to the development of resilient societies.

Academic research on DRRE has been increasing, with significant works spread across various domains of disaster education [9–11] and sustainable development education [12–14]. To assess the relevance of geography for the context of the emerging DRR discourse, it is necessary to explore its position in the curriculum of key geographic concepts that may be considered instrumental to the understanding and addressing of DRR challenges.

Nevertheless, few systematic studies of DRRE in geography education in schools have emerged. This paper describes the role that school geography education plays in China and the United States (US) in contributing to disaster resilience, benchmarked against the recognized SFDRR, as measured against a number of indicators. Arguing that the promotion of DRR should also form an essential element of geography education, we conducted a content analysis for DRR in secondary school geography textbooks in China and the US, examining how DRRE is contextualized and promotes disaster resilience in geography curricula in these countries. The research questions are as follows.

RQ1: What are the DRR-related topics in Chinese and American geography textbooks?

RQ2: What are the distinguishing characteristics of these DRR-related topics?

RQ3: What are the differences in DRR content in geography textbooks from the two countries?

2. Literature Review

2.1. Disaster Risk Reduction and Geography

China and the US are both prone to natural disasters [15]. In particular, because of China's complex geological and climatic conditions, it is one of the countries that are most frequently and severely affected by natural disasters. China has experienced almost every type of disaster, from landslides and earthquakes to floods, typhoons, droughts, forest fires, soil erosion, and severe snowstorms [16,17]. Reaching 7.9 on the Richter scale, the 2008 Sichuan/Wenchuan Earthquake left 374,000 people injured and between 5 million and 11 million people homeless. An astonishing 5 million buildings collapsed as a result of the earthquake, including a number of schools [18]. According to statistics from China's Ministry of Emergency Management, the direct economic losses caused by various natural disasters in China in 2023 amounted to approximately CNY 3454.5 billion yuan, marking a 12.6% increase over the previous 5 years [19].

The US is also severely affected by natural disasters, with the number of geophysical, meteorological, hydrological, and climate disasters increasing year on year [20]. In 2005, Hurricane Katrina struck the country, nearly destroying the city of New Orleans [21]. Disasters cause various impacts and damages to environmental, social, and economic conditions. Therefore, this situation needs to be addressed by all stakeholders in DRR policies and actions, especially the education sector.

The geography curriculum is thought to play an important role in disseminating DRRE. Kamil et al.'s [22] classroom action research indicated that 91.6% of students have adopted a geographical perspective in gaining critical knowledge regarding disasters and

their mitigation methods, as well as increasing preparedness for natural disasters after the study of geography. In general, geography involves a long and distinguished history of research and teaching, including human–environment relations, which form the heart of the discipline [13,23]. In examining the integration of physical and human geography, Goudie [24] outlined seven key areas that represent intellectual challenges and potential research opportunities. The first of these is that of natural disasters. The study of geography helps people understand processes, patterns, and mechanisms causing natural disasters and what tools and methods must be used to understand and respond to disaster risks [25]. For example, Hong Jiao et al. [26] used ArcGIS 10.7 network analysis tools in conjunction with urban disaster assessment and the supply–demand balance for disaster prevention facilities in Lindian County, Heilongjiang Province, China, to optimize emergency shelter layouts to improve urban resilience and promote sustainable urban development. Improvements in early warning systems, remote sensing technologies, artificial intelligence, and data analytics are playing an important role in reducing disaster risks and enhancing resilience, to offer a forward-looking perspective to address the challenges posed by natural disasters.

Many countries—including China, the US, Japan, Indonesia, and India—have incorporated DRR into their primary and secondary school curricula. This includes providing independent courses on DRR, integrating DRR into other disciplines, and conducting nonformal education and extracurricular activities on DRR. China has been integrating DRR into all levels of its national school geography curricula since 1986, and it has continually adjusted these curricula to reflect recent natural disasters and geography education reforms [27]. Meanwhile, in the US, geography and education for DRR have been conceptualized well [28]. The Japanese government has integrated disaster education into its primary and secondary curricula, and students now learn about disaster prevention, mitigation, and response as part of their regular coursework. Furthermore, disaster preparedness is taught as a core subject in Japanese schools, both formally (e.g., in natural science classes) and informally [29]. In India, the Central Board of Secondary Education has added a brief disaster management course to the school curriculum [30]. The integration of DRRE into school curricula and the identification of the knowledge, skills, and attitudes students need to develop concerning DRR are the most effective ways of ensuring sustained DRRE in schools [31].

2.2. Disaster Risk Reduction and Textbooks

A previous study acknowledged the role of textbooks in addressing the effects of disasters on children [32]. As a basic educational tool for the implementation of a curriculum, textbooks convey DRR knowledge and assist students in developing cognitive patterns and relevant behaviors [33]. Thus, they influence curriculum planning and implementation to a substantial extent [34].

Conducting research on DRRE in textbooks can contribute to the development of effective DRRE programs and resources. Previous works have discussed the types of disasters and topics related to DRR that are integrated in the presentation of geography in textbooks in some regions and countries. In Iran, disaster-related content is included in all textbooks from grades 1 to 12 and covers a wide range of topics, such as different types of hazards, disaster preparedness, emergency response, post-disaster interventions, psychosocial support, global disasters, first aid, global warming, and risk management [35]. Topics related to natural disasters are also included in Iranian textbooks designed for students with intellectual disabilities [32]. Across Europe, although 80% of textbooks used in secondary schools were found to include explanations of natural disasters as well as necessary procedures, they rarely included information on DRR, recovery techniques, or problem-based descriptions [36]. In Malaysia, elements of DRR were included in the geography curriculum for secondary schools. Moreover, recommendations were provided to policymakers to make geography a compulsory subject again and to develop a comprehensive curriculum for DRRE [7].

Investigating DRR content in geography textbooks offers a significant framework for analyzing the underlying dynamics of politics in education and the reciprocal relationship between social movements and education. Ultimately, the analysis of school textbooks in the context of DRR can facilitate the development of more effective educational strategies and policies that prioritize children's safety and well-being [4].

UNESCO and the United Nations Children's Fund studied 30 countries and examined how natural disasters are presented in school textbooks, capturing key national experiences and best practices for incorporating DRR into school curricula. This study found that natural disasters are covered in textbooks in various subjects, including natural science (20 countries), social studies (12 countries), geography (11 countries), language (10 countries), civics and citizenship (4 countries), health and physical education (4 countries), life skills (3 countries), civil defense or premilitary education (1 country), and agriculture (1 country). However, this study did not yet include China or the US [9].

Although China and the US have integrated DRR into their national school geography curricula, research on geography textbooks that depict natural disasters is limited, impeding the improvement of national DRR literacy and implementation of DRRE and representing a notable research gap in this field.

2.3. Policies and Practices of Disaster Risk Reduction Education in China and the US

Due to the increasing frequency of natural disasters and a growing recognition of the importance of disaster prevention, China has increasingly emphasized the inclusion of knowledge of disaster risk management and mitigation in school education. Notably, the National Comprehensive Disaster Prevention and Mitigation Plan explicitly calls for the promotion of disaster prevention and mitigation education in schools and classrooms [37]. Moreover, the Ministry of Education has encouraged the integration of disaster risk awareness education into school curricula [38,39]. Regions prone to earthquakes, such as Sichuan, have already made earthquake safety education a regular part of teaching practices, enhancing students' self and mutual rescue capabilities through regular earthquake emergency drills. Typically, Chinese geography textbooks include basic knowledge concerning common disasters such as earthquakes and floods, along with the fundamental measures for responding to these disasters [40].

The US also highly values DRRE, and this is often reflected in state and local-level education policies. The Federal Emergency Management Agency and various non-governmental organizations have provided a variety of resources and support to help schools develop disaster preparedness plans and offer educational materials for students to learn about different types of disasters and the response skills they need [41,42]. Due to the lack of a uniform, countrywide education system, different states and even individual school districts may have different educational policies and implementation methods [43]. American school textbooks not only provide relevant disaster management information in relation to the specific risks of the region but also comprehensively cover the basic knowledge, preventive measures, and response strategies for various types of disasters, ensuring that students gain a thorough understanding of dealing with different kinds of hazards.

China and the US face diverse threats from natural disasters, which endow their disaster management and educational practices with unique characteristics. The school education system in China exhibits a high degree of uniformity, meaning that the educational policies implemented nationwide can be consistently reflected. Therefore, analyzing Chinese geography textbooks not only allows us to evaluate the actual implementation of national policies in school education, but also reveals how China's unique cultural background and social values influence the selection and organization of disaster-related content in the textbooks.

We choose China as a comparative subject for analyzing the similarities and differences in DRR content between Chinese and American geography textbooks. This approach helps fill the current academic gap in comparative studies of DRRE between the two countries;

further, it provides valuable data and insights into China's DRRE, thus offering reference values for the formulation of more effective disaster education strategies.

3. Materials and Methods

This study adopted content analysis to conduct the subjective interpretation of the document data through a systematic classification process of coding and identifying topics or patterns [44], improving researchers' data understanding and testing of theoretical issues [45]. Qualitative content analysis comprises the following steps: (1) preparing and processing documents; (2) reading them to obtain in-depth knowledge; (3) coding sentences or paragraphs; (4) categorizing and describing the data; and (5) interpreting the data [46]. The classical analytical technique of quantitative content analysis is frequency analysis, where the frequency of manifest text units is counted and compared with other units [47]. The manifest text units counted in this study were keywords related to DRR. This study followed five steps to conduct content analysis, as shown in Figure 1.

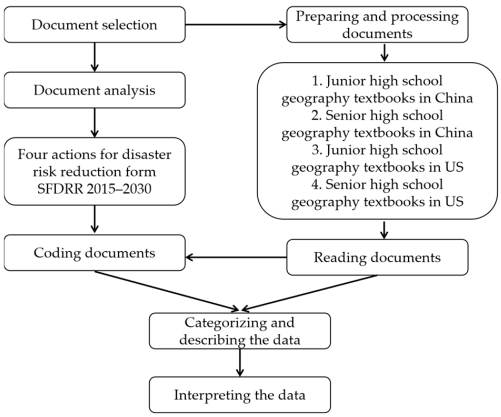


Figure 1. Research flow of this study.

Eleven secondary school geography textbooks (Table 1) from China and the US were selected as research documents and read in detail. These geography textbooks are the most widely used and influential teaching materials among Chinese and American secondary school students. They are highly authoritative and can effectively communicate the main points of DRRE.

Table 1. Research documents.

Country	Stage	Textbook	Publisher
China	Junior high school	Geography·Grade 7 Volume 1 [48] Geography·Grade 7 Volume 2 [49] Geography·Grade 8 Volume 1 [50] Geography·Grade 8 Volume 2 [51]	China People's Education Press, Beijing, China
China	Senior high school	Geography 1 [52] Geography 2 [53] Physical Geography Foundation [54] Regional Development [55] Resources, Environment, and National Security [56]	China People's Education Press, Beijing, China
US	Junior high school Senior high school	Discovering World Geography [57] Earth Science: Geology, the Environment and the Universe [58]	McGraw-Hill Company, New York, NY, USA

Note: China's junior high school geography textbooks consist of four volumes and are used for Grade 7 and 8 students; China's high school geography textbooks consist of five volumes for students in grades 10–12. US junior high and senior high school geography textbooks are bound volumes covering all of the geography curriculum content for junior high and senior high schools in the US. The difference in the number of textbooks in China and the US does not affect the results of this study.

Documents were coded based on the SFDRR. Four priority actions from the SFDRR were adapted and used as the coding framework (Table 2). The SFDRR is a landmark global agreement unanimously adopted by United Nations members at the Third United Nations World Conference on DRR. Since the SFDRR's official publication, hundreds of countries have used it as a reference for developing national DRR strategies and policies and conducting scientific research [7,59,60]. Therefore, this study employed the SFDRR as an important research tool.

Table 2. Content analysis framework of disaster risk reduction based on the Sendai Framework for Disaster Risk Reduction [2].

Code	Content
Action 1	Understanding disaster risk
Action 2	Strengthening disaster risk governance
Action 3	Investing in disaster risk management to enhance resilience
Action 4	Enhancing disaster preparedness for effective response and recovery

Textbook sentences that described the DRR content were manually coded using Nvivo14 software and then classified and analyzed to identify DRR topics. The keywords related to DRR in the coded content were counted and compared by frequency analysis. Ultimately, documentary data were interpreted to obtain meaningful conclusions and valuable insights for research.

4. Results

The results of this study show that geography education is the most critical way to achieve the goals of DRRE, significantly contributing to disaster resilience. Secondary school geography textbooks in China and the US include DRR content; however, it is unevenly distributed, with "understanding disaster risk" and "enhancing disaster preparedness" accounting for a higher proportion and "strengthening disaster risk governance" and "investing in disaster risk management to enhance resilience" accounting for a lower proportion. The contents reflect distinct geographical perspectives, including the natural scientific, humanistic, spatial, regional, and sustainable development perspectives. Additionally, the differences in DRR content between Chinese and American geography textbooks are very evident.

4.1. Disaster Risk Reduction Topics in Geography Textbooks in China and the US

The geography textbooks from China and the US were coded and analyzed following SFDRR's priority actions. Action 1 for DRR is "understanding disaster risk." In this action, 19 topics were obtained from the analysis of China's geography textbooks, while 21 topics were obtained from the US, making it the DRR action with the most topics, as shown in Table 3. These topics can help students identify and understand disaster risks by providing scientific explanations of various natural disaster mechanisms, such as the occurrence, influencing factors, formation process, temporal and spatial distribution range, hazards, and disaster impacts.

Storm surges, thunderstorms, floods, droughts, typhoons/hurricanes, cold waves, tsunamis, earthquakes, volcanic eruptions, mudslides, and landslides are among the 11 natural disasters shared by Chinese and American secondary school geography textbooks. Furthermore, six other natural disasters are covered in American textbooks: strong winds, hail, tornadoes, heat waves, water erosion, and wind erosion. The natural disasters listed above are common in both countries' geography textbooks and are likely to cause significant damage [61]. The Chinese and American textbooks provide students with examples of natural disasters that have occurred in their respective countries and worldwide.

The second DRR action is "strengthening disaster risk governance". As shown in Table 4, this action yields six topics from Chinese textbooks and five topics from American

textbooks, placing it third in terms of topic count. These topics are divided into two areas for improving disaster risk governance.

Table 3. Understanding disaster risks.

Action 1	Disaster Risk Reduction Topics	Chinese Textbooks	American Textbooks
Understanding disaster risks	Understanding the concept of natural disasters and their types	√	-
	Explaining the overall characteristics of natural disasters in China	√	-
	Explaining the occurrence of storm surges	√	√
	Giving examples of storm surges in the world	√	-
	Explaining the occurrence of thunderstorms	-	√
	Understanding the concept of strong winds, hail, and tornadoes	-	√
	Explaining the occurrence of flood disasters	√	√
	Explaining the occurrence of drought	√	√
	Explaining the occurrence of typhoons/hurricanes	√	√
	Explaining the causes and hazards of heat waves	-	√
	Understanding the concept of cold waves	√	√
	Explaining the causes and hazards of earthquakes	√	√
	Explaining the concept of earthquake waves and magnitude	√	√
	Giving examples of earthquakes in China/the US and the world	√	√
	Explaining the occurrence of tsunamis and examples in the world	√	√
	Explaining the occurrence of mudslides	√	√
	Explaining the occurrence of landslides and their hazards	√	√
	Exemplifying the impact of natural disasters on population migration	√	-
	Explaining the relationship between El Nino and La Nina and natural disasters	√	√
	Explaining the impact of plate tectonics on the occurrence of volcano eruptions	-	√
	Giving examples of volcano eruptions in the world	√	√
	Understanding the dust storm in the Great Plains in the US	√	√
	Explaining the relationship between the reduction in forest resources and natural disasters such as droughts, floods, and fires	√	-
	Describing the occurrence of water erosion	-	√
	Describing the occurrence of wind erosion	-	√
	Understanding how water affects landslides	-	√

Table 4. Strengthening disaster risk governance.

Action 2	Disaster Risk Reduction Topics	Chinese Textbooks	American Textbooks
Strengthening disaster risk governance	Understanding the role of government in DRR	√	√
	Publicizing laws and regulations on disaster prevention and reduction	√	-
	Locating earthquakes	-	√
	Understanding the 2030 Sustainable Development Goals	√	-
	Explaining human activities increasing disaster risks	-	√
	Explaining natural environmental problems increasing disaster risks	√	-
	Explaining the relationship between climate change and disaster risks	√	√
	Explaining the example of how rising sea levels caused by global warming pose a serious threat to national security in low-lying areas	√	√

First, the government plays an important role and function in strengthening disaster risk governance, as reflected in geography textbooks in both China and the US. Second, other Action 2 topics help students understand the factors that increase disaster risk and improve their disaster risk sensitivity. The geography curriculum covers the relationship between global climate change and disaster risk, and the Chinese textbook shows students the 2030 SDGs.

The third action for DRR is "investing in disaster risk management to enhance resilience". This action obtains three topics from Chinese textbooks and four from American textbooks, making it the priority action with the lowest number of topics, as shown in Table 5. These topics show how community and government participation, as well as international organizations and stakeholder cooperation, improve disaster risk management. At the same time, both Chinese and American textbooks mention technology as an important measure for mitigating disaster risks.

Table 5. Investing in disaster risk management to enhance resilience.

Action 3	Disaster Risk Reduction Topics	Chinese Textbooks	American Textbooks
Investing in disaster risk management to enhance resilience	Establishing nature reserves to deal with disasters such as sandstorms	√	-
	Exemplifying the main measures for mankind to cope with global climate change and international cooperation	√	-
	Understanding community engagement in disaster risk reduction	-	√
	Understanding careers related to disaster science, such as volcanologists, storm spotters, seismologists, geologists, etc.	-	√
	Illustrating the application of information technology in disaster monitoring, prediction, emergency planning, and rescue	√	√
	Understanding the structural design of earthquake-resistant buildings	-	√

The final DRR action is "enhancing disaster preparedness for effective response and recovery." Table 6 shows that this action yielded twelve topics from Chinese textbooks and nine from American textbooks, placing it second in topic count. These topics primarily explain how to prepare, mitigate, and recover in the face of natural disasters—that is, how to act before, during, and after a disaster to reduce disaster risks—so that students can systematically build the necessary skills to act in a risk-aware and risk-reducing manner in emergencies. For example, textbooks in both countries state that students should identify emergency shelters, prepare emergency supplies for disasters, and learn some escape skills for frequent natural disasters. The Chinese textbooks also focus on post-disaster recovery actions, such as the reconstruction of Beichuan County in a different location following the Wenchuan earthquake [52] (p. 111). Meanwhile, the American textbooks focus on helping students develop disaster prevention and reduction ideas through geographical practices, such as investigation, discussion, and design.

Table 6. Enhancing disaster preparedness for effective response and recovery.

Action 4	Disaster Risk Reduction Topics	Chinese Textbooks	American Textbooks
Enhancing disaster preparedness for effective response and recovery	Learning how to save oneself and others	√	√
	Strengthening pre-disaster preparedness, prediction, and monitoring	√	√
	Taking immediate action when receiving natural disaster warnings and evacuation information	-	√
	Participating in earthquake drills and emergency drills	√	-
	Mastering disaster escape skills for disasters such as earthquakes, floods, and mudslides	√	-
	Designing a safety preparedness brochure for a natural disaster	-	√
	Investigating the occurrence of natural disasters	-	√
	Discussing some actions to reduce landslides	-	√
	Identifying emergency shelters	√	√
	Understanding disaster rescue actions	√	√
	Understanding disaster psychological assistance	√	-
	Giving examples of China's rescue actions at home and around the world	√	-
	Explaining the relationship between the settlement site and natural disasters	√	-

Table 6. *Cont.*

Action 4	Disaster Risk Reduction Topics	Chinese Textbooks	American Textbooks
Enhancing disaster preparedness for effective response and recovery	Understanding Disaster Prevention and Reduction Day and its significance	√	-
	Focusing on post-disaster recovery in disaster areas	√	-
	Dialectically understanding the positive impact of disasters	√	-
	Discussing whether people should live in areas where natural disasters have occurred	-	√

4.2. Characteristics of the Disaster Risk Reduction Topics in Geography Textbooks in China and the US

China and the US have secondary school geography textbooks covering DRR topics. Based on the number of extracted DRR topics, the priority ranking of DRR actions mentioned in Chinese and American geography textbooks is consistent, ranging from high to low as follows: Action 1 (understanding disaster risk), Action 4 (enhancing disaster preparedness for effective response and recovery), Action 2 (strengthening disaster risk governance), and Action 3 (investing in disaster risk management to enhance resilience), accounting for 51%, 26%, 14%, and 9% of topics, respectively, as shown in Figures 2 and 3.

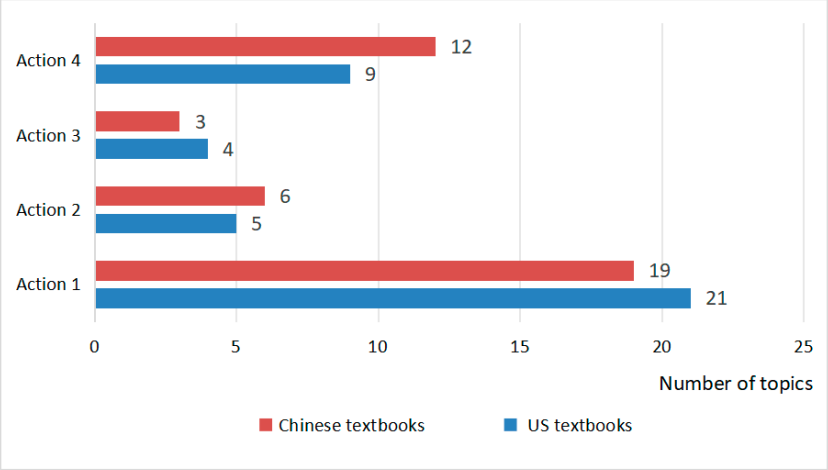


Figure 2. Distribution of disaster risk reduction content in geography textbooks.

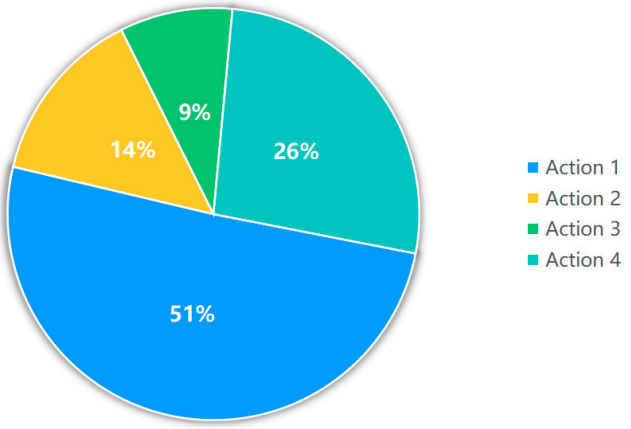


Figure 3. Percentage of disaster risk reduction content in geography textbooks.

Figures 2 and 3 depict that both Chinese and American geography textbooks place the greatest emphasis on Action 1 for DRR, which is reflected in the geography curriculum's emphasis on learning disaster knowledge and understanding disaster risk. The focus on

Action 4 for DRR is slightly lower than on Action 1, indicating that students develop the necessary skills through the geography curriculum to act in a risk-aware and risk-reducing manner in emergencies, including preparing, mitigating, and recovering in the face of natural disasters.

Both countries' textbooks pay the least attention to Actions 2 and 3, namely, strengthening disaster risk governance and resilience building, particularly the lack of government and community participation. DRR actions are generally inconsistent in Chinese and American geography textbooks. Although the Chinese and American governments have established DRR strategies, geography curriculum contents concerning disaster risk management and disaster resilience construction require strengthening. Therefore, exchange and cooperation between policy and educational initiatives must be strengthened.

4.3. Differences in Disaster Risk Reduction Content in Geography Textbooks Between China and the US

Our analysis of the DRR contents in Chinese and US geography textbooks identifies significant differences between the two countries. First, the types of natural disasters described in the textbooks differ. While both countries pay close attention to common disasters such as earthquakes and floods, Chinese textbooks emphasize landslides and droughts; meanwhile, American textbooks focus on weather phenomena such as tornadoes and thunderstorms. These differences highlight the diversity of the geographic environments of the two countries and reflect the varying strategies employed in identifying and responding to common domestic disasters.

Second, Chinese geography textbooks tend to emphasize the leading role that the government plays in disaster management and policy to reduce disaster risks and stress the dissemination of related laws and regulations. By contrast, American geography textbooks emphasize the roles of communities, non-governmental organizations, and individual actions in disaster risk management and introduce careers related to disaster science to cultivate students' interest and awareness in the field.

Furthermore, in terms of disaster preparedness and response measures, the Chinese geography textbooks tend to provide methods and action recommendations for disaster preparedness and mitigation. In comparison, American geography textbooks offer more practical operational guidance, such as designing safety manuals and encouraging students to engage in investigation activities related to natural disasters, enhancing their practical skills and ability to respond to disasters.

In summary, the differences in DRRE contents between Chinese and American geography textbooks reflect the uniqueness of the two countries in terms of the geographic environment, disaster risk management, and educational policies, as well as revealing the differences in the two countries' respective cultural backgrounds and social values.

4.4. The Disciplinary Perspectives of Geography Education in China and the US on Promoting Disaster Resilience

This study obtained the high-frequency keywords of DRR content in geography education in China and the US through word frequency analysis. Figure 4 shows the frequency distribution of keywords in Chinese geography textbooks. The top ten keywords include "disaster" (87 times), "region" (44 times), "earthquake" (44 times), "occurrence" (42 times), "natural disaster" (40 times), "flood" (37 times), "globe" (35 times), "drought" (34 times), "typhoon" (23 times), and "impact" (26 times).

Figure 5 shows the frequency distribution of keywords related to DRR content in American textbooks. The top ten keywords include "earthquake" (254 times), "region" (171 times), "occurrence" (169 times), "cause" (143 times), "volcano" (125 times), "figure" (117 times), "hurricane" (81 times), "windstorm" (78 times), "flood" (69 times), and "thunderstorm" (67 times).



Figure 4. Distribution of keywords in Chinese geography textbooks.



Figure 5. Distribution of keywords in US geography textbooks.

The examination of geography textbooks and high-frequency keywords in DRR-related content allows us to identify various geographical perspectives supporting DRRE in China and the US, as shown in Figure 6. Earthquakes, floods, droughts, and typhoons are paramount in the Chinese geography curriculum. The geography curriculum in the US emphasizes earthquakes, volcanoes, hurricanes, storms, and floods. The physical processes and causes of natural disasters are explained in the geography textbooks, indicating the natural scientific perspective of geography curricula for promoting disaster resilience. By studying the scientific principles of these natural phenomena, students can better understand the conditions and likelihood of disasters. High-frequency keywords like "impact", "human", and "destruction" emphasize the relationship between human society and natural disasters, highlighting the humanistic perspective. Keywords like "region", "occurrence", "China", and "US" focus on the specific types of disasters faced by different regions and the spatial patterns of disaster risks, showing regional and spatial perspectives. Moreover, high-frequency keywords such as "development", "system", and "climate" reflect the impact of climate change on the frequency and intensity of disasters and how to mitigate these risks through sustainable development practices, which highlights the sustainable development perspective.

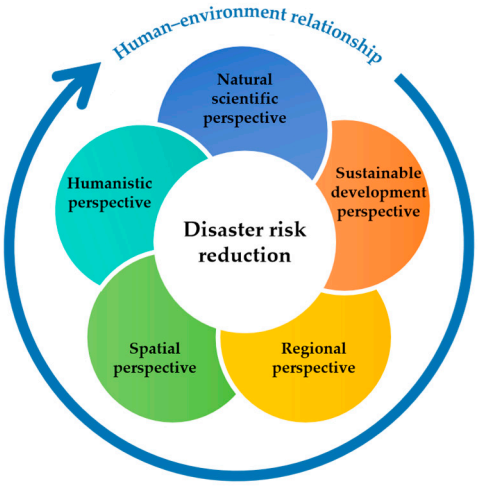


Figure 6. Geographical perspectives on promoting disaster resilience.

Overall, the study of geography emphasizes five main geographical perspectives on understanding disaster risk issues and promoting disaster resilience, namely, the natural scientific, humanistic, spatial, regional, and sustainable development perspectives.

5. Discussion

To explore the value of geography education in promoting disaster resilience, this study examines the content on DRR in secondary school geography textbooks in China and the US from the perspective of the four actions of DRR based on the SFDRR. The current study results help us understand the presence of DRR knowledge and actions in geography education in China and the US and recognize the value of geography education in building a resilient society.

5.1. Common Focus of Disaster Risk Reduction Content in Chinese and American Geography Textbooks

The results reveal that geography education in China and the US has similarities in terms of promoting disaster resilience. Geography textbooks in both countries emphasize understanding disaster risks and developing disaster preparedness capabilities, which is largely consistent with the priority actions in the SFDRR. Firstly, Action 1 "understanding disaster risk", has received extensive attention in textbooks in both countries, reflecting the centrality of scientific knowledge in disaster prevention [62]. Secondly, both countries have emphasized Action 4 "enhancing disaster preparedness", intended to develop students' abilities to cope with disasters, including prevention, response, and recovery. However, regardless of their strong disaster risk understanding and preparedness, both countries' textbooks tend to lack information on disaster risk management and investment in resilience building (Actions 2 and 3) with the involvement of governments, communities, and stakeholders.

This imbalance means that there is a lack of emphasis on multi-stakeholder collaboration and long-term resilience building, which are critical to effective disaster risk governance [63,64]. The 2030 ASD reaffirms the importance of DRR and community resilience [65], and this concept has been incorporated into the SDGs and their respective targets [66]. With the increasing threat of climate change disasters, it is more important than ever to work together to create a global safety culture for community well-being and resilience [67]. Therefore, this study calls for the revision of geography textbooks by focusing on balancing the content of various actions to strengthen student's disaster knowledge, skills, participation awareness, and attitudes, while also cultivating a culture of safety, prevention, response, and resilience, thereby enhancing the overall resilience of society. Through such improvements, geography education can not only impart knowledge

but also inspire students to actively participate in actions, enabling them to play a greater role in building disaster resilience.

Natural disaster issues in geography textbooks are often closely related to broad geographical concepts including those of place, space, process, and the relationship between human beings and the environment [68]. Different geographical perspectives fundamentally shape the diverse understanding of geographical concepts [69]. Each geographical perspective helps students understand complex issues and develop their abilities [70]. Geography education integrates natural science, the humanities, and the study of space, regions, and sustainable development to create a deep and comprehensive framework for the understanding of disaster risk issues. Geographical perspectives on natural hazards can help students cope with their complexity and offer potential support for learners' discussion of topics related to reduction in disaster risk, response to climate change, and promotion of sustainable development.

5.2. Potential Factors Influencing the Disaster Risk Reduction Content in China and the US

It is necessary to recognize that cultural and social contexts can produce certain differences in the DRRE orientation. This study found significant differences in DRR content in secondary school geography textbooks between China and the US. This is likely because of the different cultural backgrounds and social values at play between the two countries. Specifically, the US focuses on individualism [71], whereas China emphasizes collectivism [72].

The American textbooks reviewed for this study focus more on personal safety and self-protection skills, such as the preparation of personal emergency kits and formulation of family evacuation plans. This may reflect that the individualistic tendencies prevalent in the US culture [71] encourage individuals to think independently and take action to ensure their own safety during disasters.

By contrast, in Chinese textbooks, the content often emphasizes the spirit of collectivism and social responsibility, which are closely related to Chinese social structure. When describing potential natural disasters, such as earthquakes or floods, textbooks introduce relevant scientific knowledge and emphasize the ways that individuals should participate in rescue operations and play an active role in the post-disaster reconstruction process. This echoes the educational theory proposed by China's current basic education reform, i.e., a spirit of unity, cooperation, and social responsibility should be cultivated in students [38].

Through the study of these differences, we can observe that although there are cultural differences in DRRE between China and the US, they are all aimed at a common goal—improving resilience to disasters. Future research should further explore how to integrate the advantages of two education models to better promote disaster resilience on a global scale.

5.3. Strengths and Weaknesses of Geography Education in China and the US in Terms of Disaster Risk Reduction Education

Geography education is indispensable for the development of responsible and active citizens today and in the future [73]. China and the US each exhibit unique strengths in the DRRE contents provided in their geography education. Chinese geography textbooks emphasize the leading role played by the government in disaster risk management and promote the implementation of national educational policies [74]. In addition, Chinese geography education introduces domestic cases of disaster cases, helping students better understand and identify disaster risks. Furthermore, themes such as global climate change and sustainable development are widely discussed, contributing to enhanced awareness of sustainable development among students.

Meanwhile, geography education in the US places greater emphasis on explaining the scientific principles of natural disasters [75], helping to enhance students' scientific literacy. Through a variety of practical activities, geography education increases students' participation in diverse disaster risk education programs [76]. The roles that communities

and individuals play in disaster risk management are highlighted, fostering students' civic awareness. In addition, the textbook integrates disaster education with other subjects, contributing to developing students' comprehensive abilities to respond to disasters and their interdisciplinary competencies.

Nonetheless, some shortcomings remain in terms of DRRE in Chinese geography education. For example, the explanation of scientific principles is relatively weak and experiential, participatory disaster risk education practices are insufficient, and the integration with other subjects is limited. This finding is consistent with the results of Zhu and Zhang, who find that there is a consensus about strengthening school-based disaster education to enhance students' awareness and capabilities in disaster responses [77].

It is therefore recommended that Chinese geography education focus on several areas to improve DRRE. First, geography curricula might strengthen the teaching of the geographic scientific principles of disasters to improve students' scientific literacy. Second, geography teachers should enhance the application of experiential learning methods to increase students' interest and participation in disaster education projects. Finally, geography education should promote interdisciplinary teaching by integrating knowledge and methods from other subjects to enhance students' comprehensive disaster response capabilities. These recommendations have significant reference value for the practice and policy formulation of enhancing disaster resilience education.

In the current context of educational reform, China increasingly emphasizes curriculum integration [78]. A previous study indicated that curriculum integration provides an effective method for developing the required 21st-century skills, including critical thinking, creative thinking, and communication and collaboration, thus preparing students to address social risks and challenges [79]. Therefore, the integration of geography education with other subjects is crucial for the effective implementation of DRRE [80]. Disaster risk management practices can be strengthened by integrating geography education with information technology science and using geographic information systems as well as artificial intelligence to monitor and predict disasters [81]. Moreover, geographical knowledge can be combined with engineering and architectural knowledge to teach students how to design and build earthquake-resistant buildings and other infrastructure [82]. Incorporating a psychological perspective in geography curricula helps students understand the importance of psychological assistance during disasters and teaches them how to provide psychological support to affected populations [83]. An integrated curriculum will not only enhance individual student resilience but also contribute to building a more resilient society.

6. Conclusions

This article explores the role of geography education in enhancing disaster resilience. By comparing the contents on DRR in secondary school geography textbooks from China and the US, this article analyzes the contribution of geography education toward promoting disaster resilience. This study finds that geography education can enhance students' understanding and preparedness for disaster risks; however, there is a need to further balance the distribution of disaster risk management content and strengthen education on disaster risk governance and resilience building. In addition, influenced by different factors, the content on DRR between China and the US differs in many aspects, such as the selection of natural disaster types, approach to disaster risk management and policies, disaster preparedness and response measures, etc.

The findings of this study can enhance the comprehension of the content related to DRR in geography curricula for all geography education teachers, geography education researchers, and education administrative departments. Meanwhile, this study points out the strengths and weaknesses of current approaches to DRRE in China and the US, and provides reference values for improving educational practice and policy formulation for China.

Finally, this study was limited to secondary school geography textbooks in China and the US. To enhance the effectiveness of school DRRE, it is imperative to broaden the scope

of research to include other disciplines and countries, particularly in regions that are prone to frequent disasters. This will enable the acquisition of more practical knowledge and facilitate the promotion of school DRRE.

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References

1. UDNRR. Global Assessment Report on Disaster Risk Reduction. 2022. Available online: https://www.undrr.org/gar2022-our-world-risk-gar (accessed on 10 January 2024).
2. UNISDR. *Sendai Framework for Disaster Risk Reduction 2015–2030*; UNISDR: Geneva, Switzerland, 2015.
3. UNICEF. *Climate Change Adaptation and Disaster Risk Reduction in the Education Sector Resource Manual*; UNICEF: New York, NY, USA, 2012; p. 19.
4. Gokmenoglu, T.; Yavuz, I.; Sensin, C. Exploring the Interplay Between Curriculum and Textbooks in Disaster Risk Reduction Education: Insights and Implications. *Int. J. Disaster Risk Reduct.* **2023**, *96*, 103949. [CrossRef]
5. Mızrak, S.; Çam, H. Determining the Factors Affecting the Disaster Resilience of Countries by Geographical Weighted Regression. *Int. J. Disaster Risk Reduct.* **2022**, *81*, 103311. [CrossRef]
6. UNISDR. *2006–2007 World Disaster Reduction Campaign: Disaster Risk Reduction Begins at School*; UN: Geneva, Switzerland, 2007.
7. Hawa, N.N.; Zakaria, S.Z.S.; Razman, M.R.; Majid, N.A.; Taib, A.M.; Emrizal. Element of Disaster Risk Reduction in Geography Education in Malaysia. *Sustainability* **2023**, *15*, 1326. [CrossRef]
8. Mönter, L.; Otto, K.H. The Concept of Disasters in Geography Education. *J. Geogr. High. Educ.* **2017**, *42*, 205–219. [CrossRef]
9. Selby, D.; Kagawa, F. *Disaster Risk Reduction in School Curricula: Case Studies from Thirty Countries*; UNESCO: Paris, France; UNICEF: Barcelona, Spain, 2012.
10. Selby, D.; Kagawa, F. *Towards a Learning Culture of Safety and Resilience: Technical Guidance for Integrating Disaster Risk Reduction in the School Curriculum*; UNESCO: Paris, France; UNICEF: New York, NY, USA, 2014; pp. 87–92.
11. Fujioka, T. Disaster Prevention Education in the Japanese School Curricula in Recent Years: Current Status and Future Challenges. In *Disaster Resilience of Education Systems Experiences from Japan*; Shiwaku, K., Sakurai, A., Shaw, R., Eds.; Springer: Tokyo, Japan, 2016; pp. 39–53; ISBN 978-4-431-55980-1.
12. Li, J.; Xia, H.; Qin, Y.; Fu, P.; Guo, X.; Li, R.; Zhao, X. Web GIS for Sustainable Education: Towards Natural Disaster Education for High School Students. *Sustainability* **2022**, *14*, 2694. [CrossRef]
13. Meadows, M.E. Geography Education for Sustainable Development. *Geogr. Sustain.* **2020**, *1*, 88–92. [CrossRef]
14. Shaw, R. Overview of Concepts: Education for Sustainable Development and Disaster Risk Reduction. In *Education for Sustainable Development and Disaster Risk Reduction*; Shaw, R., Oikawa, Y., Eds.; Springer: Tokyo, Japan, 2014; pp. 1–13; ISBN 9784431550891.
15. Shen, G.G.; Zhou, L.; Wu, Y.; Cai, Z.M.A. Global Expected Risk Analysis of Fatalities, Injuries, and Damages by Natural Disasters. *Sustainability* **2018**, *10*, 2573. [CrossRef]
16. Shi, P.J.; Xu, W.; Wang, J. Natural Disaster System in China. In *Natural Disasters in China*; Shi, P.J., Ed.; Springer: Berlin, Germany, 2016; pp. 1–36; ISBN 9783662502686.
17. Jin, G.; Deng, X.; Yuan, Y.; Ma, S.; Li, Z.; Shi, S. Scenario Simulation of Land Exploitation and Risk Assessment of Soil Erosion in the Low-slope Hilly Area of the Erhai basin. *Phys. Chem. Earth* **2017**, *101*, 78–85. [CrossRef]
18. Renwick, N. China's Approach to Disaster Risk Reduction: Human Security Challenges in a Time of Climate Change. *J. Asian Secur. Int. Aff.* **2017**, *4*, 26–49. [CrossRef]
19. China's MEM. The Ministry of Emergency Management Released the Basic Situation of Natural Disasters Nationwide in 2023. Available online: https://www.mem.gov.cn/xw/yjglbgzdt/202401/t20240120_475697.shtml (accessed on 22 January 2024).
20. Re, M. NatCatSERVICE Loss Events in the U.S. 1980–2016 Number of Relevant Events by Peril. 2017. Available online: https://www.munichre.com/content/dam/munichre/global/content-pieces/documents/1980_2016_Paket_USA.pdf/_jcr_content/renditions/original.media_file.download_attachment.file/1980_2016_Paket_USA.pdf (accessed on 22 January 2024).

21. Gall, M.; Kevin, A.; Borden, K.M.; Christopher, T.; Emrich, C.T.; Cutter, S.L. The Unsustainable Trend of Natural Hazard Losses in the United States. *Sustainability* **2011**, *3*, 2157. [CrossRef]
22. Kamil, P.A.; Utaya, S.; Utomo, D.H. Improving Disaster Knowledge within High School Students through Geographic Literacy. *Int. J. Disaster Risk Reduct.* **2020**, *43*, 101411. [CrossRef]
23. Miao, S.; Meadows, M.E.; Duan, Y.; Guo, F. How Does the Geography Curriculum Contribute to Education for Sustainable Development? Lessons from China and the USA. *Sustainability* **2022**, *14*, 10637. [CrossRef]
24. Goudie, A.S. The Integration of Human and Physical Geography Revisited. *Can. Geogr.* **2017**, *61*, 19–27. [CrossRef]
25. Wang, L.K.; Zhou, Y.; Shi, W.X. Random Crowd-induced Vibration in Footbridge and Adaptive Control Using Semi-Active TMD Including Crowd-structure Interaction. *Eng. Struct.* **2024**, *306*, 117839. [CrossRef]
26. Jiao, H.; Feng, S. Towards Resilient Cities: Optimizing Shelter Site Selection and Disaster Prevention Life Circle Construction Using GIS and Supply-Demand Considerations. *Sustainability* **2024**, *16*, 2345. [CrossRef]
27. Gong, Q.; Duan, Y.; Guo, F. Disaster Risk Reduction Education in School Geography Curriculum: Review and Outlook from a Perspective of China. *Sustainability* **2021**, *13*, 3963. [CrossRef]
28. Fuhrmann, S.; Stone, L.D.; Casey, M.C.; Curtis, M.D.; Doyle, A.L.; Earle, B.D.; Jones, D.D.; Rodriguez, P.; Schermerhorn, S.M. Teaching Disaster Preparedness in Geographic Education. *J. Geogr.* **2008**, *107*, 112–120. [CrossRef]
29. Gavari-Starkie, E.; Casado-Claro, M.F.; Navarro-González, I. The Japanese Educational System as an International Model for Urban Resilience. *Int. J. Environ. Res. Public Health* **2021**, *18*, 5794. [CrossRef]
30. Diwakar, S. Disaster Management Education in India: Issues and Challenges. In *2nd Disaster, Risk and Vulnerability Conference, Trivandrum, India, 24−26 April 2014*; University of Kerala: Kerala, India, 2014; pp. 151–159.
31. Seidler, R.; Dietrich, K.; Schweizer, S.; Bawa, K.S.; Chopde, S.; Zaman, F.; Sharma, A.; Bhattacharya, S.; Devkota, L.P.; Khaling, S. Progress on Integrating Climate Change Adaptation and Disaster Risk Reduction for Sustainable Development Pathways in South Asia: Evidence from Six Research Projects. *Int. J. Disaster Risk Reduct.* **2018**, *31*, 92–101. [CrossRef]
32. Seddighi, H.; Sajjadi, H.; Yousefzadeh, S.; Lopez, M.L.; Vameghi, M.; Rafiey, H.; Khankeh, H.R. Representation of Disasters in School Textbooks for Children with Intellectual Disabilities in Iran: A Qualitative Content Analysis. *Int. J. Disaster Risk Reduct.* **2021**, *53*, 101987. [CrossRef]
33. UNESCO. *UNESCO Guidebook on Textbook Research and Textbook Revision 2nd Revised and Updated Edition*; UNESCO: Paris, French, 2010; p. 37; ISBN 9789231041419.
34. Simó, P.B. Doing Research on Geography Textbooks. An Overview of Methods, Samples, and Topics in International and German Journals (1960-2020). In *Textbooks and Educational Media: Perspectives from Subject Education*; Simó, P.B., Sikorová, Z., Eds.; Springer: Cham, Switzerland, 2021; pp. 134–146; ISBN 9783030803452.
35. Seddighi, H.; Yousefzadeh, S.; López, L.M.; Sajjadi, H.; Vameghi, M.; Rafiey, H.; Khankeh, H. Disaster Risk Reduction in Iranian Primary and Secondary School Textbooks: A Content Analysis. *Disaster Med. Public Health Prep.* **2022**, *16*, 1503–1511. [CrossRef] [PubMed]
36. Komac, B.; Zorn, M.; Ciglič, R. European Education on Natural Disasters−A Textbook Study. *Nat. Hazards Earth Syst. Sci. Discuss.* **2013**, *1*, 2255–2279. [CrossRef]
37. China National Commission for Disaster Reduction. The 14th Five-Year Plan for National Comprehensive Disaster Prevention and Mitigation. 2022. Available online: https://www.gov.cn/zhengce/zhengceku/2022-07/22/5702154/files/bf76d221687d4cacab6128702df07c63.pdf (accessed on 15 October 2024).
38. Ministry of Education of the People's Republic of China. *General High School Geography Curriculum Standard*, 2017th ed.; People's Education Press: Beijing, China, 2017.
39. Ministry of Education of the People's Republic of China. Guidelines for the Introduction of Life Safety and Health E-ducation into Primary and Secondary School Curriculum Materials. 2021. Available online: http://www.moe.gov.cn/srcsite/A26/s8001/202111/t20211115_579815.html (accessed on 15 October 2024).
40. Sun, H.B.; Duan, Y.S.; Yang, X. Research on the Curriculum Requirements and Practice of Disaster Education in Primary and Secondary Schools in China. *Geogr. Teach.* **2022**, *19*, 10–14.
41. Federal Emergency Management Agency of US. Ready Kids. Available online: https://www.ready.gov/kids/curriculum (accessed on 15 October 2024).
42. American Red Cross. Train for the Moments That Matter. Available online: https://www.redcross.org/about-us/our-work/training-education.html (accessed on 15 October 2024).
43. Zadrozny, J. *Social Studies and Geography Survey of Middle and High Schools 2020–2021*; The Gilbert M. Grosvenor Center for Geographic Education: Round Rock, TX, USA, 2017.
44. Hsieh, H.F.; Shannon, S.E. Three Approaches to Qualitative Content Analysis. *Qual. Health Res.* **2005**, *15*, 1277–1288. [CrossRef]
45. Elo, S.; Kyngäs, H. The Qualitative Content Analysis Process. *J. Adv. Nurs.* **2008**, *62*, 107–115. [CrossRef]
46. Creswell, J.W. *Research Design Qualitative, Quantitative, and Mixed Method Approaches*, 3rd ed.; SAGE Publication: Thousand Oaks, CA, USA, 2009; ISBN 0-7619-0070-5.
47. Bos, W.; Tarnai, C. Content Analysis in Empirical Social Research. *Int. J. Educ. Res.* **1999**, *31*, 659–671. [CrossRef]
48. Yuan, X.T. *Geography·Grade 7*; Fan, J., Gao, J.C., Eds.; People's Education Press: Beijing, China, 2012; Volume 1, ISBN 9787107245022.
49. Yuan, S.Q.; Liu, J. *Geography·Grade 7*; Fan, J., Gao, J.C., Eds.; People's Education Press: Beijing, China, 2012; Volume 2, ISBN 9787107252518.

50. Yuan, S.Q.; Ding, R.Q. *Geography Grade 8*; Fan, J., Gao, J.C., Eds.; People's Education Press: Beijing, China, 2013; Volume 1, ISBN 9787107264009.
51. Yuan, X.T.; Qin, Y.F. *Geography Grade 8*; Fan, J., Gao, J.C., Eds.; People's Education Press: Beijing, China,, 2013; Volume 2, ISBN 9787107274206.
52. Li, X.B.; Ding, R.Q. *Geography 1*; Fan, J., Gao, J.C., Eds.; People's Education Press: Beijing, China, 2019; ISBN 9787107338755.
53. Yuan, S.Q.; Liu, J. *Geography 2*; Fan, J., Gao, J.C., Eds.; People's Education Press: Beijing, China, 2019; ISBN 9787107338748.
54. Yuan, X.T.; Ding, R.Q. *Physical Geography Basis*; Fan, J., Gao, J.C., Eds.; People's Education Press: Beijing, China, 2019; ISBN 9787107347207.
55. Ge, Y.J.; Qin, Y.F. *Regional Development*; Fan, J., Gao, J.C., Eds.; People's Education Press: Beijing, China, 2019; ISBN 9787107345708.
56. Fang, X.Q.; Liu, J. *Resources, Environmental and National Security*; Fan, J., Gao, J.C., Eds.; People's Education Press: Beijing, China, 2019; ISBN 9787107349157.
57. Richard, G.B.; Jay, M.; Dinah, Z. *Discovering World Geography*; The McGraw-Hill Companies: Columbus, OH, USA, 2018; ISBN 9780076686971.
58. Borrero, F.; Hess, F.S.; Hsu, C.H.; Kunze, G.; Leslie, S.A.; Letro, S.; Manga, S.L.M.; Sharp, L.; Snow, T.; Zike, D. *Earth Science: Geology, the Environment and the Universe*; The McGraw-Hill Companies: Columbus, OH, USA, 2013; ISBN 13: 9780076587131.
59. Mizutori, M. Reflections on the Sendai Framework for Disaster Risk Reduction: Five Years Since Its Adoption. *Int. J. Disaster Risk Sci.* **2020**, *11*, 147–151. [CrossRef]
60. Gouramanis, C.; MoralesRamirez, C.A. Deep Understanding of Natural Hazards Based on the Sendai Framework for Disaster Risk Reduction in a Higher Education Geography Module in Singapore. *Int. Res. Geogr. Environ. Educ.* **2020**, *30*, 4–23. [CrossRef]
61. Shi, P.J.; Kasperson, R. *World Atlas of Natural Disaster Risk*; Springer: Berlin/Heidelberg, Germany; Beijing Normal University Press: Beijing, China, 2015; ISBN 9783662454299.
62. Torani, S.; Majd, P.M.; Maroufi, S.S.; Dowlati, M.; Sheikhi, R.A. The Importance of Education on Disasters and Emergencies: A Review Article. *J. Edu. Health. Promot.* **2019**, *8*, 85. [CrossRef]
63. Sawaneh, I.A.; Fan, L. The Mediating Role of Disaster Policy Implementation in Disaster Risk Reduction and Sustainable Development in Sierra Leone. *Sustainability* **2021**, *13*, 2112. [CrossRef]
64. Fahmi, M.; Sarilita, E.; Wilar, G. Building Resilient Communities: Rapid Response to a Crisis through Nusantara Module's Character Education and Social Contribution Initiative. *Sustainability* **2023**, *15*, 13300. [CrossRef]
65. United Nations. Transforming our World: The 2030 Agenda for Sustainable Development. 2015. Available online: https://sdgs.un.org/2030agenda (accessed on 1 March 2024).
66. Le Blanc, D. Towards Integration at Last? The Sustainable Development Goals as A Network of Targets. *Sustain. Dev.* **2015**, *23*, 176–187. [CrossRef]
67. Imperiale, A.J.; Vanclay, F. Conceptualizing Community Resilience and the Social Dimensions of Risk to Overcome Barriers to Disaster Risk Reduction and Sustainable Development. *Sustain. Dev.* **2021**, *29*, 891–905. [CrossRef]
68. Fögele, J. Acquiring powerful thinking through geographical key concepts. In *The Power of Geographical Thinking*; Brooks, C., Butt, G., Fargher, M., Eds.; Springer: Cham, Switzerland, 2017; pp. 59–73. ISBN 978-3-319-49985-7.
69. He, Y.J.; Tani, S.; Puustinen, M. GeoCapabilities Approach to Climate Change Education: Developing an Epistemic Model for Geographical Thinking. *J. Geogr.* **2024**, *123*, 2–3+23–31. [CrossRef]
70. Cresswell, T. *Geographic Thought: A Critical Introduction*; Wiley-Blackwell: Chichester, UK, 2013; ISBN 9781405169400.
71. Lin, H.L.; Gorrell, J.; Taylor, J. Influence of Culture and Education on U. S. and Taiwan Preservice Teachers' Efficacy Beliefs. *J. Educ. Res.* **2002**, *96*, 37–46. [CrossRef]
72. Menefee, T.; Nordtveit, B.H. Disaster, civil society and education in China: A case study of an independent non-government organization working in the aftermath of the Wenchuan earthquake. *Int. J. Educ. Dev.* **2012**, *32*, 600–607. [CrossRef]
73. International Geographical Union Commission on Geographical Education. 2016 International Charter on Geographical Education. Available online: https://www.igu-cge.org/wp-content/uploads/2019/03/IGU_2016_eng_ver25Feb2019.pdf. (accessed on 15 April 2024).
74. Shi, P. On the Role of Government in Integrated Disaster Risk Governance–Based on Practices in China. *Int. J. Disaster Risk Sci.* **2012**, *3*, 139–146. [CrossRef]
75. Brysch, C.P. *Status of Geography Education in the United States*; National Geographic Society: Washington, DC, USA, 2014.
76. Edelson, D.; Pitts, V. *Executive Summary: A Road Map for 21st Century Geography Education*; National Geographic Society: Washington, DC, USA, 2013.
77. Zhu, T.T.; Zhang, Y.J. An Investigation of Disaster Education in Elementary and Secondary Schools: Evidence from China. *Nat. Hazards* **2017**, *89*, 1009–1029. [CrossRef]
78. Ministry of Education of the People's Republic of China. *Compulsory Education Geography Curriculum Standard*, 2022 ed.; Beijing Normal University Publishing Group: Beijing, China, 2022.
79. Drake, S.M.; Reid, J.L. Integrated Curriculum as an Effective Way to Teach 21st Century Capabilities. *Asia Pacific J. Educ. Res.* **2018**, *1*, 31–50. [CrossRef]
80. Sampurno, P.J.; Sari, Y.A.; Wijaya, A.D. Integrating STEM (Science, Technology, Engineering, Mathematics) and Disaster (STEM-D) Education for Building Students' Disaster Literacy. *Int. J. Learn. and Teach.* **2015**, *1*, 73–76. [CrossRef]

81. Tomaszewski, B. A Survey of GIS for Disaster Management. In *Geographic Information Systems (GIS) for Disaster Management*; Tomaszewski, B., Ed.; Routledge: New York, NY, USA, 2020; ISBN 9781351034869.
82. Marini, A.; Passoni, C.; Riva, P.; Negro, P.; Romano, E.; Taucer, F. *Technology Options for Earthquake Resistant, Eco-efficient Buildings in Europe: Research Needs*; European Commission: Ispra, Italy, 2014; ISBN 978-92-79-35424-3.
83. Jacobs, G.A.; Gray, B.L.; Erickson, S.E.; Gonzalez, E.D.; Quevillon, R.P. Disaster Mental Health and Community-Based Psychological First Aid: Concepts and Education/Training. *J. Clin. Psychol.* **2016**, *72*, 1307–1317. [CrossRef] [PubMed]

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