

Cultura de prevención de riesgos en educación primaria mediante metodologías activas en Caborca, Sonora

Risk Prevention Culture in Primary Education through Active Methodologies in Caborca, Sonora

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RESUMEN: El presente artículo analiza una intervención pedagógica para mitigar la incidencia de accidentes infantiles fomentando una cultura de prevención y autocuidado en los ámbitos escolar, doméstico y público. El estudio se fundamentó normativamente en la NOM-003-SEGOB-2011 y se estructuró metodológicamente en cinco fases: inicialización, planificación, ejecución, control y cierre. La muestra incluyó a 59 estudiantes de los grados 5to A y 6to B de la escuela primaria “Flores R. de Munguía” en Caborca, Sonora. Se implementaron metodologías activas, tales como el Aprendizaje Basado en Proyectos, la gamificación y el aprendizaje experiencial a través de simulacros y talleres de primeros auxilios.

Palabras clave: Prevención de riesgos; Educación primaria; Cultura de seguridad; Metodologías activas; Aprendizaje basado en proyectos

ABSTRACT: This article analyzes an educational intervention designed to reduce the incidence of childhood accidents by fostering a culture of prevention and self-care in school, home, and public settings. The study was grounded in the NOM-003-SEGOB-2011 standard and was methodologically structured into five phases: initiation, planning, implementation, monitoring, and closure. The sample included 59 students from 5th grade A and 6th grade B at the “Flores R. de Munguía” elementary school in Caborca, Sonora. Active methodologies were implemented, such as Project-Based Learning, gamification, and experiential learning through drills and first-aid workshops.

Keywords: Risk prevention; Elementary education; Safety culture; Active learning methods; Project-based learning

Introduction

In today’s educational landscape, childhood accidents represent a critical health and safety issue that affects students’ overall development and academic performance.

In Mexico, data from the Continuous National Health and Nutrition Survey (ENSANUT, 2021) and the National Institute of Statistics and Geography (INEGI, 2022) reveal an alarming statistic: 17.1% of childhood accidents occur within the school environment.

This phenomenon stems primarily from children's limited ability to assess dangers and their innate curiosity, which leads them to face situations that exceed their self-care skills.

Despite the existence of robust regulatory frameworks, such as Mexican Official Standard NOM-003-SEGOB-2011, there remains a lack of systematic integration of a culture of prevention into the core curriculum. (Ministry of the Interior, 2011)

According to Chaux (2003), schools should function as a “small society” where learning about civic life includes the development of safe habits that extend beyond the home and into public spaces.

In this sense, prevention should not be limited to emergency response but should be promoted as a proactive approach based on risk anticipation and mitigation.

In this regard, the Disaster Prevention Guide developed by the National Center for Disaster Prevention (2014) states that:

The various disruptive events that occur in Mexico—such as floods, earthquakes, hurricanes, and landslides, among others—cause significant losses that have a severe social and economic impact, both in large cities and in small communities.

This damage, which occurs periodically in schools as a result of the aforementioned events, not only affects our students' performance and learning but also the health and emotional well-being of all members of the school community, particularly children and adolescents. (p. 9)

From an educational perspective, fostering this culture requires a shift from passive models to active methodologies.

Strategies such as Project-Based Learning (PBL) have been shown to increase knowledge retention by nearly 50% in elementary education, while gamification boosts student engagement by up to 60%, especially among children aged 6 to 12.

Likewise, experiential learning through drills can reduce chaos during real emergencies by up to 70%.

Based on this premise, this article analyzes the implementation of an educational project at the “Floencia R. de Munguía” elementary school in Caborca, Sonora, Mexico.

The intervention focused on a sample of 59 fifth- and sixth-grade students, with the goal of transforming a lack of knowledge and supervision into effective response habits.

Through an approach aligned with the Sustainable Development Goals (SDGs), the project seeks to foster resilience and mutual care as pillars of conscious and responsible citizenship education.

Development

A culture of risk prevention can be understood as a cohesive framework of knowledge, values, attitudes, and practices that enable people to anticipate, identify, and respond appropriately to potentially dangerous situations.

It is not limited to reacting to emergencies, but rather involves the internalization of self-care habits that become established patterns of daily behavior. This approach aligns with the perspective on health and safety education promoted by the World Health Organization, which emphasizes the importance of developing preventive skills from childhood as part of comprehensive education (WHO, 2018).

In the school setting, this concept takes on profound educational significance.

Chaux (2003) argues that the school constitutes a “mini-society,” where students practice forms of coexistence, norms, and responsibilities that mirror community life.

In this social microcosm, the acquisition of safety behaviors is not an incidental learning experience, but rather a practical exercise in citizenship. Learning to evacuate in an orderly manner, recognize signage, identify risks in the environment, or assist a classmate in an emergency involves developing civic competencies linked to respect, solidarity, and shared responsibility.

This education is reinforced by the family’s role as the primary educational agent. As Manjarrés-Zambrano et al. (2023) point out, the home is the primary space where children develop their first notions of care, boundaries, and self-protection.

School, therefore, does not replace this role but rather complements and systematizes it, creating a bridge between domestic learning and academic education.

When these two areas work in coordination, a culture of prevention becomes more firmly established and consistent.

However, for accident prevention in elementary education to be truly effective, it is essential to move beyond passive teaching models focused on memorizing rules.

Project-Based Learning (PBL) represents an ideal strategy. This methodology confronts students with real-world problems in their environment, encouraging research, analysis, and the proposal of concrete solutions.

The United Nations Educational, Scientific and Cultural Organization (UNESCO, 2017) has emphasized that active and context-based learning promotes greater knowledge retention and the development of skills that can be applied to everyday life. In the context of risk prevention, PBL enables students to identify real hazards in their school, home, or community, transforming preventive content into a meaningful and context-based experience.

Complementarily, gamification introduces playful elements—challenges, rewards, levels, cooperation—that increase student motivation and engagement.

According to the Inter-American Development Bank (IDB, 2020), well-designed playful strategies promote sustained participation and interest in learning among students in basic education.

In the context of prevention, these exercises allow participants to practice safe behaviors in simulated environments, where mistakes become learning opportunities without real-world consequences.

Experiential learning and the conduct of drills constitute one of the strongest pillars of preventive training.

The National Civil Protection Coordination (CNPC, 2020) emphasizes that regularly conducting drills in schools strengthens organized response capabilities and reduces emotional disorientation in real emergency situations. Repeating these drills builds familiarity with protocols and reduces the likelihood of mass panic.

Thus, the integration of PBL, gamification, and experiential learning is not an isolated methodological choice, but rather a pedagogical coherence that seeks to translate civil protection

regulations into internalized behaviors. Prevention ceases to be merely informational content and becomes a skill that is lived, rehearsed, and understood through practice.

This reasoning demonstrates that a culture of prevention in elementary school is not achieved by simply imparting rules, but rather through structured educational experiences that bring together the school, the family, and active teaching methods, all aimed at fostering citizens capable of caring for themselves and others.

Based on the above, this study adopted a descriptive and propositional approach, grounded in a structured pedagogical intervention that sought to translate safety theory into effective response habits.

The sample was a non-probabilistic convenience sample consisting of 59 students from the “Flores R. de Munguía” elementary school in Caborca, Sonora, Mexico.

The study population was divided into two groups: 5th Grade A (29 students) and 6th Grade B (30 students). A relevant methodological aspect was the inclusion of students with Autism Spectrum Disorder (ASD), which required diversified teaching strategies and personalized attention to ensure their participation in the prevention activities..

Design Phases

The design was structured into five systematic phases:

1. Initialization: Definition of objectives and assignment of technical roles.
2. Planning: Development of the regulatory framework based on NOM-003-SEGOB-2011 and selection of risk variables (school-related, domestic, and traffic-related).
3. Execution: Implementation of seven educational sessions and a final evaluative drill.
4. Monitoring: Comparative analysis of pre- and post-intervention data.
5. Closure: Documentation of findings and formulation of improvement proposals.

A standardized assessment using a five-point Likert scale (Never to Always) was used to evaluate vulnerability.

The instrument used allowed students to be categorized according to their level of preventive awareness:

- **High Risk (0–39 points):** Inability to identify hazards; requires urgent intervention.

- **Medium Risk (40–59 points):** Partial knowledge; requires reinforcement.
- **Low Risk (60–80 points):** Adequate identification of risks and safe decision-making.

Data analysis revealed a significant disparity in the impact of the intervention between the two grades, prompting a thorough reflection on the factors that influence the learning of a culture of prevention.

In this group, the application of active methodologies (PBL and gamification) proved highly effective.

In the initial assessment, only 4 students were in the low-risk category; after the intervention, this number rose to 17 students. The high-risk level decreased from 4 students to just 1.

The home environment was initially the most vulnerable area (16% responded “never” to safe actions at home).

Once the project was implemented, the percentage of students who responded “always” to the safety indicator at home rose from 34% to 60%.

The perception of safety on public streets improved dramatically, with the percentage of students identifying correct behavior when crossing streets increasing from 41% to 64%.

Unlike 5th Grade A, the 6th Grade B group showed a decline in safety indicators. The number of high-risk students increased from 2 to 5, while the number of low-risk students decreased from 8 to 7.

This phenomenon is not attributed to a lack of cognitive ability, but rather to factors related to social interaction. Direct observations revealed hurtful words, nicknames, and negative behaviors that created a chaotic classroom environment.

The authors note that the students’ lack of interest, participation, and cooperation hindered their ability to learn emergency protocols.

Despite group differences, the first aid workshops sparked widespread interest.

Learning the Heimlich maneuver and CPR basics allowed students to understand the importance of acting calmly, a technique that, according to the Mexican Red Cross (2018), increases the chances of surviving an accident by up to 80%. Likewise, the earthquake safety technique

(“Drop, Cover, and Hold On”) demonstrated that experiential learning reduces panic, a factor that contributes to children’s resilience.

Implementing a culture of prevention in elementary education requires a transformation of the teacher’s role, who must shift from being a passive supervisor to becoming an active advocate for comprehensive safety. The key implications derived from this research are outlined below:

One of the most critical implications is the need for teachers to develop skills in emotional self-regulation.

According to the Ministry of Public Education (SEP, 2019), the example set by adults is the determining factor in helping children learn to respond with emotional balance in emergency situations.

In times of crisis, teachers must serve as models of composure, as the ability to remain calm can make a significant difference in a child’s ability to respond. Likewise, the National Civil Protection Coordination Office (CNPC) emphasizes that training teachers through drills can reduce chaos and accidents by up to 70% during a real emergency.

Educational exercises must incorporate tools that go beyond theory. The use of Project-Based Learning (PBL) is essential, as UNESCO notes that this approach improves knowledge retention in basic education by nearly 50%.

Similarly, the incorporation of gamification is a powerful strategy; according to the Inter-American Development Bank (IDB), the use of game elements increases student participation by up to 60%, especially among children aged 6 to 12.

Teachers, therefore, must be trained to design experiential learning environments where vital techniques such as the Heimlich maneuver are practiced, a technique that can save lives in cases of choking.

The research findings showed that the success of a preventive intervention depends on the group’s socio-emotional climate.

While the 5th A group managed to significantly reduce risk levels, the 6th B group experienced a setback attributed to a lack of interest and negative social behaviors such as the use of hurtful words and nicknames.

For the teacher, this implies that school safety must be approached from Chaux's (2003) perspective, understanding the school as a "small society" where civic education and the practice of community life must be fostered to prevent social risks such as bullying.

Teaching practices should strengthen ties with families, as it is widely recognized that the family is the primary setting where children acquire the foundations of their holistic and ecological development.

Given that initial assessments showed that the home is the environment where children perceive the greatest risks (34% in 5th A and 48% in 6th B), teachers must guide parents so that preventive habits continue outside the classroom. All of this must be done in strict compliance with NOM-003-SEGOB-2011, which requires clear signage and ongoing training for school safety teams.

Conclusions

The study demonstrated that teaching strategies have varying impacts depending on the maturity and disposition of the group. Thus, while the 5th A group achieved a substantial improvement—increasing the number of students in the low-risk category from 4 to 17—the 6th B group experienced a setback, with the number of high-risk students rising from 2 to 5.

The success of preventive education does not depend exclusively on teaching techniques, but on group cohesion. In 6th B, lack of interest, poor cooperation, and negative behaviors (such as the use of nicknames and hurtful words) acted as critical barriers that prevented the assimilation of safety protocols.

It has been confirmed that Project-Based Learning (PBL), gamification, and experiential learning are the most effective tools for civil protection training. These strategies not only increase student participation by up to 60% but also improve retention of technical knowledge by 50%, allowing children to "learn by doing."

First aid practices (the Heimlich maneuver and CPR) and evacuation drills proved to be essential for reducing panic and chaos. Experiential learning gives students the confidence needed to act calmly, which is vital given that proper care can increase the chances of surviving an accident by up to 80%.

For a culture of prevention to be sustainable, it must extend beyond school walls. The assessment revealed that the home is perceived as a highly vulnerable environment for children. Therefore, it

is imperative to involve families in the educational process and ensure ongoing teacher training to establish stable self-care habits.

Addressing the statistic that 17.1% of childhood accidents in Mexico occur in schools is not merely a safety measure, but an investment in the holistic development of citizens. This project aligns with the Sustainable Development Goals (SDGs) by promoting safe, inclusive, and resilient environments starting with basic education.

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Contribución de los autores

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