Research Square

Preprints are preliminary reports that have not undergone peer review.
They should not be considered conclusive, used to inform clinical practice,
or referenced by the media as validated information.

Disaster Medicine in Brazilian Undergraduate Medical Education: Lessons from an International Training-of-Trainers Programme

Daniel Higor Silva Barros

drdaniel.hbarros@gmail.com

Universidade Católica de Brasília

Jose Isaias Garcia Ulerio

Università del Piemonte Orientele

Research Article

Keywords: Disaster Medicine, Medical Education, Curriculum, Capacity Building, Global Health, Brazil, International Cooperation

Posted Date: May 26th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-9476622/v1

License: This work is licensed under a Creative Commons Attribution 4.0 International License.
Read Full License

Additional Declarations: No competing interests reported.

Abstract

Background

Disaster medicine remains largely absent from Brazilian medical school curricula, despite the country's increasing exposure to recurrent and devastating disasters. This gap has critical implications for health system preparedness and response. The Training Disaster Medicine Trainers (TdmT) program, an annual international initiative co-developed by CRIMEDIM (Università del Piemonte Orientale, Italy) and IFMSA, offers an integrated blended-learning course combining a three-month online phase with a five-day residential program in Novara, Italy.

Methods

This is a single-participant reflective experience report grounded in Kolb's Experiential Learning Cycle and Gibbs' Reflective Cycle. Data sources included prospective field notes, structured self-assessment of competency domains before and after the residential phase, and qualitative analysis of intercultural group interactions. Competency self-assessment used a six-domain Likert-type instrument (1–5) aligned to TdmT content.

Results

Self-assessed competency scores improved substantially across all six domains following course completion, with the largest gains observed in Mass Casualty Incident (MCI) triage management (pre: 1.5 → post: 4.0) and humanitarian health standards (pre: 1.0 → post: 3.5). Qualitative analysis identified three emergent themes: (1) context-dependency of disaster response; (2) solidarity and emotional resonance of cross-cultural peer learning; and (3) motivation to advocate for disaster medicine integration in home curricula.

Conclusion

The TdmT program illustrates that a structured, internationally collaborative, blended-learning model is associated with marked self-assessed learning gains in this participant, and offers a potentially transferable model for contexts with limited curricular exposure. Brazil's escalating disaster burden, combined with the complete absence of disaster medicine from national curriculum guidelines, constitutes a critical public health gap. The findings support urgent advocacy for curricular reform in Brazilian medical schools and support the plausibility that peer-to-peer training programmes are a viable and low-cost means to equip medical students with disaster medicine competencies.

BACKGROUND AND RATIONALE

Disaster medicine is defined as the collaborative study and application of health sciences, alongside other disciplines, in disaster prevention, preparedness, response and recovery, with the goal of mitigating impacts on human health and society (1). As an inherently multidisciplinary field, it integrates emergency medicine, public health, epidemiology, humanitarian law and health systems management. Despite its evident relevance, disaster medicine remains one of the most underrepresented disciplines in undergraduate medical curricula worldwide (2, 3).

Evidence for this gap is consistent. A 2022 systematic review of disaster medicine curricula in medical schools worldwide identified significant heterogeneity across existing programmes and a marked absence of standardised competency frameworks, with most programmes relying on expert opinion rather than evidence-based curriculum development (3). A 2024 scoping review examining 64 articles from 2004 to 2021 corroborated that disaster medicine education is largely confined to a minority of schools concentrated in high-income countries, particularly the United States, Germany and Italy (2). Brazil — the largest country in Latin America and the fifth most populous in the world — was not represented in any of the articles included in either review, a finding that reflects rather than resolves the problem.

This gap carries urgent practical consequences. Brazil ranks among the most disaster-prone countries in the world. Between 2017 and 2021, approximately 4.44 million people across 482 of the 497 municipalities of Rio Grande do Sul were affected by floods, droughts and extreme rainfall (4). In May 2024, Rio Grande do Sul experienced the worst climate disaster in its recorded history: floods that claimed 183 lives, displaced over 600,000 people and affected approximately 2.4 million individuals across 478 of 497 municipalities (5, 6). A correspondence published in The Lancet during the event noted that more than 265 cities declared a state of calamity and that nearly one million people lost access to potable water (7). These events were neither isolated nor unprecedented: the same region had experienced four major flood disasters in the twelve preceding months (5). Climate scientists directly attributed the intensification of such events in southern Brazil to the combined effects of global warming and the El Niño phenomenon (8).

Despite this recurrent exposure, disaster medicine is absent from the National Curriculum Guidelines (Diretrizes Curriculares Nacionais — DCNs) for medical degrees, last revised in 2014. This absence has concrete practical implications. Many graduates complete their training without structured exposure to triage systems, incident command protocols or humanitarian response organisation. In routine clinical practice, this gap may not be immediately visible. However, during mass casualty incidents or large-scale environmental disasters, the absence of prior structured training becomes evident — both individually and systemically. The consequences were visible in the response to the 2024 Rio Grande do Sul floods, characterised by improvisation, absence of standardised triage protocols and coordination failures at the interface between the health sector and civil defence (7).

In this context, the Training Disaster Medicine Trainers (TdmT) programme offers a compelling model for change. Developed annually since the early 2010s by CRIMEDIM (Research Centre in Emergency and

Disaster Medicine, Humanitarian Aid and Global Health, Università del Piemonte Orientale, Novara, Italy), in partnership with the International Federation of Medical Students' Associations (IFMSA), TdmT grew directly from the success of DisasterSISM, a national peer-assisted learning (PAL) programme in disaster medicine that, between 2012 and 2018, reached 88% of Italian medical schools and trained over 2,500 students (9, 10). CRIMEDIM subsequently expanded the DisasterSISM model internationally through TdmT, with the goal of creating a global network of certified student-trainers in disaster medicine, capable of delivering peer education in their home countries (11).

This article reports the structured reflective experience of a Brazilian participant in the TdmT 2025 programme. Its objectives are to document self-assessed competency gains, characterise the pedagogical and intercultural dimensions of the training, and discuss implications for disaster medicine education in Brazil and for broader global health workforce development.

METHODS

Study Design

This study is positioned as an analytical autoethnography (28, 29), a methodology recognised in health professions education for the systematic documentation and critical analysis of experiential learning in contexts not amenable to experimental or quasi-experimental designs (12). Analytical autoethnography foregrounds the researcher's personal experience as data while situating it within broader social, institutional and theoretical contexts — a stance particularly well suited to single-participant accounts of international training programmes. Alternatively framed as a single-case study (30), this design is recognised in health professions education as a legitimate exploratory model for hypothesis generation and identification of contextual perspectives. In line with published guidelines for experience reports in medical education journals, this report integrates: (i) prospective descriptive data on programme structure and content; (ii) quantitative self-assessment of competency change; and (iii) structured qualitative reflection following established theoretical frameworks (12, 13).

Although based on single-participant assessment, the case study design (30) is recognised in health professions education as a legitimate exploratory model for hypothesis generation and identification of contextual perspectives, particularly in the evaluation of innovative educational models. The analytic stance of this study is explicitly that of the participant-researcher, and findings are offered as contextual illustration rather than generalisation.

Theoretical Frameworks

Two complementary frameworks guided data collection and analysis. First, Kolb's Experiential Learning Cycle (1984), which proposes that effective learning occurs through a four-stage process: concrete experience, reflective observation, abstract conceptualisation and active experimentation (14). This cycle is well established in medical education and offers a validated structural lens for analysing the

progressive learning architecture of blended learning programmes (15, 16). Second, Gibbs' Reflective Cycle (1988) was applied to structure the qualitative narrative, particularly in the analysis of high-impact experiential moments (XVR simulations, intercultural exchanges, ITDM presentation), through six sequential stages: description, feelings, evaluation, analysis, conclusion and action plan (17).

Data Collection

Data were collected prospectively through three channels. First, a structured field diary was maintained daily throughout the residential phase (7–11 July 2025), recording observations on pedagogical dynamics, group interactions, self-identified learning gaps and affective responses to training scenarios. Second, a self-assessment instrument for perceived competence across six core TdmT domains was administered on the morning of the first day of the residential phase (before any content session) and again on the final day, immediately following structured debriefing. Each domain was rated on a 5-point Likert scale (1 = no knowledge/skill; 5 = advanced knowledge/skill). The six domains were derived directly from the official TdmT 2025 curricular framework, as structured and delivered by CRIMEDIM/IFMSA (9, 10, 11), and their boundaries reflect the programme's own thematic organisation rather than an independently developed taxonomy. The assessed domains were: (1) Disaster Medicine Fundamentals and Classification; (2) MCI Management and Triage; (3) Humanitarian Response Standards (Sphere, Clusters, EMT); (4) Health Consequences of Specific Disaster Types (including CBRN threats and mental health); (5) Public Health in Disasters and Epidemiological Surveillance; and (6) Training Methodologies and Peer-Assisted Learning. Third, informal semi-structured notes were recorded following group discussions with participants from different countries, capturing emerging perspectives on disaster vulnerability, national health system characteristics and contextual adaptations of disaster response principles.

The TdmT 2025 Programme

The TdmT 2025 course comprised two sequential phases. The online phase (1 April – 30 June 2025) consisted of six progressive thematic modules delivered through a self-guided e-learning platform. Access to each module was unlocked only after completion of the previous module's self-assessment test, ensuring sequential knowledge consolidation. Each module integrated three learning components: mandatory reading (primary literature and Sphere Manual excerpts), expert video lectures and ITDM presentation slides for subsequent peer teaching. The residential phase (6–11 July 2025 — arrival day plus five working days) was held in Novara, Italy, at UPO facilities. The 2025 cohort comprised 30 participants from over 15 countries, including Albania, Philippines, Turkey, Iraq, Brazil, Mexico, Switzerland, Cyprus, Malawi, Austria, Romania, Jordan, Libya, England, Netherlands, Hong Kong, selected through a competitive process based on motivation, prior experience and commitment to knowledge dissemination following the programme. Table 1 describes the full programme structure.

Table 1
TdmT 2025 Programme Structure

Phase	Period / Timing	Main Content and Activities
Online — Module 1	1–18 Apr. 2025	Introduction to Disaster Medicine and Humanitarian Medicine; disaster definition and classification; key international frameworks (Sendai Framework 2015–2030)
Online — Module 2	19 Apr. – 2 May 2025	Mass Casualty Incident (MCI) management; Incident Command System (ICS); hospital preparedness for disasters; Crash Exercise (scenario-based assessment)
Online — Module 3	3–16 May 2025	Health impact of specific disaster types; mental health in disasters; psychological first aid; CBRN threats
Online — Module 4	17–30 May 2025	Public health in disasters; epidemiological surveillance; Sphere Manual; ethics in resource-limited contexts; Humanitarian Health Action Exercises
Online — Module 5	31 May – 13 Jun. 2025	International coordination of humanitarian response; UN cluster system; International Humanitarian Law; WHO EMT Initiative
Online — Module 6	14–30 Jun. 2025	Training methodologies; peer-assisted learning (PAL); simulation design and management; adult learning principles
Residential — Day 1	7 Jul. 2025	Disaster medicine in floods and conflicts; in-depth MCI triage session (coord. J. Garcia Ulerio); Networking event with CRIMEDIM faculty
Residential — Day 2	8 Jul. 2025	TableTop Exercise; health crisis management (Dr S. Gaievskyi); WHO EMT presentation (Dr A. Abdel-Fattah); Multicultural Coffee Break
Residential — Day 3	9 Jul. 2025	Full-day XVR (Extended Virtual Reality) simulations: complex multi-casualty scenarios with structured debriefing
Residential — Day 4	10 Jul. 2025	ITDM oral presentations by participant groups (assessed by IFMSA representative E. Osama); field exercise
Residential — Day 5	11 Jul. 2025	Structured debriefing; post-competency self-assessment; certification ceremony; planning of dissemination actions in home countries

Source: CRIMEDIM/IFMSA TdmT 2025 Programme Schedule. Abbreviations: MCI — Mass Casualty Incident; XVR — Extended Virtual Reality; ITDM — International Training in Disaster Medicine; EMT — Emergency Medical Team.

Data Analysis

Quantitative self-assessment data were tabulated descriptively (pre vs. post scores by domain). Given the n = 1 design, no inferential statistics were applied; data are presented as an intra-subject competency profile to illustrate learning trajectories. Qualitative data were drawn from a corpus of 47 field diary

entries totalling approximately 6,200 words, generated prospectively across the five days of the residential phase (7–11 July 2025). Data were analysed thematically following Braun and Clarke's six-phase model for reflexive thematic analysis (18). Coding proceeded inductively in an initial open-coding phase, followed by grouping of codes into candidate themes that were subsequently mapped against the Kolb and Gibbs frameworks. All coding was conducted by the author alone; the absence of a second independent coder is acknowledged as a limitation of the n = 1 design and is addressed in the Limitations section. Thematic saturation was considered reached when no new codes emerged from the final day's entries. Researcher reflexivity was maintained through a dedicated section of the field diary, recording assumptions, positionality and emotional responses throughout the programme.

RESULTS

Change in Self-Assessed Competence

Table 2 presents pre- and post-residential phase self-assessment scores across the six competency domains. Scores improved across all six domains, with a mean gain of 2.1 points (range: 1.5–2.5) on the 5-point scale. The largest gains were observed in MCI Management and Triage (Δ = 2.5) and Humanitarian Response Standards (Δ = 2.5), both domains with minimal prior exposure in the author's curriculum. Modest but critically relevant gains were documented in Training Methodologies (Δ = 1.5), reflecting prior but limited familiarity with active learning approaches. At baseline, all six domains were rated between 1.0 and 2.0, reflecting near-complete absence of formal disaster medicine education in the author's medical training. At post-assessment, no domain was rated below 3.0, and two domains reached 4.0.

Table 2
Self-Assessed Competency Scores — Pre vs. Post Residential Phase

Competency Domain	**Pre Score (1–5)**	**Post Score (1–5)**	**Δ (Change)**
Disaster Medicine Fundamentals and Classification	2.0	4.0	+ 2.0
MCI Management and Triage	1.5	4.0	+ 2.5
Humanitarian Response Standards (Sphere / Clusters / EMT)	1.0	3.5	+ 2.5
Health Consequences of Specific Disasters (incl. CBRN / Mental Health)	1.5	3.5	+ 2.0
Public Health in Disasters and Epidemiological Surveillance	2.0	4.0	+ 2.0
Training Methodologies and Peer-Assisted Learning	2.0	3.5	+ 1.5
Mean	**1.7**	**3.8**	**+ 2.1**

1 = no knowledge/skill; 5 = advanced knowledge/skill. Scores represent self-assessment using a six-domain Likert-type instrument. These data reflect a single-participant intra-subject assessment and are reported for illustrative purposes only, without inferential generalisation.

Qualitative Themes from Field Diary Analysis

Thematic analysis of field diary entries generated three overarching themes. The corpus comprised 47 entries across five days, totalling approximately 6,200 words. Codes were generated inductively from raw entries and subsequently grouped into themes; saturation was considered reached when no new codes emerged from the final day's entries. Representative illustrative passages are quoted within each theme below.

Theme 1 — Contextual dependency of disaster response. Conversations with participants from Albania, the Philippines and Malawi repeatedly suggested that the principles of disaster medicine require adaptation to each country's reality. A colleague from Malawi described the difficulty of using triage protocols in a region with no ambulances or emergency services. A participant from Iraq explained how psychological support needs to be different in prolonged conflict zones, where trauma is not a discrete event but part of everyday life.

These exchanges made clear that international guides such as the Sphere Manual and the WHO EMT Initiative are important references, but their application always depends on local conditions. For Brazil, this means that a disaster medicine curriculum must account for the country's specific realities: the unequal distribution of disaster exposure, civil defence shortfalls in municipalities, and the distinct risk profiles of urban and rural settings.

A Day 2 field diary entry captures this tension well: *"The Sphere standards look universal on paper, but listening to [the participant from the Philippines] describe a hospital without ambulances and without a triage officer made me realise that the framework presupposes an infrastructure that simply does not exist in many places."*

Theme 2 — Solidarity and emotional resonance of cross-cultural peer learning. The XVR simulation day (Day 3) emerged as the highest-impact experiential moment in the field diary. Immersed in a realistic mass-casualty scenario alongside participants from over 15 countries, the author confronted not only technical gaps in triage decision-making, but also the emotional intensity of disaster response — the prioritisation dilemmas, communication failures under pressure and the moral weight of resource allocation. The structured debriefing that followed enabled the group to process these experiences collectively. Field notes recorded that the emotional authenticity of the simulation, combined with the shared vulnerability of learning across cultural and professional boundaries, generated a quality of trust and depth of reflection that would have been unachievable in a homogeneous group. This finding aligns with the growing literature on psychological safety as a prerequisite for deep learning in high-fidelity simulation environments (19).

Theme 3 — Motivation to advocate for curricular change. Throughout the programme, and particularly during transnational discussions about participants' home contexts, a recurring theme in the author's diary was the contrast between the comprehensive disaster preparedness infrastructure described by participants from Switzerland and Austria, and the near-complete absence of structured disaster medicine education in Brazil. This contrast functioned not as discouragement, but as a motivational catalyst: Day 5 field notes record an explicit personal commitment to, upon returning, advocate for the inclusion of disaster medicine content in the home institution's curriculum and to organise the first ITDM workshop in the home city. This intention represents the direct operationalisation of TdmT's multiplier model. The Day 5 entry records, in part: *"I came here knowing Brazil was behind. I leave knowing exactly how far, and — more importantly — knowing that the path forward is not to wait for a curriculum reform that could take a decade. It starts with a workshop, a group of students, one city."* This passage encapsulates the motivational logic upon which TdmT's multiplier model depends: converting awareness of a gap into a concrete local action plan.

DISCUSSION

Pedagogical Architecture: A Reference Model for Blended Learning

From a pedagogical standpoint, the TdmT programme structure closely mirrors Kolb's experiential learning cycle, though this alignment becomes clearer in retrospect than during the experience itself. The online phase progressively builds conceptual understanding, while the residential phase confronts participants with practical, emotionally charged scenarios that demand active application. Living this sequence first-hand made the theoretical model tangible rather than abstract. The three-month online phase provides the foundational concrete experience (knowledge acquisition) and supports reflective observation through module self-assessment tests. The residential phase intensifies both abstract conceptualisation (through expert lectures, TableTop Exercises and ITDM presentations) and active experimentation (through XVR simulations, field activities and group teaching practice). Gibbs' Cycle, in turn, was particularly evident in the structured debriefing architecture of Days 3 and 5, which created formal institutional space for reflection, evaluation and action planning — components frequently omitted from disaster medicine training programmes (16, 20).

The XVR simulation warrants specific attention. A 2023 systematic review on virtual reality in disaster medicine training found that VR and augmented reality consistently improved participants' confidence and satisfaction and may be considered a valuable complement to traditional training modalities (21). A 2024 scoping review comparing VR exercises to tabletop exercises in disaster preparedness training concluded that VR exercises were at least as effective as — and in some respects superior to — traditional methods for formulating realistic disaster response plans, with advantages in realism, replicability and cost-effectiveness (22). TdmT's use of full-day XVR immersion, integrated with structured debriefing and immediately followed by ITDM oral presentations, represents a pedagogical

sequence that maximises the educational yield of each methodology by explicitly linking experiential and analytical modes of learning.

The peer-assisted learning (PAL) model underpinning TdmT is equally evidence-based. Ragazzoni et al. (2020) demonstrated in the DisasterSISM evaluation that the PAL approach successfully scaled disaster medicine education from a small group of certified trainers to 88% of Italian medical schools over five years (10). TdmT extends this model internationally, embedding PAL logic in the programme's most visible exit requirement: the ITDM oral presentations delivered by participants on Day 4. This requirement functions simultaneously as formative assessment, professional socialisation mechanism and readiness test for the multiplier role each participant assumes upon completing the programme.

Beyond the virtual reality simulation, the residential phase included a full-scale field exercise. The exercise simulated a terrorist attack during a football match: actors portrayed casualties in the stands, some trampled, others with wounds of varying severity, amid shouting, confusion and time pressure. This type of simulation with standardised patients in an outdoor environment — known in the literature as a field exercise or full-scale exercise — is recognised as one of the most effective strategies for developing disaster response competencies, by replicating conditions that controlled classroom environments cannot, including ambient noise, sensory overload and the emotional pressure of real-time decision-making (20, 22).

Participants were required to organise on-site care, establish triage priorities, coordinate the team and make decisions under stress — without a script, without pauses and without the distance of a screen. For many in the group, including the author, it was the first time that the protocols learned in the online modules needed to be applied in an environment that reproduced, with uncomfortable fidelity, the real chaos of a disaster scene. The experience exposed gaps that theory had not revealed: hesitation when faced with victims who were shouting for help while others, silent, were those most in need of immediate attention. This phenomenon is described in the simulation literature as distraction bias — the tendency to respond to the noisiest stimuli at the expense of the most clinically critical signals — and its identification in a simulated environment is considered one of the principal benefits of high-fidelity training in disaster medicine (20). The debriefing that followed transformed this discomfort into structured learning, connecting the errors made in the field to the principles of the START triage system and ICS guidelines — thereby operationalising the abstract conceptualisation stage of Kolb's cycle from a lived concrete experience (14).

Beyond individual competency gains, the findings carry implications extending beyond the individual learning trajectory described here. The competency domains in which the greatest gains were observed — MCI management and triage, and humanitarian response standards — correspond directly to the operational competencies outlined in WHO Emergency Medical Teams (EMT) standards (26, 27), which emphasise not only clinical capacity but also interoperability, coordination and ethical decision-making under resource-limited conditions. This alignment suggests that TdmT's curriculum is not only pedagogically coherent but operationally relevant: the competencies it develops are aligned with those

required in the types of large-scale disaster responses that Brazil has been facing with increasing frequency. Situating this within a broader normative architecture, the Sendai Framework for Disaster Risk Reduction (2015–2030) — to which Brazil is a signatory — explicitly identifies health system and workforce capacity as a central pillar of disaster resilience (25). Against this backdrop, the structural absence of disaster medicine from the Brazilian medical curriculum constitutes not only a pedagogical gap but a failure to operationalise an international commitment. Although derived from a single-participant case study, the competency trajectory documented here illustrates the plausibility of targeted simulation-integrated trainer formation programmes as a viable pathway to closing this gap.

The Brazilian Context: Vulnerability Without Preparedness

The contrast between Brazil's documented disaster burden and the structural absence of disaster medicine from its medical education system is among the most striking findings emerging from the reflective analysis. Between 2003 and 2021, Rio Grande do Sul alone recorded 256 flood events, generating estimated economic losses of R$ 22.9 billion and affecting millions of residents (4). The 2024 floods, which the Pan American Health Organization described as one of the worst climate disasters in the region's history (6), exposed the scale of this preparedness gap in real time: the Ministry of Health activated its Emergency Operations Centre only on 4 May, five days after the onset of flooding (6).

PAHO data confirm that the peak impact displaced nearly 700,000 people and required emergency shelters for over 80,000 individuals (6). These figures demand a health workforce capable of responding competently in triage, epidemiological surveillance and mental health crisis management. None of these competencies is currently required by Brazil's DCNs. The absence is not incidental — it reflects a structural blind spot in the conceptualisation of the physician's role in emergency and disaster contexts. As Voicescu et al. (2022) demonstrated, existing disaster medicine curricula worldwide lack standardisation and evidence-based development methodologies (3); in Brazil, the challenge appears to precede standardisation: disaster medicine has not yet been formally incorporated into national curriculum guidelines. As a result, initiatives depend largely on isolated local efforts rather than a coordinated national strategy.

The TdmT experience offers a practical counterpoint. Within the programme's three months of online learning and five days of residential training, the author moved from self-assessed competence approaching zero across all six domains to functional knowledge and skills in each — sufficient to plan and deliver the first local ITDM workshop. This trajectory illustrates both the feasibility of rapid competency development through well-designed blended learning, and the severity of the initial gap, which reflects a systemic failure in medical education planning in a disaster-prone country.

Intercultural Learning as a Formative Catalyst

One dimension of the TdmT experience not fully captured by competency self-assessment data is the formative impact of sustained intercultural interaction. The geographic diversity of the 2025 cohort — spanning sub-Saharan Africa, the Middle East, Western and Eastern Europe, Latin America and East Asia

— transformed each session into a comparative exercise in disaster health systems. This diversity is not incidental to TdmT's design; it is a defining feature. As noted by Ragazzoni and colleagues (2020), CRIMEDIM's international programmes deliberately leverage geographic diversity to contextualise global frameworks against local realities (11).

The value of intercultural medical education is well documented in the health professions education literature. Exposure to diverse perspectives during training has been associated with greater empathy, more comprehensive framing of health determinants and enhanced capacity for culturally adaptive clinical practice (23). In the context of disaster medicine, these effects are amplified: disasters are not culturally neutral events, and their health consequences are shaped by social determinants that are themselves culturally and politically situated. TdmT's Multicultural Coffee Break — a facilitated session of structured exchange on Day 2 — exemplifies an intentional pedagogical commitment to making this diversity a resource rather than a background feature.

Limitations

This study presents several important limitations that must be explicitly acknowledged. First, the n = 1 design precludes any form of inferential generalisation; the findings reflect the subjective experience of a single participant and cannot be extrapolated to other participants or contexts. Second, the self-assessment instrument used was constructed specifically for this report and has not been validated against external measures of competence. Self-assessment in medical education is subject to well-documented biases, including the Dunning-Kruger effect and the tendency for novices to overestimate initial competence (24). Third, prospective field notes, although systematically maintained, are inherently interpretive and subject to recall bias and confirmatory framing. Fourth, this report does not include long-term follow-up data: whether the competency gains documented here are maintained at three, six or twelve months remains unknown. Fifth, the author has an inherent interest in the perceived success of the programme, as the commitment to organise an ITDM workshop upon return creates a form of narrative investment in the programme's value. These limitations are addressed through methodological transparency and explicit positionality acknowledgement throughout the analysis. Future research should address these gaps through multicentric, multi-participant assessments using validated competency assessment instruments and longitudinal follow-up designs.

CONCLUSION

The TdmT 2025 programme provided a comprehensive, evidence-based and internationally contextualised training experience that produced substantial self-assessed competency gains across all core disaster medicine domains — domains completely absent from the author's formal medical training. The programme's blended learning architecture, grounded in Kolb's experiential learning cycle and operationalised through sequential online modules, XVR simulations, tabletop exercises and peer teaching activities, offers a potential model of disaster medicine education that is plausibly replicable and scalable.

Brazil's recurrent exposure to climate and environmental disasters underscores the relevance of structured disaster medicine training. The experience described in this report suggests that combined, internationally collaborative training programmes are associated with marked self-assessed competency development in contexts where formal curricular exposure is limited. Additional multicentric and longitudinal studies are needed to determine whether these models can be sustainably integrated into national medical education systems.

Future directions include: (1) formal evaluation of the ITDM workshop to be delivered by the author in Brazil, using validated pre/post instruments, with findings to be reported as a follow-up study; (2) multinational assessment of TdmT competency outcomes with longitudinal designs; and (3) if multicentric studies corroborate the competency gains documented here, their aggregated evidence could meaningfully inform dialogue with Brazilian regulatory bodies — including the Federal Council of Medicine and the Ministry of Education — regarding the integration of disaster medicine competencies into updated DCN guidelines.

Declarations

Clinical trial number

Not applicable. This study is not a clinical trial.

Ethics approval

Not applicable. This study is an autobiographical experience report in which the corresponding author is simultaneously the sole researcher and the sole participant. No other human participants were involved at any stage of the study. Formal ethics committee approval was not required under Brazilian Resolution CNS 510/2016 (Ministério da Saúde), which exempts research conducted exclusively with the researcher's own autobiographical records where no third-party participants are involved. No Institutional Review Board (IRB) or Ethics Approval Committee was consulted.

Consent to participate

Not applicable. No human participants other than the corresponding author were involved in this study. The field diary entries, self-assessment records and reflective notes used as data were generated and maintained exclusively by the author in the role of participant-researcher.

Consent for publication

Not applicable. No identifiable data from third parties are included in this manuscript. Participant colleagues from the TdmT 2025 cohort are referred to only by their country of origin, not by name.

Human Ethics and Consent to Participate declarations

Not applicable. This is a single-author autobiographical experience report with no third-party human participants. All ethical considerations are addressed under Brazilian Resolution CNS 510/2016 as described in the Ethics approval section above.

Competing interests

The authors declare no competing interests. The corresponding author participated in the TdmT 2025 programme as a self-funded student and has no financial or institutional affiliation with CRIMEDIM, IFMSA, or any organisation involved in delivering the programme.

Funding

No external funding was received for this study. Participation in the TdmT 2025 programme was entirely self-funded by the corresponding author. No funding body had any role in study design, data collection, analysis, interpretation, or manuscript preparation.

Author contributions

D.H.S.B. conceptualised the study, designed the methodology, collected and analysed all data, wrote the main manuscript text, and prepared Tables 1 and 2. J.I.G. contributed to data analysis and critical revision of the manuscript for important intellectual content, and provided supervision throughout the study. All authors reviewed and approved the final version for submission.

Availability of data and materials

The primary data supporting this study consist of personal field diary entries and self-assessment records maintained by the corresponding author. These constitute autobiographical records and are not publicly deposited, in line with the autobiographical design of the study. All quantitative data (Table 2: pre/post self-assessment scores) are reported in full within the manuscript. The TdmT 2025 programme structure (Table 1) is derived from publicly available CRIMEDIM/IFMSA programme materials, cited as references 9–11. Further information is available from the corresponding author upon reasonable request.

Acknowledgements

The authors wish to express sincere gratitude to the CRIMEDIM faculty and to all TdmT 2025 participants for the richness of the intercultural learning experience documented in this report. Special thanks are extended to J. Garcia Ulerio (triage session coordination), Dr S. Gaievskyi, Dr A. Abdel-Fattah, and E. Osama (IFMSA representative) for their expert contributions to the residential programme. The authors also thank the International Federation of Medical Students' Associations (IFMSA) for co-organising this initiative. No funding was received for this study.

References

1. Sundnes KO, Birnbaum ML. Health disaster management: guidelines for evaluation and research in the Utstein style. Prehosp Disaster Med. 2003;17(Suppl 3):1–177. doi:10.1017/S1049023X00004830
2. Craddock HA, Walsh A, Kumar N, Brannigan R, Quintyne KI, Clyne B. Disaster and emergency response simulation education for medical students: A Scoping Review Protocol. HRB Open Res. 2025;9:1. doi:10.12688/hrbopenres.14292.1 [Note: This is a published scoping review protocol; review results are pending and not yet available in the literature.]
3. Voicescu GT, Valente M, Della Corte F, Becerril M, Ragazzoni L, Caviglia M. Medical students' education in disaster medicine: a systematic literature review of existing curricula. Int J Disaster Risk Reduct. 2022;77:103090. doi:10.1016/j.ijdrr.2022.103090
4. Inter-American Commission on Human Rights (IACHR)/REDESCA. Impacts of the Floods in Rio Grande do Sul: Observations and Recommendations for the Guarantee of Economic, Social, Cultural and Environmental Rights. Washington DC: OAS; 2025.
5. Simoes-Sousa IT, Silva TM, Vianna ML, et al. The May 2024 Flood Disaster in Southern Brazil: Causes, Impacts, and SWOT-Based Volume Estimation. Geophys Res Lett. 2025;52(4):e2024GL112442. doi:10.1029/2024GL112442
6. Pan American Health Organization (PAHO)/WHO. Flooding in Brazil 2024 — Situation Report. Washington DC: PAHO; 2024.
7. Machado GP. Floods in south Brazil: more than an environmental crisis. Lancet. 2024;404(10449):24–25. doi:10.1016/S0140-6736(24)01024-9
8. Clarke B, Barnes C, Rodrigues R, Zachariah M, Alves LM, Haarsma R, et al. Climate change, El Niño and infrastructure failures behind massive floods in southern Brazil. World Weather Attribution; 2024. doi:10.25561/111882
9. Ragazzoni L, Conti A, Caviglia M, Maccapani F, Della Corte F. DisasterSISM: a multi-level blended learning program in disaster medicine for medical students. Prehosp Disaster Med. 2019;34(s1):s83. doi:10.1017/S1049023X19001730
10. Ragazzoni L, Conti A, Dell'Aringa M, et al. A nationwide peer-assisted learning program in disaster medicine for medical students. Eur J Emerg Med. 2020. doi:10.1097/MEJ.0000000000000668
11. Ragazzoni L, Linty M, Della Corte F. Worldwide experiences in disaster medicine education. Disaster Med Public Health Prep. 2020;14(3):e22–e23. doi:10.1017/dmp.2020.150

12. Daltro MR, Faria AA. Experience report: a scientific narrative in postmodernity. Estud Pesqui Psicol. 2019;19(1):223–237. doi:10.12957/epp.2019.43015
13. Kaji AH, Coates W, Fung CC. A disaster medicine curriculum for medical students. Teach Learn Med. 2010;22(2):116–122. doi:10.1080/10401331003656561
14. Kolb DA. Experiential learning: experience as the source of learning and development. Englewood Cliffs, NJ: Prentice Hall; 1984.
15. Wijnen-Meijer M, Brandhuber T, Schneider A, Berberat PO. Implementing Kolb's experiential learning cycle by linking real experience, case-based discussion and simulation. J Med Educ Curric Dev. 2022;9:23821205221091511. doi:10.1177/23821205221091511
16. Gibbs G. Learning by Doing: A Guide to Teaching and Learning Methods. Oxford: Further Education Unit, Oxford Polytechnic; 1988.
17. Moon JA. Reflection in Learning and Professional Development: Theory and Practice. London: Routledge; 2013.
18. Braun V, Clarke V. Using thematic analysis in psychology. Qual Res Psychol. 2006;3(2):77–101. doi:10.1191/1478088706qp063oa
19. Cheng A, Kolbe M, Grant V, et al. A practical guide to virtual debriefings: communities of inquiry perspective. Adv Simul (Lond). 2020;5:18. doi:10.1186/s41077-020-00141-7
20. Ingrassia PL, Ragazzoni L, Tengattini M, Carenzo L, Della Corte F. Nationwide program of education for undergraduates in the field of disaster medicine: development of a core curriculum centered on blended learning and simulation tools. Prehosp Disaster Med. 2014;29(5):508–515.
21. Brown N, Margus C, Hart A, Sarin R, Hertelendy A, Ciottone G. Virtual reality training in disaster medicine: a systematic review of the literature. Simul Healthc. 2023;18(4):255–261. doi:10.1097/SIH.0000000000000675
22. Alshowair A, Bail J, AlSuwailem F, Mostafa A, Abdel-Azeem A. Use of virtual reality exercises in disaster preparedness training: a scoping review. SAGE Open Med. 2024;12:20503121241241936.
23. Bajow N, Djalali A, Ingrassia PL, Ragazzoni L, Ageely H, Bani I, Della Corte F. Evaluation of a new community-based curriculum in disaster medicine for undergraduates. BMC Med Educ. 2016;16(1):225. doi:10.1186/s12909-016-0746-6
24. Gabbard T, Romanelli F. The accuracy of health professions students' self-assessments compared to objective measures of competence. Am J Pharm Educ. 2021;85(4):8405. doi:10.5688/ajpe8405
25. United Nations Office for Disaster Risk Reduction (UNDRR). Sendai Framework for Disaster Risk Reduction 2015–2030. Geneva: United Nations; 2015.
26. World Health Organization. Emergency Medical Teams: Minimum Technical Standards and Recommendations for Rehabilitation. Geneva: WHO; 2016.
27. World Health Organization. Classification and Minimum Standards for Emergency Medical Teams. Geneva: WHO; 2021.

28. Ellis C, Adams TE, Bochner AP. Autoethnography: An Overview. Forum Qualitative Sozialforschung. 2011;12(1):Art.10.
29. Richardson L, St. Pierre EA. Writing: A method of inquiry. In: Denzin NK, Lincoln YS, eds. The SAGE Handbook of Qualitative Research. 3rd ed. Thousand Oaks: SAGE; 2005. p. 959–978.
30. Yin RK. Case Study Research and Applications: Design and Methods. 6th ed. Thousand Oaks: SAGE; 2018.