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Abstract: Integrated disaster risk reduction in schools represents a key component of safety strategies within the educational sector of every country. In this study, a series of 850 face-to-face interviews (650 with students and 200 with teachers) were conducted throughout 2023 in 10 out of the total 18 municipalities in the Western Morava Basin of the Republic of Serbia. The paper proposes two central hypotheses regarding school-based disaster risk reduction. Firstly, it suggests that gender, age, parent's employment, academic achievement, living situation, paternal and maternal education levels, and engagement with social media collectively influence students' perspectives on this matter. Secondly, it posits that gender, age, marital status, parenthood, and educational background significantly impact teachers' viewpoints on school-based disaster risk reduction. Multivariate linear regression was used to explore predictors of students' and teachers' insights on school-based disaster risk reduction. Various statistical tests including Chi-square, t-tests, one-way ANOVA, and Pearson's correlation were employed to investigate the influence of demographic and socioeconomic factors on these insights. The results of multivariate regression analyses indicate that age, gender and marital emerge as the primary predictors across various facets of students' and teachers' insights on school-based disaster risk reduction (awareness of disasters, disaster education activities, attitudes on disaster risk reduction education, enhancement of disaster information accessibility, etc). The results of this study provide insight into the key factors influencing students' and teachers' perceptions of disaster risk reduction in schools. As such, they can serve as a basis for improving educational programs, developing policies and strategies, normative educational frameworks, teacher training, and further research in disaster education.

Keywords: disaster; safety; risk reduction; preparedness; education; schools; students; teachers; human resources; Western Morava Basin; Serbia

1. Introduction

In the endeavour to mitigate natural and man-made disasters, enhancing the awareness of teachers and students is crucial, as they serve as pivotal conduits for disseminating vital information. Given that effective information exchange is a fundamental prerequisite for preparedness and response to natural disasters, every element in the information dissemination chain holds equal significance [1]. Disaster education aims to provide knowledge, skills, and motivation to individuals and groups to take action to reduce their vulnerability to disasters [2]. Even education of vulnerable

individuals leads to effective actions for others or communities. Also, disaster education serves as a practical, efficient, and cost-effective approach to mitigating risks [3].

In this sense, the importance of school disaster education has sharply increased in contemporary conditions [4]. Schools play an indispensable role in reducing the risk of natural disasters [5]. Transferring knowledge about disasters, especially their consequences, within schools is crucial because schools remain centres of education, and the results of the educational process are transmitted to their families and the local community [6–9]. Therefore, alongside the growing role of alternative sources and forms of education, schools retain a leading role in education and upbringing [10,11]. With its position, a school largely reflects the real state of the social environment and its development potential, guiding and accelerating the learning process, i.e., the development of personality in line with its needs and possibilities [12,13].

Its purpose enables individuals and generations to live in a modern society where various natural and man-made disasters are a reality [14]. To successfully meet the increasing demands of human and societal development, a school needs to be of high quality, efficient, and oriented toward new developments [15]. The path to this goal involves modernization, where tradition and innovation play a part [16,17]. Youth are among the most vulnerable populations during disasters, especially those attending school during such events [18,19]. School buildings are often destroyed during disasters [20], taking the precious lives of children and teachers and disrupting access to education after the disaster [4,21,22]. The reconstruction of these schools can take years and is very costly. Education on disaster risk and secure school buildings are two key priority areas for action in the event of disasters [23]. Building on the concept of enhanced social participation, an increasing number of studies on disaster risk reduction focus on examining the role of youth in various phases of disaster management [24,25]. The potential of youth to be active citizens and agents of change also contributes to greater value through improving their skills in active programming for disaster risk reduction [26–28]. Related positive outcomes include increased visibility of youth in their communities and strong long-term resilience to disasters [29–31].

To reduce the risk of the mentioned disasters in the territory of Serbia, local self-governments play a leading role in the process of disaster risk management, and all other state and provincial institutions should support their role [32]. It is essential to emphasize the significant mutual coordination and alignment of procedures and plans of all institutions and entities, conducted through intersectoral cooperation and partnerships (Official Gazette of the Republic of Serbia, 87/2018, Article 4). By the principles of participatory and solidarity, all citizens of Serbia have the right to participate in designing the content and implementation of activities for disaster risk reduction. They also have the right to participate in proposing, undertaking, and executing specific measures, tasks, and activities in protection and rescue, and express their needs for aid resources (Official Gazette of RS, 87/2018, Article 8). Disaster risk reduction involves building a culture of safety and resilience among individuals and communities, as well as intensive collaboration of all relevant institutions at all levels of authority. Partnership with private and public enterprises, other legal entities, entrepreneurs, civil society organizations, and all interested citizens who can contribute to disaster risk reduction is emphasized (Official Gazette of RS, 87/2018, Article 11).

In terms of primary and secondary education, there's a plan for occasional training to gain essential knowledge in disaster risk reduction and emergency management [32–34]. Citizens undergo this training as part of their primary and secondary education, adhering to specific laws and relevant programs. However, in reality, education is sporadic and varies from school to school [35]. It involves different entities and forces of protection and rescue, such as the police and firefighting rescue units [36]. Those citizens who don't receive education in disaster risk reduction and emergency management during their primary and secondary education, can acquire basic knowledge through the activities of entities specializing in protection and rescue, as dictated by specific laws and program activities [37]. Also, citizens have certain obligations: to equip themselves for protection and rescue, take measures for personal and mutual protection, accept assignments in civil protection units, respond to the mobilization of these units, heed the call of competent emergency staff to participate in protection and rescue actions, and promptly inform the operational centre 112 about the onset of

danger. They are also required to implement prescribed and ordered protection and rescue measures [37].

High schools in Serbia are part of the entities within the disaster risk reduction and emergency management system, alongside state administration bodies, autonomous provinces, local self-government units, etc. (Official Gazette of RS, 87/2018, Article 13). Educational institutions are legally obligated to conduct a risk assessment of disasters and develop a protection and rescue plan for all facilities where education takes place (Official Gazette of RS, 87/2018, Article 15). According to the Law on Fire Protection (Official Gazette of RS, No. 111/2009, Article 42), institutions of importance for education, such as primary and high schools, are required to install fire detection and reporting devices, as well as possess fire extinguishing equipment. In cases where a school is located near the chemical industry, which, according to the Accident Protection Plan, may be directly or indirectly threatened by hazardous materials' consequences, the school must establish cooperation with the Operator responsible for providing all relevant information about safety measures and procedures in case of a chemical accident (Article 60b, Official Gazette of RS, No. 36/2009).

Based on the Law on Disaster Risk Reduction and Emergency Management (Official Gazette of RS, 87/2018), schools (primary and secondary) play a significant and crucial role in the process of disaster risk reduction in Serbia. Considering that the implementation of educational and other measures (social, economic, cultural, etc.) is necessary for establishing and conducting policies to prevent new and reduce existing disaster risks, a clear conclusion can be drawn about the unquestionably important role of schools in such a process. One drawback is related to the fact that the Law on Disaster Risk Reduction (Official Gazette of RS, 87/2018) extensively regulates the obligations of higher education institutions, while schools are mentioned only in the segment related to citizen education. It is stipulated that higher education institutions and other organizations involved in scientific research engage in protection and rescue tasks and disaster risk reduction through participation in staff, expert-operational teams, and operational staff (Official Gazette of RS, 87/2018, Article 35).

Additionally, it is envisaged that higher education institutions and other organizations involved in scientific research inform the Ministry about scientific findings relevant to disaster risk reduction and protection and rescue. On the other hand, when it comes to citizens (Official Gazette of RS, 87/2018, Article 36), it is provided that citizens have the right to be informed about disaster risks, measures and activities undertaken to reduce them, threats, and possible consequences of disasters, as well as all necessary information relevant to protection and rescue. However, the practice is entirely different, considering that comprehensive and continuous citizen information mechanisms (the 112 system is still not implemented) do not exist. Additionally, there are no provided ways to inform citizens about measures taken or intended to be taken by competent state authorities to reduce or prevent certain disaster risks.

When constructing facilities for preschool institutions, schools, and faculties, measures to prevent the spread of fires must be foreseen (Regulation on technical norms for fire protection of residential and business buildings and public-purpose buildings, Official Gazette of RS, 2019). Preschool institution buildings can have up to one floor, and if the space for children in nurseries is placed on the floor of the building, additional fire safety and secure evacuation measures must be provided. Primary schools are built with a maximum of two floors, secondary schools with a maximum of three floors, and faculties with a height not exceeding 30 m. Classrooms, offices, and similar spaces where students of primary and secondary schools stay cannot be in underground levels. Schools and faculties with more than two floors, a side length greater than 35 m, must have at least two staircases mutually distant at least 25 m. Chemical and similar laboratories (one or more in a block) of faculties are separated as fire sectors.

Considering all mentioned factors, this paper aims to investigate the influence of various demographic and socio-economic factors, such as gender, age, parent's employment, academic achievement, living situation, parental education levels, engagement with social media, marital status, parenthood, and educational background, on students' and teachers' perspectives regarding school-based disaster risk reduction. Specifically, the paper aims to examine how these factors shape

awareness of different types of disasters, disaster education activities in schools, attitudes towards disaster risk reduction education, enhancement of disaster information accessibility, and implementation of disaster curriculum in schools, etc.

1.1. Literature Review on School-Based Disaster Risk Reduction and Safety

In the realm of disaster studies, there has been significant scrutiny devoted to exploring the perceptions held by both educators [6–11,38–40] and students [3,41–67] concerning the multifaceted dimensions of disaster risk reduction. This examination encompasses a broad spectrum of factors, ranging from understanding different types of disasters [23,68–70] to evaluate the efficacy of disaster education initiatives within school settings [71–73].

Furthermore, literature analysis reveals that numerous studies have investigated the effects of disaster risk reduction education programs on students' knowledge, attitudes, and behaviours concerning disaster preparedness and response [74–83]. These programs often include curriculum integration, training workshops, simulation exercises, and community engagement strategies [3,6,18,21,33,36,39,43,46,48,81,84–94]. Additionally, there are numerous studies assessing the safety and resilience of school infrastructure and facilities to mitigate risks and ensure the well-being of students and staff during disasters [7,20,72,87,88,91,95–101]. On the other hand, numerous studies examine collaboration among various stakeholders, including government agencies, educational institutions, civil society organizations, and local communities, to enhance disaster risk reduction efforts. These studies focus on multi-sectoral partnerships, coordination mechanisms, and participatory approaches aimed at enhancing resilience [43,44,48,49,51,82,94,102–104].

Diverse quantitative and qualitative research studies have exclusively focused on exploring knowledge related to natural disasters [72,84–86,90,101,105–116]. In numerous studies, various influences such as gender [77–83], age [6,16,18,19,21,34,38,39,44,49,53,55,59,66,67,74,80,94,96,106,117–120], marital status [88,121–123], education [88,118,123,124], academic achievement [22,123,125–127], prior experience [123,128], etc., have been examined on various aspects of students' and teachers' insights on school-based disaster risk reduction and safety.

Based on a case study spanning thirty countries and centred on the analysis of disaster risk reduction measures in schools, it's apparent that the evaluation of student learning receives minimal attention and development [94]. This underscores the necessity for the creation of more imaginative and innovative assessment methodologies within disaster risk reduction programs. Shaw et al. [102] discovered that education about natural disasters within Japanese families and local communities yields a more substantial influence compared to education provided in schools. Conversely, Adem [129] asserts that individuals who have undergone some form of natural disaster education in schools exhibit a deeper understanding, grounded in scientific facts. In contrast, knowledge obtained through family and media channels, lacking structure, tends to be haphazard and may propagate misconceptions and misinformation.

Research findings concerning youth and disasters in Serbia reveal that 40.2% of children report feeling safe, 37.8% are uncertain, and 21.8% express feeling unsafe within school premises in the event of disasters [130]. In Serbia, adolescents express their greatest fear of epidemics, with 67.5% citing it as their primary concern [56]. About 65.7% of students state that they were first educated about natural hazards in schools, while slightly more students (69.9%) mention being first educated within their families. The sources of information about disasters and their harmful consequences influence the perception of high school students [131]. Within various subjects and extracurricular activities, students have the opportunity to hear certain information about natural and anthropogenic hazards. Still, their knowledge is not assessed, and they do not practice preventive activities [132]. A handbook for children in grades 2 to 4, "Let's Get Ready with Herman," has been presented. In this handbook, accessible to children, the sea crab Herman describes various natural disasters that befell him and how he dealt with them. Teachers who attended workshops then used these handbooks in their activities with children (16 participating schools) (http://caritas.rs/caritas/?p=1902). When it comes to child safety, as one of the vulnerable categories, the family plays a crucial role. Parents are key factors in educating children about disasters [133]. Furthermore, research has indicated that education has

an impact on adequate responses to disasters because individuals with higher education levels have more knowledge about disasters and are more inclined to attend various training in this field [119]. Kovačević-Majkić et al. [1] conducted an analysis of risk education status in the Republic of Serbia. According to the authors, the current state of hazard education in Serbia remains incomplete, lacking a comprehensive approach to risk education. They note that while hazards are systematically addressed, the coverage of risks is sporadic and inadequately represented. Moreover, mitigating natural disaster risks involves both reducing vulnerability and enhancing population resilience, with proper risk education serving as a critical component in achieving these goals. Given that the public education system reaches the widest audience, it serves as an effective platform for disseminating essential knowledge on natural disasters, thereby enhancing community resilience [1].

2. Methods

A multistage random sampling method was employed for a study conducted in 2023 within secondary schools (general education, vocational, and professional schools) across the western Morava River basin in Serbia, encompassing 18 local municipalities. In the initial stage, utilizing random number generation, 10 local municipalities were selected for the research: Užice, Čajetina, Kruševac, Kraljevo, Vrnjačka Banja, Knić, Kosjerić, Arilje, Novi Pazar, and Gornji Milanovac. These municipalities were chosen to reflect the diverse demographic and social characteristics of the entire population in the Western Morava Basin of Serbia. In the second phase, 10 secondary schools (including general education, vocational, and professional schools) were selected for the study. In the third phase, specific classrooms were chosen, and face-to-face interviews were conducted with students (n = 650) and teachers (n = 200) in those schools. A series of 850 face-to-face interviews (650 with students and 200 with teachers) were conducted throughout 2023 in 10 out of the total 18 municipalities in the Western Morava Basin of the Republic of Serbia (Figure 1).
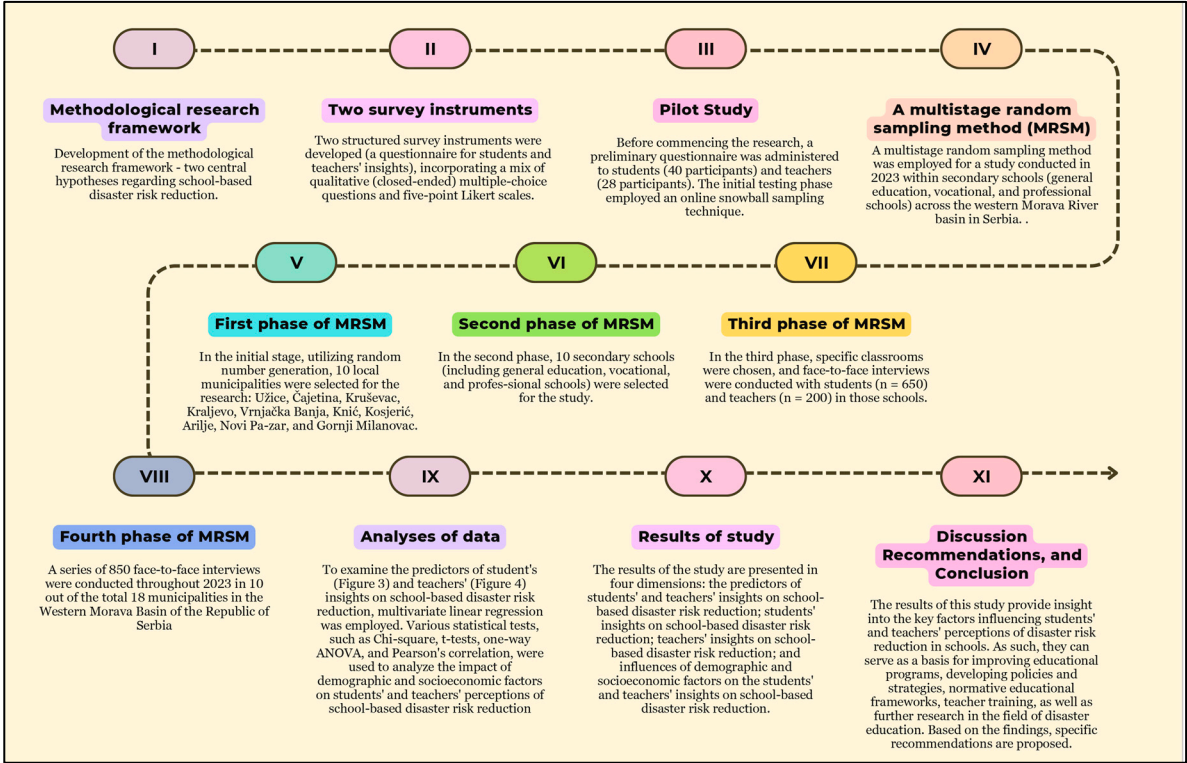

Figure 1. Designing research steps to explore students' and teachers' perspectives on school-based disaster risk reduction.

The hypothesis is proposed that demographic and socio-economic factors, including gender, age, parent's employment, academic achievement, living situation, paternal education level, maternal

education level, and engagement on social media, collectively exert a statistically significant influence on students' perceptions of school-based disaster risk reduction (H1-H8). It is also hypothesized that gender, age, marital status, parenthood, and educational background significantly shape teachers' attitudes towards school-based disaster risk reduction (H1-H5) (Figure 2).
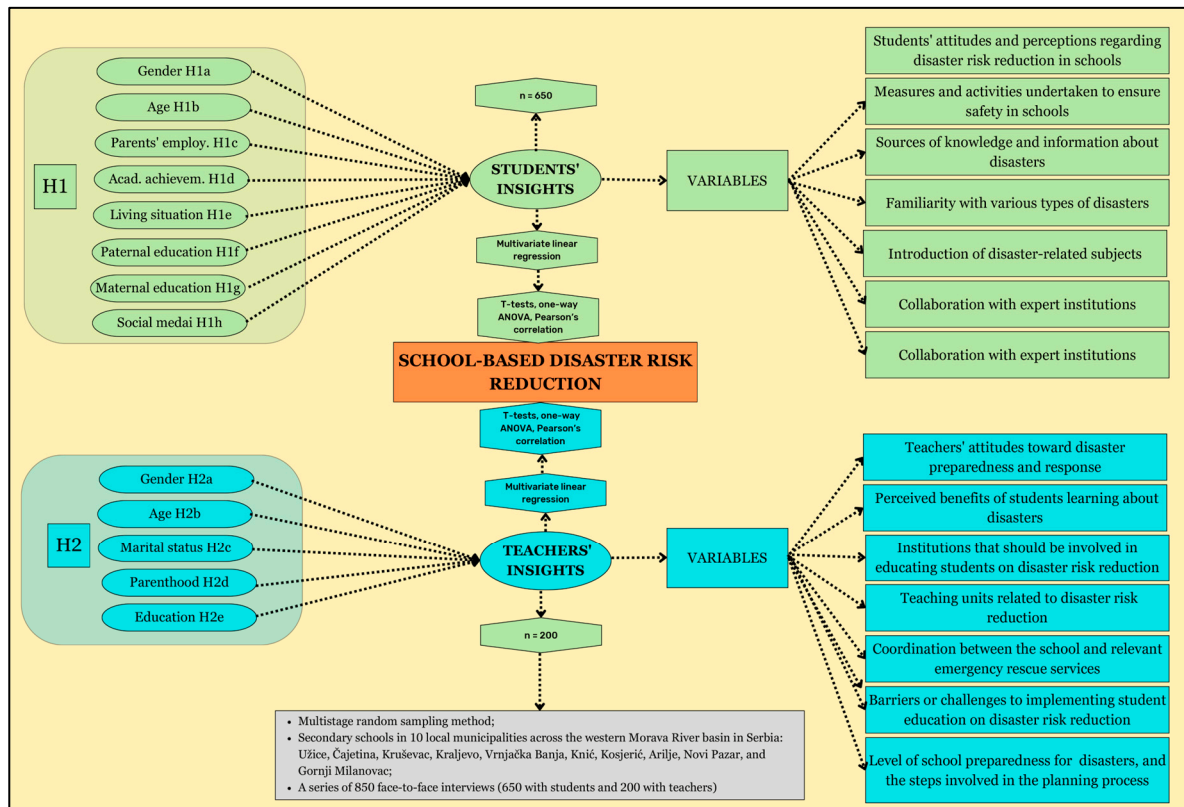

Figure 2. The research design for exploring students' and teachers' insights on school-based disaster risk reduction.

2.1. Study Area

Based on the results of the previous researchs [134,135], the territory of the Republic of Serbia is vulnerable to various natural hazards, and the degree of danger is different depending on the type of hazard, but it is sufficient to cause significant consequences, endanger people's health and lives, and cause damage of greater volume on material goods. Heaving in mind the natural characteristics of the territory of Serbia, the most important potential risks from natural hazards, caused by natural and anthropogenic factors, are determined as *lithospheric* (seismic, strong erosion, landslides, rockfalls), *atmospheric* (storm-hail, cumulative and intense precipitation, drought), *hydrospheric* (floods and flash floods) and *biospheric* (forest fires) hazards. Every natural disaster represents a potential danger to people (death, injury, illness, stress), material goods (property damage, economic losses) and the environment (losses to flora and fauna, pollution and degradation). Western Morava river basin covers around 15,850 km² and app. 910,500 inhabitants and this part of Serbia is seriously vulnerable by different natural hazards (seismic, landslides, rockfalls, strong erosion, floods and torrential floods, etc.). So, from the aspect of multi-hazards, the Western Morava river basin is at high risk (Figure 3).

The research area is vulnerable to various natural and man-made hazards [32,35,93,100,136–138], and the consequences of their occurrence have been recorded in previous research. The most important natural hazards threatening this area are seismic activity, landslides, rock falls, floods and torrential floods. The last strong earthquake in this area hit the town of Kraljevo and its surroundings. The Kraljevo earthquake occurred on November 3rd, with the epicenter several kilometers north of the city of Kraljevo, in Vitanovac. Approximately 70% of all structures in Vitanovac were damaged

and declared unsafe. Two people were killed in Grdica, and about 100 were injured [139]. There were more than 350 aftershocks, including an M = 4.3 event on November 4th. During the main shock, reported intensity in Kraljevo was VII, and it was IV in Belgrade [140].
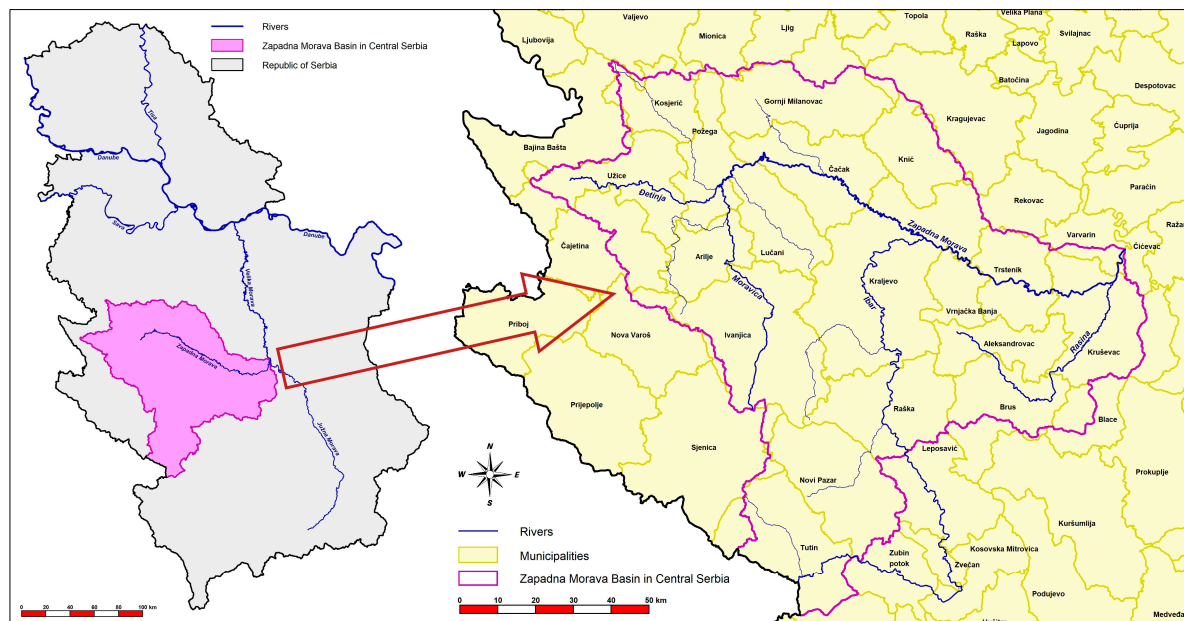

Figure 3. Study area: Location of Western Morava Basin, Serbia.

The greatest number of torrential flood events is recorded in the watersheds of tributaries of the Great Morava due to the highest area in the Republic of Serbia, especially in her tributaries, South and Western Morava. In the inventory of torrential floods that was made for the territory of Serbia [141] for the period 1915-2013. year, the highest number of torrential flood events was recorded in the Juzna Morava basin (195 events with 61 casualties) , followed by the Zapadna Morava (157 events with 11 casualties) and Velika Morava (127 events with 12 casualties).

According to data from Serbia's Emergency Situations Department, there was a significant 50% rise in the number of fires documented in 2017 compared to the previous year. The Directorate for Fire-Rescue Units records show that between 2012 and 2022, Serbia experienced 38,279 residential fires, resulting in 665 fatalities, 1747 injuries, and 2134 successful rescues. For comparative analysis within this period, annual fire occurrences and associated fatalities were as follows: 2012 (946/7), 2013 (836/6), 2014 (887/8), 2015 (827/5), 2016 (872/10), 2017 (899/18), 2018 (842/14), 2019 (796/10), 2020 (842/23), and 2021 (828/21). As outlined in the National Strategy for Protection and Rescue, Serbia encountered roughly 134,686 fires from 2003 to 2011. Notably, in 2020, residential fires claimed the lives of 51 individuals nationwide. The Ministry of Interior reported conducting over 4000 interventions, with more than 3000 specifically addressing fire incidents [100,136].

2.2. Socio-Economic and Demographic Characteristics of Respondents

2.2.1. Students in High Schools

Out of 650 respondents, the sample includes 37.8% male and 62.2% female participants. Regarding age, the largest number of participants is 18 years old (58.2%), followed by 17 years old (31.8%), while a certain number of participants are 16 (5.2%) and 15 years old (4.6%). The majority of participants have excellent academic performance (39.8%), followed by very good (38.8%) and good (20.3%). A higher number of participants in the sample indicated that they live in a community where both parents work (59.8%), while a certain number mentioned that only one parent is employed (30.3%) or both parents are unemployed (9.8%). A large number, of participants stated that they are users of social networks (98.3%), while only a few mentioned that they are not (1.7%). The research

results show that a larger number of participants have not experienced the consequences of family disasters (66%), while a certain number of participants live in families that have experienced the consequences of specific disasters (33.8%) (Table 1).

Table 1. Basic socio-economic and demographic information of students in high schools (n = 650).

Variable	Category	Frequency	%
Gender	*Male*	246	37.8
	Female	404	62.2
Age	15	30	4.6
	16	34	5.2
	17	207	31.8
	18	378	58.2
Achievement in School	Good	132	20.3
	Very Good	252	38.8
	Excellent	259	39.8
Parental Employment	Single Parent	197	30.3
	Both Parents Working	389	59.8
	Unemployed	64	9.8
Social Media Users	Yes	639	98.3
	No	11	1.7
Experienced Consequences of Family Disasters	Yes	220	33.8
	No	429	66

2.2.2. Teachers in High Schools

When it comes to teachers, out of a total of 200, the sample includes 75.5% female respondents and 24.5% male respondents. Regarding years of teaching experience, the majority of respondents reported having 16-25 years of experience (32.5%), followed by the highest number of teachers in the category of 26-35 years of work experience (22.7%). After that, there are teachers with 8-15 years of experience (18.5%), teachers with 3-7 years of experience (11%), and 9% of teachers with 36 or more years of experience, while the least number of teachers have been employed in the school for less than two years (5.5%). Concerning marital status, the majority of respondents stated that they are married (69%), and the least number of respondents mentioned being divorced (3.5%). In the category of unmarried individuals, there are 23.5%, while widows/widowers make up 4%. In response to the question, "Do you have children?" a higher number of respondents answered in the affirmative (66.5%), while the number of respondents without children was lower (33.5%). The largest number of respondents in the sample have completed a university degree (65.5%), while the least number of respondents have completed vocational education (10.5%). Additionally, a certain number of respondents mentioned having completed master's studies (24%) (Table 2).

Table 2. Basic socio-economic and demographic information for teachers in high schools (n = 200).

Variables	Category	N	%
Gender	Male	79	39.5
	Female	121	60.5
Years of work experience	0-2	11	5.5
	3-7	22	11
	8-15	37	18.5
	16-25	65	32.5
	26-35	45	22.5
	36 and over	18	9
Marital status	Single	132	20.3
	Married	252	38.8

	Divorced	259	39.8
	Widowed	8	4
Education level	High school	21	10.5
	Bachelor's degree	131	65.5
	Master's degree	48	24
Parenthood	Yes	133	66.5
	No	67	33.5

2.3. Questionnaire Design on School-Based Disaster Risk Reduction and Safety

Two structured survey instruments were developed (a questionnaire for students and teachers' insights on school-based disaster risk reduction - Appendix A), incorporating a mix of qualitative (closed-ended) multiple-choice questions and five-point Likert scales, as suggested by various studies [18,92,95,104,142,143]. The survey instrument was administered directly to the participants in their native Serbian language through face-to-face interactions in schools. The questions were presented in a consistent format during the administration process.

The first segment of both mentioned questionnaires addressed the demographic and socioeconomic profiles of the respondents (students and teachers). It encompassed factors such as gender, age, parents' employment, academic success, living arrangement, father's education, mother's education, use of social media, marital status, parenthood, and other relevant variables.

Subsequent sections in this questionnaire, titled Students' insights on school-based disaster risk reduction, comprise a set of questions that explore students' attitudes and perceptions regarding disaster risk reduction in schools, the measures and activities undertaken to ensure safety in the event of a disaster, primary sources of knowledge and information about disasters, familiarity with various types of disasters, support for the introduction of disaster-related subjects, collaboration with expert institutions, and statements regarding key variables in disaster education.

On the other hand, subsequent sections in this questionnaire, titled 'Teachers' Insights on School-Based Disaster Risk Reduction,' encompass a series of inquiries delving into teachers' attitudes toward disaster preparedness and response, the perceived benefits of students learning about disasters, the institutions that should be involved in educating students on disaster risk reduction, whether teaching units related to disaster risk reduction are included in the school curriculum, the coordination between the school and relevant emergency rescue services, barriers or challenges to implementing student education on disaster risk reduction, the level of preparedness of your school for natural disasters, and the steps involved in the planning process.

Before commencing the research, a preliminary questionnaire was administered to students (40 participants) and teachers (28 participants). The initial testing phase employed an online snowball sampling technique. It is paramount to underscore that our research strictly followed the guidelines outlined in the Helsinki Declaration, which offers ethical principles for research involving human subjects in the social and medical fields. Furthermore, all participants granted informed consent before their involvement in the study, thereby acknowledging and agreeing to the terms of participation. The research protocol received approval from the Scientific-Professional Society for Disaster Risk Management, following a thorough review by the Scientific Research Group, with ID - 04012024.

2.4. Analyses of School-Based Disaster Risk Reduction and Safety

To examine the predictors of student's (gender, age, parent's employment, academic success, living arrangement, father's education, mother's education, and use of social media) and teachers' (gender, age, marital status, parenthood, and education) insights on school-based disaster risk reduction, multivariate linear regression was employed. For the purpose of examining the influences of demographic and socioeconomic factors on students' and teachers' insights on school-based disaster risk reduction, various appropriate statistical tests were employed, such as Chi-square, t-tests, one-way ANOVA, and Pearson's correlation. Since the initial homogeneity test for variance revealed a departure from the assumption of homogenous variance, alternative tests that are resilient

to this violation, namely Welsh and Brown–Forsythe tests, were taken into account for analysis. Additionally, it's important to highlight that all tests were approached with a two-tailed perspective, meaning we considered both directions of the effect, with a significance level set at p < 0.05. The statistical analysis was executed using SPSS software (IBM SPSS Statistics, Version 26, New York, NY, USA), a commonly employed tool for such analyses in research settings.

In addition to the aforementioned analyses, the internal consistency of Likert scales was assessed for various subscales related to disaster risk reduction. The internal consistency of Likert scales for the awareness of different types of disasters subscale (7 variables) is good, with a Cronbach's alpha of 0.85, attitudes on disaster risk reduction education subscale (5 variables) of 0.79, enhancing disaster information accessibility subscale (5 variables) of 0.86, disaster education activities in school (5 variables) of 0.82, teacher preparedness for disaster response (5 variables) of 0.87, school disaster preparedness assessment (12 variables) of 0.86. These findings suggest reliable measurement across the various dimensions of disaster risk reduction education considered in the study. Previous research findings illustrated in the residual diagram [144] indicated that assumptions regarding normality, linearity, multicollinearity (correlation coefficient $r = 0.76$), and homogeneity of variances (assessed through NPSP and scatterplot) were upheld and not found to be violated.

3. Results

The results of the study are presented in four dimensions: the predictors of students' and teachers' insights on school-based disaster risk reduction; students' insights on school-based disaster risk reduction; teachers' insights on school-based disaster risk reduction; and influences of demographic and socioeconomic factors on the students' and teachers' insights on school-based disaster risk reduction.

3.1. The Predictors of Students' and Teachers' Insights on School-Based Disaster Risk Reduction and Safety

The paper revolves around two central hypotheses related to school-based disaster risk reduction:

a) Firstly, our hypothetical framework proposes that gender (H1), age (H2), parents' employment (H3), academic achievement (H4), living situation (H5), paternal education level (H6), maternal education level (H7), and engagement with social media (H8) collectively exert a statistically significant influence on students' perspectives concerning school-based disaster risk reduction.

b) Secondly, our framework suggests that gender (H1), age (H2), marital status (H3), parenthood (H4), and educational background (H5) significantly shape teachers' viewpoints on school-based disaster risk reduction.

These hypotheses serve as the foundational pillars upon which our research is constructed, aiming to elucidate the multifaceted dynamics influencing both students' and teachers' insights regarding disaster risk reduction within the school environment.

Multivariate regression analysis was employed to assess the relationship between eight demographic and socio-economic variables (gender, age, parent's employment, academic achievement, living situation, paternal education level, maternal education level, and engagement with social media) and five dimensions of students' insights on school-based disaster risk reduction, namely awareness of different types of disasters, disaster education activities in school, attitudes on disaster risk reduction education, enhancing disaster information accessibility, and implementation of disaster curriculum in schools.

The analysis conducted affirmed the validity of assumptions concerning normal distribution, linearity, multicollinearity, and variance homogeneity, all of which are pivotal in this form of analysis, as depicted in Tables 3 and 4. This comprehensive validation enhances the reliability of the study's findings and strengthens the credibility of the statistical analysis conducted.

3.1. The Predictors of Students' Insights on School-Based Disaster Risk Reduction and Safety

The results of the multivariate regression analyses regarding the awareness of different types of disasters subscale reveal that the primary predictor of significance was success in school ($\beta = 0.113$), explaining 1.3% of the variance in awareness of different types of disasters. This is followed by gender ($\beta = -0.088$, 0.8%). The remaining predictors did not exhibit significant associations with awareness of different types of disasters. This model ($R^2 = 0.031$, Adj. $R^2 = 0.021$, $F = 2.94$, $t = 13.70$, $p < 0.01$) with the inclusion of all specified independent variables, the model elucidates the 2.1% variance of awareness of different types of disasters (Table 3 and Figure 4).

Table 3. Results of a multivariate regression analysis concerning students' insights on school-based disaster risk reduction (awareness of disasters, perception of disaster education activities, attitudes on disaster risk reduction and disaster information sources) (n = 650).

Predictor Variable	Awareness of different types of disasters			Disaster education activities in school			Attitudes on disaster risk reduction education			Enhancing disaster information accessibility			Launching disaster curriculum in schools		
	B	SE	β	B	SE	β	B	SE	β	B	SE	β	B	SE	β
Gender	−0.123	0.058	−0.088*	−0.130	0.087	−0.062	−0.109	0.077	−0.061	0.022	0.085	0.011	−0.052	0.113	−0.019
Age	−0.105	0.129	−0.033	0.843	0.192	0.174**	0.945	0.192	0.191**	0.947	0.189	0.199**	1.539	0.251	0.238**
Parents employment	−0.060	0.091	−0.026	0.213	0.136	0.062	0.111	0.136	0.052	−0.082	0.133	−0.024	0.216	0.177	0.047
Success in school	0.156	0.057	0.113*	−0.074	0.085	−0.036	−0.075	0.085	−0.036	−0.002	0.084	−0.001	−0.402	0.111	−0.145**
Living arrangement	0.135	0.081	0.067	−0.191	0.121	−0.063	−0.171	0.111	−0.053	0.068	0.119	0.023	−0.068	0.158	−0.017
Father's education	0.023	0.055	0.016	−0.070	0.082	−0.033	−0.038	0.091	−0.017	−0.182	0.081	−0.088	−0.246	0.108	−0.087
Mother's education	−0.210	0.209	−0.040	−0.336	0.311	−0.043	−0.057	0.089	−0.027	−0.572	0.306	−0.074*	−0.150	0.406	−0.014*
Use of social media	−0.123	0.058	−0.088	−0.130	0.087	−0.062	−0.329	0.312	−0.042	0.022	0.085	0.011	−0.052	0.113	−0.019
$R^2 (R^2_{adj})$	0.031 (0.021)			0.051 (0.040)			0.052 (0.037)			0.058 (0.047)			0.093 (0.083)		

* $p \leq 0.05$; ** $p \leq 0.01$; *B*: unstandardized (*B*) coefficients; *SE*: std. error; *β*: standardized (*β*) coefficients. Note: men, excellent school performance, living with mother, father's primary education, mother's primary education, social media user, employed parents have been coded as 1; 0 has been assigned otherwise.

Further, the results of the multivariate regression analyses regarding the disaster education activities in the school subscale reveal that the primary predictor of significance was age ($\beta = 0.174$), explaining 2.9% of the variance in disaster education activities in school. The remaining predictors did not exhibit significant associations with disaster education activities in school. This model ($R^2 = 0.051$, Adj. $R^2 = 0.040$, $F = 4.84$, $t = 11.26$, $p < 0.01$) with the inclusion of all specified independent variables, the model elucidates the 4% variance of disaster education activities in school (Table 3).

In subsequent analyses regarding attitudes toward disaster risk reduction education, it was found that the most prominent predictor was age ($\beta = 0.191$), explaining 3.5% of the variance in disaster risk reduction education. The remaining predictors did not exhibit significant associations with Attitudes toward disaster risk reduction education. This model ($R^2 = 0.052$, Adj. $R^2 = 0.037$, $F = 3.54$, $t = 12.26$, $p < 0.01$) with the inclusion of all specified independent variables, the model elucidates the 3.54% variance of attitudes on disaster risk reduction education (Table 3).

In further analyses concerning the enhancement of disaster information accessibility, it was determined that the most prominent predictor was age ($\beta = 0.199$), explaining 3.8% of the variance in disaster information accessibility. This is followed by the mother's education ($\beta = -0.074$, 0.75%). This model ($R^2 = 0.058$, Adj. $R^2 = 0.047$, $F = 5.56$, $t = 12.93$, $p < 0.01$) with the inclusion of all specified independent variables, the model elucidates the 4.7% variance of attitudes on disaster information accessibility (Table 3).
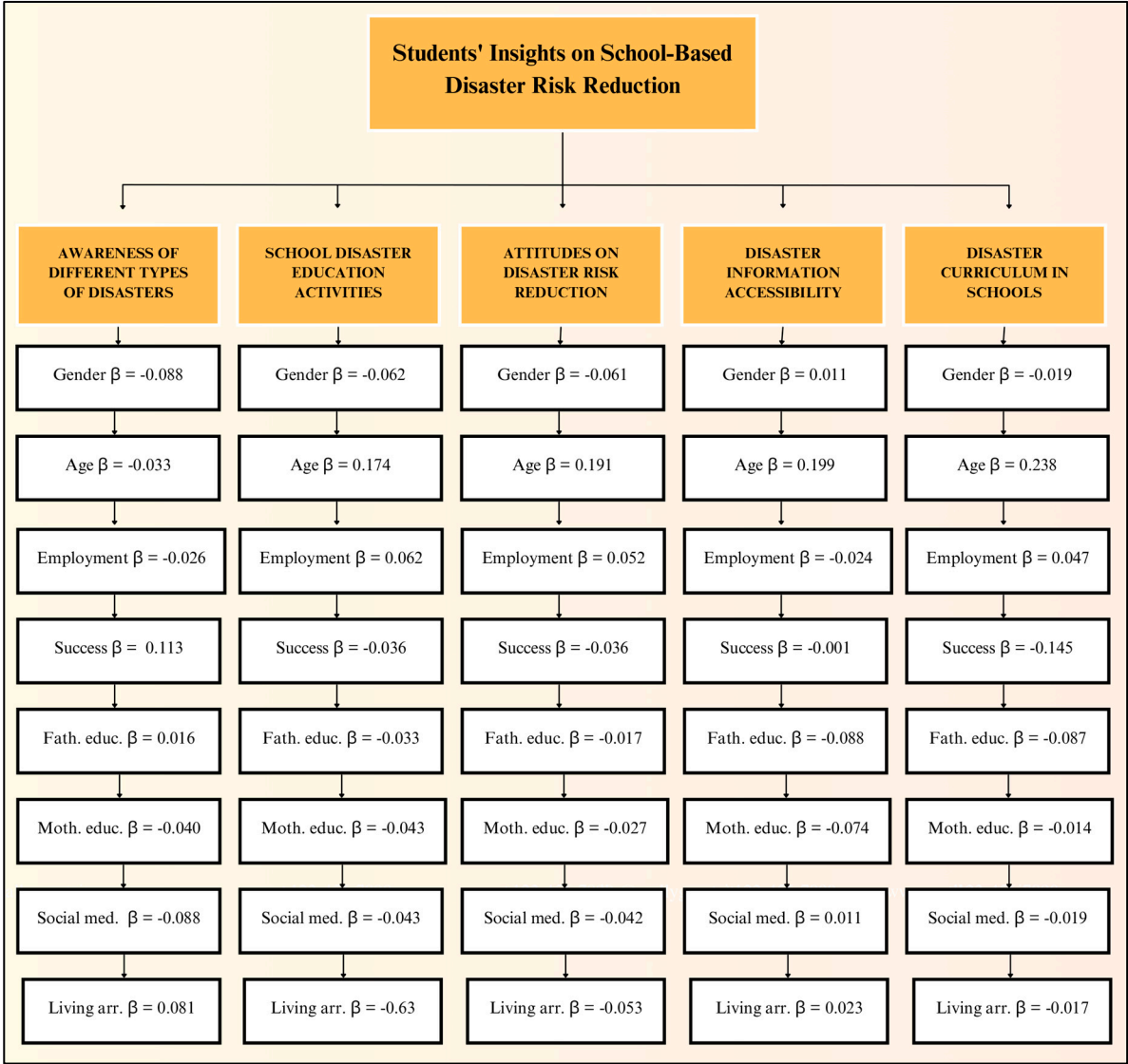
Figure 4. The predictors of the of students' insights on school-based disaster risk reduction.

Finally, the results of the multivariate regression analyses regarding the launching disaster curriculum in schools reveal that the primary predictor of significance was age (β = 0.238), explaining 5.33% of the variance in the launching disaster curriculum in schools. This is followed by success in school (β = −0.145, 1.84%) and mother's education (β = −0.014, 0.6%). This model (R^2 = 0.093, Adj. R^2 = 0.083, F = 9.32, t = 7.16, p < 0.01) with the inclusion of all specified independent variables, the model elucidates the 8.3% variance in the launching disaster curriculum in schools (Table 3).

3.2. The Predictors of Teaches' Insights on School-Based Disaster Risk Reduction and Safety

The results of the multivariate regression analyses regarding the school facility resilience to disasters reveal that the primary predictor of significance was success in school education (β = 0.224), explaining 4.66% of the variance in school facility resilience. This is followed by gender (β = −0.139, 1.71%). The remaining predictors did not exhibit significant associations with school facility resilience. This model (R^2 = 0.076, Adj. R^2 = 0.052, F = 3.17, t = 16.74, p < 0.01) with the inclusion of all specified independent variables, the model elucidates the 5.2% variance of attitudes related to school facility resilience (Table 4 and Figure 5).

Table 4. Results of a multivariate regression analysis concerning teachers' insights on school-based disaster risk reduction (school facility resilience to disasters, teacher preparedness for emergency response, involvement of students in disaster preparedness, and school disaster preparedness assessment) (n = 200).

Predictor Variable	School facility resilience to disasters			Teacher preparedness for disaster response			Involvement of students in disaster preparedness			School disaster preparedness assessment			Disaster education course in schools		
	B	SE	β	B	SE	β	B	SE	β	B	SE	β	B	SE	β
Gender	−0.354	0.186	−0.139**	−0.407	0.192	−0.152*	−0.029	0.165	−0.013	−0.463	0.170	−0.196*	−0.867	0.244	−0.256*
Age	0.413	0.351	0.086	0.568	0.361	0.112	0.530	0.311	0.123	0.266	0.321	0.060	0.432	0.459	0.067
Marital	−0.269	0.272	−0.104	−0.390	0.280	−0.143	−0.760	0.241	−0.329**	−0.488	0.248	−0.203*	0.326	0.356	0.095
Parenthood	−0.054	0.240	−0.023	0.361	0.247	0.148	−0.058	0.212	−0.028	−0.054	0.219	−0.025	0.291	0.314	0.094
Education	0.800	0.256	0.224*	0.538	0.263	0.143*	0.000	0.227	0.001	0.621	0.234	0.187*	1.159	0.335	0.244*
R^2 (R^2_{adj})	0.076 (0.052)			0.117 (0.094)			0.091(0.068)			0.104 (0.081)			0.107 (0.084)		

* $p \leq 0.05$; ** $p \leq 0.01$; *B*: unstandardized (*B*) coefficients; *SE*: std. error; *β*: standardized (*β*) coefficients. Note: men, with up to 2 years of work experience, married, parents, with completed college education have been coded as 1; 0 has been assigned otherwise.

In further analyses concerning teacher preparedness for disaster response, it was determined that the most prominent predictor was gender (*β* = 0.152), explaining 2.1% of the variance in teacher preparedness for disaster response. This is followed by teacher education (*β* = 0.143, 1.90%). The remaining predictors did not exhibit significant associations with teacher preparedness for disaster response. This model (R^2 = 0.0117, Adj. R^2 = 0.094, *F* = 3.17, *t* = 16.75, *p* < 0.01) with the inclusion of all specified independent variables, the model elucidates the 9.4% variance of teacher preparedness for disaster response (Table 4).
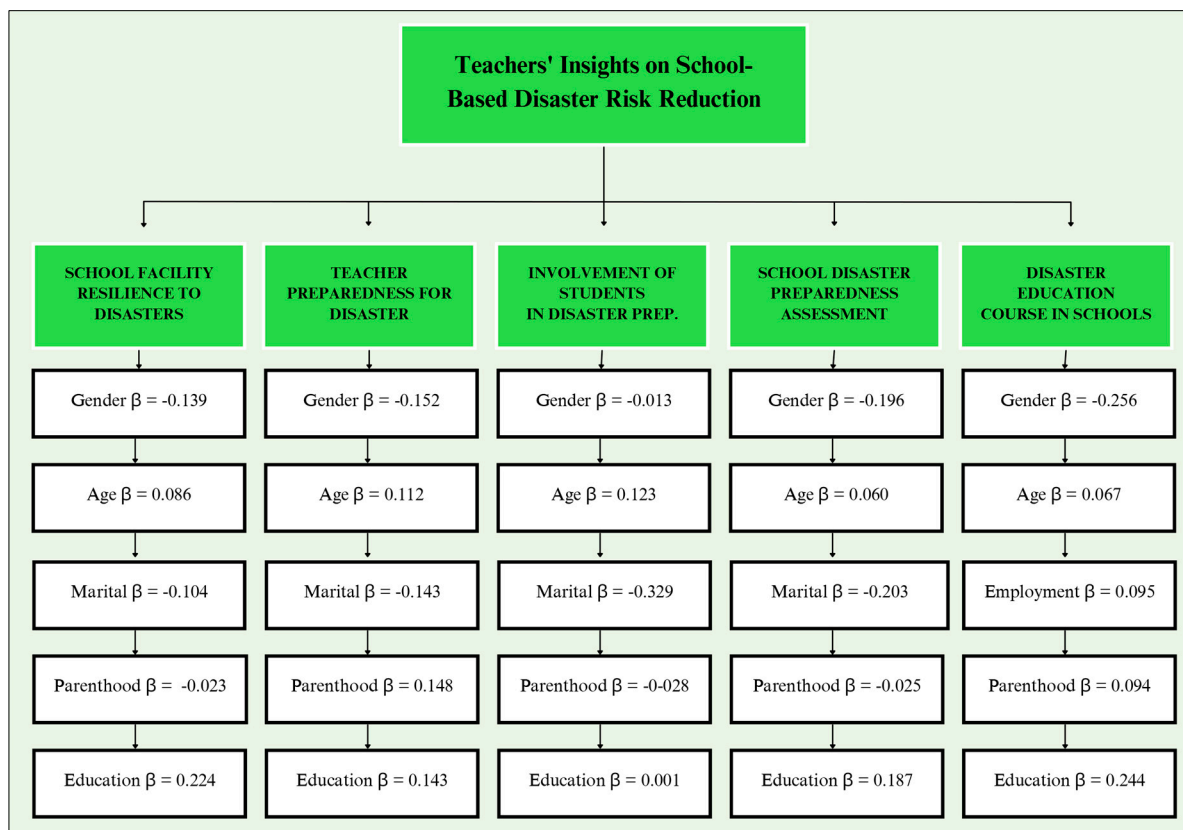

Figure 5. The predictors of the of teachers' insights on school-based disaster risk reduction.

In subsequent analyses regarding the involvement of students in disaster preparedness, it was determined that the most prominent predictor was marital (β = –0.329), explaining 4.7% of the variance in the involvement of students in disaster preparedness. The remaining predictors did not exhibit significant associations with the involvement of students in disaster preparedness. This model (R^2 = 0.091, Adj. R^2 = 0.068, F = 5.14, t = 15.46, p < 0.01) with the inclusion of all specified independent variables, the model elucidates the 6.8% variance of involvement of students in disaster preparedness (Table 4).

Then, the results of the multivariate regression analyses regarding school disaster preparedness assessment reveal that the primary predictor of significance was marital (β = 0.203), explaining 3.42% of the variance in school disaster preparedness assessment. This is followed by the gender of teachers (β = 0.196, 2.93%) and teachers' education (β = 0.187, 2.89%). The remaining predictors did not exhibit significant associations with school disaster preparedness assessment. This model (R^2 = 0.0104, Adj. R^2 = 0.081, F = 4.52, t = 20.96, p < 0.01) with the inclusion of all specified independent variables, the model elucidates the 8.1% variance of involvement of students in disaster preparedness (Table 4).

Finally, further analyses related to the disaster education course in schools, it was determined that the most prominent predictor was gender (β = –0.256), explaining 14.89% of the variance in disaster education courses in schools. This is followed by teachers' education (β = 0.244, 5.52%). The remaining predictors did not exhibit significant associations with disaster education courses in schools. This model (R^2 = 0.0107, Adj. R^2 = 0.084, F = 4.66, t = 10.94, p < 0.01) with the inclusion of all specified independent variables, the model elucidates the 8.4% variance of disaster education courses in schools (Table 4).

3.2. Students' Insights on School-Based Disaster Risk Reduction and Safety

Considering the subject of the research, respondents were asked how they acquired knowledge and information about different disasters. According to the obtained results, it was found that the majority of respondents acquire knowledge by searching the internet (54.2%), while the least common method is through social and video games (6.5%). Some respondents mentioned that they gain knowledge about disasters primarily through conversations with their families (13.5%), as well as through mass media (18.6%).

In response to the question, "Does your school collaborate with professional institutions to better acquaint students with disasters?" 38.2% of respondents provided a positive answer, while a larger number emphasized that such collaboration does not exist (61.4%). When asked, "Does your school involve parents to collaborate more effectively in acquainting students with disasters?" 27.7% of respondents answered yes, while 72% stated that such collaboration does not exist.

In the further course of the research, the focus was on exploring students' awareness of specific disasters. The majority of respondents are most familiar with epidemics (M = 3.5), followed by floods (M = 3.0), earthquakes (M = 2.9), fires (M = 2.8), landslides (M = 2.3), while explosions (M = 2.2) and accidents (M = 2.0) are the least known (Figure 6).

Regarding students' attitudes towards the introduction of disaster-related subjects into the curriculum, 57.4% believe it is unnecessary, while 42.6% of respondents support the inclusion of such subjects. When asked, "Does your school collaborate with non-governmental organizations and civil society to better inform students about disasters and the correct way to react?" more than half (75.5%) answered negatively, while 24.5% gave a positive response. Similarly, when asked, "Does your school collaborate with the local government's civil protection department to better inform students about disasters and the correct way to react?" more than half responded negatively (69.4%), while 30.6% indicated such collaboration exists.
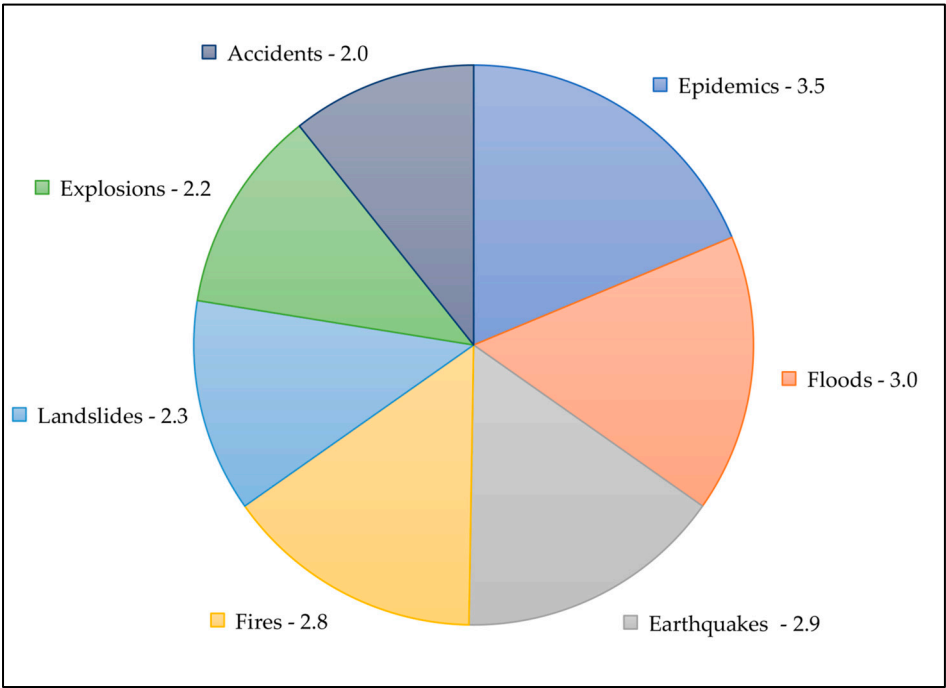
Figure 6. Students' awareness of specific disasters.

The research results indicate that respondents mostly agree that visual representation of real-life situations contributes to a better understanding of how to behave during disasters (M = 3.8). Following this assertion, the majority of respondents (M = 3.5) agree that training sessions on evacuation procedures through simulations significantly enhance knowledge about disasters (Figure 7).
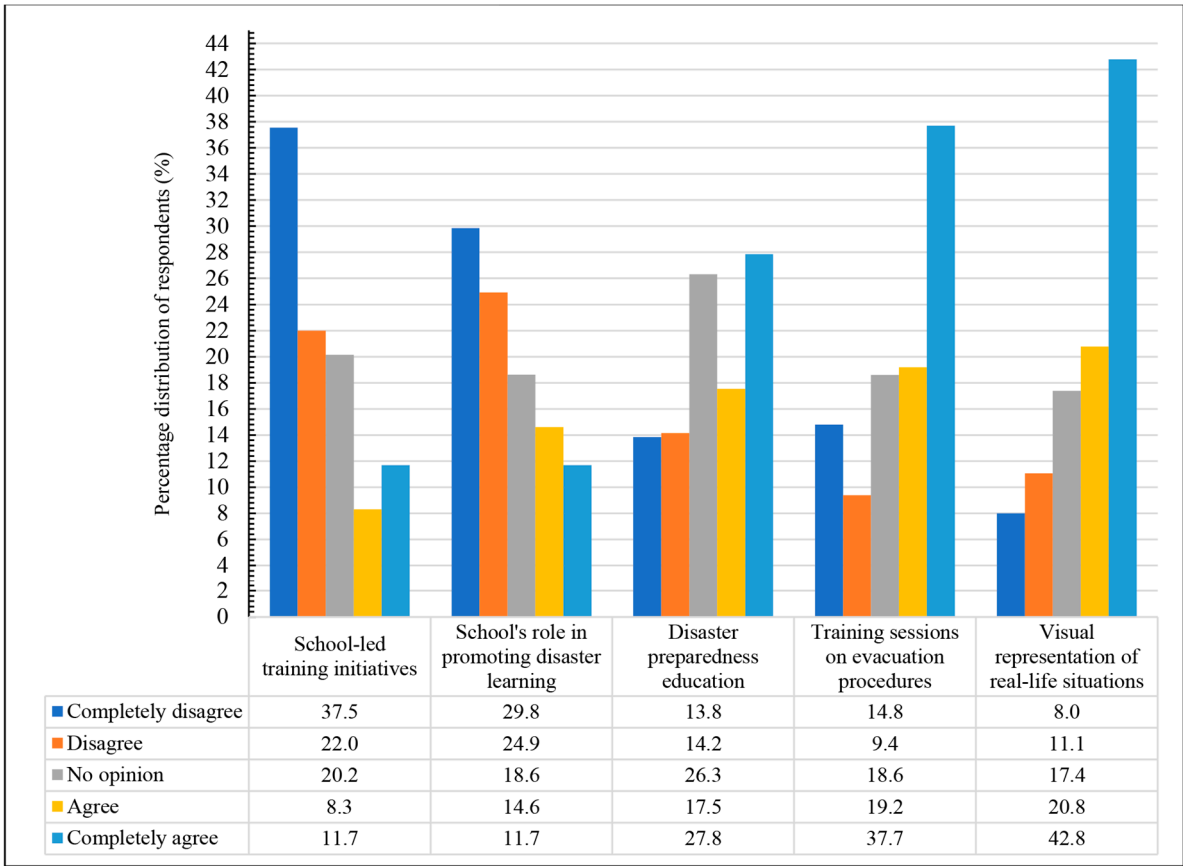

	School-led training initiatives	School's role in promoting disaster learning	Disaster preparedness education	Training sessions on evacuation procedures	Visual representation of real-life situations
■ Completely disagree	37.5	29.8	13.8	14.8	8.0
■ Disagree	22.0	24.9	14.2	9.4	11.1
■ No opinion	20.2	18.6	26.3	18.6	17.4
■ Agree	8.3	14.6	17.5	19.2	20.8
■ Completely agree	11.7	11.7	27.8	37.7	42.8

Figure 7. Assessment of students' perceptions on school-led training initiatives and disaster education efforts.

Many respondents (M = 3.3) also agree that disaster preparedness education enables them to gain new insights into occurrences, consequences, and potential disasters in their environment. The smallest number of respondents agree with the statement that their school provides them with knowledge and necessary information about disasters and the correct way to react in such situations (M = 2.5), as well as with the idea that the school consistently conducts specific training for proper reactions in emergencies (M = 2.3) (Figure 8).

Regarding learning about disasters through the content of other subjects, more than half of the respondents (53.7%) stated that such a system does not exist in their school, while a certain number of respondents (46.3%) confirmed that they acquired certain knowledge about disasters within the framework of other subjects (Table 5).

Table 5. Overview of students' attitudes towards key variables in disaster education.

Variable	Category	N (%)
Collaboration between schools and professional institutions is important	Yes	248 (38.2)
	No	399 (61.4)
Involving parents in the process of informing students about disasters	Yes	180 (27.7)
	No	468 (72)
Learning about disasters studied through the content of other subjects	Yes	301 (46.3)
	No	349 (53.7)
Introducing subjects in the field of disasters	Yes	277 (42.6)
	No	373 (57.4)
Collaboration between our school and NGO organizations	Yes	159 (24.5)
	No	491 (75.5)
Collaboration between our school and civil protection departments	Yes	199 (30.6)
	No	451 (69.4)

3.2. Teachers' Insights on School-Based Disaster Risk Reduction and Safety

In further research, teachers were asked to evaluate attitudes related to knowledge about the concept of disasters, preparedness for response, knowledge of preventive actions, response procedures during disasters, and familiarity with the field of disaster risk management.

The results show that the majority of teachers agree that their knowledge about the concept, occurrence, and consequences of disasters is high (M = 3.46). Additionally, a large number of teachers stated that they have a high level of knowledge about security procedures in the event of a disaster (M = 3.37). After these, to some extent, they agree that they know about preparedness for an adequate response during disasters (M = 3.36). A smaller number of teachers agreed that they are very familiar with preventive actions preventing disasters (3.32). The lowest-rated attitude is that they have a high level of knowledge about the field of disaster risk management (M = 3.24).

Considering the subject of the research, teachers were asked to assess specific attitudes (Table 4). The highest number of teachers agreed with the statement that involving students in disaster preparedness strengthens preparedness plans (M = 4.30). Additionally, a large number of teachers agreed that students should be involved in disaster simulations (M = 4.29), as well as that involving students in disaster preparedness can be beneficial for them (M = 4.27) (Table 6).

Table 6. Attitudes and practices towards student involvement in disaster preparedness activities.

Attitudes	M	SD
Involving students in disaster preparedness can be beneficial for them	4.30	0.98
Students should be included in disaster simulations and exercises	4.29	0.97
Involving students in disaster preparedness can be beneficial for them	4.27	0.98

Teachers want to prepare for the correct response in emergencies	4.25	4.17
Educate and train teachers to respond in emergencies	4.22	1.00
The safety level of students in schools is satisfactory	4.02	1.02
Students should be involved in the process of creating household disaster plans	4.01	1.04
I am sure that I want to involve students in the process of disaster preparedness	4.01	1.07
Motivate teachers to conduct evacuation exercises from classrooms	3.94	1.21
Students should be involved in the development of plans in schools	3.93	1.01
Teachers are familiar with the correct way to respond	3.63	1.15
The school facility is resistant to disasters	3.60	1.09
Students have a significant role in the disaster preparedness process	3.44	1.11
My school has the capacity or financial means to develop a Risk Assessment and Plan	3.41	1.14
Introduce the subject of Security Culture into the curriculum.	3.35	1.46

Techers largely wish to be prepared for the correct response in disasters (M = 4.25) and agree that the education and training of teachers for responding in disasters are significant (M = 4.22). The results show that teachers mostly agree with the statement that the safety level of students in schools is satisfactory (M = 4.02), but they also agree that students should be involved in the process of creating household disaster plans (M = 4.01) (Table 6).

A significant number of teachers agree that they are sure they want to involve students in disaster preparedness (M = 4.01) and that it is very important to motivate teachers to conduct evacuation exercises (M = 3.94). After this, teachers most agree with the statement that students should be involved in the process of developing plans in schools (M = 3.93). Techers, to some extent, indicated that they are familiar with the correct way to respond in emergencies (M = 3.63) and that their school facility is resistant to disasters (M = 3.60) (Table 6).

After that, teachers rated the attitude that students play a significant role in the disaster preparedness process (M = 3.44). To a lesser extent, teachers rated the attitude that their school has the capacities and financial resources to develop a Disaster Risk Assessment and Protection Plan in disasters (M = 3.41). Techers agreed with the importance of introducing the subject of Security Culture into the curriculum (M = 3.35), but in contrast, they poorly rated the attitude that they are familiar with legal obligations regarding disaster risk reduction in schools (M = 3.34). Also, a very small number of teachers think that involving students in disaster preparedness will expose them to a high risk (M = 2.71) (Table 6).
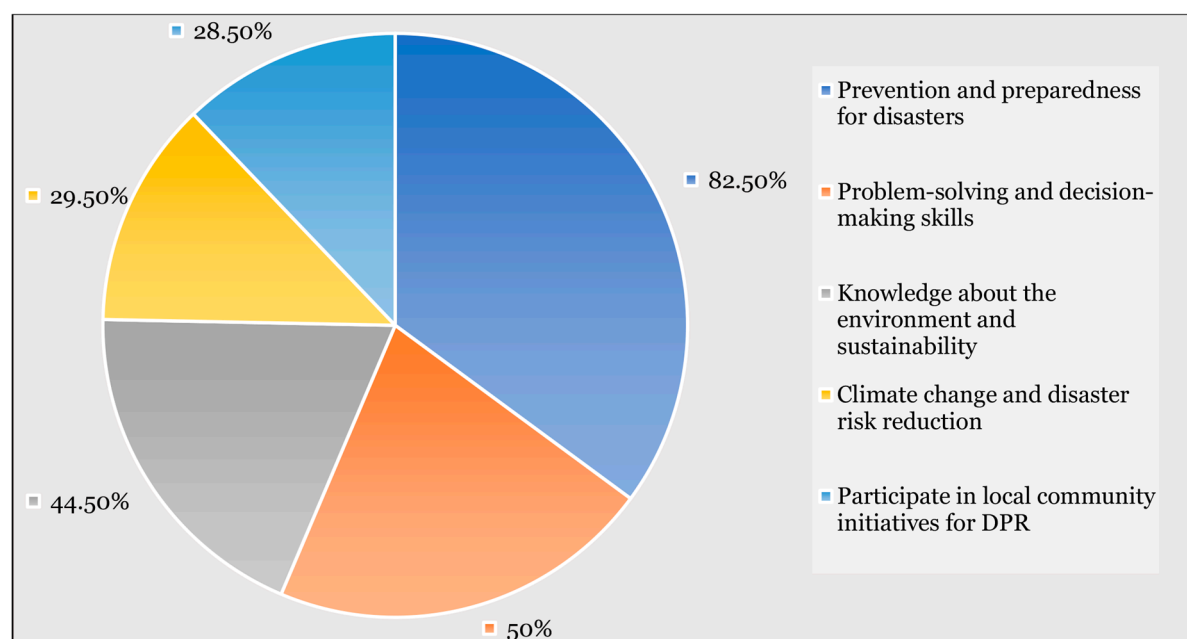

Figure 8. Implemented certain teaching units related to disaster risk reduction in schools.

The research showed that the majority of teachers think it would be very useful for students to gain knowledge about prevention and preparedness for disasters (82.5%), followed by problem-solving and decision-making skills in disaster (50%), knowledge about the environment and sustainability (44.5%), climate change (29.5%), and finally, ways to participate in local community initiatives for disaster preparedness and response (28.5%) (Figure 8).

Regarding which institutions should be involved in educating students about disaster risk reduction, the majority of teachers mentioned competent disaster management authorities (civil protection departments) (73.5%), followed by schools (61%) and first responders services (52.5%), local communities (42%), health authorities (40%), and non-governmental organizations and civil society (12%).

The research showed that schools implement certain teaching units related to disaster risk reduction, included in the curriculum on environmental and sustainability education (41.5%) and climate change (31.5%). The most common activities that schools carry out in this area are exercises and workshops (65%), and the majority of teachers (94%) believe that activities of this type (disaster simulations and response and recovery training) can contribute to improving disaster preparedness. Also, teachers, the majority, responded that they expect certain changes in the level of collaboration between the school and competent authorities (79.5%), as well as changes in the level of collaboration between the school and non-governmental organizations (57%).

When it comes to barriers/challenges to implementing student education on disaster risk reduction in schools, the majority of teachers mentioned a lack of knowledge about disaster risk reduction (60%), insufficient space in curricula and programs (43%), as well as a lack of budget and staff. More than half of the teachers (64.5%) are interested in training in disaster risk management and state that practical exercises would suit them best (40%). The results show that the majority of teachers (37%) believe that their school is moderately prepared for natural disasters (Figure 9).
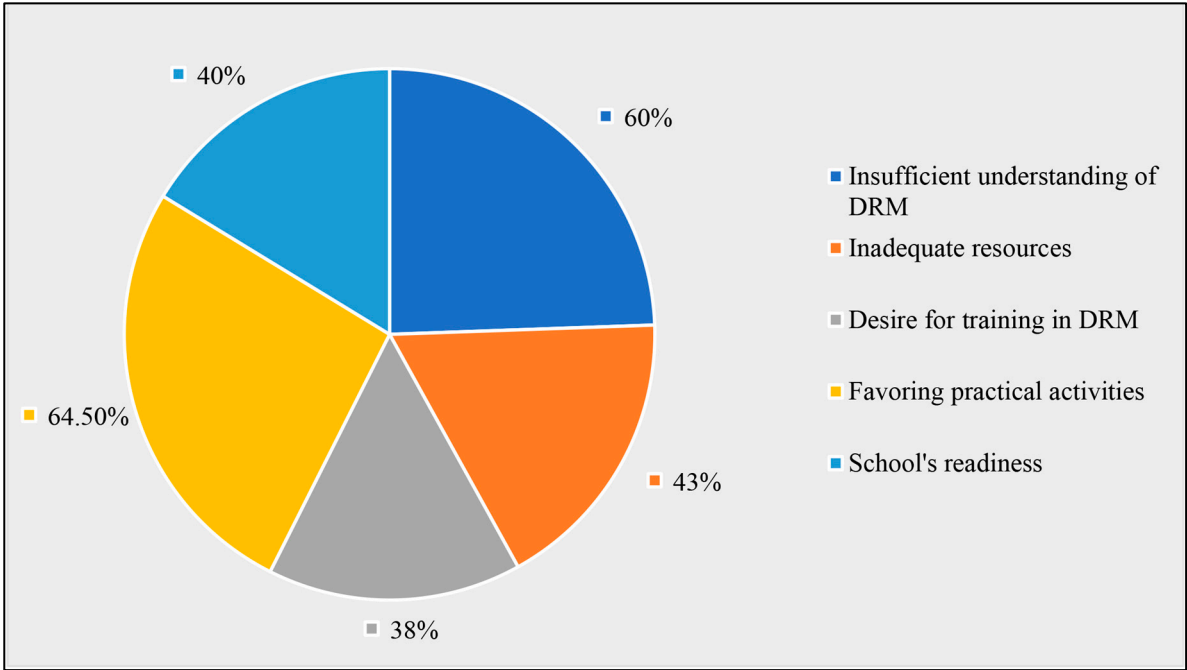

Figure 9. Barriers or challenges to implementing student education on disaster risk reduction in schools.

Regarding recommendations for legal solutions to improve schools in the process of disaster risk reduction, teachers have stated that it is necessary to legally regulate the introduction of training in this area, legislate lectures in schools on this topic, and introduce subjects in this area into the curriculum. As for recommendations regarding financial capacities to improve schools in the process of disaster risk reduction, the majority of teachers have mentioned that the school should have a good

relationship with local self-government, which will allocate a specific budget for improving resilience and preparedness for disasters, as well as allocate a certain amount of money from the state budget.

Table 7 depicts the perception of attitudes towards various steps in disaster planning among teachers. Also, this table provides a detailed description of responses across different variables, including involving students, informing students, not involving students, and uncertainty regarding each step. The obtained results show that to a greater extent, teachers: believe that students should be involved in conducting risk assessment and analysis (56.5%); support involving students in the development of disaster scenarios (62.5%); emphasize the importance of involving students in analyzing the severity and impact of disasters (51.5%); advocate for involving students in identifying policies and strategies (49%); consider it necessary to involve students in projecting needs and available resources (33.5%); support involving students in identifying steps to improve preparedness (37.5%); and endorse the inclusion of students in testing disaster plans through simulations (58%). General recommendations, in terms of enhancing the school's capacity in the process of disaster risk reduction, according to respondents, mostly involve the necessity for everyone to participate in this process, working on informing and educating teachers and students about this topic, and organizing workshops, seminars, and training in this area (Table 5).

Table 7. Perception of attitudes towards disaster planning steps.

Variables	Involving students n (%)	Informing students n (%)	Not involving students n (%)	I am not sure n (%)
Conducting risk assessment and analysis	113 (56.5)	46 (23)	13 (6.5)	25 (12.5)
Development of disaster scenarios	125 (62.5)	42 (21)	8 (4)	22 (11)
Analysis of severity and impact of disasters	103 (51.5)	63 (31.5)	3 (1.5)	28 (14)
Identification of policies and strategies	98 (49)	58 (29)	19 (9.5)	22 (11)
Projection of needs and available resources	67 (33.5)	76 (38)	15 (7.5)	39 (19.5)
Identification of steps to improve preparedness	75 (37.5)	71 (35.5)	13 (6.5)	38 (19)
Testing the disaster plan through simulations	116 (58)	38 (19)	14 (7)	29 (14.5)

3.4. Influences of Demographic and Socioeconomic Factors on the Students' and Teachers' Insights on School-Based Disaster Risk Reduction and Safety

The results of the one-way ANOVA revealed correlations between students' gender and the subsequent variables related to disaster knowledge and preparedness: evacuation exercise impact (p = 0.047) and practical examples visualization (p = 0.001) (Table 8). Nevertheless, no statistically significant associations were discovered between gender and other variables associated with disaster knowledge and preparedness. Further examination revealed that female students (M = 3.64; SD = 1.44) reported significantly higher ratings for attitudes that demonstrating evacuation exercises using simulation significantly contributes to improving disaster knowledge compared to male students (M = 3.41; SD = 1.42). Additionally, female students (M = 3.98; SD = 1.46) reported significantly higher ratings for attitudes that visualizing practical examples contributes to a better understanding of disaster response.

Upon conducting additional analyses, it has been established that there exist correlations between students' age and following variables related to disaster knowledge and preparedness: school emergency training (p = 0.001); disaster knowledge access (p = 0.001); disaster education impact (p = 0.001); practical examples visualization (p = 0.003); disaster knowledge level (p = 0.001); disaster response readiness (p = 0.001); preventive action awareness (p = 0.001); safety procedure awareness (p = 0.001); disaster risk management awareness (p = 0.001) (Table 8).

Further investigation disclosed that 16-year-old students (M = 3.01; SD = 1.27) reported significantly higher ratings for attitudes that the school consistently conducts specific training for proper disaster response compared to 17-year-old students (M = 2.50; SD = 1.37) and 18-year-old students (M = 2.13; SD = 1.28). Furthermore, it was found that 17-year-old students (M = 2.75; SD = 1.35) reported significantly higher ratings for attitudes that the school provides knowledge and necessary information about disasters and proper response methods compared to 18-year-old

students (M = 2.75; SD = 1.35). Additionally, 17-year-old students (M = 3.45; SD = 1.37) reported significantly higher ratings for attitudes that disaster education enables acquiring new insights into the aetiology and phenomenology of disasters compared to 18-year-old students (M = 3.15; SD = 1.38). Similarly, 17-year-old students (M = 3.88; SD = 1.24) reported significantly higher ratings for attitudes that visualization of practical examples contributes to easier understanding of disaster response compared to 16-year-old students (M = 3.76; SD = 1.23) and 18-year-old students (M = 3.72; SD = 1.33). On the contrary, 18-year-old students (M = 3.36; SD = 1.08) reported significantly higher ratings for their knowledge of disasters compared to 17-year-old students (M = 3.46; SD = 1.01). 16-year-old students (M = 3.67; SD = 1.01) reported significantly higher ratings for preparedness for adequate disaster response compared to 17-year-old (M = 3.49; SD = 1.06) and 18-year-old students (M = 3.19; SD = 1.19). Additionally, it was revealed that 16-year-old students (M = 3.79; SD = 1.07) reported significantly higher ratings for familiarity with safety procedures during disasters compared to 17-year-old (M = 3.44; SD = 1.17) and 18-year-old students (M = 3.20; SD = 1.15). Furthermore, 16-year-old students (M = 3.55; SD = 1.018) reported significantly higher ratings for understanding the field of disaster risk management compared to 18-year-old students (M = 3.08; SD = 1.015).

Then, it has been determined that there exist correlations between students' achievement in school and the following variables related to disaster knowledge and preparedness: school emergency training ($p = 0.001$); disaster knowledge access ($p = 0.001$); disaster education impact ($p = 0.023$); evacuation exercise impact ($p = 0.018$); practical examples visualization ($p = 0.001$) (Table 8).

Additional examination unveiled that students with achieved good performance (M = 2.53; SD = 1.27) reported significantly higher ratings for attitudes that the school consistently conducts certain training for proper disaster response compared to students who achieved very good (M = 2.50; SD = 1.44) and excellent performance (M = 2.08; SD = 1.27). Conversely, students with very good performance (M = 2.75; SD = 1.38) reported significantly higher ratings for enabling the acquisition of knowledge about disasters in school compared to students who achieved good (M = 2.53; SD = 1.27) and, finally, excellent performance (M = 2.28; SD = 1.33).

Students with achieved very good performance (M = 3.46; SD = 1.35) reported significantly higher ratings for attitudes that the school provides knowledge about disasters and proper response in such situations compared to students who achieved excellent (M = 3.32; SD = 1.44) and good performance (M = 3.00; SD = 1.21). Similarly, students with achieved very good performance (M = 3.65; SD = 1.46) reported significantly higher ratings for attitudes that demonstrating evacuation exercises significantly contributed to improving disaster knowledge compared to students who achieved good performance (M = 3.20; SD = 1.39) (Table 8).

Finally, it has been confirmed that there is no statistically significant correlation between students' parental employment and all variables related to disaster knowledge and preparedness (Table 8).

Table 8. One-way ANOVA results examine the relationship between students' gender, age, achievement in school, parental employment, and variables related to disaster knowledge and preparedness.

Variables	Gender		Age		Achievement in school		Parental employment	
	F	p	F	p	F	p	F	p
School emergency training	0.210	1.57	10.86	0.001**	5.81	0.001**	2.55	0.078
Disaster knowledge access	0.222	0.63	25.41	0.001**	6.94	0.001**	2.43	0.088
Disaster education impact	6.72	0.10	5.80	0.001**	3.18	0.023*	1.87	0.154
Evacuation exercise impact	3.95	0.047*	1.88	0.130	3.94	0.018*	0.63	0.530
Practical examples visualization	16.96	0.001**	4.58	0.003*	12.04	0.001**	0.50	0.606
Disaster knowledge level	4.43	0.036	9.98	0.001**	1.68	0.056	0.756	0.470
Disaster response readiness	0.161	0.688	10.54	0.001**	0.381	0.767	0.85	0.919
Preventive action awareness	0.666	0.415	7.82	0.001**	0.176	0.913	0.96	0.91
Safety procedure awareness	1.37	0.242	15.02	0.001**	1.07	0.358	0.80	0.44

| Disaster risk management awareness | 0.451 | 0.502 | 10.46 | 0.001** | 1.26 | 0.286 | 0.100 | 0.90 |

* $p \leq 0.05$; ** $p \leq 0.01$.

The Chi-square test results examining the relationship between students' gender and factors in disaster education engagement indicate a statistically significant association with the following variable: disaster knowledge channels ($p = 0.006$) (Table 9). No statistically significant association was found between gender and other variables related to disaster education engagement.

Further examination of the acquired results discloses that female students, to a greater extent compared to male students, emphasize obtaining information about disasters through school (62.8% compared to 37.2%), mass media (66.1% compared to 33.9%), internet usage (64.8% compared to 35.2%), and discussions with family members (59.6% compared to 40.4%). Conversely, male students, to a greater extent compared to female students, acquire information about disasters through social media and certain video games (64.3% compared to 35.7%). Discussion with family members is an important source of information for both genders, with similar proportions (40.4% for males and 59.6% for females).

Concerning age, the Chi-square test results reveal a statistically significant association between age and the following variables related to disaster education engagement: knowledge channels ($p = 0.001$); school collaboration ($p = 0.001$); parent involvement ($p = 0.001$); cross-subject teaching ($p = 0.011$); and civil protection collaborations ($p = 0.001$) (Table 9). However, no statistically significant association was found between age and other variables related to disaster education engagement.

Extended scrutiny of the obtained findings unveils that students aged 17 and 18 predominantly emphasize obtaining disaster-related information from school (39.5% and 37.2%), compared to students aged 15 and 16 (7.0% and 16.3%). Furthermore, it has been established that older students aged 18 and 17 are more likely (48% and 34.3%) to highlight their school's collaboration with professional institutions to better acquaint students with disasters. Students aged 18 most commonly (65.8%) indicate that their school does not involve parents in disaster education processes, while 17-year-old students predominantly highlight parental involvement (40.6%) in such forms of collaboration. Similarly, older students aged 18 and 17 more frequently (55.5% and 31.2%) point out the inclusion of disaster-related content in other subjects compared to students aged 16 and 15 (8.3% and 5.1%). Additionally, older students aged 18 and 17 are more likely (53.8% and 26.6%) to highlight school cooperation with local government civil protection departments to enhance student education on disasters, compared to students aged 15 and 16 (12.1% and 7.5%).

In further analyses, it has been found that there is a statistically significant association between achievements in school and the following variables related to disaster education engagement: knowledge channels ($p = 0.001$); school collaboration ($p = 0.038$); and parent involvement ($p = 0.032$) (Table 9). Nevertheless, no statistically significant association was found between achievements in school and other variables related to disaster education engagement.

A thorough analysis of the obtained results uncovers that students who achieve excellent academic performance predominantly highlight obtaining information about disasters through public media (52.1%), the internet (43.2%), and family discussions (30.3%). On the other hand, it has been found that students who attain very good academic performance mostly rely on social media and video games as sources of information about disasters (64.3%). Meanwhile, students with good academic performance often depend on social media and video games (28.6%) and family discussions (29.2%), while public media (13.2%) are less utilized in the process of obtaining information. These results suggest that academic success can influence the choice of sources for information about disasters. Importantly, it is noted that more successful students tend to use traditional media and resources such as public media and family discussions, while less successful students often rely on digital sources of information such as social media and video games.

Also, the Chi-square test results examining the relationship between students' parental employment and factors in disaster education engagement indicate a statistically significant association with the following variables: school collaboration ($p = 0.001$); parent involvement ($p = 0.001$); NGO and civil collaboration ($p = 0.001$); civil protection collaborations ($p = 0.001$) (Table 9).

Nevertheless, no statistically significant association was found between parental employment and other variables related to disaster education engagement. Further examination of the gathered results reveals that students whose both parents are employed rate the collaboration with specialized institutions in disaster risk reduction the highest (52.8%). On the other hand, students with only one employed parent give lower ratings to such collaboration (33.1%), while students whose parents are unemployed rate it the lowest (14.1%).

Finally, the Chi-square test results examining the relationship between social media users and factors in disaster education engagement indicate no statistically significant association with all observed variables (Table 9).

Table 9. Chi-square test results examine the relationship between students' gender, age, achievement in school, parental employment variables, and factors in disaster education engagement.

Variable	Gender		Age		Achievement in School		Parental Employment		Social media users	
	p	X^2	p	X^2	p	X^2	p	X^2	p	X^2
Disaster knowledge channels	0.006*	14.59	0.001**	38.51	0.001**	46.01	0.062	14.87	0.205	5.92
School Collaboration	0.564	2.03	0.001**	40.16	0.179	12.64	0.038*	13.34	0.961	0.293
Parent involvement	0.527	1.28	0.001**	68.03	0.001**	32.22	0.032*	10.55	4.04	0.132
Cross-subject teaching	0.989	0.01	0.011*	11.13	0.032*	8.78	0.093	4.74	0.558	0.362
Disaster subject support	0.056	0.849	0.374	3.11	0.848	0.805	0.211	3.11	1.01	0.540
NGO and civil collaboration	0.273	1.20	0.240	4.2	0.61	1.77	0.21*	7.68	0.310	0.206
Civil protection collaborations	0.102	2.67	0.001**	40.82	0.39	3.00	0.05*	10.71	0.744	0.449

* $p \leq 0.05$; ** $p \leq 0.01$.

The results of the one-way ANOVA revealed correlations between teachers' education level and the subsequent attitudes and practices towards student involvement in disaster preparedness activities: involving students in disaster preparedness exposes them to high risk ($p = 0.007$); the school facility is resistant to disasters ($p = 0.016$); the school has the capacity and financial means for planning ($p = 0.000$); introduce the subject of security culture into the curriculum ($p = 0.008$) (Table 10).

Additional examination unveiled that teachers with completed vocational education (M = 3.10; SD = 1.09) mostly perceive that involving students in disaster preparedness processes exposes them to risk compared to teachers with completed university education (M = 2.79; SD = 1.12) and master's degrees (M = 2.31; SD = 1.15). To the least extent (M = 3.46; SD = 1.05), teachers with completed master's degrees highlight the resilience of the facility to disasters compared to teachers with completed vocational education (M = 4.24; SD = 1.01). Furthermore, teachers with completed university education (M = 3.37; SD = 1.17) and master's degrees (M = 3.06; SD = 1.00) least emphasize that the school has the capacity and financial resources to develop appropriate documentation for student protection and rescue in disasters compared to teachers with vocational education (M = 4.28; SD = 1.03). Regarding the introduction of the subject of security culture, within which contents related to risk reduction and response to disasters would be studied, the obtained results show that teachers with completed university education mostly agree with this (M = 3.34; SD = 1.46), while teachers with completed vocational education least agree with it (M = 3.00; SD = 1.52).

Upon conducting additional analyses, it has been established that there exist correlations between teachers' marital status and following attitudes and practices towards student involvement in disaster preparedness activities: students should be included in disaster simulations and exercises ($p = 0.001$); teachers want to prepare for the correct response in emergencies ($p = 0.000$); educate and train teachers for responding in emergencies ($p = 0.000$); the safety level of students in schools is satisfactory ($p = 0.000$); involve students in the process of disaster preparedness ($p = 0.000$); motivate teachers to conduct evacuation exercises from classrooms ($p = 0.000$); students have a significant role in the disaster preparedness process ($p = 0.004$) (Table 10).

Further investigation revealed that married teachers (M = 4.42; SD = 0.79) predominantly assess that students should be included in disaster drill simulations compared to divorced teachers (M =

4.86; SD = 0.65) and widowers (M = 4.38; SD = 0.55). Additionally, it was found that married teachers are more inclined (M = 4.47; SD = 1.65) towards preparing for proper disaster response compared to single teachers (M = 3.55; SD = 1.58) or divorced (M = 3.25; SD = 1.45).

In contrast, divorced teachers (M = 4.92; SD = 1.01) predominantly believe that educating and training teachers for disaster response is necessary compared to married teachers (M = 4.36; SD = 1.21) and single teachers (M = 3.68; SD = 1.36). Similarly, divorced teachers primarily (M = 4.57; SD = 0.53) emphasize that the level of student safety from disasters is satisfactory compared to single teachers (M = 3.66; SD = 1.08) and married teachers (M = 4.19; SD = 1.07). Divorced teachers (M = 2.86; SD = 1.09) predominantly advocate for involving students in disaster preparedness processes compared to married teachers (M = 2.43; SD = 1.01) and single teachers (M = 2.43; SD = 1.01). Married teachers (M = 4.14; SD = 1.42) primarily emphasize the need to motivate teachers to conduct education and drills for disasters compared to single teachers (M = 2.43; SD = 1.01) and divorced teachers (M = 2.43; SD = 1.01).

Table 10. One-way ANOVA results examine the relationship between teachers' education level, marital status, years of work experience, and attitudes and practices towards student involvement in disaster preparedness activities.

Variables	Education level		Marital status	
	F	p	F	p
Involving students in disaster preparedness can be beneficial	0.368	0.693	2.439	0.066
Students should be included in disaster simulations and exercises	0.018	0.982	5.514	0.001*
Involving students in disaster preparedness exposes them to high-risk	5.12	0.007*	1.688	0.171
Teachers want to prepare for the correct response in emergencies	1.534	0.219	8.255	0.000**
Educate and train teachers to respond in emergencies	0.763	0.467	7.501	0.000**
The safety level of students in schools is satisfactory	2.519	0.083	8.025	0.000**
Students should be involved in the process of creating disaster plans	0.360	0.698	1.705	0.051
Involve students in the process of disaster preparedness	0.673	0.511	13.626	0.000**
Motivate teachers to conduct evacuation exercises from classrooms	2.306	0.102	7.186	0.000**
Students should be involved in the development of plans in schools	0.538	0.585	.615	0.607
Teachers are familiar with the correct way to respond	1.882	0.155	5.053	0.002*
The school facility is resistant to disasters	4.214	0.016*	1.174	0.321
Students have a significant role in the disaster preparedness process	0.825	0.440	4.597	0.004*
School has the capacity and financial means for planning	12.787	0.000**	1.622	0.186
Introduce the subject of Security Culture into the curriculum	5.042	0.008*	2.160	0.094

*$p \leq 0.05$; ** $p \leq 0.01$.

According to the results of Pearson's correlation, it was found that there is a statistically significant correlation between the years of teaching experience of teachers and the school facility being resistant to disasters ($r = 0.024$). On the other hand, the results of Pearson's correlation indicate that there is no statistically significant association between years of teaching experience of teachers and the following variables: student involvement in disaster preparedness; student participation in disaster simulations; student involvement high high-risk exposure; teacher emergency response preparedness; teacher emergency training; student school safety satisfaction; student involvement plan creation; student involvement preparedness process; teacher evacuation exercise motivation; student plan development involvement; teacher correct response familiarity; school facility disaster resistance; student disaster preparedness role; school planning capacity; and security culture curriculum introduction (Table 11).

In further analyses, it was found that with an increase in teachers' years of work experience, the rating of the resilience of school facilities to various disasters also increases. The obtained result could be related to the fact that with increasing years of work experience, teachers gain a deeper understanding of the needs and requirements for the resilience of school facilities to disasters.

Furthermore, it can be assumed that more experienced teachers have developed skills in identifying security risks related to the resilience of the school infrastructure itself and other risks to both teachers and students.

Table 11. Pearson's correlation results for the relationship between teachers' attitudes and practices towards student involvement in disaster preparedness activities and their years of work experience.

Variables	Years of work experience	
	Sig.	*r*
Involving students in disaster preparedness can be beneficial	0.236	−0.085
Students should be included in disaster simulations and exercises	0.635	−0.034
Involving students in disaster preparedness exposes them to high-risk	0.068	0.130
Teachers want to prepare for the correct response in emergencies	0.918	0.008
Educate and train teachers to respond in emergencies	0.588	−0.039
The safety level of students in schools is satisfactory	0.406	0.059
Students should be involved in the process of creating disaster plans	0.828	−0.016
Involve students in the process of disaster preparedness	0.473	−0.051
Motivate teachers to conduct evacuation exercises from classrooms	0.346	0.067
Students should be involved in the development of plans in schools	0.272	0.079
Teachers are familiar with the correct way to respond	0.383	0.062
The school facility is resistant to disasters	0.024*	0.160
Students have a significant role in the disaster preparedness process	0.899	0.009
My school has the capacity and financial means for planning	0.266	0.079
Introduce the subject of Security Culture into the curriculum	0.305	0.073

Independent samples t-test results for teachers between gender and the variables on attitudes and practices towards student involvement in disaster preparedness activities, indicate that there is a statistically significant association with the following variables: student safety satisfactory ($p = 0.009$); students in plan creation ($p = 0.018$); involve students in preparedness ($p = 0.019$); subject of security culture ($p = 0.006$); teachers know response ($p = 0.045$). Alternatively, there was no statistically meaningful correlation between gender and the remaining variables: students in disaster preparedness; student inclusion in simulations; student inclusion, high risk; students in prep. beneficial; school capacity for planning; school facility resilient; educate teachers for disasters; teachers preparedness for emergencies; motivate teachers in drills (Table 12).

After a more thorough investigation and analysis of additional results, it was found that female teachers (M = 4.33) rate the level of student safety in schools from disasters higher compared to male teachers (M = 4.18). Furthermore, it was determined that female teachers (M = 4.03) give higher ratings to involving students in the process of developing school-level disaster protection and rescue plans compared to male teachers (M = 3.63). Similarly, female teachers (M = 4.10) give higher ratings to involve students in school-level disaster preparedness processes compared to male teachers (M = 3.71). Regarding the introduction of the subject of Security Culture, which encompasses teaching content related to the reduction of risks from various natural and man-made disasters, it was found that female respondents (M = 3.51) are more supportive of its introduction compared to male respondents (M = 2.86). Additionally, it was found that female teachers (M = 4.41) rate the familiarity and training of teachers for proper response during natural or man-made disasters in schools higher compared to male teachers (M = 3.70) (Table 12).

Table 12. Independent samples t-test results for teachers between gender and the variables on attitudes and practices towards student involvement in disaster preparedness activities.

Variable	F	t	Sig. (2-Tailed)	df	Male M (SD)	Female M (SD)
Students in disaster preparedness	0.079	−0.754	0.362	198	3.32 (1.033)	3.54 (1.118)
Student inclusion in simulations	0.647	−1.780	0.077	198	4.08 (1.057)	4.36 (0.934)
Student inclusion with high risk	1.208	−0.875	0.273	198	3.76 (1.109)	4.09 (1.052)
Students in preparedness beneficial	0.575	0.870	0.385	198	4.16 (1.028)	4.30 (0.967)
Student safety satisfactory	0.664	−2.656	0.009*	198	4.18 (0.972)	4.33 (0.985)
Students in plan creation	6.190	−2.393	0.018*	198	3.63 (1.185)	4.03 (0.934)
Involve students in preparedness	1.842	−2.387	0.019*	198	3.71 (1.099)	4.10 (1.012)
The subject of Security Culture	3.214	−2.760	0.006*	198	2.86 (1.339)	3.51 (1.469)
School capacity for planning	0.73	−0.666	0.506	198	3.10 (1.195)	3.51 (1.113)
School facility resilient	0.575	−1.563	0.120	198	3.39 (1.077)	3.67 (1.100
Educate teachers about disasters	0.029	−1.776	0.077	198	4.00 (1.118)	4.29 (0.956)
Teachers preparedness for disasters	0.578	−0.906	0.366	198	3.35 (1.011)	3.73 (1.188)
Teachers know response	2.680	−2.021	0.045*	198	3.70 (.777)	4.41 (4.739)
Motivate teachers in drills	0.325	−0.953	0.570	198	3.80 (1.323)	3.99 (1.183)

* $p \leq 0.05$; ** $p \leq 0.01$.

4. Discussion

In this paper, we present the results of a quantitative research aimed at exploring how demographic and socio-economic factors collectively influence students' perceptions (H1-H8) and shape teachers' attitudes towards school-based disaster risk reduction (H1-H5). The findings from the multivariate regression analyses reveal that age, gender, and marital status emerge as significant predictors across different aspects of students' and teachers' perceptions regarding school-based disaster risk reduction. These aspects include awareness of disasters, participation in disaster education activities, attitudes towards disaster risk reduction education, and improvement of access to disaster information, among others. Discussion divided into two sections for conciseness and ease of follow-up: teachers' and students' perspectives on school-based disaster risk reduction.

4.1. Discussion Related to Students' Insights on School-Based Disaster Risk Reduction and Safety

The research results show that the majority of respondents primarily acquire knowledge through internet searches, while the least common method is through social and video games. Conversations with family members and mass media are also mentioned as sources of information about disasters. Potential explanations for these results could include the availability and accessibility of the internet as the primary source of information in today's digital age [30,31]. Internet searches provide quick and easy access to various sources of knowledge about disasters, including news and guidance for action [18,19]. On the other hand, social and video games may not be as common sources of information about disasters due to their entertainment nature [145], while conversations with family members and mass media can provide information passed down through generations or obtained through regular news and safety programs [146,147].

When asked about the collaboration between schools and professional institutions and the involvement of parents in disaster education, a significant percentage of respondents reported a lack of such collaboration. However, there is general awareness of certain disasters, with epidemics being the most well-known and accidents such as fires being the least known among respondents. It can be said that schools and parents may not fully grasp the importance of collaboration in disaster education or may prioritize other educational initiatives over disaster preparedness [41–47]. Additionally, there may be limitations in terms of time, finances, or staff for establishing and maintaining effective collaboration in disaster education [48,49]. Furthermore, communication and coordination challenges between schools, professional institutions, and parents may lead to a lack of effective collaboration in disaster education initiatives [50,51].

Regarding awareness of specific disasters, it is assumed that epidemics and other widely spread disasters often receive extensive media coverage, leading to greater public awareness and knowledge among respondents [52–54]. Moreover, students may have personal experiences or know someone who has experienced epidemics, which could contribute to their familiarity with such disasters [55–58]. Certainly, schools or community organizations may prioritize educating students and families about certain types of disasters, leading to increased awareness among respondents [3,59].

As for attitudes towards the introduction of subjects related to disasters into the curriculum, a significant portion of respondents believe it is unnecessary. Similarly, there is limited collaboration between schools and non-governmental organizations or civil society, as well as local authorities responsible for civil protection, in informing students about disasters and proper response. Students may not fully realize the importance of disaster education and the significance of preparedness for such situations, leading them to consider the introduction of such subjects unnecessary [60,61]. Schools and teaching staff may prioritize other areas of education or programs over disaster education, resulting in a lack of support for the introduction of such subjects or collaboration [62,63].

Respondents generally believe that visual representations and training sessions on evacuation procedures through simulations contribute to better understanding disaster response. However, there is a perception of a lack of knowledge provision and specific training in schools for proper reactions in emergencies. When it comes to learning about disasters through the content of other subjects, most respondents reported a lack of such integrations in their school curriculum, suggesting a potential area for improvement in disaster education initiatives. It is possible that school administration and teachers may not fully grasp the importance of integrating disaster education into the curriculum [64,65]. The lack of support or guidance may hinder teachers from integrating this topic into their lesson plans [46,66,67].

It has been found that female students showed higher ratings of attitudes regarding the impact of evacuation exercises and visualization of practical examples on disaster knowledge. These results can be explained by a higher level of female socialization or their encouragement towards greater attention to various aspects of natural and man-made hazards [67,148]. They may also exhibit a greater inclination and interest in group exercises and activities involving information exchange and collaboration [149,150]. Thus, various cultural factors and societal expectations may influence students' attitudes towards education and preparations for disasters [87,151].

Further analysis of the obtained results reveals that female students, to a greater extent compared to male students, emphasize obtaining information about disasters through school, mass media, internet usage, and discussions with family members. Conversely, male students, to a greater extent compared to female students, acquire information about disasters through social media and certain video games. These findings can be explained through a variety of socio-cultural factors, preferences, and information-gathering habits on one hand [152–154], and differences in risk perception and priorities on the other [155,156]. Specifically, female students may show a greater inclination towards traditional sources of information such as school, mass media, and discussions with family members. This may be due to their higher attention to reliable and verified sources of information, as well as greater openness to conversation and discussion within the family [157]. On the contrary, male students may prefer digital media and video games as sources of entertainment and information. Additionally, female students may perceive disasters as a more serious threat and thus are more motivated to inform themselves through various channels [99]. Conversely, male students may have a different approach and interest in disaster-related topics, perhaps being more attracted to interactive and visual aspects provided by quick and dynamic entertainment, along with the possibility of gaining information [158].

Additionally, significant peer differences in attitudes and perceptions regarding disaster knowledge and preparedness among students of different ages are noticeable. Specifically, students who are 16 years old tend to give higher ratings to attitudes related to school training on disaster response and familiarity with safety procedures, while students who are 17 years old tend to give higher ratings to attitudes related to the impact of disaster education and visualization of practical examples. Furthermore, students who are 18 years old are inclined to give higher ratings in their perception of

their knowledge about disasters and readiness to respond to disasters. According to the obtained results, these differences may be attributed to various stages of emotional, cognitive, and social development [159] that occur during adolescence, as well as the specific needs and experiences of students at different ages [89]. Moreover, it can be argued that 16-year-old students may be more focused on practical skills and procedures that prepare them for possible disaster situations [21]. In contrast, 18-year-old students may be more focused on understanding and confidence in their ability to cope with disasters [97]. Additionally, it can be noted that older students may be more influenced by societal norms and expectations, which can affect their perception of knowledge and preparedness for disasters [160]. Peer influences and behavior modeling may play a greater role in shaping the attitudes of older adolescents [161].

Further analysis of the obtained findings reveals that students aged 17 and 18 predominantly highlight obtaining information about disasters from school, compared to students aged 15 and 16. Similarly, they more frequently indicate the inclusion of disaster-related content in other subjects and give higher ratings to the collaboration of the school with local government departments of civil protection to enhance student education on disasters. Additionally, they more commonly emphasize their school's collaboration with professional institutions to better acquaint students with disasters. Furthermore, students aged 18 most often mention that their school does not involve parents in disaster education processes, while 17-year-olds predominantly highlight parental involvement in such forms of collaboration. Such results can be understood through the explanation that older students may have a higher level of awareness of the importance of disaster preparedness [162], as well as the significance of obtaining information about disasters through the school system. As they become more mature, they may prioritize topics relevant to their personal safety both in and out of school [98]. Older students may perceive a greater integration of disaster-related themes across various subjects, which can contribute to their higher ratings of collaboration between the school and local government departments of civil protection [163,164]. They may be more informed about such collaborations and recognize their value in providing comprehensive disaster education [165].

Regarding academic achievement, certain correlations have been identified indicating that students with better academic performance tended to give higher ratings to attitudes related to school training on disaster response, acquiring knowledge about disasters at school, and perception of the school's effectiveness in providing knowledge about disasters and appropriate responses. These results suggest that students with better academic performance may demonstrate a higher level of motivation and engagement throughout their schooling [125]. As a result, they may be more attentive to the disaster training and education provided by the school, leading to more positive attitudes towards it [22]. Additionally, they may have stronger cognitive abilities, enabling them to better understand complex concepts and appreciate the value and importance of disaster preparedness education [126]. Certainly, they may also exhibit a higher level of responsibility and thus recognize the importance of disaster preparedness [127]. In contrast, concerning parental employment, no statistically significant correlation was found with any variables related to disaster knowledge and preparedness.

Furthermore, it has been found that students achieving outstanding academic results mainly emphasize obtaining information about disasters through public media, the internet, and discussions with family members. On the other hand, students achieving very good academic results tend to use social media and video games as sources of information about disasters. Additionally, students with good academic results often rely on social media and video games, as well as discussions with family members, while public media are less utilized in the process of obtaining information. It is important to note that more successful students often use traditional media and resources such as public media and discussions with family members, whereas less successful students often use digital sources of information such as social media and video games. Observed patterns can be explained by various factors influencing students' behavior in seeking information about disasters [166]. Students achieving outstanding academic results may prioritize reliable and credible sources of information [167]. Their academic success may also reflect their ability to critically evaluate information and effectively use it in their studies [168]. Conversely, students achieving very good academic results

may find social media and video games more engaging and accessible, leading them to rely on these digital platforms for information about disasters [169]. Additionally, differences in media usage among students with good academic results may reflect varying levels of media literacy and critical thinking skills. In contrast, students with lower academic achievement may rely more on digital sources without fully considering their reliability or accuracy [170]. Furthermore, the results of the examination of the relationship between the use of social media and variables related to engagement in disaster education do not show a statistically significant association with all observed variables.

4.2. Discussion Related to Teachers' Insights on School-Based Disaster Risk Reduction and Safety

The discussion reveals several key findings regarding teachers' attitudes and practices related to disaster risk reduction in schools. Generally, teachers express a strong desire to be prepared for the correct response during disasters and to involve students in disaster preparedness. They also largely agree that the safety level of students in schools is satisfactory, but they recognize the importance of involving students in developing household disaster plans. Teachers who express a strong desire to be prepared for disaster response are likely to have undergone appropriate training [6], participated in workshops dedicated to disaster preparedness [7], have awareness of the potential consequences of future disasters [8], and recognize the necessity of building better societal preparedness [9].

Additionally, teachers emphasize the importance of student involvement in various aspects of disaster preparedness, such as developing disaster scenarios, analyzing the severity and impact of disasters, identifying policies and strategies, and testing disaster plans through simulations. This highlights a proactive approach to involving students in efforts to reduce disaster risk. These results indicate the recognition of the value of empowering and involving students in addressing security issues [38]. Furthermore, teachers may believe that involving students in the development of disaster plans and simulations not only enhances their preparedness but also fosters a sense of responsibility and resilience among students [10,11].

Regarding educational content, teachers prioritize teaching units related to disaster risk reduction within the curriculum, especially in the areas of environmental education and sustainability, as well as climate change. They also recognize the value of activities such as exercises and workshops in improving disaster preparedness. It can be said that prioritizing teaching units related to disaster risk reduction within the curriculum reflects a conscious effort to integrate disaster preparedness education into broader educational objectives, such as environmental education and sustainability [39]. This indicates the recognition of the interconnectedness of disaster risk with broader social and environmental issues [40].

Teachers acknowledge the importance of collaboration between schools and relevant authorities and organizations in disaster risk reduction efforts, expressing expectations for increased collaboration in the future. They also support the involvement of various stakeholders, including competent disaster management authorities, first responder services, local communities, and non-governmental organizations, in educating students about disaster risk reduction. It seems that teachers recognize that collaborative relationships can facilitate access to resources, expertise, and support systems necessary for effective disaster preparedness initiatives in schools [96]. By engaging various stakeholders, teachers can leverage community resources and knowledge to enhance students' understanding of disaster risks [171].

The obtained results show that the majority of teachers believe that their knowledge of disasters, as well as their familiarity with safety procedures for responding to such situations, is at a higher level. They somewhat agree that they are familiar with preparations for an adequate response during disasters. However, a smaller number of respondents stated that they are very familiar with preventive measures to prevent disasters. Potential explanations for these results could include various factors, such as the level of training and awareness programs provided to teachers regarding disaster preparedness [6]. It is possible that teachers have undergone comprehensive training or updates on disaster management protocols, leading to their perceived higher knowledge in this area [22]. The lowest rating pertains to teachers' perception of a high level of knowledge about disaster risk management. Such lower ratings regarding preventive measures may indicate a lack of training

or awareness in this specific aspect of disaster management [172]. Regarding specific attitudes related to the research topic, respondents evaluated their agreement with certain statements. The highest level of agreement was recorded for the statement that involving students in disaster preparedness strengthens preparedness plans. Additionally, a significant number of respondents agreed that students should participate in disaster simulations, as well as that such involvement can be beneficial for students. As for specific attitudes, the high level of agreement among teachers regarding the benefits of involving students in disaster preparedness activities may reflect the recognition of the importance of proactive measures in ensuring school safety [91]. Furthermore, positive attitudes towards involving students in disaster simulations suggest the recognition of the value of practical experiences in enhancing students' preparedness for emergencies [12,13].

After a more thorough investigation, it was observed that female teachers exhibit certain differences in perception compared to their male counterparts regarding student safety and disaster preparedness in schools. Specifically, female teachers often rate the level of student safety in schools in the event of disasters higher compared to male teachers. These findings may stem from traditional social norms and roles associated with care and protection [77]. Additionally, it is possible that they possess higher emotional intelligence or levels of empathy, making them more sensitive to student safety issues [78]. Furthermore, it can be assumed that female teachers perceive greater responsibility for student well-being and consider the safety dimension an important part of their profession [79].

Additionally, it was found that female teachers are more inclined to involve students in the process of developing school-level disaster protection and rescue plans compared to male teachers. This suggests that female teachers may value student involvement and empowerment in disaster preparedness initiatives more [80], as well as support a more inclusive approach to education, which entails involving all students in decision-making and planning processes [81].

Similarly, female teachers also give higher ratings to involving students in the processes of disaster preparedness at the school level, as well as to introducing the subject of Security Culture, which would encompass teaching content related to reducing the risks of disasters, compared to male teachers. All of this clearly indicates a potential gender difference in attitudes towards integrating disaster preparedness education into the curriculum [81]. Undoubtedly, this can have long-term benefits for the school community in terms of raising awareness of disaster risks and readiness for their potential consequences [82]. Therefore, it is important to support further research and implementation of initiatives that promote inclusivity and preventive action in the field of school safety [83].

Ultimately, female teachers rate the familiarity and training of teachers for proper response during natural or human-induced disasters in schools higher compared to male teachers. This result suggests that female teachers may have more social interactions with colleagues and students, which can increase their awareness of the need for disaster training and preparedness [173]. Additionally, they may have a broader and deeper professional network that provides access to a greater number of information and potential resources in the field of disaster training. And of course, they may have experienced more negative personal experiences related to disasters, which could make them more aware [117].

The results indicate significant correlations between teachers' levels of education and their attitudes and practices regarding student involvement in disaster preparedness activities. Namely, it was found that teachers with different levels of education have different perspectives on these issues. Teachers with completed vocational education express greater concern about exposing students to risk during disaster preparedness activities, while those with higher academic qualifications, such as master's degrees, perceive greater resilience of school facilities to disasters. Similarly, teachers with vocational education are more likely to believe that the school has the capacity and financial resources for planning in case of disaster compared to those with university or master's degrees. Furthermore, there is a difference of opinion regarding the introduction of a safety culture into the curriculum, with teachers holding master's degrees being more supportive of this initiative compared to their colleagues.

Differences in attitudes among teachers with different levels of education may result from their varying experiences, expertise, and training in disaster management [174]. Teachers with higher education levels may have a deeper understanding of risk management principles and the possibilities for protecting school facilities [103]. Additionally, they might have greater trust in institutional support mechanisms, such as legal regulations and professional assistance, which could make them more optimistic about the resilience of school facilities to disasters [120]. On the other hand, teachers with lower levels of education may have less experience and training in this area, which could result in greater concern about potential risks for students [175].

Further analysis has revealed correlations between the marital status of teachers and their attitudes towards involving students in disaster preparedness activities. Married teachers tend to prioritize involving students in disaster drills and exercises, preparing for disaster response, and encouraging fellow teachers to conduct evacuation drills. On the other hand, divorced teachers express stronger beliefs in the necessity of educating and training teachers for disaster response and are more inclined to involve students in disaster preparedness processes. It can be emphasized that married teachers, likely relying on their family responsibilities and experiences, prioritize student safety and preparedness by advocating for their active participation in disaster drills and simulations [121]. Their belief in the importance of student involvement may stem from a desire to ensure the well-being of the entire school community, reflecting a sense of duty towards protecting the students under their care [122]. Conversely, divorced teachers, perhaps considering their personal experiences or seeking to enhance school safety in light of potential risks, emphasize the necessity of educating and training teachers for disaster response [88].

Further analysis revealed that as teachers' years of work experience increase, so does their assessment of the resilience of school facilities to different disasters. This finding could be attributed to the notion that as teachers accumulate more years of experience, they develop a deeper understanding of the necessary measures for ensuring the resilience of school facilities to disasters [88]. Moreover, it is plausible to assume that more experienced teachers have honed their ability to identify security risks associated with the resilience of school infrastructure and other potential hazards affecting both teachers and students [118].

After conducting a more thorough investigation and analyzing additional results, it became evident that female teachers generally perceive a higher level of student safety in schools from disasters compared to their male counterparts. Additionally, female teachers tend to give higher ratings to involving students in the development of school-level disaster protection and rescue plans, as well as in disaster preparedness processes, in comparison to male teachers. Moreover, female respondents are more supportive of the introduction of Security Culture subject, which covers teaching content related to the reduction of risks from various disasters, compared to male respondents. Furthermore, female teachers rate the familiarity and training of teachers for proper response during disasters in schools higher than male teachers.

The obtained results unequivocally indicate observed differences between female and male participants regarding various aspects and attitudes and practices towards student involvement in disaster preparedness activities. Overall, female teachers provided higher ratings compared to male teachers regarding the level of student safety in schools, active involvement of students in the process of developing disaster protection and rescue plans, involvement in disaster preparedness processes, and support for the introduction of the subject of Security Culture. Higher ratings can be explained by potentially heightened awareness of disaster risks, nurturing instincts, emphasis on collaborative and participatory learning methods regarding disasters, clear prioritization of acquiring and improving relevant skills and knowledge related to disaster response, deeper understanding of the importance of comprehensive disaster education, recognition of the value of incorporating topics related to disaster risk reduction into curricula, and acknowledgement of the long-term benefits of promoting a culture of resilience among students [124,176,177]. Such findings necessitate a gender perspective in initiatives aimed at developing more inclusive and effective strategies for integrated disaster risk reduction in schools [178].

Regarding the limitations of the conducted research, the following have been identified: a) the study was conducted only in secondary schools in the western Morava River basin in Serbia, which may limit the general applicability of the results; b) although the sample size was quite large (650 students and 200 teachers), the research was conducted in only 10 out of a total of 18 municipalities in the western Morava River basin. This may lead to limitations in the representativeness of the sample for the overall population; c) the research used a multistage random sampling method, but only certain municipalities and schools were included in the study. This may affect the generalization of the results to a wider population; d) although the survey questions were structured and designed to explore specific aspects of disaster risk reduction education in schools, there is a possibility that some questions did not sufficiently cover all relevant aspects or were too general; e) although the survey questionnaires were distributed among students and teachers in certain schools in the western Morava River basin in Serbia, the sample may not have been sufficiently representative of the entire population of students and teachers across Serbia; f) respondents answered questions during face-to-face interactions in schools, which may lead to potential response biases due to social norms or expectations.

5. Recommendations

Based on the findings, the following recommendations are proposed: a) schools should enhance collaboration with disaster risk reduction entities and forces to transfer knowledge, experience, and all relevant information about disasters; b) develop mechanisms for actively involving all parents in various disaster education processes, especially to create synergy between schools and families in enhancing society's resilience to disasters; c) introduce the subject of safety culture to inform students about all potential risks and protection opportunities from various natural and anthropogenic disasters; d) integrate disaster themes into other existing subjects to adequately cover this topic within the current curriculum; e) promote the use of online resources for disaster education among students; f) implement student training programs for proper and safe disaster response, including evacuation simulations and visualization of practical examples, to enhance understanding and readiness for disaster response; g) conduct evacuation drills and disaster simulation exercises to actively involve students in preparation processes and develop response skills; h) educate and train teachers for disaster education and proper disaster response; i) enable students to participate in the development of disaster protection plans to strengthen their personal responsibility and risk awareness; j) develop and strengthen collaboration with relevant disaster management authorities for more effective student education; k) increase students' awareness of legal obligations related to disaster risk reduction to promote responsibility and compliance with regulations; l) conduct education on proper disaster response and increase awareness of risks, encouraging the development of personal and family disaster plans; m) ensure inclusivity in disaster preparedness processes, considering the diverse needs and abilities of students; n) organize additional training for teachers, including topics such as first aid, student safety during disasters, and the latest information on community-facing risks; o) increase the budget for acquiring modern equipment, materials for teachers and students, organizing field visits, and practical exercises. Additionally, allocate part of the budget to promote educational programs on disaster risk reduction through campaigns and workshops; p) intensify collaboration with intervention and rescue services and non-governmental organizations, including regular meetings, joint exercises, and sharing resources and information on disasters; q) form local working groups or councils involving representatives from educational institutions and relevant organizations to further advance disaster risk reduction; r) integrate practical exercises into the regular curriculum, focusing on realistic scenarios that may occur in a specific community; s) besides organizing workshops and seminars, it is important to develop online platforms that enable continuous access to information on disaster risk reduction; t) engage local disaster risk management experts to share their knowledge with teachers and students; u) implement a monitoring and evaluation system for disaster risk reduction education programs; v) encourage schools to join local initiatives for disaster risk reduction; w) promote the formation of local support networks involving schools, local government representatives, non-governmental organizations, and other relevant

stakeholders for resource sharing, information exchange, and best practices; x) support innovation in approaches to educating students and teachers about disaster risk reduction through various technologies and other interactive learning methods; y) develop collaboration with non-governmental organizations and civil society to improve informal and additional education beyond the school curriculum on disasters.

The recommendations resulting from the conducted research aim to contribute to the creation of a more effective disaster education system, increasing the level of knowledge, awareness, and preparedness of students for adequate responses to various natural and man-made disasters. These recommendations focus on enhancing: methods of disaster risk reduction education, awareness among students and teachers about the consequences of disasters, collaboration, safety culture, integration of themes, online educational resources, disaster training and exercises, etc. Targeting various aspects of the educational process, these recommendations provide a comprehensive approach to raising awareness and preparedness for disasters within the education system.

6. Conclusions

In this paper, we present insights from a quantitative study examining the collective influence of demographic and socio-economic factors on students' perceptions and teachers' attitudes toward school-based disaster risk reduction. The findings highlight the importance of age, gender, and marital status as significant predictors affecting various aspects of disaster risk reduction perceptions among both students and teachers.

Overall, teachers demonstrate a strong commitment to disaster preparedness and express a desire to actively involve students in disaster risk reduction initiatives. They recognize the importance of collaboration between schools and relevant authorities and organizations in advancing disaster education and risk reduction efforts. Teachers prioritize instructional units related to disaster risk reduction within the curriculum, emphasizing the integration of disaster education into broader educational goals such as environmental education and sustainability. They value practical activities such as drills and disaster simulations in improving disaster preparedness among students. Additionally, differences in attitudes and practices among teachers based on their education and marital status were identified.

On the other hand, it was found that the majority of students primarily use internet searches as the main source of information on disasters, while social media and video games are significantly less utilized for this purpose. Family discussions and mass media are also mentioned as significant sources of information. Regarding collaboration between schools, professional institutions, and parents in disaster education, the results indicate a lack of such collaboration, although there is general awareness of certain types of disasters. Moreover, epidemics were found to be the most recognized among respondents, while accidents such as fires were the least recognized. Regarding attitudes toward the introduction of disaster-related subjects into the curriculum, a significant number of respondents consider it unnecessary. Lastly, differences in attitudes and perceptions among students of different age groups and academic achievement levels were identified. Based on the extensive array of recommendations provided, it is evident that a comprehensive approach to disaster risk reduction education is essential for fostering resilience within communities.

The findings underscore the imperative for schools to not only integrate disater risk reduction into their curricula but also to actively engage with various stakeholders to ensure effective implementation. Collaboration with disaster risk reduction entities, including intervention and rescue services, non-governmental organizations, and local government representatives, emerges as a key strategy for transferring knowledge and resources. Incorporating disaster themes into existing subjects, promoting online resources for education, and conducting practical exercises such as evacuation drills are crucial steps towards enhancing students' understanding and readiness for disaster response. Moreover, empowering students to participate in the development of disaster protection plans fosters personal responsibility and risk awareness.

Teacher education and training are paramount in ensuring the effective delivery of disaster risk reduction education, including topics such as first aid and student safety during disasters.

Additionally, initiatives to ensure inclusivity in preparedness processes and to address the diverse needs of students are fundamental for equitable resilience-building efforts. Allocating sufficient budgetary resources for modern equipment, materials, and educational programs underscores the commitment to prioritizing DRR within the educational framework. Moreover, promoting local initiatives, forming support networks, and leveraging innovative approaches are vital for sustaining momentum in DRR education beyond the school curriculum. By embracing these recommendations, educational institutions can play a pivotal role in nurturing a culture of safety and resilience, thereby contributing to the overall well-being and sustainability of communities in the face of disasters.

Therefore, the results emphasize the significance of comprehensive disaster preparedness initiatives in schools and underscore the need for tailored approaches that consider the diverse attitudes, experiences, and backgrounds of teachers. Implementing effective disaster education programs requires collaboration, proactive engagement, and ongoing professional development among teachers to ensure the safety and well-being of students and the broader school community. Further research in this area is crucial to inform evidence-based practices and policy recommendations aimed at strengthening disaster resilience in educational institutions.

The scientific significance of this research lies in investigating the collective impact of demographic and socio-economic factors on students' perceptions and teachers' attitudes towards school-based disaster risk reduction. By analyzing these factors, the study provides valuable insights into the dynamics shaping attitudes and preparedness for disaster management within educational environments.

This research contributes to the advancement of knowledge and practices in the field of disaster risk reduction education by providing insights into the complex interaction of factors shaping perceptions and attitudes within educational environments. By emphasizing the importance of collaboration, inclusivity, and tailored approaches, the study informs evidence-based practices aimed at strengthening resilience and ensuring the safety and well-being of communities in the face of disasters. Further research in this area is crucial for refining strategies and policies to enhance resilience to disasters in educational institutions.

Appendix A

1. Questionnaire for Students' Insights on School-Based Disaster Risk Reduction
Please state the name and location of the high school you attend:_____
Please indicate your age:_____

1.   Gender of the participant:
     –   Male
     –   Female

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2. Please indicate your academic achievement:
    – Excellent
    – Very good
    – Good
    – Sufficient

3. You live in a community:
    – Only with mother
    – Only with father
    – With both parents
    – Someone else takes care of you

4. In the community where you live:
    – Only one parent works
    – Both parents work
    – Both parents are unemployed

5. Please indicate the educational level of your parents:
    Father:
    – Elementary education
    – Secondary education
    – Higher education
    – High Education

    Mother:
    – Elementary education
    – Secondary education
    – Higher education
    – High Education

6. Are you a user of social networks?
    – Yes
    – No

7. Has anyone in your family experienced direct or indirect consequences of a disaster?
    – Yes
    – No

8. How do you primarily receive knowledge and information about disasters? (not at all familiar (1); somewhat familiar (2); moderately familiar (3); very familiar (4)):
    – Learning and knowledge from school | 1 | 2 | 3 | 4
    – Social and video games | 1 | 2 | 3 | 4
    – Mass media | 1 | 2 | 3 | 4
    – Searching for information on the internet | 1 | 2 | 3 | 4
    – Conversations with family | 1 | 2 | 3 | 4

9. Please indicate to what extent you are familiar with the following disasters (not at all familiar (1); somewhat familiar (2); moderately familiar (3); very familiar (4)):
    – Earthquake | 1 | 2 | 3 | 4
    – Flood | 1 | 2 | 3 | 4
    – Landslide or soil slippage | 1 | 2 | 3 | 4
    – Pandemic | 1 | 2 | 3 | 4
    – Fire | 1 | 2 | 3 | 4
    – Explosion | 1 | 2 | 3 | 4
    – Accident | 1 | 2 | 3 | 4

10. Are you in favour of introducing subjects related to disasters?
    – Yes
    – No

11. Does your school collaborate with expert institutions to better acquaint students with disasters?

- – Yes
- – No

12. Does your school involve parents to collaborate on better-acquainting students with disasters?

   - – Yes
   - – No

13. Is learning about disasters covered through the content of other subjects?

   - – Yes
   - – No

14. Does your school collaborate with non-governmental organizations and civil society to better acquaint students with disasters and proper response methods?

   - – Yes
   - – No

15. Does your school collaborate with the civil protection department of the local government to better acquaint students with disaster and response methods?

   - – Yes
   - – No

16. Rate your agreement with the following statements towards key variables in disaster education (strongly disagree; disagree; neutral; agree; strongly agree):

   - – My school consistently conducts certain training to ensure proper response in disasters | 1 | 2 | 3 | 4 | 5
   - – The school enables me to acquire knowledge and necessary information about disasters and proper response methods in such situations | 1 | 2 | 3 | 4 | 5
   - – Disaster education allows me to gain new insights into the occurrence, consequences, and potential disasters in the environment | 1 | 2 | 3 | 4 | 5
   - – Demonstration of evacuation exercises through simulation significantly contributes to improving knowledge about disasters | 1 | 2 | 3 | 4 | 5
   - – Visualizing practical examples contributes to a better understanding of how to behave in the event of a disaster | 1 | 2 | 3 | 4 | 5

19. Rate the following attitudes toward disaster risk reduction (strongly disagree; disagree; neutral; agree; strongly agree):

   - – Comprehensive understanding of the concept, occurrence patterns, and ramifications of disasters | 1 | 2 | 3 | 4 | 5
   - – Readiness to effectively respond in the event of a disaster | 1 | 2 | 3 | 4 | 5
   - – Familiarity with proactive measures to mitigate the occurrence of disasters | 1 | 2 | 3 | 4 | 5
   - – Proficiency in safety protocols to be followed during a disaster | 1 | 2 | 3 | 4 | 5
   - – Competence in disaster management strategies for handling disasters effectively | 1 | 2 | 3 | 4 | 5

1. Questionnaire for Teachers' Insights on School-Based Disaster Risk Reduction

1. Gender: 1. male 2. female
2. Years of work experience: 0-2, 3-7, 8-15, 16-25, 26-35, 36 and above
3. Marital status:

   a) single
   b) married
   c) divorced
   d) widowed

4. Do you have children?

   a) yes
   b) no

5. Level of education:

   a) high school

b) college

c) master's degree

d) doctoral studies

6. Please rate the following attitudes regarding disaster preparedness and response attitudes assessment (strongly disagree; moderately disagree; neither agree nor disagree; moderately agree; strongly agree):

    – I am familiar with legal obligations regarding disaster risk reduction in schools | 1 | 2 | 3 | 4 | 5
    – My school has the capacity or financial resources to develop a Disaster Risk Assessment and Emergency Response Plan | 1 | 2 | 3 | 4 | 5
    – The school building is resilient to disasters | 1 | 2 | 3 | 4 | 5
    – The level of student safety in schools is satisfactory | 1 | 2 | 3 | 4 | 5
    – Students play a significant role in disaster preparedness processes | 1 | 2 | 3 | 4 | 5
    – Involving students in disaster preparedness exposes them to high risk | 1 | 2 | 3 | 4 | 5
    – Involving students in disaster preparedness can be beneficial for them | 1 | 2 | 3 | 4 | 5
    – Involving students in disaster preparedness strengthens the preparedness plan | 1 | 2 | 3 | 4 | 5
    – I am confident that I want to involve students in disaster preparedness | 1 | 2 | 3 | 4 | 5
    – Students should be included in disaster simulations and drills | 1 | 2 | 3 | 4 | 5
    – Students should be involved in developing household disaster plans | 1 | 2 | 3 | 4 | 5
    – Students should be involved in the development of school plans | 1 | 2 | 3 | 4 | 5
    – Teachers are familiar with proper response procedures in emergencies | 1 | 2 | 3 | 4 | 5
    – Teachers are willing to prepare for proper emergency response | 1 | 2 | 3 | 4 | 5
    – Educate and train teachers for emergency response | 1 | 2 | 3 | 4 | 5
    – Motivate teachers to conduct classroom evacuation drills | 1 | 2 | 3 | 4 | 5
    – Introduce safety culture subject into the curriculum | 1 | 2 | 3 | 4 | 5

7. I believe it will be very beneficial for students to learn about (you can choose more than one answer):

    – Disaster prevention and preparedness
    – Problem-solving/decision-making
    – Engaging with the local community in disaster preparedness and response
    – Climate change
    – Environment and sustainability
    – None of the above

8. I believe the following institutions should be involved in educating students about disaster risk reduction (you can choose more than one answer):

    – School
    – Disaster management authorities (civil protection department)
    – Public health authorities
    – Local communities
    – Non-governmental organizations and civil society
    – Emergency rescue services (police, military, emergency medical services)

9. The following teaching units related to disaster risk reduction are included in the curriculum at my school (you can choose more than one answer):

    – Disaster prevention and preparedness
    – Problem-solving and decision-making on life issues
    – Engaging with the local community to assist in preparation and response to disasters
    – Climate change
    – Environment and sustainability
    – None of the above

10. My school conducts the following activities (check x):

    – Exercises and workshops
    – Response and recovery training

–   Disaster simulations

11. Do you think the mentioned activities can contribute to improving disaster response preparedness?
     –   Yes
     –   No

12. How would you rate the coordination between the school and relevant emergency rescue services responsible for disaster prevention?
     –   No coordination
     –   Very weak
     –   Weak
     –   Moderate
     –   High
     –   Very high
     –   Don't know

13. Do you expect certain changes in the level of cooperation between your school and relevant disaster management authorities?
     –   Yes
     –   No

14. How would you rate the coordination between the school and non-governmental organizations significant for disaster prevention?
     –   No coordination
     –   Very weak
     –   Weak
     –   Moderate
     –   High
     –   Very high
     –   Don't know

15. Do you expect certain changes in the level of cooperation between your school and non-governmental organizations significant for disaster management and preparedness?
     –   Yes
     –   No

16. What do you consider to be barriers or challenges to implementing student education on disaster risk reduction in schools (check x):
     –   Lack of knowledge about disaster risk reduction
     –   Lack of training for the development and implementation of such programs
     –   The topic is not relevant to students
     –   The topic is not a priority for school management
     –   Incompatibility with what students should learn in schools according to my beliefs
     –   Insufficient space in the curriculum
     –   Lack of community interest
     –   Insufficient budget and staff shortage
     –   Poor coordination between schools and disaster management authorities
     –   Unclear policy on implementing disaster risk reduction in schools

17. Are you interested in training if offered and does not disrupt your schedule?
     –   Yes
     –   No
     –   If you answered yes, what type of training would be suitable for you (check x):
          –   Classroom learning
          –   Practical exercises
          –   Computer-based learning
          –   Distance learning
          –   Combination of the above

18. Please indicate how prepared your school is for natural disasters (check x):
     | 1 | 2 | 3 | 4 | 5

19. The following are steps in the planning process. Please mark one option for each of the 7 steps (I think students should be involved in this process (1); I think students should only be informed about the results of this process (2); I don't think students should be involved in this process (3); Not sure (4):

     – Step 1: Conducting risk assessment and analysis | 1 | 2 | 3 | 4
     – Step 2: Development of disaster scenarios | 1 | 2 | 3 | 4
     – Step 3: Analysis of the severity of disaster impacts | 1 | 2 | 3 | 4
     – Step 4: Identification of policies and strategies during disasters | 1 | 2 | 3 | 4
     – Step 5: Assessment of projected needs and available resources | 1 | 2 | 3 | 4
     – Step 6: Identification of steps to improve building preparedness | 1 | 2 | 3 | 4
     – Step 7: Testing the disaster plan through simulations | 1 | 2 | 3 | 4

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