

Operational Risk Management Analysis Based On Severity Level And Frequency In The School Risk Management Framework: A Qualitative Study At Smpn 50 Bandung

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Abstract:

Operational risks in schools continue to increase along with the complexity of learning activities, the dynamics of student behavior, and the increasing dependence on infrastructure and information technology. This study aims to analyze the types of operational risks at SMPN 50 Bandung, map the severity and frequency of occurrence (likelihood), and evaluate the mitigation strategies implemented by the school within a modern risk management framework. The study used a descriptive qualitative approach with data collection techniques in the form of semi-structured interviews, direct observation, and documentation studies. Informants consisted of the principal, vice principal for infrastructure, teachers, security officers, administrative staff, and students, providing a comprehensive perspective. The results of the study identified five main risk categories that affect the smooth operation of the school: student safety, infrastructure, environmental security, information technology, and student discipline. Through severity-likelihood analysis, three risks were found to be in the high category: electrical short circuits, unknown visitors, and sports injuries, while the other risks were in the medium and low categories. The mitigation strategies implemented by schools include preventive, corrective, and responsive measures, but have not been implemented consistently due to budget, human resource, and risk management literacy limitations. This study recommends developing integrated risk SOPs, increasing human resource capacity, improving priority infrastructure, and conducting regular risk audits to strengthen the school's safety culture and operational preparedness.

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INTRODUCTION

Risk management is a strategic component of modern school governance. The complexity of educational activities, the intensity of social interactions, and the reliance on infrastructure and technology make schools highly vulnerable to various forms of operational risk. These risks can include physical injury, damage to facilities, security threats, information technology disruptions, and even student indiscipline. If not managed systematically, these risks can hinder the learning process, reduce the quality of educational services, and endanger the safety of the school community. In this context, risk management is urgent for schools to ensure the safe, effective, and sustainable continuity of operational activities.

According to ISO 31000 (2018), risk is defined as "the effect of uncertainty on objectives." In the context of schools, the primary goal of educational institutions is to ensure a safe, orderly, and high-quality learning process. Therefore, any form of uncertainty that could potentially disrupt these objectives must be identified, analyzed, and controlled through systematic procedures. However, many schools in Indonesia still employ a reactive approach to risk management, acting after an incident occurs, rather than a preventive and anticipatory approach. This situation aligns with Hidayat's (2024) findings, which state that most public schools do not yet have a structured and well-documented risk management system.

SMPN 50 Bandung is a large public school with a large student population, a broad scope of educational activities, and high levels of infrastructure use. This complexity creates potential operational risks that manifest in various forms. Initial observations revealed a number of recurring incidents, such as injuries during physical education, students slipping in certain areas, damaged tables and chairs, electrical wiring that could potentially short-circuit, the arrival of unidentified guests, and internet network disruptions that hamper digital-based learning activities. Although several mitigation efforts have been implemented, the school lacks a structured risk documentation system and risk assessment matrix. Therefore, mitigation priorities cannot be objectively determined.

The phenomenon of school operational risk is not unique to Indonesia. Globally, schools in various countries face risks with varying characteristics. In Japan, disaster risks such as earthquakes and fires are a major threat, leading schools to implement regular simulations and detailed evacuation procedures (Nakamura, 2018). In Australia, student safety and child protection risks are a primary concern, particularly in preventing violence, neglect, or external threats (Smith, 2019). Meanwhile, in Finland, risks related to the comfort of the learning environment, such as lighting, air quality, and student psychological distress, are prioritized (Hakala, 2020). This global comparison demonstrates that school risk management is contextual and dependent on the characteristics of the environment, culture, and education system.

In Indonesia, school operational risks are still dominated by traditional issues such as damaged facilities, unsafe electrical installations, unruly student behavior, and weak supervision of school security. This is reinforced by research by Munawwaroh (2017), who noted that many minor accidents in schools occur due to inadequate infrastructure maintenance, a lack of safety literacy, and the absence of safety standard

operating procedures (SOPs). Meanwhile, Miftahuldzanah and Hidayat (2024) found that risk management literacy among educators and education personnel remains low, resulting in risks often being ignored or considered trivial and not requiring serious attention.

As a junior high school with hundreds of active students every day, SMPN 50 Bandung faces operational risks stemming from the high physical activity levels of students, the intensive use of facilities, and limited supervision in certain areas. Student safety risks frequently arise during sports activities, breaks, and high mobility in corridors and stairs. Infrastructure risks are evident in damaged classroom furniture, roof leaks, and potentially dangerous electrical installations. Security risks arise from unknown visitors, poorly supervised areas behind the school, and heavy traffic during after-school hours. Information technology risks frequently occur due to network disruptions and computer hardware failures, which impact digital learning activities. Furthermore, student disciplinary risks such as tardiness, uniform violations, and excessive device use also present daily challenges.

One approach that can be used to systematically identify and map risks is severity-likelihood analysis. This approach allows schools to determine mitigation priorities based on the severity and likelihood of each risk. Lam (2017) explains that modern risk management must be based on matrix-based analysis to produce objective and accountable mitigation decisions. In practice, severity-likelihood analysis divides risks into three levels of severity (low, medium, high) and three levels of frequency (rare, periodic, frequent). The combination of these two parameters produces a risk classification that helps schools determine the most urgent mitigation actions.

However, although this approach has been widely used in industry and healthcare, its application in the educational context, particularly in secondary schools in Indonesia, remains limited. Research on school risk management has focused more on discrete issues such as student safety, discipline, or infrastructure maintenance, but has not integrated all operational risks into a comprehensive matrix. Therefore, this study fills a research gap related to the lack of severity-likelihood-based school operational risk studies.

Based on this background, this study aims to: (1) identify operational risks at SMPN 50 Bandung; (2) analyze the severity and likelihood levels; (3) evaluate the mitigation strategies implemented by the school; and (4) provide managerial recommendations for developing a more effective school risk management system. This study is expected to contribute both theoretically and practically. Theoretically, this study enriches the educational risk management literature and offers a conceptual model for operational risk management based on severity-likelihood. Practically, the findings of this study can serve as a reference for schools in developing risk SOPs, strengthening supervision, and increasing the preparedness of school residents.

This research encompasses four main components: the basic concepts of risk management in education, the severity-likelihood approach, school operational risk from a national and international perspective, and the theoretical framework underlying the research. These four components provide the conceptual foundation

necessary to understand the complexity of school operational risk and its relevance to the context of SMPN 50 Bandung.

Risk management in education is a systematic process aimed at identifying, analyzing, evaluating, and controlling risks that could disrupt the achievement of school goals. According to Arifudin (2020), educational risk management needs to encompass physical, psychological, social, and operational aspects, as schools are complex environments involving many actors.

ISO 31000 (2018) views risk as the effect of uncertainty on organizational objectives. In the school context, risks can include: 1. Incidents that endanger student safety; 2. Damage to facilities or infrastructure; 3. Disruption of learning services; 4. Environmental security threats; 5. Information system failure; and 6. Undisciplined behavior.

Because risk is multidimensional, its management requires an integrated approach and cannot be done in isolation. One major weakness in school management in Indonesia is the lack of formal SOPs for risk assessment. Many schools only respond to risks after they occur, rather than taking an anticipatory approach. This aligns with Hidayat's (2024) findings, which state that risk awareness in Indonesian schools remains low and has not yet become part of the organizational culture.

In educational management theory, risk is viewed as a controllable variable if the institution has a strong governance structure. Munawwaroh (2017) states that schools should implement three risk control measures: preventive control, corrective control, and recovery control. These three measures require organizational readiness in terms of resources, policies, and supporting facilities. If any of these components are not met, risk control becomes difficult.

Furthermore, Rukin (2019) emphasized that educational risk must be viewed as an integral part of the quality of educational services. A school must not only excel in learning but also ensure a safe, healthy, and conducive learning environment. Therefore, risk management is a fundamental aspect of developing the quality of modern schools.

Furthermore, the severity-likelihood approach is one of the most commonly used risk assessment methods in industry, healthcare, and education. This approach assesses risk based on two main parameters: 1) Severity, measuring how much impact a risk has on school safety, facilities, or operations. 2) Likelihood, measuring how often the risk occurs within a certain time period.

The severity-likelihood matrix typically consists of a three-level scale: low, medium, and high. The combination of these two parameters results in nine risk categories. In a school context, this matrix is useful for assessing: a. Student injuries during sports; b. Potential electrical short circuits; c. Facility damage; d. Arrival of unknown guests; e. Internet network disruptions; and f. Disciplinary violations.

Sufa'atin (2017) explains that the severity-likelihood model not only helps identify risk levels but also serves as the basis for developing risk control SOPs. Therefore, this approach is highly relevant for schools that do not yet have a structured risk management system, such as SMPN 50 Bandung.

Operational risk, then, is the risk that arises from human, process, system failure, or external events that can disrupt the smooth running of organizational activities (Sirait & Susanty, 2016). In the context of schools, operational risk encompasses all incidents that hinder the smooth running of the learning process and threaten the safety of the school community.

RESEARCH METHOD

This research uses a descriptive qualitative approach, aiming to capture the phenomenon of school operational risk in a natural, in-depth, and contextual manner. This approach was chosen because the characteristics of operational risk cannot be fully understood through quantitative data but rather require interpreting the experiences, perceptions, and interactions of actors in the field. According to Anggito and Setiawan (2018), qualitative research allows researchers to comprehensively explore empirical reality through direct contact with the research environment.

The research was conducted at SMPN 50 Bandung, a public junior high school that has: a. A large number of students, b. A spacious physical environment, c. Intensively used infrastructure, d. Diverse learning and extracurricular activities, and e. A high level of social interaction.

Informants were selected using purposive sampling, which involves selecting informants based on their knowledge, experience, and direct involvement in school operations. The number of informants was determined based on the principle of data saturation, which occurs when the data obtained is repetitive and no longer yields new information (Miles, Huberman, & Saldaña, 2014).

Finally, data were obtained through three main techniques: semi-structured interviews, field observations, and documentation studies. Interviews were conducted using open-ended questions to gather in-depth information regarding the types of risks, frequency of occurrence, impacts, and school responses. Non-participatory observations were conducted in high-risk areas such as sports fields, classrooms, laboratories, corridors, and electrical installations, with field notes and supporting photographs. Documentation studies included analysis of incident records, infrastructure reports, attendance records, and internal policies. Data analysis employed the Miles, Huberman, and Saldaña model through data reduction, presentation, and verification. Validity was maintained through triangulation, member checking, and audit trails, while research ethics were upheld through informed consent, confidentiality, and objectivity.

RESULT AND DISCUSSION

The results of this study are presented based on field findings obtained through interviews, observations, and documentation studies. The data are presented in five main subthemes that describe the types of operational risks at SMPN 50 Bandung, followed by a severity-likelihood analysis, implemented mitigation strategies, and obstacles to risk management implementation. The presentation in the results section is descriptive and objective, without including further theoretical interpretations (which will be discussed in the Discussion section).

Operational Risk Identification at SMPN 50 Bandung

This study found five main operational risk categories, namely: (1) student safety risks, (2) infrastructure risks, (3) environmental security risks, (4) information technology risks, and (5) student discipline risks. These five emerged repeatedly and stemmed from learning activities, infrastructure conditions, environmental factors, and student social interactions.

First, Student safety risks are the most dominant category and directly impact students' physical health. Interviews with Physical Education teachers and field observations revealed several common risks, including sports injuries such as sprains, strains, abrasions, and collisions during ball games. Contributing factors include slippery fields during rain, inadequate warm-up times, and suboptimal sports equipment. Furthermore, the risk of slipping in corridors and stairs increases during breaks or after school, especially when the floors are wet. In science and computer labs, minor injuries can arise from broken glass, sharp tools, scattered cables, and unstable equipment. Student safety is the school's top priority.

Second, risks to school facilities and infrastructure (*sarpras*) include damage or malfunctions that could potentially disrupt the comfort and safety of the school community. Research findings indicate that many classroom desks and chairs have loose or broken connections, increasing the risk of injury. Roof leaks during the rainy season cause slippery floors and threaten electronic equipment damage. Electrical installations were also found to be unsafe, with frayed cables, loose plugs, and old sockets, which have caused short circuits and are categorized as high severity. Furthermore, sports facilities such as loose basketball hoops, rusty volleyball poles, and cracked courts add to the potential hazards. The intensity of daily use of *sarpras* makes these risks highly likely.

Third, environmental security risks in schools relate to conditions that could threaten the physical and psychological safety of the school community. Research findings indicate that unknown visitors enter without clear identification, posing a potential threat to students. Furthermore, several areas, such as the back of the school, hallway corners, and parking areas, are not covered by CCTV, making them vulnerable to theft, fights, and other unethical activities. Congestion at the gate during closing time also increases the risk of minor accidents and conflicts between drivers. Friction between students, while minor, remains a concern. Overall, security risks are categorized as a high priority because they directly impact the safety of the school community.

Four, Information technology (IT) risks in schools are becoming increasingly prominent with the increasing digitalization of learning, which relies on networks and computer devices. Internet disruptions frequently occur during peak hours, hindering technology-based learning processes. Furthermore, some computers experience problems such as automatic restarts, malfunctioning keyboards, overheating CPUs, and outdated software. Administrative data input errors also recur, particularly on digital grade cards and attendance due to human error. Furthermore, the lack of a structured backup system makes school data vulnerable to loss in the event of device failure or a virus attack. IT risks are categorized as medium severity but high likelihood due to their

frequency.

Fifth, disciplinary risks are daily and frequently occur during school activities. Findings include: tardiness to school, uniform violations, carrying prohibited items, inappropriate use of gadgets, and disruptive or unfocused behavior during learning. The guidance and counseling teacher noted that student discipline was influenced by family factors, the environment, and internal school supervision.

Risk Severity–Likelihood Analysis

To objectively map risk levels, this study used a severity–likelihood matrix that classifies risks based on their severity and frequency of occurrence. The analysis revealed that high-severity risks include electrical short circuits, unidentified visitors, and moderate to severe sports injuries, all of which have a significant impact on school safety and require immediate action. Medium-severity risks include information technology disruptions, moderate infrastructure damage, and minor student conflicts; although they do not directly threaten safety, they have the potential to disrupt the smooth operation of the school. Meanwhile, low-severity risks, such as student tardiness, minor infrastructure damage, and uniform violations, occur frequently but have a relatively small impact and can be addressed through routine supervision and simple disciplinary policies.

Table 1. Severity–Likelihood Matrix

Types of Risk	Severity	Likelihood	Risk Level
Electrical short circuit	Tall	Low	Tall
Unknown guest	Tall	Tall	Tall
Sports injuries	Tall	Currently	Tall
IT disruption	Currently	Tall	Currently
Minor infrastructure damage	Low	Tall	Currently
Student tardiness	Low	Tall	Currently

Risk Mitigation Strategy at SMPN 50 Bandung

Research findings indicate that the school has implemented three forms of risk mitigation: preventive, corrective, and responsive measures. Preventive measures include gate monitoring, sports safety awareness campaigns, the installation of hazard signs in slippery areas, monitoring device use, and minor electrical inspections. Corrective measures include repairing damaged tables and chairs, replacing hazardous cables, repairing the internet network, and repairing jammed doors and windows. Responsive measures include handling injuries by the school health unit (UKS), evacuations for minor short circuits, summoning parents of problematic students, and handling student conflicts by guidance counselors. However, the implementation of risk management faces obstacles such as budget constraints that delay infrastructure improvements, low risk management literacy among teachers and staff, the absence of

integrated SOPs for incident reporting and evacuation, and a limited number of security personnel disproportionate to the size of the school grounds.

The discussion of the research results is conducted by integrating field findings and risk management theory, previous research, and the global context of school risk management. The analysis is conducted through four main aspects: (1) the relationship of the findings with modern risk management theory, (2) interpretation of the severity–likelihood matrix in the context of Indonesian schools, (3) comparison with international research results, and (4) theoretical and practical implications for the development of school risk management.

Consistency of Findings with Modern Risk Management Theory

The research findings indicate that SMPN 50 Bandung faces various operational risks stemming from student physical activity, infrastructure conditions, security aspects, information technology, and student discipline. This condition aligns with modern risk management theory according to ISO 31000 (2018), which emphasizes that risks can arise from various internal and external sources and must be managed through a systematic process ranging from identification, analysis, evaluation, to mitigation.

In accordance with the ISO 31000 framework, operational risks in schools should be viewed as part of the organization's goal of providing safe, comfortable, and effective educational services. However, findings indicate that the risk assessment process at SMPN 50 Bandung has not been structured. Risk management tends to be reactive, consistent with Hidayat's (2024) finding that most public schools still rely on field experience and have not implemented a risk-based management approach.

Munawwaroh (2017) stated that schools often view risks as incidental events, rather than systemic phenomena that need to be mapped and mitigated on an ongoing basis. Research findings support this view, particularly given that schools lack risk documentation, incident management standard operating procedures (SOPs), or integrated monitoring systems. From an educational administration perspective, Sirait and Susanty (2016) emphasized that operational risk arises from weaknesses in processes, people, or internal systems. Research findings confirm that most risks at SMPN 50 Bandung stem from internal factors, such as unstable infrastructure, lack of supervision, data input errors, and student behavior. Therefore, internal improvements are a strategic step in strengthening school risk management.

Severity–Likelihood Analysis in the Context of Indonesian Schools

One of the important contributions of this study is the use of a severity–likelihood matrix to objectively assess risk levels. This approach is commonly used in industry, occupational health and safety, but is rarely applied in school environments in Indonesia. The study findings indicate that three risks fall into the high category: electrical short circuits, unknown visitors, and sports injuries. Electrical short circuits have the potential for significant impacts, such as fires, asset damage, and even threats to life. Although infrequent, the discovery of frayed cables and loose plugs indicates a latent threat. This reinforces Fatmawati's (2019) finding that poorly maintained

infrastructure can be a source of serious risk.

This finding is highly relevant to the issue of school security. Unidentified entry by unidentified individuals can threaten student safety. This aligns with Hartatik (2024), who emphasized the importance of strict supervision at school gates and vulnerable areas. In the context of Indonesian schools, many risks have a high likelihood due to the dense physical environment and infrastructure used without regular maintenance. However, severity is often underestimated, leading to underestimation of mitigation priorities. This research demonstrates that a severity-likelihood approach can more objectively prioritize risks for mitigation.

The risk classification table shows a mapping based on severity (urgency), likelihood (frequency), and the combined result of both, resulting in a risk level. An electrical short circuit is categorized as high severity because it has the potential to endanger physical safety, even though the likelihood is low. Its impact is significant, so it remains a high risk and requires immediate attention. An unknown visitor has both high severity and high likelihood, making it a top priority risk because its presence has the potential to threaten student safety and must be handled with a strict monitoring system. Sports injuries are at high severity with medium likelihood; these risks often arise during student physical activities and directly impact safety, so they remain in the high category. IT disruptions have medium severity but high likelihood; although they do not threaten safety, they occur frequently and hinder the smooth flow of digital learning, so they are categorized as medium. Minor infrastructure damage and student tardiness both have low severity but high likelihood. Their impact is relatively small, but because of their frequency, they are both categorized as medium risks that still require regular monitoring. Overall, this classification helps schools determine mitigation priorities by focusing on high risks that threaten safety, while still controlling medium risks to prevent operational disruption.

To understand the risk profile of schools in Indonesia, the research findings were compared with several international studies. In Japan, Nakamura (2018) showed that schools are highly focused on disaster risks such as earthquakes, fires, and tsunamis. Strengthening disaster-resistant facilities and infrastructure and conducting regular simulations are characteristic. In contrast to Japan, the primary risks at SMPN 50 Bandung are primarily damaged facilities and electrical hazards, rather than major disasters.

In Australia, Smith (2019) noted stringent child protection standards, including digital surveillance at school entrances and technology-based visitor identification. Findings regarding unknown visitors at SMPN 50 Bandung highlight the need for more modern security systems. Meanwhile, Hakala (2020) from Finland highlighted risks related to classroom noise, poor lighting, and psychological distress. These findings suggest that developed countries have shifted their focus to non-physical risks, while Indonesia still needs to address physical risks and basic infrastructure.

In the United States, Baker (2017) noted that the risk of armed violence is a major concern for schools, leading them to implement a "lockdown" protocol. This risk is not relevant in the Indonesian context but demonstrates the diversity of global threats. This comparative conclusion suggests that operational risks in schools in Indonesia, such as

damaged infrastructure, student conflict, unknown visitors, and IT disruptions, reflect the characteristics of developing countries, in contrast to the high-level risks in developed countries, such as mental health risks and extreme disaster risks (Baharun, 2023).

This research provides the following theoretical contributions. First, the severity-likelihood model has proven effective in the Indonesian school context and can be adopted as a basic framework for educational risk assessment, thus expanding educational risk management literacy. Second, key elements of ISO 31000 theory, such as risk identification and risk evaluation, can become new standards for schools, emphasizing the importance of integrating ISO 31000 into schools. Third, operational risks cannot be viewed as individual events, but as part of the school's environmental system, strengthening the systemic perspective on school risk. Fourth, the formulated conceptual model, which includes identification, severity-likelihood analysis, mitigation strategies, and implementation barriers, can be used as a reference for further research.

This research also has real practical implications for school management. SMPN 50 Bandung needs to develop specific SOPs for risk management, including protocols for electrical evacuations, unknown visitors, sports injuries, IT disruptions, and incident reporting. Teachers and security officers need basic risk management training and safety simulations to strengthen the school's human resources. Furthermore, installing additional CCTV and a digital guest identification system can reduce the risk of entry by unknown parties, as part of strengthening the security system. Optimizing infrastructure maintenance is also important, with priority repairs such as electrical installations and damaged desks and chairs requiring a special budget allocation. A reward-punishment-based student discipline program and device monitoring can reduce

In line with research by Miftahuldzanah and Hidayat (2024), the main obstacles to implementing risk management in schools are low risk literacy and limited facilities. This study confirms that these obstacles are systemic and influenced by limited school funding, low awareness that risks must be managed, the absence of formal regulations requiring risk assessments, and limited human resources for supervision (Hasanah, 2025). Therefore, a paradigm shift regarding the importance of risk management is urgently needed. The risk classification table shows a mapping based on severity (urgency), likelihood (frequency), and the combined result of both in the form of a risk level. Electrical short circuits are categorized as high severity because they have the potential to endanger physical safety, even though the likelihood is low. The impact is significant, so it remains a high risk level and requires immediate attention. Unknown visitors have high severity and high likelihood, making them a top priority risk because their presence has the potential to threaten student safety and must be handled with a strict monitoring system. Sports injuries are at high severity with medium likelihood; this risk often occurs during student physical activities and has a direct impact on safety, so it remains categorized as high. IT disruptions have medium severity but high likelihood; While not a safety threat, these disruptions occur frequently and hinder the smooth running of digital learning, thus categorizing them as moderate. Minor

infrastructure damage and student tardiness both have low severity but high likelihood. Their impact is relatively small, but due to their frequency, they are both categorized as moderate risks that still require regular monitoring (Hidayat et al., 2024). Overall, this classification helps schools prioritize mitigation by focusing on high risks that threaten safety, while still controlling moderate risks to prevent operational disruption.

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This research also has real practical implications for school management. SMPN 50 Bandung needs to develop specific SOPs for risk management, including protocols for electrical evacuations, unknown visitors, sports injuries, IT disruptions, and incident reporting. Teachers and security officers need basic risk management training and safety simulations to strengthen the school's human resources. Furthermore, installing additional CCTV and a digital guest identification system can reduce the risk of entry by unknown parties, as part of strengthening the security system. Optimizing

infrastructure maintenance is also crucial, with priority repairs such as electrical installations and damaged desks and chairs requiring a dedicated budget allocation. A reward-punishment-based student discipline program and device monitoring can reduce risky student behavior.

In line with research by Miftahuldzanah and Hidayat (2024), the main obstacles to implementing risk management in schools are low risk literacy and limited facilities. This study confirms that these obstacles are systemic and influenced by limited school funding, low awareness that risk must be managed, the absence of formal regulations requiring risk assessments, and limited human resources for supervision. Therefore, a paradigm shift regarding the importance of risk management is urgently needed.

CONCLUSION

This study shows that operational risk management at SMPN 50 Bandung still requires a more structured and data-driven system. Through a descriptive qualitative approach and severity–likelihood analysis, five main risk categories were identified that impact the smooth operation of the school: student safety, infrastructure, environmental security, information technology, and student discipline. Three risks are in the high category—electrical short circuits, unknown visitors, and sports injuries—and therefore require priority handling. The remaining risks are in the medium category and still require ongoing mitigation. The research findings indicate that current mitigation efforts are still reactive because they are not supported by specific SOPs, adequate risk management literacy, and systematic documentation. This study contributes to expanding the application of the severity–likelihood model in school environments and provides practical recommendations for strengthening SOPs, increasing human resource capacity, and conducting regular risk audits.

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