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Mapping new training and preparation opportunities in disaster management for the adult population in Hungary

A magyar felnőtt lakosság új katasztrófavédelmi képzési- és felkészítési lehetőségeinek feltérképezése

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Introduction

The frequency and severity of natural and civilisational disasters is constantly increasing in the modern world. To meet these challenges, cooperation between individuals and professional disaster management is essential. Although innovative technologies and developments allow for faster and more precise intervention, the preparedness of society remains a fundamental prerequisite for successful response. The author's aim is to develop a basic disaster management training system that can be compulsorily integrated into companies' training programmes, similar to fire and occupational safety training. The article contains suggestions for modernising the methods and tools of knowledge transfer using today's modern technology. The article was based on the publication "The applicability of new training and preparation forms and methods in the Hungarian disaster management", which is currently being published in the online professional scientific journal Védelem Tudomány.

A természeti és civilizációs katasztrófák gyakorisága és súlyossága folyamatosan növekszik a modern világban. Ezen kihívások kezelésére elengedhetetlen mind az egyének, mind a hivatásos katasztrófavédelem együttműködése. Bár az innovatív technológiák és fejlesztések lehetővé teszik a gyorsabb és precízebb beavatkozást, a társadalom felkészültsége továbbra is alapvető feltétele a sikeres védekezésnek. A szerző célja egy olyan alap katasztrófavédelmi oktatási rendszer kidolgozása, amely kötelezően beilleszthető a cégek képzési programjába, hasonlóan a tűzvédelmi és munkavédelmi oktatásokhoz. A cikkben javaslatokat találhatunk az ismeretátadás módszereinek és eszközeinek korszerűsítésére a mai modern technológia használatával. A cikk Varró Tekla „Új képzési és felkészítési formák, módszerek alkalmazhatósága a hazai katasztrófavédelemben” című, a Védelem Tudomány online szakmai tudományos folyóiratban megjelenés alatt álló publikáció alapján készült.

Keywords: prevention period, training and preparedness, basic disaster education, e-learning in disaster management

Kulcsszavak: megelőzés időszaka, képzés és felkészítés, katasztrófavédelmi alapoktatás, e-learning a katasztrófavédelemben

INTRODUCTION

In the modern world, the frequency and severity of natural and civil disasters are on the rise, requiring increased preparedness and coordinated response. In addition to the effective tools, advanced systems and procedures of professional disaster management, the active participation of the population is necessary for the successful management of emergencies. Innovation and technological developments contribute significantly to faster and more accurate interventions, thus ensuring the safety of society and the effectiveness of cooperation between all actors involved.

My research focuses on the modernisation of the public information and alert system, which involves analysing current systems and exploring new opportunities for improvement. My main objective is to assess the Hungarian population's awareness of disaster management procedures, which include knowledge of the rules of conduct to be followed in the event of a MoLaRi system[1] start-up, or of the evacuation protocols to be followed in case of a hazardous plant or Paks Nuclear Power Plant malfunction. My research methods include the analysis of relevant national literature, the application of relevant legislation and the results of a questionnaire survey.

Another of my objectives is to develop a comprehensive disaster management education system that could be integrated on a mandatory basis into the workplace and fire safety training programmes of Hungarian businesses and companies. The educational modules would cover three areas of disaster management: fire safety is created by providing fire safety education, industrial safety is created by providing specialised education for people working in and around hazardous plants, people working in and around nuclear facilities, and people living near nuclear facilities, while the civil protection module is created by providing basic disaster management education, which I have developed. This education system would significantly increase the preparedness and capacity to act of the population in the event of disasters, while supporting the development of safety awareness in society at large.

THE RELEVANT LEGAL REGULATIONS, STRATEGIES, METHODS AND TRAINING OF PROFESSIONAL DISASTER MANAGEMENT AGAINST CIVIL AND NATURAL DISASTERS

1.1 Legislation

The implementing decree of the Civil Protection Act, Government Decree No. 234/2011 (XI.10.), Article 49.5, paragraph 5 [1] states that the regional body of the professional disaster management body shall carry out the training of civil protection organisations and the population. In view of the subject of this article, which is to provide basic disaster management education to the entire population of Hungary, it is necessary to change the legislation, to create a new paragraph in the aforementioned legislation, according to which the authorised disaster management lecturer may also carry out educational activities in the workplaces of Hungary, thus facilitating the dissemination of the educational material to as many people as possible.

BM Decree 62/2011 (XII.29.) from § 46 to § 70 [2] defines the requirements for disaster management and civil protection training. The purpose of disaster management training is to prepare for the tasks involved in preventing, averting and recovering from civil and natural

[1] Monitoring and Public Alert System: a major project of the National Directorate General for Disaster Management of the Ministry of Interior (hereinafter referred to as BM OKF, which is the Hungarian abbreviation for the Ministry of the Interior's National Directorate General for Disaster Management), which has set up a highly available, redundant meteorological and chemical monitoring and public alert system in the area of lower and upper threshold hazardous chemical industrial plants.

disasters and to minimise the damage in the event of such disasters. The training programme is prepared by the BM OKF and approved by the Director General of the BM OKF, and the training material I am developing can also be used with the approval of the Director General of the BM OKF. The department setting up and running the training shall keep records of the participants in the training.

Public protection is governed by Government Decree 234/2011 (XI.10.), one of the main parts of which is public information and alerting. This is supplemented by Chapter IX of BM Decree 62/2011 (29.XII.2011), which provides for the preparation of the population for disaster prevention. Article 67 states that "*The main objective of disaster preparedness is to inform the population as widely as possible about the local hazards and the rules of conduct to be followed in the event of danger or alarm.*"

1.2 Disasters of civilisational and natural origin and their prevention in Hungary

"*The new disaster management organisation, created from the predecessors of the fire brigade and civil protection, had to face civilisational hazards, natural disasters, human and ecological threats as challenges. The civilisation threats were nuclear energy systems, nuclear material transports, cross-border nuclear accidents, industrial accidents involving hazardous materials, hazardous plants and hazardous material transports. Natural hazards threats were forecast as hydrological, geological and meteorological. The human and ecological challenges were identified as ecological pollution, fires threatening nature, possible epidemics, proliferation, migration, possible occurrences of terrorism.*" [3]

Hungary's National Disaster Risk Assessment 2023 report [4] identified the following as the most challenging risk factors:

- severe storms (windstorms, snowstorms),
- extreme temperature conditions (heat wave, cold wave),
- drought,
- forest fires,
- freezing rain,
- tidal wave, flood, inland water,
- other effects due to poor geological conditions (dam bursting), landslides,
- earthquake,
- emergence of infectious diseases, pandemic,
- invasive allergen or toxic plants,
- space weather,
- release of large quantities of flammable or explosive substances,
- toxic substance released in large quantities and the environmental damage caused by it,
- major transport accidents (rail, shipping, road or air transport),
- nuclear accident
- terrorism, migration.

Hungary's natural features and economic structure make it a moderate risk area for natural and civil disasters. In particular, meteorological and hydrometeorological events and extreme weather events pose the greatest risk of natural disasters. With regard to disasters of civilisation origin, the main sources of risk are the operation of hazardous industrial plants, the transport and storage of dangerous substances and human interference with nature. All these factors pose a threat to human life, the environment and national property.

The task of the professional disaster management is to operate a unified and coordinated protection system to prevent, manage and eliminate emergencies. The aim is not only to protect human life directly, but also to safeguard property and national assets and to minimise damage

to the environment. In addition, disaster management pays particular attention to raising public awareness of safety, including appropriate information, education and awareness of emergency rules of conduct. Preparing the population is of paramount importance to ensure that they are able to respond effectively and in a disciplined manner to emergencies.

By operating a unified system of protection, disaster management aims to protect human life, safeguard property, protect national property, protect the environment and maintain and develop people's sense of security.

1.3 The disaster preparedness system

According to Article 3.16. point 16 of Act CXXVIII of 2011, the definition of prevention is "*any activity or regulation that eliminates or minimises the causes of a disaster and minimises the likelihood of its harmful effects.*"

Of the prevention, mitigation and recovery periods, the prevention period is the most important for the purposes of this paper. This is the period during which the causes of the disaster are eliminated and the consequences reduced. Preparation of the population during this phase is aimed at transferring knowledge and related information for a possible future event. Public preparedness is the "tool" of the main period of prevention, ensuring that citizens have the necessary and basic knowledge at the time of a potential disaster. It is important to prepare people for - and to deal with - hazards that are likely to occur in their environment. [5]

The training material will ensure that, in the event of an emergency, citizens will be able to recognise the warning signs and messages, increase the number of people able to act, learn to apply the rules of conduct and have a high rate of self-rescue. [6]

In the period of prevention, the so-called "mixed" type of preparedness takes place, in which, in addition to the professional disaster management bodies, civil and voluntary organisations and different levels of the protection administration are involved in preparing the population. The mayors and the heads of the protection committees coordinate the preparation of the population together with the staff of the professional civil protection services. The training can be of an awareness-raising, skills development or mixed type. Educational publications, textbooks, workbooks and other traditional educational tools are used. [7]

1.4 Possible methods of knowledge transfer

The way in which information is communicated should be adapted to the age of the population in order to reach the different target groups effectively. For the older generation, traditional means of communication such as printed materials, brochures, leaflets, calendars, television and radio programmes are particularly important. These information sources are easily accessible to them and serve as a reliable channel.

For the younger generation, new digital forms of knowledge transfer are coming to the fore. Interactive content available on the internet, such as tutorial videos, podcasts and social media information campaigns, are an effective complement to practical training. In addition, downloadable apps for smartphones will be given a prominent role, thanks to their ease and speed of use in emergency situations.

The first step in the transfer of information is to raise awareness, which is key to generating interest. It should then focus on the transfer of basic knowledge and information to enable the public to react in an informed and responsible way in the event of an emergency. In the long

term, targeted education and information can contribute to the development of a safety-conscious society, where people not only know the right rules of behaviour, but are also able to apply them when necessary.

These age-specific approaches allow information to reach all target groups and provide an effective tool for improving disaster preparedness. [8]

KNOWLEDGE OF THE POPULATION ON BASIC DISASTER MANAGEMENT ISSUES

The mapping of the population's basic knowledge of disaster management was examined by processing an anonymous questionnaire completed by 250 people. The respondents were classified into 5 main age groups, 0-18, 19-35, 36-60, 61-70 and 71+ years of age. To answer the questions, I created an online questionnaire that was completed by 250 volunteers between 1 August 2024 and 29 August 2024. I used Google Forms for data collection and analysis. The questionnaire asked the respondents to answer 11 questions, 10 of which were compulsory and 1 optional.

The highest percentage of completers (57.6%) came from the 19-35 age group, the 2nd highest number of completers (33.2%) came from the 36-60 age group, followed by the 61-70 age group (6.8%), then the 71+ age group (1.6%) and finally the 0-18 age group (0.8%). Among those who responded to the questionnaire, it can therefore be seen that the age group most receptive to the work of civil protection is the population aged between 19 and 60, which implies that there is a need to create, develop, design and introduce the basic training in civil protection that I have set as my objective, as compulsory training in the workplace.

An analysis of the responses to the 11 questions showed that a significant proportion of the population has a lack of knowledge about the functioning of disaster management systems and emergency response. The majority of respondents are not at all familiar with public alert forms, which makes it clear that there is a significant need for basic disaster management education.

Although television and radio announcements are relatively widely known, awareness of SMS notification and the VÉSZ[2] app is much lower. As these tools are also becoming more prominent in our country, I conclude that the public's awareness of digital notification systems needs to be further improved.

One of the most worrying findings is that 74.4% of respondents are not aware of the rules of conduct to follow when a MoLaRi siren is triggered. More than half of those who completed the questionnaire are not familiar with how the MoLaRi system works and the purpose and time of its test. These results show that, despite the widespread use of the system, citizens do not have access to effective information about the MoLaRi system itself and what to do in an emergency.

Emergency preparedness knowledge is also very low: 78% do not know how to prepare for an emergency in their home. This clearly shows that the public's disaster awareness and preparedness is significantly below the desired level.

69.2% of the respondents are not aware of the official communication channels of the professional emergency services and only a small proportion of those who are aware of and use

[2] The VÉSZ app (Hungarian abbrevation form Emergency Notification Service – „Veszélyhelyzet értesítési Szolgálat") is an emergency service developed for smartphones and tablets that provides real-time information on accidents, fires, fire brigade interventions and meteorological service alerts.

these channels. This suggests that disaster management information does not reach the public effectively and therefore the promotion of these channels is a priority.

On the positive side, more and more people are getting information through social media, with 70.8% of respondents indicating Facebook as the most frequently used source, which provides an excellent opportunity for the professional civil protection services to communicate more actively with the public.

Overall, the data points to the need for improved public information and basic disaster management education, especially through modern notification systems and social media platforms.

TEACHING MATERIALS FOR BASIC EDUCATION IN DISASTER MANAGEMENT

The evaluation of the results of the questionnaire described above revealed that the public's knowledge of basic disaster management issues is not satisfactory. The responses also made it clear that the population has only minimal knowledge of the tools and procedures used by disaster management, media platforms used by professional disaster management, training and events. Based on the responses received, the development of educational material should be organised into 5 groups, each of which contains basic education on a specific hazard. These are: floods, hazardous materials emergencies, fire emergencies, extreme weather emergencies and earthquakes.

The content of the educational material is partly the same as the content of the active public information material, which should include the following:

- preparing the population to recognise alert methods and signs,
- the rules of conduct to be followed,
- forms of assistance,
- the natural and civilisation risks threatening the area concerned,
- possible ways of averting the danger.

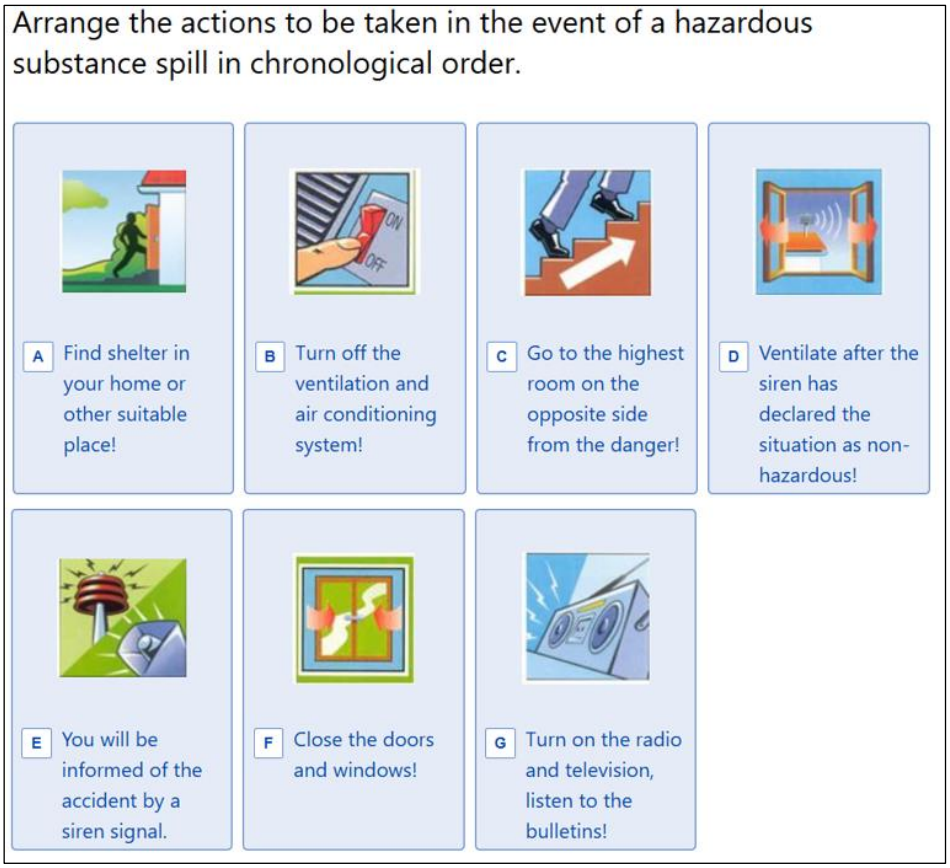
One means of making educational material available is passive public information, which includes:
- printed and electronic information publications accessible to the interested public,
- open days at disaster management branches.

3.6 Use of innovation proposals

Preparing the population for civil protection tasks falls within the scope of adult education and training. One of the main challenges for adults in further education is that work commitments make it difficult to participate in traditional education. E-learning[3] and m-learning[4] offer an effective solution to this challenge, as they allow for convenient learning without time and place constraints. Learners are in constant contact with their instructors and have the opportunity to collaborate with the rest of the group. E-learning and m-learning are among the most advanced forms of modern digital education, thanks to their high quality, efficiency, cost-effectiveness and flexibility. An additional advantage of e-learning and m-learning is that the learning material can

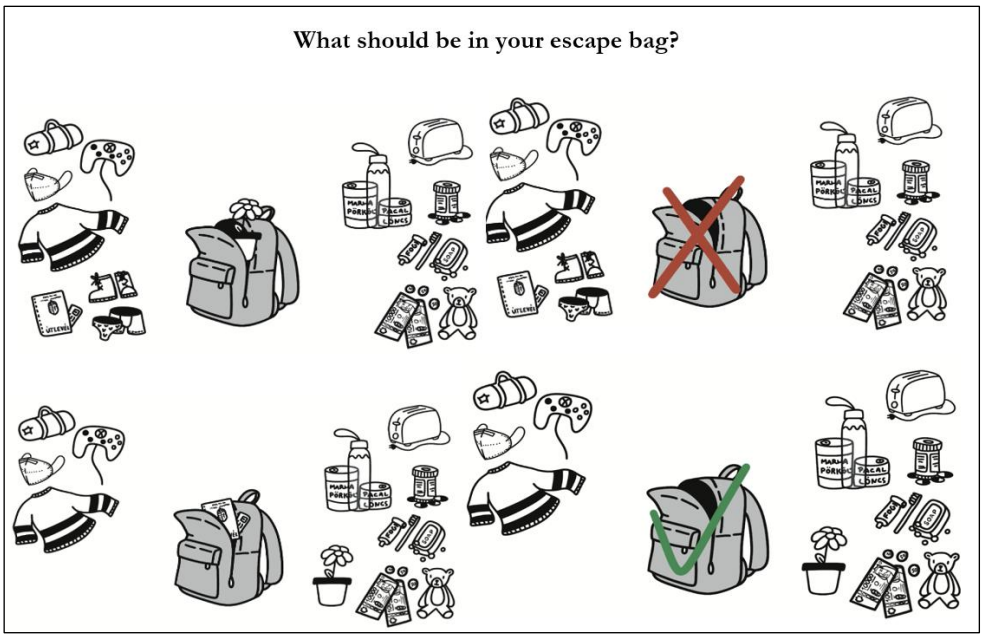
[3] teaching-learning supported by ICT and ICT-enhanced tools
[4] distance learning and e-learning, where learners can learn anywhere, anytime, without being tied to a network, on a laptop, tablet or mobile phone

be delivered in individual sessions, allowing learners to work at their own pace and on their own timetable.



1. Figure: E-learning exercise: „Arrange in chronological order the actions to be taken in the event of a hazardous substance spill." Self edited image with combined use of Typeform.com and Miskolc public information brochure. [9]

Gamification can be one of the most popular and effective ways of training adults and children. People have a desire for reward and recognition from childhood. Praise for a job well done makes people feel good and motivates them to do it well again. Today's adults and children love to play games, and a well-designed gamification can be a significant aid to education. With the right reward system, people of all ages can be encouraged to work and learn more effectively. Gamification is closely linked to the various applications and simulation games that can be downloaded onto mobile phones and tablets. I recommend that the educational material developed be presented and tested in a gamified form. During the game, correct answers and solutions can be rewarded with points, rewards, medals, which allow participants to reach higher and higher levels in the game. [10]



2. Figure: "What should be in your escape package?" gamification game. By pulling different objects into the bag, you can see if you know the contents of the escape bag correctly. Graphics by Adél Mikes

So my aim is to teach the compiled training material to the residents of Hungary using e-learning, m-learning and gamification. The educational material can be used as an educational aid, which should be made available to the population in printed and online form. The knowledge acquired can be tested by means of tests and game exercises. I also propose the introduction of the above-mentioned compulsory disaster prevention training, alongside fire safety and occupational safety training, in the form of lectures, e-learning and simulation exercises. In addition, the knowledge of adults and children can be enhanced by the educational material I have developed through lectures on disaster prevention and law and order days. The material could also be tested and rewarded with small gifts on disaster management themes (e.g. key rings, shopping trolley coins, neck straps, pens, notebooks or fridge magnets).

SUMMARY

Overall, it can be concluded that the legal environment provides an adequate basis for the introduction of the curriculum and with it the compulsory basic education in disaster management, but legislative changes are needed if the system is to be adopted.

The primary aim of the curriculum is to prepare the population for effective protection against natural and civil disasters and to help build effective response capacity. The methods of preparation should be designed to meet the specific needs of the target groups, so that everyone can acquire the appropriate attitudes and actions.

The responses to the questionnaire I compiled show that a significant proportion of the population has little or no knowledge of how disaster management systems work, the rules of conduct to follow in an emergency, and the tools and procedures already available. It is a cause for concern that the majority of the population is not aware of the MoLaRi system sirens and that awareness of digital alert systems such as SMS notifications and the VÉSZ app is extremely low. However, it is positive that the role of social media is a growing trend that the professional emergency services should take advantage of in order to provide more effective information. To

address these problems, I have gathered the most important disaster management basics that the public may need at any time. The educational material is divided thematically into five groups: floods, hazardous materials, fires, extreme weather and earthquakes. The material needs to focus on warning signs, rules of conduct to follow, forms of assistance and recognition of imminent risks. The ready-to-use educational material can also be used as a slide show, for example in workplace training, disaster management open days and school education.

Another suggestion is to use e-learning and m-learning courses to bring the playful educational material to as large a part of the population as possible, thus increasing their resilience to disasters. Online learning offers a flexible solution for adults who would find it difficult to attend traditional training courses due to work commitments. Gamification can increase the motivation to learn by gamifying the learning material, which can be supported by different applications. The educational material developed should be made available online and in printed form, with test questions and answers. It is proposed that theoretical education be supplemented by practical training and simulation exercises to help the public to easily master the knowledge already acquired.

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