Crisis Preparedness and Perceived Safety in Higher Education: The Role of Response Information, Crisis Concerns, and Critical Incidents

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Abstract: The security environment in Europe has changed substantially over the past decade. Geopolitical instability, hybrid threats, cyberattacks, disinformation campaigns, and violent incidents in public spaces have increased the importance of individual preparedness and security awareness. At the same time, many post-communist countries in Central and Eastern Europe have gradually abandoned educational approaches that historically included elements of civil defence, emergency preparedness, and population protection. As a result, contemporary university students often receive little formal education on how to recognize threats, react during emergencies, or behave appropriately in crisis situations. Recent incidents, including attacks on educational institutions, have highlighted the need to reconsider the role of universities in preparing students for emerging security challenges. While higher education traditionally focuses on disciplinary knowledge and professional competencies, the changing security landscape requires a broader educational perspective that also develops personal preparedness, situational awareness, and crisis-response skills. The study examines crisis preparedness and perceived safety in higher education, focusing on the relationships between perceived crisis-response information, threat-related safety impact, crisis-related concerns, and the perceived impact of the December 2023 shooting at the Faculty of Arts, Charles University in Prague. The study is based on a survey of 358 respondents from universities in Slovakia, including 329 students and 29 university employees. Higher perceived crisis-response information was associated with a lower perceived impact of potential threats on respondents' sense of safety. All three crisis-related concerns were positively associated with threat-related safety impact, with concern about life and health showing the strongest relationship. The perceived impact of the Prague shooting showed the strongest association with threat-related safety impact and was also negatively associated with perceived crisis-response information. These findings point to the importance of ensuring that university communities have clear information about how to respond to crisis situations. At the same time, information alone may not be sufficient to prepare individuals to act during an emergency. Based on the findings of this study and previous research, the paper discusses the potential use of Massive Open Online Courses (MOOCs) and Virtual Reality (VR) simulations in university crisis-preparedness education. MOOCs could provide accessible crisis-response information to large numbers of students, while VR could provide opportunities to practise decision-making and behavioural responses in simulated crisis situations. Their combined use is proposed as a possible approach to connecting crisis-response information with practical training in higher education.

Keywords: Crisis Preparedness; Crisis-Related Concerns; Crisis-Response Information; Higher Education; Perceived Safety; Security Education

1. Introduction

The security environment in Europe has undergone a substantial transformation over the past decade, defined by geopolitical instability, hybrid threats, cyberattacks, and violent incidents in public spaces. Within this shifting landscape, educational institutions are increasingly recognized as "soft targets", locations characterized by high concentrations of people and limited security measures, making them attractive for violent exploitation (Jankura et al., 2019). According to the latest data from UNESCO (2026), educational institutions, learners, and educators are being targeted during armed conflicts at an unprecedented rate.

Recent violent incidents in European educational institutions further demonstrate that serious security threats are not limited to a single country or type of educational setting. In December 2023, a shooting at the Faculty of Arts, Charles University in Prague resulted in the loss of 14 lives and injuries to 25 students and employees (Charles University, 2024). More recently, in August 2026, an 18-year-old man armed with a sword attacked students at Brinell High School in Fagersta, Sweden, killing a 17-year-old student and injuring three other young people (The Guardian, 2026).

At the global level, the Global Coalition to Protect Education from Attack (GCPEA, 2026) recorded at least 8,566 attacks on education in 2024 and 2025, representing an increase of more than 40% compared with 2022–2023. These attacks harmed at least 10,600 school and university students, teachers, professors, and other education personnel. Furthermore, the UN Secretary-General's 2025 report indicates a 44% increase in attacks on schools

in 2024 compared to the previous year worldwide (UNESCO, 2026). Recent attack in Sweden (The Guardian, 2026)

This global trend is reflected in the European context, where Europol (2026) reports that the terrorism threat remains high, with established ideologies such as jihadism, right-wing, and left-wing extremism persisting and evolving. In 2025, 45 terrorist attacks were reported by 10 EU Member States, and 486 suspects were arrested for terrorism-related offenses (Europol, 2026).

Despite these rising threats, many post-communist countries in Central and Eastern Europe, including Slovakia, have gradually abandoned historical educational approaches that included civil defense and population protection. Consequently, contemporary university students often receive little formal education on recognizing threats or behaving appropriately in crisis situations. Research in Serbia by Roković and Stojanević (2024) highlights that while public universities have begun integrating disaster risk reduction (DRR) into curricula, many institutions still rely on a "transmission paradigm", the one-way delivery of theoretical knowledge which fails to develop the proactive behavior necessary for modern disaster management.

The increasing frequency and severity of violent attacks have intensified concerns regarding the preparedness of educational institutions to respond effectively to emergency situations (Moore-Petinak et al., 2020). These developments raise an important question for higher education: whether students and university employees feel sufficiently informed about how to respond to crisis situations and how this perceived preparedness relates to their sense of safety and concerns about potential threats.

Against this background, this study examines perceived crisis-response information and threat-related safety impact among students and employees in Slovak higher education. It further considers specific crisis-related concerns and examines whether the December 2023 attack at the Faculty of Arts, Charles University in Prague influenced respondents' perceptions of university safety.

2. Literature Review

2.1 Crisis Preparedness, Information and Perceived Safety

University safety depends not only on institutional security measures but also on how individuals understand and respond to potential threats (Jankura et al., 2019; Zhu et al., 2020). Jankura et al. (2019) emphasize that students should know how to behave before, during and after a violent incident, while Zhu et al. (2020) show that the effectiveness of security countermeasures depends partly on occupants' awareness of how to use them and on their behaviour during an emergency.

This relationship between institutional measures and human response makes crisis-response information an important part of preparedness. During an emergency, individuals must first understand what is happening and then decide how to respond. Zhu et al. (2020) found that accurate and timely information can support appropriate action, whereas unclear or ambiguous information may negatively affect decision-making. At the same time, the availability of information does not necessarily mean that students know where to find it or feel able to use it. Scott et al. (2021) found that although many students were aware of active-shooter guidance, awareness of other university emergency resources remained limited.

This distinction between institutional preparedness and individual preparedness is important because the two are related but not identical. Scott et al. (2021) found that students who were more confident in their ability to respond to an active-shooter event also tended to feel safer, while perceptions of university preparedness were positively related to perceptions of safety. Students who were more involved in emergency preparedness activities likewise reported higher perceptions of preparedness and safety.

However, the literature also shows that awareness alone does not necessarily lead to appropriate behaviour. Alyami et al. (2022) argue that security education may increase awareness without automatically changing practice, particularly when training is passive or poorly designed. Their review further suggests that active forms of security learning may be more effective than simply reading reference materials. This complements findings from emergency preparedness research, where training and practice repeatedly appear as necessary elements alongside information (Zhu et al., 2020; Scott et al., 2021).

> **H1:** Higher perceived crisis-response information is associated with a lower perceived impact of potential threats on respondents' sense of safety at university.

2.2 Threat Perception, Crisis-Related Concerns and Perceived Safety

Previous research shows that perceived safety is closely related to how individuals interpret threats, but perceived risk, fear, and feelings of safety represent distinct aspects of this process (Reid et al., 2020; Maier and DePrince, 2020). Reid et al. (2020) describe feelings of security and insecurity as being related to risk perception and argue that insecurity can arise from a combination of perceived risk of victimisation and a perceived lack of control. Maier and DePrince (2020) similarly distinguish between fear as an emotional response and perceived safety as a cognitive evaluation, showing that the factors associated with fear are not necessarily the same as those associated with feeling safe.

These distinctions suggest that the effect of a potential threat on perceived safety may depend on the specific concerns that the threat creates. Reid et al. (2020) identify fear of personal harm as one component of security perception and link insecurity to both perceived risk and a lack of control. They further argue that responses to threatening situations combine cognitive evaluation with prior expectations, current awareness, and appraisal of the situation. In a crisis context, concerns about life and health, panic or inability to leave a hazardous area, and insufficient information can therefore be understood as different aspects of how individuals evaluate their vulnerability and ability to respond.

Evidence from university settings supports the relationship between such threat-related evaluations and perceived safety. Maier and DePrince (2020) found that a greater perceived likelihood of victimisation was associated with greater fear and lower perceived safety. More specifically, worry about a campus shooting was positively associated with fear of crime and negatively associated with perceived university safety. These findings connect specific concerns about possible harm with broader evaluations of safety rather than treating concern and perceived safety as the same construct.

The ability to respond may also form part of this relationship. Zhu et al. (2020) show that information available during an emergency can influence occupants' perception of environmental cues and subsequent decision-making, while accurate and timely information can support appropriate action. At the same time, Moore-Petinak et al. (2020) found that young people themselves identified panic and the possibility of being unable to remember emergency procedures as concerns about their ability to respond during an actual active-shooter event. Thus, crisis-related concerns may involve not only fear of direct physical harm but also uncertainty about whether an individual will have sufficient information and be able to act effectively when a threat occurs.

H2a: Concern about life and health is positively associated with threat-related safety impact.

H2b: Concern about panic or inability to leave a hazardous area is positively associated with threat-related safety impact.

H2c: Concern about insufficient information and instructions is positively associated with threat-related safety impact.

2.3 Incident-Related Safety Perception

Previous research indicates that highly salient violent incidents can influence how university students perceive threats beyond the institution where the incident occurred. Research conducted after the shootings at Virginia Tech and Northern Illinois University found increases in students' general fear, fear of murder, and fear of being attacked with a weapon, suggesting that the effects of such incidents may extend beyond those directly exposed to them (Kaminski et al., 2010, cited in Maier and DePrince, 2020). This is consistent with Snyder (2014), who notes that fear and anxiety among students may increase following severe school violence even when the event occurs elsewhere, and that continued exposure to reports of violence may affect individuals' sense of safety and anxiety. Maier and DePrince (2020) further argue that, although school shootings are relatively rare, their occurrence can make students perceive a similar event as possible on their own campus. Their study therefore treats worry about a campus shooting as relevant to both fear and perceived safety. Together, these findings provide a basis for examining whether a major violent incident at another university can be associated with perceptions of safety in a different university context. This relationship is particularly relevant to the present study, which examines whether the perceived impact of the December 2023 shooting at the Faculty of Arts, Charles University in Prague is associated with the extent to which potential threats affect respondents' sense of safety at Slovak universities.

H3: A greater perceived impact of the December 2023 Prague university shooting on perceptions of university safety is associated with a greater perceived impact of potential threats on respondents' sense of safety at university.

H4: Higher perceived crisis-response information is associated with a lower perceived impact of the December 2023 Prague university shooting on perceptions of university safety.

3. Methodology

3.1 Research Design and Data Collection

The empirical investigation was based on a cross-sectional survey conducted at Alexander Dubček University of Trenčín, Slovakia, in 2024. The survey formed part of a broader research initiative examining how members of the academic community perceive security threats, crisis situations, information preparedness, and safety within the university environment. The present study uses this dataset for a distinct analytical purpose: to examine the associations between perceived crisis-response information, specific crisis-related concerns, and the perceived impact of potential threats on university safety. The analytical sample consisted of 358 respondents with complete data for all variables included in the analysis.

Data collection was conducted online between 27 February and 11 May 2024. Access to the questionnaire was provided through a hyperlink or QR code and distributed primarily through institutional communication channels. A total of 358 valid questionnaires were collected from 416 recorded questionnaire accesses, corresponding to a response rate of 86.06%. The full sample comprised 329 students (91.90%) and 29 university employees (8.10%). These data-collection characteristics correspond to the original survey documentation.

Participation was voluntary and anonymous. Respondents were informed about the research purpose of the survey and the use of the collected data. Participants were recruited through non-probability convenience sampling within the university community. Accordingly, the resulting sample should not be interpreted as statistically representative of the entire Slovak university population. Rather, it provides respondent-level evidence from the investigated institutional context.

The questionnaire consisted of 12 questions addressing respondents' demographic characteristics and their perceptions and experiences related to security threats and crisis situations. Eleven questions required a single response, while one question allowed respondents to select multiple response options.

The questionnaire development was informed by the literature on university safety, crisis management, risk communication, and crisis preparedness. The instrument was reviewed with regard to the relevance and clarity of individual questions and was pilot-tested prior to the main data collection. This procedure was intended to improve the comprehensibility and contextual appropriateness of the questionnaire items rather than to establish psychometric validation of multi-item latent constructs.

3.2 Measures and Variable Coding

Table 2 summarises the operationalisation and coding of the variables used in the analysis. PCRI, TSI, and ISP were measured as single-item ordinal variables, with higher values representing higher perceived crisis-response information, a stronger impact of potential threats on perceived safety, and a stronger impact of the Prague incident on perceptions of university safety, respectively. The three crisis-related concerns were derived from a multiple-response question and analysed as separate binary indicators. They were retained as individual variables because each represents a distinct type of concern rather than a different level of a common underlying construct. The measurement and coding of the variables used in the analysis are presented in Table 1.

Table 1*:* Operationalisation and Coding of Study Variables (Source: own)

Variable	Survey item	Response categories and coding
Perceived Crisis Response Information (PCRI)	I am sufficiently informed about how to respond to crisis events that may occur at the university.	1 = Disagree; 2 = Rather disagree; 3 = Neutral, 4 = Rather agree; 5 = Agree

Variable	Survey item	Response categories and coding
Threat-related Safety Impact (TSI)	Do potential threats affect your sense of safety at the university?	1 = No; 2 = Rather no; 3 = Neutral; 4 = Rather Yes, 5 = Yes
Concern	What are your main concerns regarding potential threats and crisis events at the university?	You may select more than one answer.
• Concern about life and health (CLH)	Concern about life and health	−1 = Not selected; 1 = Selected
• Concern about panic/inability to leave (CPL)	Concern about panic and inability to leave a hazardous area	−1 = Not selected; 1 = Selected
• Concern about insufficient information/instructions (CII)	Concern about insufficient information and instructions	−1 = Not selected; 1 = Selected
Incident-related Safety Perception (ISP)	Did the incident that occurred at the Faculty of Arts, Charles University in Prague in December 2023, which resulted in 14 fatalities, affect your view of the safety of higher education institutions in Slovakia?	1 = No; 2 = Rather no; 3 = Neutral; 4 = Rather yes; 5 = Yes

3.3 Statistical Analysis

First, descriptive statistics were used to summarise the sample and the study variables. Frequencies and percentages were reported for categorical and binary variables. For the ordinal variables, response distributions were examined, with means and standard deviations reported as additional descriptive information.

Associations between the study variables were examined using Spearman's rank correlation coefficient (ρ). Spearman's correlation was selected because Perceived Crisis Response Information (PCRI), Threat-related Safety Impact (TSI), and Incident-related Safety Perception (ISP) were measured as single-item ordinal variables. The analysis examined the association between PCRI and TSI, as well as the associations of ISP with PCRI and TSI.

Spearman's rank correlations were also used to examine the associations between TSI and each of the three crisis-related concern indicators: concern about life and health, concern about panic or inability to leave a hazardous area, and concern about insufficient information and instructions. These concerns were analysed separately because they were derived from a multiple-response question and represented distinct types of concern rather than levels of a single underlying construct.

All statistical tests were two-tailed, with statistical significance set at $p < .05$. The direction and magnitude of the associations were assessed using the sign and absolute value of Spearman's ρ. Positive coefficients indicate that higher values of one variable were associated with higher values of the other, whereas negative coefficients indicate an inverse association.

4. Results

4.1 Perceived Crisis-Response Information and Threat-Related Safety Impact

Spearman's rank correlation showed a statistically significant negative association between PCRI and TSI ($\rho = -.248$, $p < .001$). Respondents who reported being better informed about how to respond to crisis events tended to report a lower impact of potential threats on their sense of safety at the university. Conversely, lower perceived crisis-response information was associated with a greater perceived impact of potential threats.

4.2 Crisis-Related Concerns and Threat-Related Safety Impact

All three crisis-related concerns were positively and statistically significantly associated with TSI. The strongest association was observed for concern about life and health ($\rho = .334$, $p < .001$). Respondents who identified life and health as a concern tended to report a greater impact of potential threats on their sense of safety.

Positive but weaker associations were found for concern about panic or inability to leave a hazardous area ($\rho = .179$, $p < .001$) and concern about insufficient information and instructions ($\rho = .179$, $p < .001$). Thus, respondents who selected either of these concerns also tended to report a greater threat-related impact on their sense of safety. The results indicate that all three concerns were related to TSI, with concern about life and health showing the strongest association.

4.3 Incident-Related Safety Perception

Incident-related Safety Perception (ISP) was positively and statistically significantly associated with TSI (ρ = .500, $p < .001$). Respondents who reported that the December 2023 incident at the Faculty of Arts, Charles University in Prague had a greater impact on their view of university safety in Slovakia also tended to report a greater impact of potential threats on their own sense of safety at the university. With ρ = .500, this was the strongest association among the relationships examined in the present analysis.

ISP was also negatively associated with PCRI (ρ = −.252, $p < .001$). Respondents who perceived themselves as better informed about how to respond to crisis events tended to report a lower impact of the Prague incident on their view of university safety. Conversely, respondents reporting lower levels of crisis-response information tended to report a greater impact of the incident. This association was considerably weaker than the relationship between ISP and TSI.

Taken together, these results show that the reported impact of the Prague incident was particularly closely related to respondents' current perceptions of how potential threats affect their sense of safety. Its relationship with perceived crisis-response information was weaker and in the opposite direction

Overall, the results supported all hypothesised relationships. The results of the hypothesis testing are summarised in Table 3.

Table 2: Summary of hypothesis testing results (Source: own)

Hypothesis	Tested Relationship	Spearman's ρ	*p*	Result
H1	PCRI ↔ TSI	−.248	< .001	Supported
H2a	Life and health ↔ TSI	.334	< .001	Supported
H2b	Panic/inability to leave ↔ TSI	.179	< .001	Supported
H2c	Insufficient information/instructions ↔ TSI	.179	< .001	Supported
H3	ISP ↔ TSI	.500	< .001	Supported
H4	PCRI ↔ ISP	−.252	< .001	Supported

5. Direct Implications for Education and Future Research

The findings of this paper point primarily to the need to reconsider how crisis-response education is delivered in higher education. The negative association between perceived crisis-response information and threat-related safety impact suggests that the educational objective should extend beyond making emergency information available. Students need to understand what is expected of them and how to respond when a crisis occurs. This direction is consistent with Scott et al. (2021), who found that greater involvement in emergency-preparedness activities was associated with higher perceived preparedness and safety and concluded that appropriate preparedness programmes may help students become familiar with available resources. Similarly, Zhu et al. (2020) emphasised that the effectiveness of security measures depends partly on occupants' awareness of how to use them and highlighted both training and practice as important components of preparedness.

This suggests a shift from predominantly information-based education towards a combination of accessible knowledge and practical application. Rokvić and Stanojević (2024) explicitly recommend replacing traditional knowledge transmission with active learning approaches, including scenario-based simulations and workshops, and identify virtual reality among the technologies that can be incorporated into disaster-risk education. The present findings provide an additional reason to explore such approaches in higher education: respondents who perceived themselves as better informed about crisis response also reported a lower threat-related impact on their sense of safety. However, the objective of practical education should not be to remove concern altogether. Moore-Petinak et al. (2020) found that active-shooter drills could simultaneously teach young people what to do and produce fear or hopelessness, demonstrating that educational and emotional outcomes do not necessarily develop in the same direction.

A possible educational model would therefore combine scalable theoretical preparation with controlled practical training. For example, MOOCs could provide consistent and widely accessible instruction on crisis procedures, while VR or other scenario-based simulations could allow students to apply this knowledge through decision-making in realistic situations without requiring exposure to an actual emergency. This proposal is consistent with the broader direction identified by Rokvić and Stanojević (2024), who recommend integrating emerging

technologies and simulation into security-related curricula, and with Snyder (2014), whose intervention study found that computer- and video-based active-shooter training influenced selected safety and resilience outcomes, with the combined training producing the largest effects on safety and resilience compared with the control group. Importantly, the present study did not test MOOCs, VR, or any other educational intervention, and their effectiveness should therefore be treated as a direction for educational development and empirical testing rather than as a conclusion of the present research.

Such education should also be systematic rather than limited to isolated activities. Henrichsen and Shelton (2023) showed how security education can remain informal and dependent on individual "security champions" when it is not formally embedded in university programmes. Alyami et al. (2022) further show that effective security education requires attention to the whole educational process, including assessment, delivery and repeated evaluation; their participants specifically identified pre- and post-training assessment as a means of determining whether knowledge had actually been acquired. For universities, the implication is therefore not simply to distribute more crisis-response material, but to teach, practise and evaluate whether members of the university community know how to respond.

Future research should directly test this educational progression. An intervention design could measure PCRI, TSI and crisis-related concerns before and after crisis-response education and compare different modes of delivery, such as information-only instruction, MOOCs, scenario-based exercises and VR simulations. Particular attention should be given to whether these approaches improve perceived crisis-response information and practical response knowledge without unnecessarily increasing distress. This is especially important because existing evidence shows that training may influence safety, resilience and fear differently (Snyder, 2014; Moore-Petinak et al., 2020). Future studies should therefore assess knowledge, behavioural preparedness, perceived safety and emotional responses separately, rather than assuming that improvement in one dimension necessarily produces improvement in the others.

6. Conclusion

University safety is not determined only by whether security procedures and protective measures are formally in place. It also depends on whether students and employees understand how to respond when a crisis occurs and whether they feel prepared to act under uncertain conditions. The present study draws attention to this individual dimension of university security. Feeling informed, being concerned about possible consequences, and interpreting serious incidents occurring at other universities are different aspects of how people experience safety within their own academic environment.

The findings also raise a broader question about what universities mean by preparedness. Providing emergency instructions is necessary, but their existence alone does not ensure that members of the university community know how to use them. Preparedness should therefore move beyond the availability of information towards ensuring that students and employees understand what is expected of them and can translate this knowledge into appropriate action. At the same time, preparedness initiatives need to recognise that information, concern, and perceived safety are related but distinct. Improving one does not necessarily remove the others.

This shifts the practical question from whether universities should prepare for crisis events to how such preparedness can be developed without creating unnecessary fear. Previous research points to training, simulations, and technology-supported learning as possible ways of connecting information with practice. These approaches should not be viewed as substitutes for institutional security measures, but as ways of helping individuals understand and apply them. Future research should therefore examine whether different forms of crisis-response education, including scenario-based and immersive training, can improve practical preparedness while maintaining or strengthening perceived safety.

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Ethics Declaration

Ethical approval was not required for the conduct of this study.

AI Declaration

Generative AI (ChatGPT, GPT-5.6 Sol, OpenAI) was used solely for grammatical and language editing.

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