
Application of information technologies in fire protection education

[Student Paper - Undergraduate Research]

Ivica Kolenkaš, Higher Education Technical School of Professional Studies Novi Sad, ivica.kolenkas@gmail.com

Miloš Ljatković, Higher Education Technical School of Professional Studies Novi Sad, milosljatkovic@sbb.rs

Verica Milanko, Higher Education Technical School of Professional Studies Novi Sad, milanko@vtsns.edu.rs

Tanja Krunić, Higher Education Technical School of Professional Studies Novi Sad, krunic@vtsns.edu.rs

Abstract

Proper fire hazard education saves lives and helps avoid many other consequences of fires. The survey conducted on the student population and the platform created for this investigation obtain and process data necessary to design a set of lectures accompanied with a training in fire protection.

Key words: survey, fire hazard, open source technologies, content management system, education

Introduction

Together with other technical and technological disasters, fires have become part of a modern society, causing damage and taking lives almost every day. Anyone who has witnessed a fire breaking out could see and feel a very powerful and scary enemy, which consumes all and everything. But, if you get to know your enemy a little better, find out its weaknesses and how to control it, your chances of avoiding danger will be high.

Sadly, in the last couple of years, there were two major fire disasters in Novi Sad, which took several young lives. One, happened on February the 17, 2008, when 8 young people died during the fire in the cafe bar *Lounge*, (Blic, 2008). Figure 1 shows the building after the fire. The next tragedy happened on April 1, 2012 in the discotheque *Contrast* where 6 young people died, (Telegraf, 2012). Both fires caught our attention because the victims were young people, and fellow students who died in clubs. Whoever or whatever is to blame for this is irrelevant, but one thing is certain – with proper fire hazard education, better understanding of fire behaviour and our own actions in case of fire some, if not all, consequences could be avoided.

On the other side, panic and the psychology of the crowd cloud the judgment of almost everyone. According to 'convergence theory', the behaviour of the crowd is not the result of that crowd, but of individuals who transmit their behaviour to the crowd. It is not difficult to figure out what happens if the behaviour of several individuals affected by fear and panic is transmitted onto the people surrounding them.

Nowadays, information technology is ever-present in the lives of people, working its way into every aspect of their daily routine. The area where it can excel is education, because younger generations are traditionally open-minded to novelties including IT and the Internet. Besides, young people enjoy working on computers. According to a 'Safe computer usage' survey by Subić and Krunić (2013), students in our school spend approximately 5 hours and 20 minutes on their computers a day. Some of that time could be used for the purpose of their fire protection education. Hence, it would be extremely useful to employ IT as a medium to educate students in our school about fire protection.



Figure 1: Cafe *Lounge* after the fire, Novi Sad 2008

The survey

Human negligence, carelessness and ignorance often cause fires. Statistical data for Serbia from the period 2001 – 2009 suggests that the two most common causes of fires in residential areas are human negligence and faulty/untested electrical wiring. While researching fire safety among tenants of multi – story buildings, Milanko and Laban (2012) concluded that only 10% percent of all participants were well informed about fire prevention and evacuation. Only 5% of all participants were somewhat trained in firefighting. Hence, there is a need for fire protection education of people of all generations. People should be informed about what can cause a fire, how to behave during the fire and how to protect themselves. In order to get information about knowledge in the field of fire protection of young people, we created an appropriate web application containing a questionnaire for students. The questionnaire consists of 15 questions (Figure 2) covering various areas of fire protection like what causes a fire, the fire hazards, the evacuation from the place of fire, and emergency calls.

The main feature of all the questions is that there are no right/wrong answers. We wanted the survey to give everyone a chance to express their own opinion through the multiple-choice questions, but also to check the credibility of some answers, since a few questions scattered across the list have contradictory answers, which will be explained later.

At the end, all the results of the questionnaire are stored in a database and can serve for statistical purposes.

Ninety-three students took part in the survey. They were from various study programs and of both genders. The average age of the participants was 21.5 years, and all participants were of equal age (21-22 years old). These parameters are consistent with the ones referring to the victims of the two disastrous fires in the city of Novi Sad mentioned earlier.

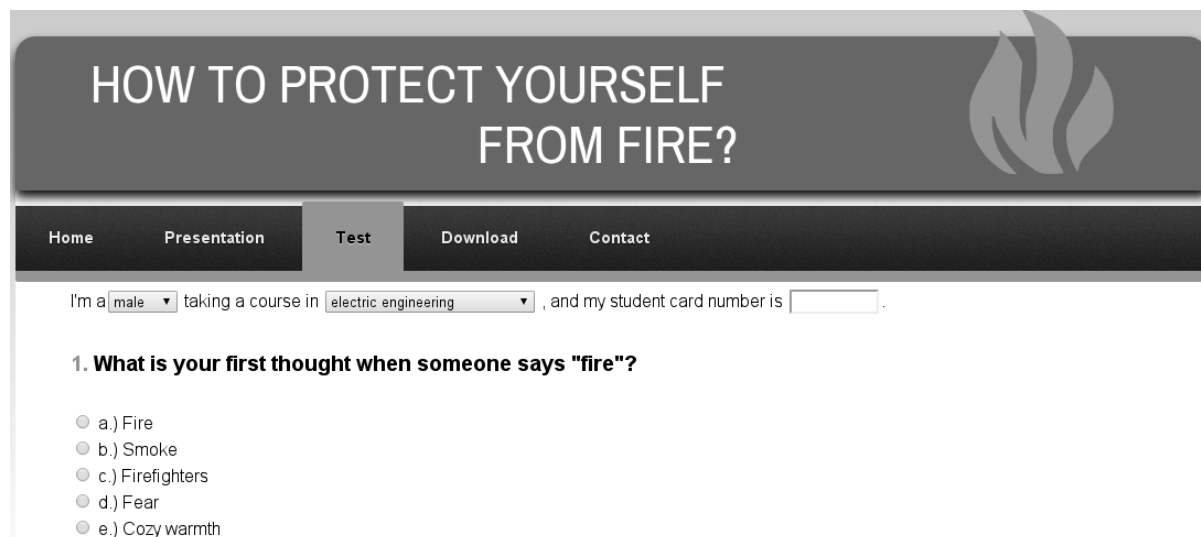


Figure 2 – The design of the survey, with the first question shown

Let us present the obtained results now. Figure 3 shows the answers obtained from the first question “What is your first thought when someone says 'fire'?”. The answers were as expected, because 90% of the surveyed chose the option “fire”, while the rest mainly selected answers “smoke” and “firefighters”.

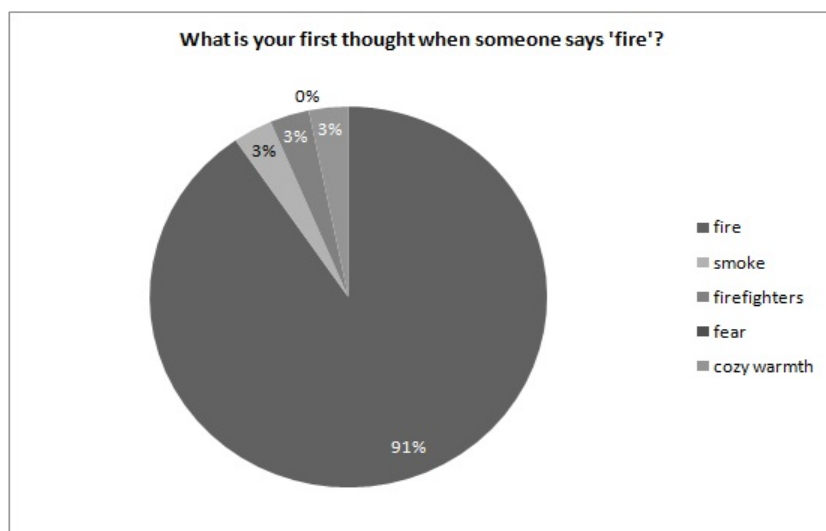


Figure 3 – Distribution of answers regarding question 1

One of the subsequent questions targeted environments and events that are common for students, such as picnics, movie theaters and clubs. Even 74% of all students answered that

they do not pay attention to where the evacuation routes are. However, in few questions further along they were asked “If a fire breaks out, you will evacuate using ...” with answers such as “Elevator”, “Fire staircase”, “Regular staircase” and “Jumping from the terrace”. It is interesting that 81% said that they would use a fire staircase. But how will they know where to find it, if they said that they did not pay attention to where that staircase was, or if it even existed? Figures 4 and 5 show the comparison of percentages obtained for offered answers to two related questions.

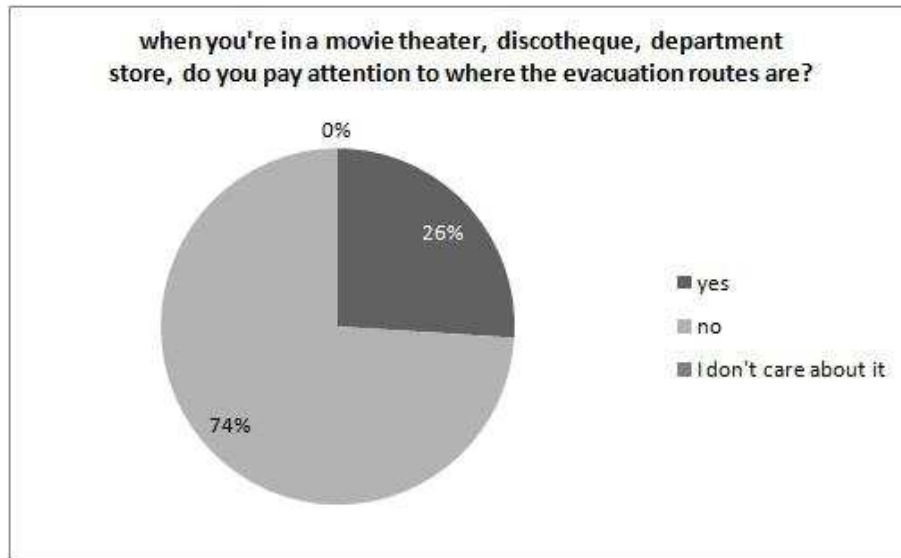


Figure 4 – Diagram describing answers to the first of two related questions

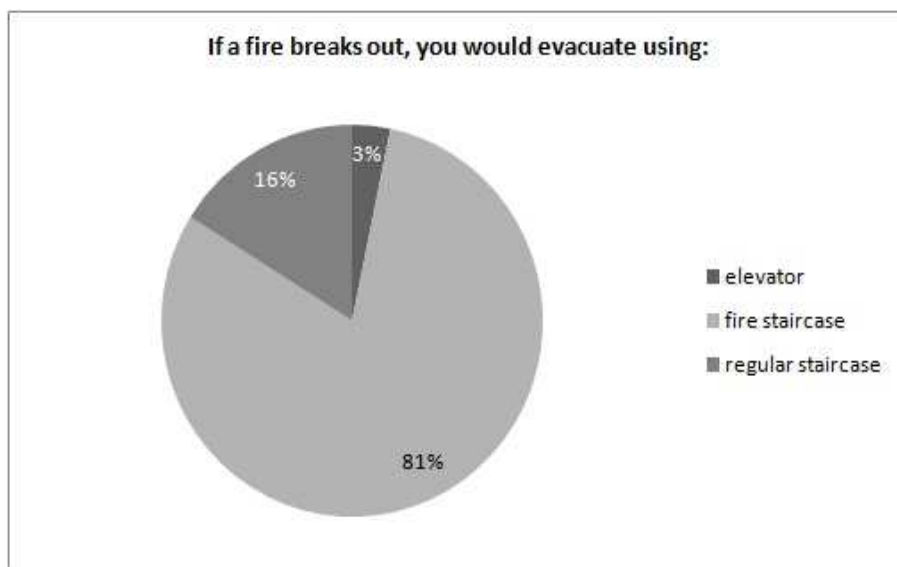


Figure 5 – Diagram describing answers to the second of two related questions with contradictory answers

A few questions downward, we asked if they had ever activated a fire extinguisher, and 74% of them all answered “No”, which is consistent with 74% affirmative answers to the question

“Should every person have a basic training in firefighting?” as displayed in Figure 6.

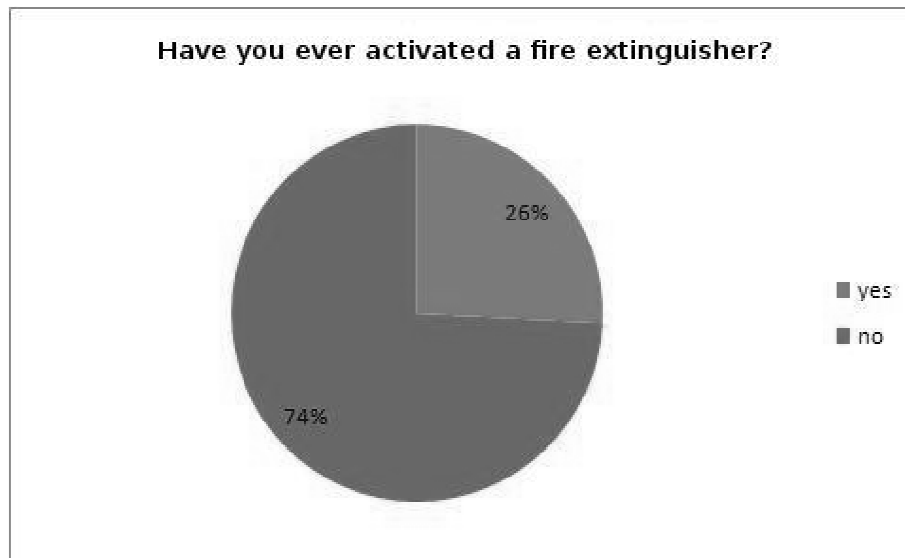


Figure 6 – Diagram describing how many participants have activated a fire extinguisher

These were just some of the questions and answers from the survey, which we thought would be interesting to present.

The platform

There are a lot of survey systems online that are ready to be used, but we wanted to build our own for several reasons. First of all, we were learning throughout the creation process. Secondly, we made it fully adaptable for our needs, and we also have total and complete control over the surveying process. If a need arises to upscale the CMS, other students from our school can continue our work. Technology-wise, our obvious choices were free and open source technologies, such as PHP and MySQL, a proven duo capable of almost any task. The surveying itself was conducted anonymously, and besides answers, we collected data on categories including students' gender and study program. However, answers were not influenced by their gender or study program, but the term “*Fire protection*” was left out for obvious reasons.

To access the survey, every student received a token via email, which was discarded after the first use. This system was implemented to prevent any irregularities.

The administration panel

There was a necessity for some kind of administration, which turned this whole project into a content management system (CMS). From that administration panel questions could be added, along with possible answers, and the user could generate tokens for every student if a need to repeat the survey arises.

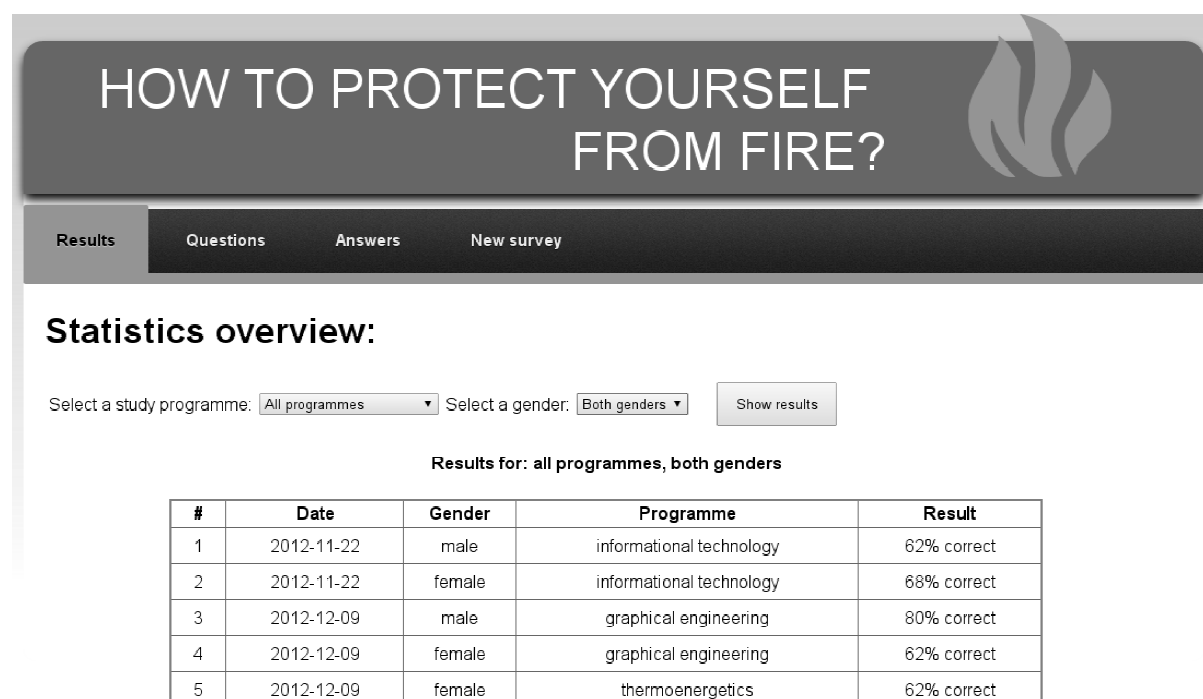


Figure 7 – Overview of the administration panel with results

Conclusion

The purpose of our application is to provide a way to efficiently gather and process statistical data about the current state of fire hazard awareness, and to provide a means of using that data. Further activities that stem from this data include fire protection training and lectures about it. In these lectures, special attention will be paid to questions that were not answered correctly in the survey. For example, if the majority of students do not know which number to call if a fire breaks out, that number will be repeated several times during the lectures. Consequently, this project represents a platform for surveying and educating students, and all others, especially secondary school pupils, in the protection against fire hazards. Furthermore, the administration panel allows the questions and answers to be changed and adjusted according to potential participants. Finally, it can be used for surveying various topics of interest, not just fire protection.

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Biographies

Ivica Kolenkaš is currently a student at the Higher Technical School of Professional Studies, Novi Sad, Serbia, on the Department of Information Technology. His interest in IT began at an early age, and remains still. Since then his focus narrowed to open source technologies including Linux administration, programming in Python and advocating the open source philosophy.

Miloš Ljatković was born on March 16th 1992. in Novi Sad, Serbia. He grew up in Novi Sad, where he completed the secondary electrical school "Mihajlo Pupin". He is currently a second year student at the Higher Technical School of Professional Studies, Novi Sad, on the Department of Information Technology.

Verica Milanko is a professor at the Higher Technical School of Professional Studies, Novi Sad, Serbia. She received her BEng and MEng from the Faculty of Technology, University of Novi Sad. She also received her PhD in Fire Risk Management from the Faculty of Management, Novi Sad. Her research deals with topics in the fields of safety engineering, risk assessment, planning and design in fire protection, planning and design in occupational safety, and environmental engineering. As author or co-author, she has published about a hundred papers from these areas in Serbian and international journals and conferences. She also works at the Institute of Protection Technology in Novi Sad.

Tanja Krunić is a lecturer at the Higher Technical School of Professional Studies, Novi Sad, Serbia. She teaches courses in programming, web design and Internet languages and tools. She holds an MSC in mathematics and is currently working towards her PhD in Numerical Analysis from the Faculty of Mathematics and Natural Sciences, Novi Sad. Her research interests include important issues like responsive design, search engine optimization usability, accessibility, privacy, and security on the World Wide Web.