

INPUT PAPER

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Non-systematic inclusion of DRR concepts and practices in the compulsory education network, prior to formal inclusion into school curricula

Case study of Serbia

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Abstract

The paper includes analysis, synthesis and propositions for improvement of the current situation related to natural disaster issues in education process in Serbia. Analytical part is focused on curricula in geography, including the overview of textbooks contents. Policy documents (laws and regulations referring to education and disasters) are analysed as well. The only formal training on natural disasters for teachers, developed for geography teachers and approved by the Ministry of Education, is presented. The training aims to motivate teachers to include the DRR issues into the teaching process prior to the formal inclusion in curricula, in order to overcome the temporal gap until the complicated and time-consuming process of curricula adaptation is finished. The feedback on the practical implementation of DRR issues is obtained through a poll survey among the teachers. The opinions of pupils are analysed as well, through the results of another poll survey, carried out among the pupils in earthquake-struck town of Kraljevo (M 5.4 in 2010). The results show that the children are highly aware of the need for better coverage of risk reduction in their education. The need for better communication between the institutions dealing with various segments of DRR in education is stressed. The Ministries should use the offered input from scientists and experts to a higher extent. It is suggested how to overcome the present problems and to head towards the best results in DRR through the compulsory – primary education.

Introduction

The role of education in the issue of natural disaster risk reduction has been confirmed in the majority of relevant references: e.g. Agenda 21¹, Hyogo Framework for Action 2005– 2015², UN Decade of Education for Sustainable Development 2005-2014³, the UN campaigns “Disaster Reduction Campaign on Disaster Prevention, Education and Youth” (2000)⁴, “Disaster Risk Reduction Begins at School” 2006-2007⁵, etc. Education contributes to the realistic risk perceptions, to raising awareness of the possible outcomes, as well as to gaining the necessary knowledge about the proper protective behaviour. It is a platform for building a culture of prevention and disaster-resilient societies. Prepared and educated societies are subject to a smaller number of casualties and to a reduced material damage (Izadkhah and Hosseini, 2005). Education about natural disasters leads to risk reduction and fits to the Pressure-and-Release model defined by Wisner et al. (2004). Out of 8 types of vulnerability defined by Aysan (1993, cited in Alcántara-Ayala, 2002), three may be substantially reduced through education: educational vulnerability (lack of access to information and knowledge), attitudinal and motivational vulnerability (lack of public awareness), and cultural vulnerability (related to beliefs and customs).

In Serbia, the disaster risk reduction has not yet been included in the formal curriculum, so the minority among the participants in the process (experts, teachers) apply different solutions to overcome the present formal limitations. The majority of people involved in the

¹ Internet: <http://www.un.org/esa/sustdev/documents/english/Agenda21.pdf> (27-07-2012)

² Internet: http://www.unisdr.org/files/1037_hyogoframeworkforactionenglish.pdf (27-07-2012)

³ Internet: <http://www.desd.org> (21-08-2012)

⁴ Internet: <http://www.unisdr.org/2000/campaign/pa-camp00-kit-eng.htm> (08-08-2012)

⁵ Internet: http://www.unisdr.org/files/761_education-good-practices.pdf (25-07-2012)

education system are not aware of the HFA recommendations and tasks (PFA3/CI2 in particular), so the challenge for those who promote their application is even higher.

The role of formal (compulsory) education

Numerous studies and articles stress the importance of formal education because of its role in learning on natural disasters (e.g. Wisner, 2006; Fridl et al., 2009; Komac et al., 2010; Komac et al., 2011). Without diminishing the importance of informal learning, we insist on the role of formal and obligatory education, considering the fact that the majority of the population acquire this type of education. The effectiveness of school-based hazard education programs is claimed by many authors (e.g. Ronan et al., 2010, 2012; Gulay, 2010; Finnis et al., 2010; Johnston et al., 2011; etc). Kuhlicke et al. (2011) highly recommended a combination of a) curriculum based, standardized education and b) participatory, locally embedded education, which correspond to formal and informal education. Although this is an ideal option, in reality it is sometimes difficult to organize the parallel implementation of both types. In case when the capacities are insufficient to provide the combination of two types of education, it is more efficient to opt for the first type, because the effective risk reduction requires a large proportion of the population who receives the best training possible, while informal education affects small parts of population. In Serbia, according to official statistics, about 70,000 pupils enroll each year in the 1st grade of primary school, which is compulsory and lasts for eight years (Statistical Survey of Serbia, 2012)⁶. During eight years of primary education, the elements of disaster risk reduction may be gradually included, in accordance with the age. The mechanisms of intensive natural processes and their interactions with society may be taught through the subjects with synthesis-based approach, like Nature and Society, The World Around Us (1st to 4th grade) and especially Geography (5th to 8th grade), while general awareness of the presence of natural disasters and the basic steps for their mitigation may be introduced also through the classes of history, languages, art, etc.

Geographical knowledge, by joining and overlapping of physical (natural) and human (social) elements, is often regarded as a knowledge "for living", having daily and vocational applications (Gritzner, 2004), one of which is certainly the role in prevention of natural disasters. For the same reasons, according to Mitchell (2009), geography is the natural academic "home" for teaching about hazards. As the risk reduction certainly includes the human-environment relations, the necessary integrative approach is provided through geography as a science (Golledge, 2002; Cross, 2009; Stoltman, 2006).

Review of the conditions which precede DRR integration to Serbian education

The analysis of the present conditions is carried out through several aspects: the legal framework (which is supposed to enable the DRR inclusion into education system), the present curricula (seen through the contents of geography textbooks) and the present state of DRR knowledge among the pupils.

⁶ Internet: <http://webrzs.stat.gov.rs/WebSite/Public/ReportResultView.aspx?rptKey=ind> (5-8-2012)

Legislation

In the Republic of Serbia, the legislation related to DRR in education system is defined by particular education laws, as well as by other laws which do not directly refer to education but mention the education issues in other contexts. Enacting of laws related directly or indirectly to risk education is under the jurisdiction of two ministries: Ministry of Education and Science and Ministry of Interior Affairs. Intersectoral collaboration in treating of these issues is generally not synchronized, which results in the lack of desired effects of enacted laws. In other words, up to now, the framework laws have not yet led to enacting of new proficient by-laws in the field of education. Legislation related to disaster risk education in Serbia is composed of the following elements: (1) International conventions, (2) Particular laws on education and emergency situations, (3) Strategies, and (4) Curricula.

International conventions: The Hyogo Framework for Action 2005-2015 has been one of the bases for enacting of the Law on Emergency Situations and the National Strategy on Protection and Rescue in Emergency Situations. *Particular laws on education and emergency situations* are listed in Tab.1. The Article 119 of the Law on Emergency Situations foresees that training is done through primary and secondary education, for getting knowledge on the dangers of natural and other disasters, as well as for protection. The Article 4 Paragraph 5 of the Law on the basics of education system states that one of the general aims of the education process is to make children "capable of solving the problems, application of knowledge and skills in further education, professional work and everyday life", which completely corresponds to the need for DRR education. The Laws on primary and secondary schools (Articles 20 and 24, respectively), declare that the curriculum is enacted by the Minister of education, according to the suggestion of the advisers for particular subjects.

Law	Official Gazette number
Law on Emergency Situations	111/09
Law on the Basics of Education System	72/2009, 52/2011
Law on Primary Schools	50/92, 53/93, 67/93, 48/94, 66/94, 22/02, 62/03, 64/03, 101/05, 72/09
Law on Secondary Schools	50/92, 53/93, 67/93, 48/94, 24/96, 23/02, 25/02, 62/03, 64/03, 101/05, 72/09

Table 1 : Laws in the Republic of Serbia related to education and risk management

Strategies: The National Strategy on Protection and Rescue in Emergency Situations (2011) says within the Strategic section 3 that "issues related to protection, rescue and disaster risk reduction should be incorporated into the curricula of all educational institutions". *Curricula* are defined in the Regulations enacted by the Ministry of Education (Table 2). The analyzed regulations for the primary school curricula show that there is only one lesson related to some kind of natural disasters: "Volcanism and earthquakes" in the 5th grade, subject Geography. There are two kinds of secondary schools, with different curricula: gymnasium and vocational schools. In the 1st grade of gymnasium, subject Geography, there are three lessons partially related to natural disasters: Volcanism; Earthquakes (with seismically active zones in Serbia); and Precipitation. In other gymnasium grades there are no geographical lessons treating the issue of natural disasters. Among the vocational schools, only in the 2nd grade of touristic vocational school, there are two geography lessons related to natural

disasters: Water-management problems in Serbia; and Natural disasters. The Curricula are a bottleneck not properly transferring the legislation-provided possibilities towards the schools.

Regulations	Official Gazette – Educational Gazette
Regulation on the Plan for the 2nd cycle of primary education and the Curriculum for 5th grade of primary education	6/2007, 2/2010, 7/2010, 3/2011
Regulations on the Curricula for 6th, 7th and 8th grade of primary education	5/08, 6/09, 2/2010
Regulation on the Plan for the gymnasium education and the Curriculum for 1st grade of gymnasium	110-00-32/97-01
Regulation on the Curriculum for 2nd, 3rd and 4th grade of gymnasium	11/2006

Table 2 : Regulations on the school curricula in the Republic of Serbia

Education material within the education system – geography textbooks

Within this research, 23 geography textbooks were analysed, all of which are formally approved by the Ministry of Education for usage in schools (which implies that they are in accordance with the curricula). Greater variety of textbooks is characteristic for the primary school, especially 5th grade (six different textbooks), while secondary school programs mostly have one available textbook per grade. The analysis of geography textbooks for primary and secondary schools was done on a qualitative basis, and included not only the texts, but also the illustrations (charts, sketches, photographs) and thematic maps. The lessons precisely defined by the curricula occur regularly in all textbooks, regardless of the publisher and the edition. Additional contents and aspects related to natural disasters occur randomly, depending on the authors of the textbooks. The evaluation was done following the three main principles: perception principle, spatial principle and temporal principle.

The *perception principle* considers various qualifications on particular natural processes, depending on textbook authors and their experiences. It is analyzed whether the particular processes are treated only as natural processes of increased intensity or, on the other hand, they are treated as a natural disaster (as defined by the UNISDR (2009, 09)⁷. If an event is treated only through its genesis and its influences on spatial physiognomy, it has a category of a hazard - a natural process of increased intensity. In cases where an event is treated through its impact on society and its transformation, it has a category of a natural disaster. There is also a third case - when the authors point to some positive impacts of natural processes of increased intensity. Unfortunately, the processes which are systematically studied in all textbooks are presented as hazards (natural processes) and not as natural disasters. Geography textbooks mention the following natural processes which may have the characteristic of a disaster: meteorites, earthquakes, volcanoes, tsunamis, landslides, avalanches, floods, tropical cyclones, tornadoes, hail. Only several authors mention these processes in the context of natural disasters. The example of the lesson Earthquakes (5th

⁷ Internet: http://www.unisdr.org/files/7817_UNISDRTerminologyEnglish.pdf (05-08-2012)

grade) shows that its main function is to explain the functioning of plate tectonics, which is common for all 5th grade textbooks. Only in two editions the lesson includes a short instruction on how to properly behave during an earthquake (Sitarica and Tadić, 2010; Milivojević and Čalić, 2012). In the lessons in human and regional geography, natural disasters are occasionally mentioned in a positive context. The most typical examples are the floods in the valleys of the Nile River and the Tigris-Euphrates River system, or the volcanic activity in Indonesia, which in longer time span lead to formation of natural resources, such as high quality soils or ores (e.g. Jakovljević and Birovljev, 2012; Đurić, 2011). The lessons on Egypt mention the Nile floods mostly as a process which enabled the formation and development of the whole country, while only few authors point also to the negative consequences of the Nile floods (Sitarica and Tadić, 2010).

The *spatial principle* stands for the analysis of spatial distribution of natural hazards and disasters studied in textbooks (reactions of children are different for the events in Serbia than for the events abroad). The majority of the described examples of hazards and disasters are situated out of Serbia – either in European or, even more often, non-European countries. The most obvious examples are earthquakes: many Serbian textbooks describe the M 9.1 earthquake in the Indian Ocean in 2004, while none mentions multiple M 5 events in Serbia, which in fact have much greater impact on the real everyday situations. The reason for this paradox lies within the fact that textbooks tend to show the most intensive event of a kind, and these are almost never related to Serbia. In terms of spatial aspect, in some European countries there is the opposite case, meaning that content of geography textbooks is primarily related to their own countries (Senegačnik, 2010).

The *temporal principle* stands for the analysis of time span between a disaster occurrence and the time when the information about it appears in the textbooks. The fact that the 2004 Indian Ocean earthquake has its place in many textbooks shows a good temporal accordance between an event and the time of textbook response. The greatest natural disasters in Serbia in the period 2000–2011 were: the floods of the Tamiš River in 2005, numerous landslides (e.g. Bogdanje) in the spring of 2006, extreme air temperatures (44.9°C in Smederevska Palanka) in 2007, and the Kraljevo earthquake (M 5.4) in 2010. Although these disasters of regional scale had the human victims, large evacuations and extensive material damage, none of them has been mentioned in geography textbooks up to now – neither in the lessons on natural processes, nor in the lessons covering the regions of the affected areas. We can conclude that there is neither temporal nor spatial coordination between the Serbian natural disasters and Serbian geography textbooks. This fact leads to the substantial decrease of awareness and preparedness for a potential event.

Education material apart from the education system

One of the examples of DRR-oriented educational activities is the publication of a booklet named "A family handbook on reacting in emergency situations"⁸, issued by the Sector for Emergency Management of the Ministry of Interior Affairs of the Republic of Serbia. However, this publication is not a part of the Serbian education system. It has been issued as a part of the system of interior affairs, and is distributed through the network of police departments and municipal authorities. In that way, it reaches a relatively small number of

⁸ Internet: http://prezentacije.mup.gov.rs/svs/HTML/Vanredne%20situacije%20latinica_Final.pdf

people. The booklet can be downloaded from the web page of the Sector for Emergency Management, but it is questionable whether in that way it can reach sufficient number of potential readers.

Pupils' knowledge on DRR issues

The analysis of children's knowledge about natural disaster threats was done through a poll survey in the town of Kraljevo. Kraljevo faced an M 5.4 earthquake on November 3rd 2010 at 1:56 AM and suffered relatively large material damage, with two victims. The poll survey was carried out 16 months after the event. Here we present the results obtained among 839 primary school children, aged 11-15 years (from 5th to 8th grade). Gender and age distribution of the participants shows that the survey involved 437 boys (52%) and 402 girls (47%), approximately evenly distributed in different grades: in the 5th grade - 149 pupils (18%), in the 6th grade - 228 pupils (28%), in the 7th grade - 193 pupils (23%) and in the 8th grade - 269 pupils (32%). The pupils filled out the questionnaire at school, during the classes. The questionnaire comprised 17 close-ended questions, with multiple-choice answers. The questions were grouped in four segments: activities and feelings of pupils during the earthquake, the activities and feelings after the earthquake, sources of knowledge about the earthquake and the type of training they need.

When asked about their reaction during the earthquake, about 37% of participants responded that they stayed in the place where they were at that moment, while about 27% of participants responded that they immediately ran out. Only 13% of participants reacted adequately - by crouching under a table or under a door frame (Figure 1). Boys and girls had almost the same reaction at the time of the earthquake, with very little variation and deviation.

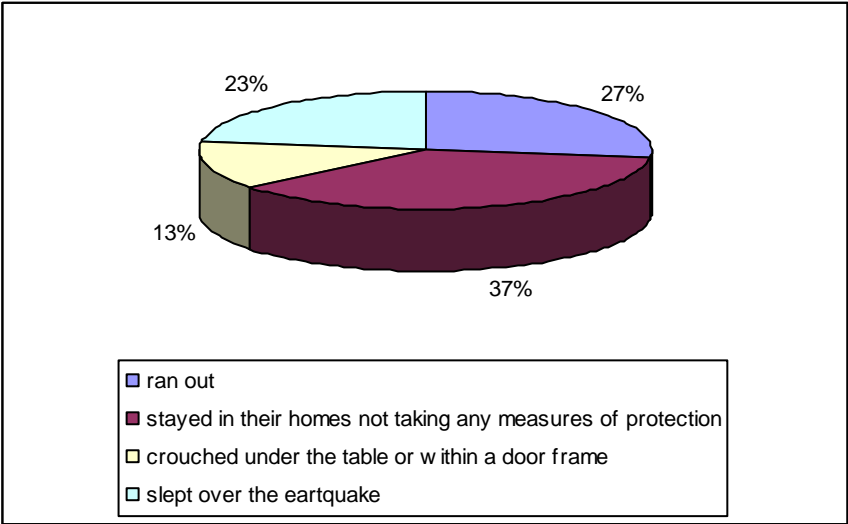


Figure 1: Pupils' reactions during the earthquake

Many pupils reacted inadequately during the earthquake, and the type of their response does not correlate with gender or their age (grade). Since the earthquake occurred during the night, when the pupils were at their homes with families, it is clear that they did not have to make decisions independently. This situation indicates that adults were not familiar with the

proper way of reacting in these situations either. It should be noted that about 23% of participants overslept the event.

When asked about their opinion on their own reaction at the time of the earthquake, about 51% of the total number of participants thought that they have acted correctly (Figure 2). About 28% of the pupils said they did not respond at the time of the earthquake, regardless of the grade they attend. About 21% of pupils responded "I did not know what to do, and I waited for help", which is a frequent response for girls (within this group, 58% are girls), and 8th grade pupils (37% of this group).

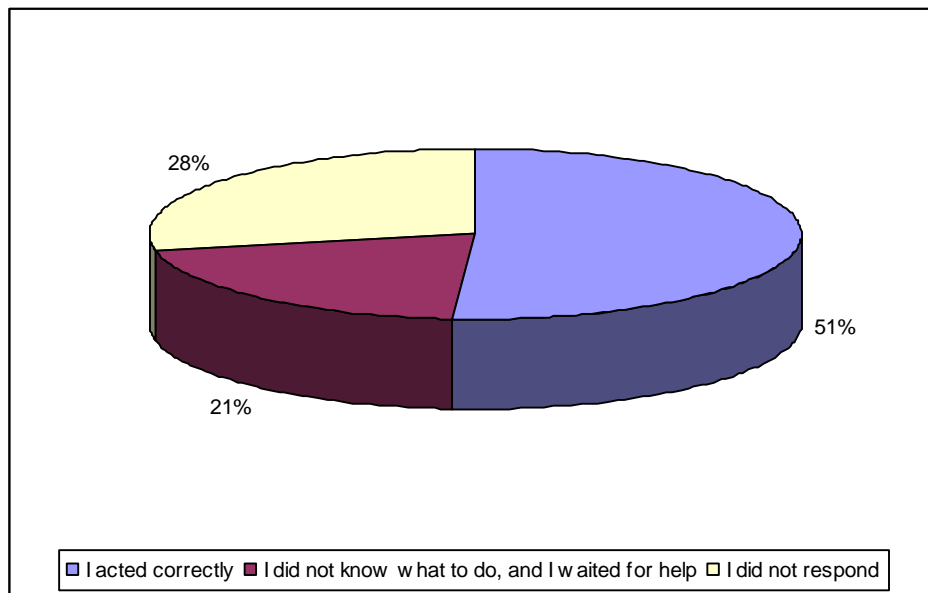


Figure 2: Pupils' opinions on their reactions

The aim of this question was to determine how pupils evaluate their own response in a crisis situation, considering they did not receive any formal tuition on this subject. Analysis of the results revealed that the majority of pupils had inadequate reaction, but failed to realize so — declaring that they had acted properly.

Activities for DRR integration into the Serbian education system

Being aware both of the situation explained in the previous chapter, and of the fact that the proper integration of DRR into the education system requires long lasting procedures, we decided to take certain steps in order to start the processes which would lead to full DRR integration in future, and at the same time provide at least some kind of DRR coverage in schools. The first step was to establish a program of professional training for geography teachers, as these programs are generally a dominant model of professional development of teachers in Serbia (Tatić-Janevski and Kovačević, 2013). In the following steps, we conducted a survey among both teachers and pupils to find out how they react to DRR issues, and finally all the results have been summed up in a study which was used in the process of curricula revision.

Training program for teachers

Inspired by the guidelines defined in the Hyogo Framework for Action and a series of the related documents, group of researchers from the Geographical Institute "Jovan Cvijić" SASA have developed a specialized training program "Natural disasters and geography teaching". The program is approved by relevant bodies of the Ministry of Education, as one in a series of various programs for professional training of teachers. In the period 2008-2013, about 500 teachers (10% of the total number of geography teachers in Serbia) have finished this training. After attending the program, the teachers are supposed to develop students' awareness of natural disasters in their environment and of their role in prevention and mitigation. The training lasts for two days and consists of theoretical and practical parts, such as field work, as well as a workshop. During 16 teaching hours, various topics are presented and different activities are held: natural hazards in general, natural hazards in Serbia, floods, landslides, earthquakes, erosion, atmospheric natural hazards, social and economic consequences of natural hazards, methods for determining natural disasters in local communities, defence systems against natural disasters, adequate response during natural disasters, field work and a workshop.

Analysis of teachers' opinions regarding teaching on natural disasters was done with participation of 361 teachers who attended the program. The research included two steps. The first step was a poll survey using a short questionnaire aimed at establishing whether the teachers are in a position to actually transfer the knowledge they gained at the training program. The close-ended question "Is this program applicable in practice, in schools?" was chosen to determine whether they can include this issue in their classes, regardless of the fact that it is actually not a part of the official curriculum. The offered answers were scaled in 5 options (ordinal-polytomous items), ranging from "I completely agree" to "I completely disagree".

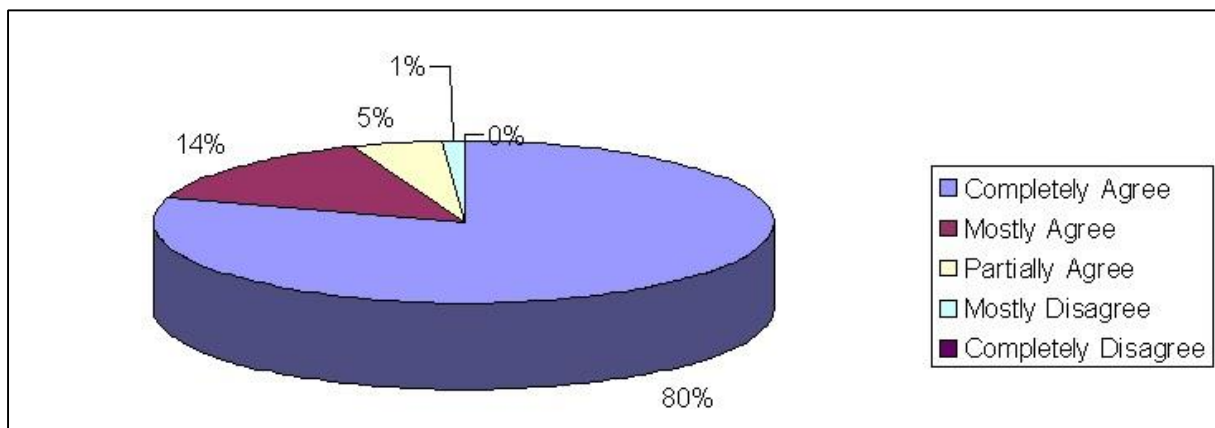


Figure 3: Teachers' answer to the question whether this program is applicable in practice

The second phase was an interview aimed at detection of the reasons for the negative answers they gave in the questionnaire. It turned out that the teachers are overwhelmed with formal limitations (extensive geography curricula with small number of teaching hours), generally insufficient pupils' motivation, and sometimes even by their own demotivation (many are strictly adhering to the curriculum and are not ready for innovations). The possible solutions to these problems are summed up in the Table 3.

Problems in DRR education	Possible solutions	How to do it?
Formal limitations	Changes of curricula	Initiatives of experts and teachers
Lack of teachers' enthusiasm	Motivation improvement	Professional trainings
Lack of pupils' enthusiasm	Motivation improvement	Creative approach

Table 3: Overview of problems and possible solutions in inclusion of DRR concepts into formal education

Pupils' expectations and needs related to DRR in education

The poll survey described above in the chapter "Pupils' knowledge on DRR issues" included also several questions related to the future improvement of risk education. When asked about the presence of earthquake-related issues in geography textbooks, 35% said they thought that the present contents were enough, while 65% thought that the existing material "*should be expanded with the instructions on how to behave during an earthquake*" (Figure 4). This attitude is characteristic for pupils in all grades.

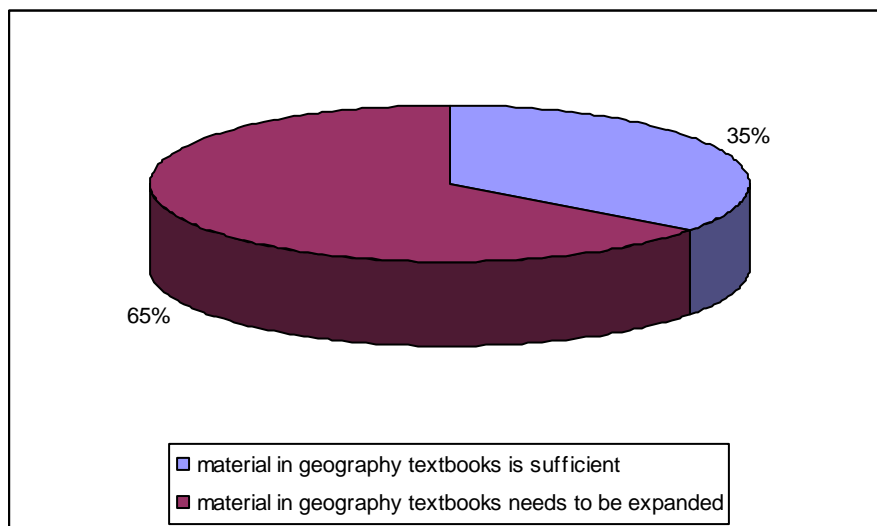


Figure 4: Pupils' opinion on earthquake issues in geography textbooks

On the question about the types of knowledge and practical training on adequate behaviour during natural disasters— that could also be a part of the school program—about 35% of participants said that they need to learn how to behave during an earthquake, 31% of participants believe that they need to learn how to behave both during and after an earthquake, about 17% of participants declared that they need a practice session on the required behaviour (drills), while 17% of pupils thought that they need all types of knowledge (theoretical knowledge and practical training) (Figure 5). More details about the poll survey among the schoolchildren in Kraljevo can be found in Panić et al. (2013).

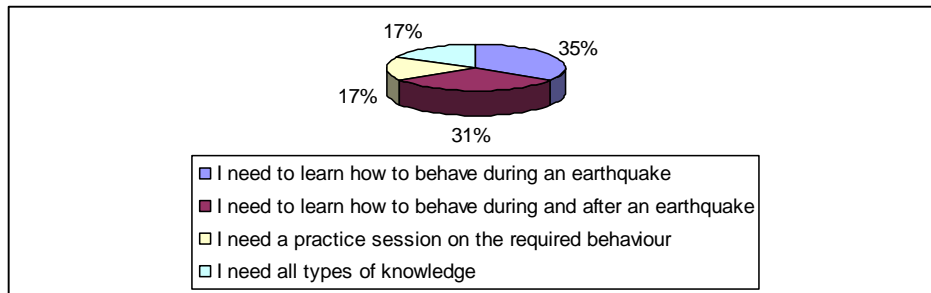


Figure 5: Types of needed knowledge and training

Formal initiative for curricula adaptation

According to the Regulations specified in the chapter “Legislation” in the above text, the school curricula rely on the formally adopted units called educational standards. Educational standard is a group of statements which describe the knowledge and skills which a pupil is expected to show at the certain level at the end of the obligatory education. There are three levels of standards: (1) Basic level standard – knowledge and skills achieved by 80% or more pupils; (2) Middle level standard – knowledge and skills achieved by 50% or more pupils; and (3) Advanced level standard – knowledge and skills achieved by about 25% of pupils.

The present educational standards for geography are defined in the document entitled “Educational standards at the final stage of compulsory education, for the subject Geography” (defined by the Ministry of Education in 2010). These standards presently do not contain the knowledge and skills related to detection and prevention of natural disasters.

In 2012, the process of revision of the present standards began. The study “Natural disasters and geography teaching” (Milošević et al., 2013) was used as a basis for the inclusion of basic level standards related to detection and prevention of natural disasters. This revision will have the experimental status in the first phase. Cooperation and help of Mr Dragan Rakita, the representative for geography within the National Survey for Evaluation of Education, was of great significance. The revision of the standards is supposed to be enacted in February 2014 by the National Education Council of the Republic of Serbia. It is very important to stress that it is suggested that the DRR elements are supposed to have the status of the basic standards, which are to be reached by more than 80% of schoolchildren. As this is an experimental revision, it will last for two years, and in this period it will be applied in 190 schools. After this period, it will hopefully be included in the regular education system of the Republic of Serbia.

Conclusion

The Serbian example of non-systematic inclusion of DRR concepts and practices in the compulsory education network may serve as a partial solution in the situations where the existing school curricula are not yet updated with this kind of contents. The ideas and recommendations on DRR education given in the Hyogo Framework for Action (PFA3/CI2) took some time to be accepted and performed.

The situation with knowledge about some basic issues, like the proper reaction in case of an earthquake, has been proven relatively poor among the schoolchildren. The poll survey in the schools of Kraljevo, described in the above text, revealed that:

- reaction of the children at the time of the main earthquake was inadequate;
- children are not aware that their reaction at the time of the earthquake was not correct;
- children need training in order to react correctly before, during and after an earthquake.

Being aware that the full inclusion of hazard and disaster risk-related issues into existing education curricula is a time-consuming process, we started with small and relatively easy, yet effective steps in that direction. Following the recommended steps stated in the "Words into Action: A Guide for Implementing the Hyogo Framework" (UNISDR, 2007)⁹, a number of actions have been taken. Within the step (1) a working group was established in our research institute, to prepare a teachers' professional training program; within the step (2) the survey among schoolchildren was performed, as well as the analysis of geography curricula; within the step (4) education material (particularly geography textbooks) was thoroughly analysed; within the step (5) training for teachers has been provided; within the step (9) the dialogue among researchers and policymakers has led to the formal initiative for curricula adaptation, which will probably be formally enacted in two years time.

In the meantime, the great majority of teachers who positively responded to the question on applicability of the program in schools indicate that it is possible to take the responsibility and the initiative, and to include the elements of disaster risk reduction in a number of other lessons, regardless of the fact that they are not yet in the formal curricula. The fact that in this phase the process depends solely on the personal readiness and good will of teachers makes this approach non-systematic by default. However, despite the fact that this is a partial limitation, at the same time it is a good opportunity in a given situation.

Among the various approaches presented in the "Disaster Risk Reduction in School Curricula: Case Studies from Thirty Countries" (Selby and Kagawa, 2012), our course of actions can be regarded as a Textbook-driven approach. In spite of several disadvantages, our opinion is that the numerous advantages (primarily the largest number of involved pupils) serve as a good recommendation to this concept. The first step of curricula adaptation has been done within the subject geography, but according to the recommendations, the actions in favour of disaster-related information will be spread also to other subjects within the education system.

⁹ Internet: http://www.unisdr.org/files/594_10382.pdf (27-07-2012)

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