PEDAGOGY AND TEACHING IN EMERGENCY CONTEXTS IN THE AGE OF ARTIFICIAL INTELLIGENCE: TOWARDS A HUMAN-CENTRED FRAMEWORK FOR EDUCATIONAL CONTINUITY, INCLUSION AND RESILIENCE

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ABSTRACT
Natural, health, armed conflict, and socioeconomic crises disrupt educational continuity and exacerbate inequalities, requiring resilient educational systems. This paper critically reviews Education in Emergencies (EiE) and develops a theoretical-operational framework linking it with Artificial Intelligence (AI). Based exclusively on peer-reviewed literature, it integrates four research areas: EiE, resilience, trauma-informed education, and Artificial Intelligence in Education. The review shows that effective crisis education depends on safety, accessibility, flexibility, predictability, participation, and socio-emotional support. AI can strengthen these dimensions through early warning systems, adaptive tutoring, accessible content generation, multilingual translation, and decision support, but also entails risks such as bias, surveillance, opacity, digital exclusion, and excessive automation. The SAFE-AI-Edu framework is proposed to guide ethical, human-centred AI adoption, ensuring human oversight, proportional data use, accountability, inclusion, and resilience

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1. Introduction

Emergencies constitute a critical test for educational systems as they rapidly expose organizational vulnerabilities, social inequalities, and the limitations of ordinary teaching practices. Earthquakes, floods, fires, epidemics, wars, forced migrations, energy crises, and infrastructural collapses can disrupt attendance, destroy learning environments, disperse school communities, and profoundly alter the psychological conditions in which students and teachers are called to teach and learn. In these scenarios, educational continuity does not coincide with the simple remote reproduction of lessons, but requires the reconstruction of a sufficiently safe, predictable, and relational environment, capable of sustaining participation even when the context remains unstable. The international field of Education in Emergencies has progressively recognized that education is an integral part of humanitarian response and social reconstruction. Schools can offer protection, routine, belonging, access to reliable information, and the possibility of imagining the future. At the same time, not every educational intervention activated during a crisis is automatically protective. Improvised programs, inaccessible platforms, disproportionate educational demands, or excessive control practices can increase anxiety, exclusion, and feelings of inadequacy. The quality of the intervention, therefore, depends on the ability to read the crisis as a transformation of the entire educational ecosystem rather than as a simple logistical obstacle.

The literature shows that exposure to disasters, war, and terrorism can impact development through multiple trajectories, with differentiated outcomes depending on individual, family, and community resources (Masten & Narayan, 2012). Trauma and chronic stress can interfere with attention, working

memory, motivation, self-regulation, and interpersonal trust; however, the response is not deterministic. Stable relationships, reliable institutions, participation opportunities, and meaningful routines can act as protective systems. Education, from this perspective, does not "cure" trauma in a clinical sense but can prevent further harm, strengthen resources, and build favorable conditions for recovery.

Furthermore, the digital acceleration produced by the pandemic has introduced a new variable. Educational systems today have platforms, analytics, generative models, translation systems, classifiers, and predictive tools potentially usable to maintain contacts, adapt materials, identify students at risk of disconnection, and support decisions under conditions of information scarcity. The literature on Artificial Intelligence in Education documents a rapid growth of applications but also highlights the persistent prevalence of technical logic over pedagogical questions, as well as critical issues related to transparency, bias, privacy, and the role of educators (Zawacki-Richter et al., 2019; Bond et al., 2024). In emergency contexts, these risks are amplified: data may be incomplete, infrastructures intermittent, people vulnerable, and decisions particularly sensitive.

The scientific problem addressed in this article, therefore, concerns the possibility of correlating emergency pedagogy and artificial intelligence without reducing the former to technical management and without attributing a salvific function to the latter. The proposed hypothesis is that AI can support continuity, inclusion, and resilience only when it is embedded in a human-centred framework, pedagogically governed, proportionate to the risk, and oriented towards reducing barriers. The objective is to critically review the baseline text, consolidate its scientific foundation exclusively through peer-

reviewed articles, and develop a theoretical-methodological model capable of guiding research and practice.

2. Education in Emergencies: definitions, functions, and limits

Education in Emergencies encompasses the educational opportunities developed during and after conflicts, disasters, displacements, and protracted crises. The literature emphasizes that education under such conditions cannot be treated as a deferrable service, as prolonged interruption produces learning losses, exposes individuals to exploitation and violence, weakens protection networks, and limits future possibilities. Dryden-Peterson (2016), analyzing refugee education, demonstrates how schools find themselves at the crossroads of global processes, national systems, and individual aspirations; the mere availability of a seat in a classroom does not guarantee quality, recognition of pathways, or genuine inclusion. Studies on educational interventions in countries affected by conflicts and humanitarian crises highlight promising results but also a heterogeneous empirical base. The review by Burde et al. (2017) notes that some programs can improve access, learning, and well-being, but points out gaps in the evaluation of long-term effects and outcomes for the most vulnerable subgroups. Hence the need to distinguish at least four functions of emergency education: curricular continuity, protection, psychosocial support, and community reconstruction. These functions are interdependent. A formally effective teaching method that is incapable of offering relational security may prove unsustainable; an intervention focused exclusively on well-being, devoid of authentic learning opportunities, may lower expectations for students affected by the crisis.

A second distinction concerns temporality. In the acute phase, safety, communication, and the restoration of minimal routines prevail. In the stabilization phase, the assessment of losses, the recomposition of groups, teacher support, and pathway flexibility become central. In long-term recovery, it is necessary to integrate the crisis experience into the curriculum, remove entrenched inequalities, and strengthen institutional capacity to prepare for future events. The transition between these phases is not linear: wars, epidemics, and climate disasters can produce recurring cycles of opening, closing, and mobility.

The pandemic popularized the concept of emergency remote teaching, distinct from intentionally designed online education. Research on the first global semester of remote teaching shows that institutions and teachers adopted rapid solutions, often without adequate preparation, with stark differences in access and experience quality (Bond et al., 2021). This distinction is fundamental: a tolerable solution in the immediate term should not automatically be consolidated as an ordinary model. Emergencies reduce available time but do not suspend pedagogical criteria. On the contrary, they require even more explicit decisions regarding priorities, workload, accessibility, and assessment.

Crises also challenge the traditional separation between school and territory. Community spaces, radios, telephones, paper materials, reception centers, and family networks can become parts of the educational infrastructure. Continuity, therefore, does not depend on a single channel, but on the redundancy and integration of different resources. This observation will be central in correlating EiE and AI: artificial intelligence must be an optional and interoperable component of a multichannel ecosystem, not its sole access point.

3. Resilience, trauma, and learning conditions

Resilience is frequently invoked in discourses on emergencies, but it risks being interpreted as an individual capacity to endure adverse conditions. Developmental research, instead, describes it as a dynamic process supported by ordinary protection systems: reliable relationships, self-regulation, belonging, competence, family, school, and community. Masten and Narayan (2012) show how the outcomes of exposure to disasters and war depend on the interaction between cumulative risk and adaptive systems. This perspective prevents blaming those who manifest difficulties and shifts focus to the quality of available resources. On a scholastic level, trauma can present itself through hypervigilance, avoidance, irritability, withdrawal, concentration difficulties, memory reduction, oppositional behaviors, or apparent disinterest. Such manifestations are not specific and do not authorize diagnoses by teachers. Rather, they require a functional and prudent reading: what happens before the behavior, which demands prove unsustainable, what signals anticipate dysregulation, what resources facilitate returning to the task. Here, emergency pedagogy meets trauma-informed approaches, which propose environments based on safety, predictability, choice, collaboration, and attention to the risk of retraumatization.

Systematic reviews, however, urge caution. Maynard et al. (2019) note an insufficient empirical base to draw robust conclusions on school-wide trauma-informed approaches, while Avery et al. (2021) show a growing dissemination of integrated models but also significant variability in definition and methodological quality. The adoption of a trauma-informed vocabulary does not guarantee effectiveness. Training, supervision, coordination with clinical services, observable indicators, and outcome evaluation are necessary. Schools

must be sensitive to trauma without transforming into therapeutic settings or applying generalizing labels.

The effects of trauma on academic performance are documented by extensive literature. Perfect et al. (2016), through a meta-analysis, link traumatic symptoms to cognitive, behavioral, and academic difficulties. This connection should not be read linearly: absences, housing instability, loss of materials, family stress, and school changes interact with neurocognitive processes. The pedagogical response must therefore act simultaneously on the task and the context: reduce simultaneous load, segment instructions, offer routines and anticipations, use formative assessments, allow for recovery, support peer relationships, and arrange appropriate referrals when clinical needs emerge.

School interventions focused on trauma can yield benefits, particularly when they include cognitive and emotional regulation components, but their transferability depends on culture, resources, and implementation conditions. Han et al. (2021) note improvements in post-traumatic symptoms, depression, and anxiety in a substantial portion of examined interventions, highlighting the variety of programs. Berger (2024) further shows that trauma-informed physical activities can support social, emotional, behavioral, and academic outcomes, albeit requiring more rigorous and longitudinal studies. These findings reinforce the idea that the body, movement, and relationships are not accessory dimensions of educational recovery.

Resilience also concerns teachers. Continuous exposure to narratives of suffering, increased needs, uncertainty, and perceived responsibility can generate secondary traumatic stress and burnout. A credible framework must therefore include organizational support, distribution of responsibility, coordination time, and access to counseling. It is ethically unsustainable to demand that teachers unilaterally compensate for system deficiencies.

4. Inclusion and inequalities amplified by crises

Emergencies do not distribute their effects uniformly. The possibility of continuing to study depends on income, housing, connectivity, device availability, language, disability, health, gender, migratory status, and family support. The closure of school buildings can transform pre-existing differences into systematic exclusion. Even when a platform is formally available, real access can be hindered by incompatible interfaces, inaccessible materials, lack of subtitles, sensory overload, rigid schedules, or difficulties in autonomous management. The literature on refugee education shows that inclusion does not end with administrative enrollment. Unrecognized curricula, language barriers, lowered expectations, and precarious residency can limit belonging and continuity (Dryden-Peterson, 2016). Similarly, students with disabilities may lose personalized support when schools rapidly transition to remote modalities. An inclusive emergency pedagogy must therefore start from the analysis of barriers and provide multiple equivalent pathways. The principle of inclusive redundancy requires that every essential activity be accessible through at least two channels: synchronous and asynchronous, digital and analog, individual and mediated. Redundancy is not inefficiency, but organizational resilience. In conditions of intermittent connectivity, a system relying exclusively on high-bandwidth video is fragile; in displacement contexts, a pathway requiring a stable individual account may be inappropriate. Downloadable materials, low-intensity messaging, radio, paper kits, and territorial support points must be considered parts of the same design. Personalization must avoid two opposite risks: standardizing needs or preemptively lowering expectations. An emergency may demand different timelines and priority objectives, but it does not justify impoverished pathways for the most vulnerable individuals. It is necessary to distinguish between

channel adaptation, workload modulation, and objective modification. The use of automated tools to simplify texts, translate, or generate alternative formats can support accessibility, provided the outputs are verified and do not produce conceptual distortions. The participation of students and families represents an additional equity criterion. Solutions designed without listening to the recipients may prove unusable. In emergency contexts, co-design can assume rapid yet meaningful forms: brief interviews, accessible questionnaires, advisory groups, mapping of available channels, and preliminary tests. Inclusion is not a property of the device, but of the decision-making process governing its use.

5. Risk education, prevention, and agency

Emergency pedagogy is not solely concerned with the post-event response. A resilient system educates on risk comprehension, prevention, and participation. Disaster risk reduction education aims to develop knowledge about the territory, decision-making skills, safety behaviors, and community involvement. Research highlights that effective programs are not limited to evacuation procedures but connect science, geography, citizenship, local memory, and collective action. Risk learning must avoid both catastrophism and superficial reassurance. Students need to understand probability, uncertainty, sources, and the limits of forecasts. They must be able to distinguish between hazard, exposure, vulnerability, and response capacity. This literacy is particularly important in the era of social media, where unverified information can spread rapidly during crises. The participation of children and adolescents in risk reduction is recognized as a resource, but it must be authentic and age-appropriate. Students can map barriers, observe critical issues, produce accessible materials, simulate decisions, and contribute to communication. Educational agency does not consist of attributing adult

responsibilities, but of recognizing that preparedness increases when people understand the rationale behind procedures and can discuss them.

Digital simulations and serious games offer opportunities to exercise decision-making without real exposure. AI can generate adaptive scenarios, introduce unexpected variables, and provide feedback on choices. However, simulations must be governed by pedagogical and psychological criteria: overly realistic or inadequately debriefed scenarios can increase anxiety. The goal is to build competence and confidence, not to sensationalize the disaster.

6. Artificial Intelligence in education: potential and criticalities

Artificial intelligence in education encompasses systems capable of classifying, predicting, recommending, generating, translating, or adapting content based on data and models. The review by Zawacki-Richter et al. (2019) highlighted four prevalent areas: profiling and prediction, assessment, adaptive systems and tutoring, and management and support. The authors also noted a limited presence of educators in research design, a criticality that remains central. Bond et al. (2024), in a meta-review, call for increased rigor, interdisciplinary collaboration, and ethics. In emergency contexts, certain functions can assume particular relevance. Predictive systems can analyze aggregated data to identify areas with a higher risk of dropout or interruption. Generative models can produce differentiated linguistic versions, formative questions, and low-complexity materials. Chatbots can offer guidance information outside of school hours. Computer vision can support damage assessment or logistical management, while text analysis tools can synthesize reports from schools and communities. The review by Lythreatis et al. (2026) on AI in humanitarian aid shows applications throughout the phases of a crisis but underscores issues of governance, data quality, and accountability. Generative AI introduces further possibilities. Large language models can support brainstorming, feedback, and

material adaptation, but they produce probabilistic responses and can generate false information. Kasneci et al. (2023) describe the opportunities and challenges of large language models for education, highlighting personalization, writing support, and tutoring, alongside bias, hallucinations, and the risk of over-reliance. Tlili et al. (2023) demonstrate how ChatGPT must be analyzed simultaneously as an opportunity and a source of criticality, with particular attention to integrity, privacy, and quality. The ethics of educational AI cannot be retrofitted after implementation. Nguyen et al. (2023) identify recurring principles such as transparency, equity, privacy, accountability, safety, and human-centeredness. In emergencies, proportionality becomes essential: the pressure to "act quickly" does not legitimize massive data collection or opaque automated decisions. Data collected for assistance must not be repurposed without guarantees; vulnerability cannot transform into unlimited availability for data extraction. A further risk concerns the digital divide. Introducing an AI solution may improve the experience for those with connectivity and skills but exclude those without. A seemingly personalized system can thus produce structural inequality. Every proposal must include a functionally equivalent alternative and an analysis of cognitive, technical, and economic costs.

7. Correlation between emergency pedagogy and artificial intelligence

The proposed correlation is neither deterministic nor merely technological. It stems from the correspondence between recurring needs in emergency situations and specific AI functions, mediated by pedagogical constraints. Emergencies generate information scarcity, discontinuity, heterogeneity of needs, the necessity for rapid adaptation, and difficulty in maintaining individualized contact. AI can help analyze signals, organize large amounts of

data, and produce differentiated support. However, the very conditions that make AI potentially useful also increase the risk of error and abuse.

The first correlation concerns continuity. Conversational and adaptive systems can maintain a support channel when the teacher is not immediately available, offer graduated explanations, and guide remedial work. This function must be limited to low-risk educational tasks and supervised. A chatbot cannot manage psychological crises, evaluate diagnoses, or replace the human relationship. It must declare its limits and redirect to people and services when sensitive requests emerge.

The second correlation concerns accessibility. AI can support translation, summarization, text-to-audio conversion, image description, and linguistic adaptation. In contexts of forced migration, translation can facilitate orientation and participation. However, terminological or cultural errors can produce misunderstandings. Human review is indispensable for communications regarding safety, rights, and health.

The third correlation concerns the early identification of disconnection. Data regarding access, submission, and participation can signal that a student is losing contact. Responsible use, however, requires interpreting these data as signals, not diagnoses. A lack of access may depend on connectivity, family caregiving, displacement, or illness. The algorithm must trigger a human verification and a support proposal, not a sanction.

The fourth correlation concerns prevention. Predictive models and support systems can contribute to planning, but they must communicate uncertainty. In risk education, AI can be used as an object of literacy: students compare forecasts, real data, and sources, learning that every model is partial. This perspective transforms AI from an authority into a criticizable epistemic tool.

The fifth correlation concerns teacher training. Generative systems can produce cases, scenarios, and materials for simulations, supporting preparedness for rare events. A teacher can practice managing a communication, reorganizing the curriculum, or adapting an assignment. Scenarios must be validated by experts and accompanied by debriefing. The value lies not in the realistic theatricalization of the crisis, but in the opportunity to reflect on decisions, alternatives, and distributive effects.

The sixth correlation concerns coordination. Dashboards and synthesis systems can aggregate information from schools, services, and the territory. This can improve the visibility of needs, but it introduces risks of surveillance and profiling. Minimization, pseudonymization, differentiated access, defined retention periods, and independent audits are necessary.

The correlation can be summarized as a conditional relationship: the greater the uncertainty and vulnerability, the greater the human supervision must be, and the lesser the decision-making autonomy attributed to the system. AI can increase organizational capacity and accessibility, but it must not decide who receives protection, who is credible, who can continue, or which student is "at risk" without contextual evaluation.

8. The SAFE-AI-Edu framework

To translate the correlation into operational criteria, the SAFE-AI-Edu framework is proposed. The acronym integrates eight dimensions: Safety, Accessibility, Flexibility, Emotional regulation, Human oversight, Accountability, Inclusion, and Resilience. The framework is not a rigid protocol but a matrix for designing, evaluating, and monitoring AI-assisted educational interventions in crisis situations. Safety concerns physical, psychological, and digital protection. No solution should increase exposure to danger, unwanted

contacts, manipulation, or overload. Systems must not be used for automatic diagnoses, invasive emotional surveillance, or punitive decisions. Safety communications must be verified by competent personnel. Accessibility requires that contents and interfaces be usable by students with different abilities, languages, and technical conditions. AI can generate alternative formats, but outputs must be controlled. Every critical function must have a non-AI and, whenever possible, offline alternative. Flexibility concerns timing, pathways, and forms of participation. Crises alter availability and family burdens; the system must permit asynchrony, recovery, and modulation. AI can suggest pathways, but it must not automatically fix lowered expectations based on historical profiles. Emotional regulation implies routines, predictability, a sustainable workload, and recognition of stress signals. Tools can offer reminders, breaks, or self-regulation activities, but they do not replace human support. Any automated affective computing must be avoided or subjected to extremely restrictive criteria, as emotional inference is uncertain and culturally sensitive.

Human oversight establishes that significant decisions remain under the responsibility of identifiable professionals. Users must know when they are interacting with a system, be able to request a review, and contest an output. The teacher retains governance over the curriculum and assessment. Accountability requires the traceability of purposes, data, versions, prompts, modifications, and responsibilities. It is not sufficient to declare that the tool is "innovative" or "secure". Impact assessments, incident logs, and suspension procedures are required. Inclusion considers the distribution of benefits and costs. Before adoption, one must ask who can use the system, who remains excluded, which groups are underrepresented in the data, and what adaptations are necessary. Equity does not equate to providing everyone with

the exact same tool. Resilience concerns the ability of the educational system to continue functioning in the presence of failures, interruptions, and changes. A resilient solution is modular, interoperable, documented, and does not depend on a single vendor. It provides backups, alternative materials, and skill transferability.

The framework further introduces four transversal rules. The rule of necessity mandates using AI only when it offers a specific advantage. The rule of proportionality limits data and automation. The rule of verifiability demands information control. The rule of reversibility ensures that activities can continue without the system. These rules prevent the emergency from being used as a pretext for ungoverned experimentation.

9. Didactic and organizational implications

Applying the framework modifies the instructional design. The first step is not selecting the tool, but defining the need: maintaining contact, translating, differentiating, analyzing reports, simulating scenarios, or supporting remedial learning. Only subsequently is it evaluated whether AI is necessary and proportionate. For curricular continuity, objectives must be hierarchized. In the acute phase, communication, orientation, relationships, and essential competencies may be priorities. The workload should be reduced without transforming the reduction into permanent impoverishment. Short, modular, and reusable materials prove more resilient. Generative AI can produce drafts, questions, or graduated versions, but the teacher must verify their accuracy and coherence. Assessment must prioritize a formative function. In conditions of discontinuity, results may reflect access and stress rather than competence. Analytics and predictive systems must not automate high-stakes grading. Instead, they can help visualize gaps, provided the data is contextualized. Rayhan et al. (2022), proposing an AI system for exams during the pandemic,

demonstrate interest in predictive solutions, but such applications raise crucial issues of equity and validity. Emergency pedagogy should be particularly cautious regarding automated assessments based on unequal historical data. Relationally, technology must support, not replace, presence. Personalized messages, small groups, and periodic contacts are more important than a multiplication of contents. The teacher must be able to use AI to reduce administrative tasks and free up relational time, not to increase the volume of demands. Professional development must include three levels: emergency literacy, digital didactic competence, and critical AI literacy. Teachers must understand model limits, bias, privacy, verification strategies, and criteria for declaring usage. Training must be practical, situated, and supported by learning communities. An isolated technical webinar is insufficient. Schools must establish policies before a crisis occurs. Approved tools, alternative channels, roles, communication procedures, data access levels, and coordination modalities with services must be defined. Preparedness reduces the temptation to adopt opaque solutions at the moment of maximum pressure.

10. Methodological proposal for framework validation

The SAFE-AI-Edu framework requires empirical validation. A four-phase research program is proposed, capable of integrating quantitative and qualitative methods and respecting the heterogeneity of emergencies. The first phase is a Delphi study with experts in pedagogy, psychology, risk management, inclusion, data protection, and AI. The objective is to evaluate the relevance, clarity, and completeness of the dimensions. Two or three anonymous rounds would allow for reaching consensus without nullifying documented dissent.

The second phase is co-design with teachers, students, families, and services. Through workshops and scenario-based design, needs, barriers, and potential

uses are analyzed. Participants evaluate simulated cases: temporary closure due to flooding, reception of displaced students, connectivity interruption, health emergency. Co-design produces contextual protocols and acceptability criteria.

The third phase involves pilot studies in schools across different territories. A quasi-experimental design could compare classes adopting the framework with classes using ordinary continuity procedures. Outcomes would include participation, submission rates, essential learning, perceived well-being, teacher workload, accessibility, privacy incidents, and support quality. Data collection should occur in exercises or real situations without artificially inducing stress.

The fourth phase is longitudinal and evaluates maintenance, transferability, and organizational resilience. Sampling should include urban and rural schools, varying socioeconomic levels, and students with diverse educational needs. The unit of analysis is not solely the student, but the school as a system.

Quantitative tools can include validated scales for engagement, self-regulation, school safety, well-being, and trust in AI; learning assessments and continuity indicators must be carefully constructed. Platform data are secondary and minimized. Multilevel analyses allow for distinguishing individual, class, and school effects. Outcomes must be reported with confidence intervals and effect sizes, not just significance.

The qualitative component includes interviews, focus groups, diaries, and observations. It is particularly important to collect negative cases: excluded students, unusable tools, incorrect translations, false alarms, and situations where the analog alternative works better. The quality of the framework depends on the ability to make failures visible.

AI evaluation must include accuracy, robustness, fairness, intelligibility, and burden. For each function, inputs, outputs, corrections, and human decisions are recorded. Errors are not treated as irrelevant exceptions but as central data. A system can be accurate on average yet dangerous for a subgroup.

Ethics require approval, consent, accessible information, and the possibility of opting out of AI use without penalties. Data concerning trauma, health, and vulnerability must not be used to train commercial models. Research must prepare support procedures should participation bring distress to the surface.

11. Application scenarios and decision matrix

The framework can be clarified through application scenarios showing how the same technology can produce different outcomes depending on governance. In the first scenario, a school is closed due to a flood and a portion of the students are temporarily housed in different facilities. The priority need is to rebuild contact and determine the channels actually available. An AI system can help the administration classify requests, translate communications, and prepare accessible versions, but it must not automatically deduce family conditions or establish assistance priorities. The correct procedure involves minimal data, telephone or localized verification, and logging of the human decision. The measure of success is not the number of messages produced, but the percentage of students effectively reached through at least one usable channel.

In the second scenario, a class welcomes displaced students from a conflict zone. The generative system is used to prepare glossaries, bilingual materials, and graduated explanations. The use is pedagogically justified because it reduces a language barrier, but it requires review by teachers and mediators. Automatic translation is not used for certifications, legal communications, or

clinical information. Students can choose whether to use the support and are not publicly identified as recipients of a simplified track. In this case, AI supports access without transforming linguistic difference into permanent profiling.

In the third scenario, a platform flags a reduction in connections and submissions. The algorithm does not produce a reliability score for the student, but generates a list of situations to be verified. The class council distinguishes between technical problems, caregiving burdens, distress, displacement, and academic difficulties. The response may consist of offline materials, modified deadlines, family contact, or service activation. Digital data is thus an incomplete indicator embedded in an ecological assessment. This approach reduces false positives and prevents absence from being automatically interpreted as disengagement.

In the fourth scenario, teachers use a language model to construct a seismic emergency simulation. The system generates events, questions, and decision alternatives, but the content is verified by safety experts. During the activity, students are not exposed to shocking images and can halt their participation. The debriefing distinguishes emotional reaction, procedure, and reasoning. AI increases scenario variety, while the teacher maintains control over intensity and educational meaning.

In the fifth scenario, a principal evaluates a dashboard that aggregates data on attendance, access, and support requests. The framework dictates that the visualization must also display the quality and incompleteness of the data. Individual vulnerability rankings are not presented; aggregated levels sufficient for resource planning are used. Access is logged and restricted. Information is deleted when no longer necessary. The dashboard is a coordination tool, not a surveillance system.

From these scenarios, a seven-question decision matrix is derived. First: what specific educational need is being addressed? Second: is there a simpler and less invasive solution? Third: what data is indispensable? Fourth: who verifies the output and assumes the decision? Fifth: which students might be excluded or harmed? Sixth: what alternative works in the absence of a network or consent? Seventh: how are errors, complaints, and corrections documented? A project that does not answer these questions convincingly should not be implemented during a crisis.

The matrix also helps distinguish three levels of risk. Low risk includes internal draft generation, exercise adaptation, and material organization, always with review. Medium risk includes translation, tutoring, and disconnection flagging, which require formalized procedures and monitoring. High risk encompasses grading, health inferences, service access, and disciplinary decisions: such functions must not be automatically delegated and, in many cases, should not use AI. Classification does not depend on technical sophistication, but on the consequences of error.

Gradual adoption is preferable to simultaneous deployment. A school can begin with a single low-risk function, define indicators, collect feedback, and suspend use in the presence of critical issues. Experimentation must be separated from urgent response: individuals affected by a crisis cannot become unwitting test subjects. Unvalidated tools can be tested in simulations and controlled contexts, whereas only pre-evaluated procedures are used during an emergency.

Finally, each scenario confirms that the educational value of AI depends on the quality of the relationships and institutions surrounding it. Technology does not compensate for a lack of trust, personnel, or coordination. It can accelerate a well-designed process, but it can also amplify an unjust one. The framework

therefore assumes that critical capacity, supervision, and participation are infrastructures as important as networks and devices.

12. Discussion

The review of the field highlights that emergency pedagogy cannot be reduced to a set of techniques activated after an event. It represents a systemic perspective connecting prevention, response, recovery, and transformation. Its object is not merely the continuity of transmission, but the quality of the conditions that make learning possible in the presence of vulnerability and uncertainty.

The correlation with artificial intelligence appears plausible when AI is used as a support tool rather than an authority. The most promising functions concern accessibility, adaptation, synthesis, and coordination. The added value is not automatic. A chatbot can offer language support but also provide incorrect information; a predictive system can flag disconnection but also transform poverty and absence into risk labels; a generative model can lighten the workload but also increase demands and standardization.

The literature on AI in education shows that the speed of innovation often outpaces the capacity for validation. Zawacki-Richter et al. (2019) and Bond et al. (2024) converge on the need for a stronger pedagogical presence. This necessity is even more acute in emergency contexts, where decisions have immediate consequences and people have fewer opportunities for contestation. The SAFE-AI-Edu framework addresses this problem by subordinating every function to necessity, supervision, and alternatives.

A central point concerns the tension between personalization and profiling. To personalize means to modify support in response to a declared or observed need; to profile means to infer characteristics and predict behaviors based on

data. In an emergency, profiling may seem efficient, but it risks crystallizing vulnerability. The framework favors adaptations that are transparent, reversible, and user-controlled.

Technological resilience constitutes another issue. AI depends on energy, networks, devices, and services—the very infrastructures that can be compromised. A solution that is effective under ordinary conditions may fail during a crisis. For this reason, the criterion of reversibility is non-negotiable. Organizational competence must precede technological complexity. This paper has limitations. It is not a systematic review with meta-analysis and does not quantitatively estimate the effectiveness of AI applications in EiE, as direct literature is still limited. The correlation is built by integrating contiguous fields: Education in Emergencies, trauma-informed schooling, AI in education, and humanitarian AI. This integration offers a theoretical framework but requires specific empirical studies. A second limitation concerns rapid technological evolution. Performance, terms of service, and models change frequently. Guidelines must therefore be formulated at the level of principles and processes, not individual products. A third limitation relates to the cultural diversity of emergencies. Safety, participation, and trust assume different meanings; the framework requires local adaptation. Despite these limitations, the proposal offers a contribution: it shifts the debate from the question "which AI to use?" to the question "which educational problem to address, with what guarantees, and for whom?". This shift is consistent with a pedagogy that considers technology a part of the environment, not its center.

13. Conclusions

Emergencies interrupt spaces, times, and relationships, but they do not suspend the right to a quality education. Educational continuity must be interpreted as the ability to maintain bonds, access, meaning, and

opportunities to learn, not as an obligation to reproduce ordinary functioning without adaptation. Safety, inclusion, flexibility, and resilience constitute interdependent dimensions. Artificial intelligence can contribute to the educational response when it reduces barriers, supports translation, makes differentiated materials available, helps organize information, and flags interruptions that require verification. It cannot replace professional judgment, relationships, protection, or institutional responsibility. In contexts of greater vulnerability, supervision must increase and automation must decrease.

The SAFE-AI-Edu framework proposes an operational synthesis based on Safety, Accessibility, Flexibility, Emotional regulation, Human oversight, Accountability, Inclusion, and Resilience. The four rules of necessity, proportionality, verifiability, and reversibility constitute its transversal core. The model can guide policy, training, design, and research. The future scientific agenda should produce comparative, longitudinal, and participatory studies. It is necessary to evaluate not only whether a solution maintains access, but also who benefits, what costs it incurs, what errors it commits, and how it alters the educational relationship. Quality will not be measured by the number of automated interactions, but by the system's capacity to protect, include, and sustain agency. Emergency pedagogy in the age of AI must remain a pedagogy of responsibility. Crises do not legitimize ethical shortcuts; rather, they make the construction of comprehensible, contestable, and human systems more urgent. The most significant innovation does not consist in delegating the response to machines, but in using intelligent tools to strengthen the capacity of educational communities to care, decide together, and rebuild the future.

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