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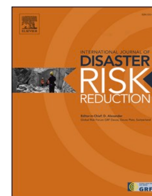

Emotions matter: EMPOWER-ing youth by integrating emotions of (chronic) disaster risk into strategies for disaster preparedness

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ABSTRACT

In a context where disaster risk has become a chronic, continuous condition, this paper explores new pathways for creating long-term (emotional) resilience. I show that emotions matter as part of devising community-based and formal educational strategies for disaster risk reduction and preparedness. Focus is on exploring young people's everyday emotional experiences in situations of recurrent disaster risk, such as flooding and landslides. The article draws on lessons learned from participatory and community-based research with 30 young people in the urban periphery of Sao Paulo, Brazil, as well as educational approaches on dealing with climate anxiety and ecological distress. Results indicate that participants tended to 'normalise' risk while using humour to engage with difficult emotions. Results however also show that with the tools at hand to acknowledge, validate and engage with the emotions of disaster risk, youth can develop and cultivate hope, improve individual coping behaviours, and recognise their agency without minimising or denying their experience. To guide interdisciplinary disaster risk scholars and practitioners in developing a process of reflective participation and collaborative peer- and intergenerational learning about disaster risk, I developed the EMPOWER framework. I suggest that by openly engaging with and sharing emotions across the researcher/practitioner and participant divide, we can develop critical reflexivity and collective hope as part of a praxis for improved wellbeing and disaster preparedness.

1. Introduction

> "Disasters have become part of the new normal in contemporary times, whether they involve wildfires, heat waves, floods, a pandemic, a technological accident or violent acts. Planning for and adapting to risk is now a much-needed skill for facing the future." [1]:91–92)

Globally, disaster risk is on the rise due to more frequent and more intense hazards, resource scarcity, growing social inequality, and increased exposure on a densely populated planet, against the backdrop of the global climate emergency and the covid-19 health crisis [1–3]. Countries such as Brazil (the focus for this paper) have profoundly experienced the impacts of such multiple urban crisis coupled with structural youth unemployment and a rapid and unplanned urban expansion [4]. In addition, in Brazil's urban peripheries, marginalised communities live with a chronic risk of disasters due to (increasingly intense and frequent) seasonal extreme weather events. Children and young people are particularly affected by ecological distress [5–7]. Amongst their many impacts, these entangled global challenges have caused equally entangled emotions of doom, dread, grief, and anxiety [4]. Yet, young people's

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emotions, knowledges and experiences are often overlooked despite being the generation most impacted by climate change [6,8]

In a context where, rather than being a one-time event, disaster risk has become an ongoing, continuous everyday condition with "interconnected episodic and everyday disaster risk" [3], this calls for new ways of "planning for and adapting to risk" [1]: 91–92). [9] point to the "significant long-term implications for physical and mental health as a result of acute and chronic environmental changes" (p.3). I argue that responding to such complex socio-environmental and emotional challenges requires integrated approaches that enable us to move from a focus on short-term risk reduction to long-term (emotional) resilience. To date, there is a lack of strategies on how to "protect children and youth's mental health by preparing for potential environmental disasters" [10]:16), especially in the context of chronic disaster risk. I propose that an emotion-based approach may enable young people to cope better with and respond to risk on an *everyday* basis, since providing them "with tools to identify and understand their emotions can support them to respond constructively" [6]: 141). To date, such a focus on engaging young people with their everyday *emotions of* chronic disaster risk as part of risk reduction education and practice has been missing. Moreover, I argue that we need to learn from the experiences in the global South for promoting (emotional) resilience when facing natural hazards.

In Brazil – a country which is hit frequently by seasonal disasters – there have been advances in integrating disaster risk reduction into school curricula [11], despite initial challenges and setbacks to mainstreaming disaster risk education. In addition, community-based educational practices and research on disaster risk have emerged in Brazil, the lessons of which can be applied beyond [7,12,13]. Although bottom-up and participatory learning approaches have been integrated into both formal and community-based education on disaster risk [8,14], disaster risk reduction activities in Brazil (and elsewhere) have retained a *technical* focus on risk knowledge, monitoring, communication, and response capability as part of awareness of and preparedness [14–16]. Although the Sendai Framework for Disaster Risk Reduction encourages learning approaches based on "interdisciplinary, analytical, and emotional knowledge" [17], there has been no focus on young people's emotional experiences of acute and chronic environmental risk.

To close this gap, I aim to develop a framework for disaster risk reduction that integrates a focus on emotional experiences as part of prevention and preparedness. In developing such a framework, I draw on (a) lessons learned from participatory and community-based research and educational practices on disaster risk reduction in Brazil, as well as (b) literature on research and educational approaches on climate anxiety and ecological distress. In the following, I present several vignettes from participatory youth research with youth aged 12 to 18 in the urban periphery of Sao Paulo. The project was delivered in the format of a university extension course at two youth centres in areas affected by seasonal flooding and landslides. In these vignettes, I explore why and how young people's *emotions matter* not only in the *aftermath* of one-time disasters but as part of their *everyday* experience with disaster risk. In this context, I discuss the importance of intergenerational memories and participatory youth-to-youth learning in reflecting on their emotions and experiences. Moreover, I explore the challenges of 'normalising' disaster risk on the one hand and the risk of 'emotional disconnection' on the other. I furthermore reflect on the use of humour as a strategy to cope with emotionally challenging experiences and the role of collective hope for improving long-term emotional resilience. The vignettes from the case study are situated in affective learning strategies on climate anxiety to acknowledge, validate and engage with difficult emotions [6]. Based on the lessons learned, I then propose the so-called EMPOWER framework for integrating emotions into disaster risk reduction research, education and practice as part of disaster preparedness.

2. Methods

This research was part of the project "Building resilience in the face of nexus threats: local knowledge and social practices of Brazilian youth (NEXUS-DRR)".[1] The researcher is a white, female German national living and working in the UK. At the beginning of her Fellowship, in October 2019, the researcher relocated from the UK to Sao Paulo where she was enrolled as a postdoctoral student at the University of Sao Paulo. The researcher is fluent in Brazilian Portuguese. She researcher lived in Sao Paulo between October 2019 and May 2021, when she temporarily returned to the UK due to the covid-19 pandemic. The researcher has previous experience of researching with children and youth in contexts of urban risk in Latin America. She has previously lived and studied in Mexico for three years during her master's and PhD.

Designed pre-COVID as a participatory research project, the research used a co-production of knowledge approach to explore young people's (aged 12–18) everyday experiences, adaptive practices and knowledge related to disaster risk reduction in a context of resource scarcity. Ethics approval for the project was obtained from the ethics boards of the University of Sao Paulo and the University of Birmingham as well as the European Commission as part of the H2020 ethics clearance process. The participating CRAS facilitated participant recruitment, informed consent of the participants, and the setting-up of WhatsApp groups for communication.

The aim of the project was to research *with* young people rather than about them to develop pathways for integrating youth knowledge into participatory early warning systems and education for resilience [14]. The research was conducted in collaboration with two Community Assistance Social Reference Centres (CRAS) and the Civil Defence in vulnerable neighbourhoods in the municipality of Franco da Rocha in Sao Paulo's urban periphery. Both CRAS were chosen based on their location in risk areas: (1) CRAS 1 was located in proximity to the river in a flood-risk area, and (2) CRAS 2 was situated in a higher part of the municipality in an area with informal settlements at risk of seasonal recurrent flooding and mudslides.

The project had originally been designed as hybrid participatory research project using a mobile phone app for data collection as

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well as participatory workshops (e.g., participatory youth-led walks or community poetry workshops). To adjust to the constraints of covid-19 on participatory research due to the displacement of the researcher from the field [18], we then developed a remote methodology entirely based on WhatsApp, one of the most widely used social media platforms in Brazil which is widely accessible also to low-income groups [7,12]. All the participants had access to a mobile phone with WhatsApp. However, only some of the older participants had their own phone while some participants used their parents' phones. Not all participants had continuous internet access, and some relied on public Wi-Fi hotspots to participate in online group discussions and to send data in the group (e.g., photos or videos).

Research was conducted on a weekly basis through three WhatsApp groups as the main means of communication with a total of approximately 30 participants and took place between November 2020 and June 2021. Research activities included a trial phase (WhatsApp group 1) to test remote WhatsApp activities and to develop an overall structure for weekly activities as well as a replication phase (WhatsApp groups 2 and 3, one for each CRAS). The weekly activities are summarised in Table 1 [19]; submitted). As the project also aimed to explore young people's experiences with food, water, and energy insecurity as well as disaster risk, not all weekly activities had a disaster risk focus. Activities with a disaster risk focus were designed based on the Brazilian CEMADEN Education project [20] which advocates for building "people-centred, 'horizontal', and participatory" [14]:391) early warning systems. I focused on the following components: an oral history of disasters, causes of flooding and landslides, knowledge of disaster risk areas including participatory mapping, youth agency, disaster prevention, and pathways for the future. In designing the activities, I followed the CEMADEN Education principles of "Com-VidAção", including citizen science, participatory peer-and intergenerational learning and information sharing, enabling young people to become coproducers of knowledge through participatory learning activities [8,13,14].

Although the activities followed a similar structure in the different groups, weekly topics were designed flexibly to give participants ownership over the research process and involve them as responsible, socially engaged critical and participatory citizens [1,21]. Participants were also asked to contribute their ideas and preferences for topics and were given the choice of *how* they wanted to share their experiences (e.g., in writing, by taking pictures, or by making short videos). The proposed weekly activities included (a) a stimulus for an online group discussion in the form of a short video, question or picture related to disaster risk which was sent in the WhatsApp group, (b) a mix of synchronous and asynchronous WhatsApp group discussions and individual interactions, and (c) participatory activities such as photo-voice, short videos, audios, or written activities by the participants that were shared in the WhatsApp group in response to the weekly theme [19]; submitted). For instance, participants were asked to take and send pictures of examples of risk areas in their neighbourhood. The project also involved different stakeholders such as youth climate activists from the urban periphery and experts in participatory risk mapping in some of the weekly inputs.

The data presented in this paper is derived from the written WhatsApp conversations in the three WhatsApp groups. The data was exported as a chat protocol in a text file to facilitate the word search. In addition, screenshots were taken of all the WhatsApp conversations to be able to maintain "emojis" and GIFs and to be able cross-reference participants' text contributions with pictures and videos sent by the participants. In addition, transcripts from initial face-to-face group discussions were included in the analysis. For the purpose of this paper, the focus was on the analysis of the written conversations. Photos (e.g., a photo taken by one of the participants of a risk area behind her house and photos taken during a youth-led walk) were only included for illustrative purposes. Data analysis was conducted using Qualitative Content Analysis, coding data according into different main and sub-themes. To this purpose, a mixed deductive-inductive coding scheme of medium complexity was used. Data was categorised deductively according to the main research themes: perceived environmental issues, experiences with disaster risk (flooding and landslides), knowledge of climate change, access to food/water/energy, use of food/water/energy as well as interconnections between disaster risk and resource insecurity. Under the categories of disaster risk, inductive sub-categories were established based on the data, including causes of disaster risk, intergenerational knowledge, feeling at risk, normalising disasters, emotions of disaster risk (e.g., humour, hope, grief), and individual/collective adaptive action.

3. Theory

3.1. Towards an agenda for researching the emotions of disaster risk with a focus on youth

As an integral part of climate-change adaptation, disaster risk reduction plays a key role in increasing awareness on disasters. The 2021 report of the United Nation's Office for Disaster Risk Reduction made clear that we are 'at a crossroads', as climate change is threatening the ability to achieve the 2030 Agenda for Sustainable Development, including the Sendai Framework for Disaster Risk Reduction [22]. Disaster risk reduction aims to minimise exposure to hazards, reduce vulnerability of people, while improving prevention, preparedness and early warning mechanisms to limit the adverse impacts of extreme weather events [1,14]. Traditionally, disaster research has focused on macro-level quantitative data and technology [23] with only little attention being paid to community-based and bottom-up approaches in disaster risk and early warning systems [14]. Under the Sendai Framework for Disaster Risk Reduction, community-based "'people-centred' or 'needs-centred'" [3]: 2) approaches with a focus on the "risk concerns, priorities and associated needs of people" (ibid.) and approaches to change "people's behaviour, perception and emotion" [24]:3099) have become common. Nonetheless, research and education in disaster risk have fallen short of addressing, validating and engaging with emotions in the context of improving disaster preparedness and prevention. While the importance of disaster preparedness programmes for children has been recognised, it remains centred on "increased knowledge and skills and risk perception" [16]:2).

There have been some attempts to explore the psychological and emotional impacts on disaster survivors; however, focusing almost exclusively on the timeframe *during* or in the *aftermath* of disasters [1,23–28]. To date, there has however been little focus on the importance of psychological preparedness [29,30], although [2] points out that people's "emotions color their experiences of preparation (if any), the event itself, and the aftermath of a disaster for indefinite periods of time" (p.10). Studies have highlighted the wide

Table 1
Overview of the weekly thematic activities [19]; submitted).

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7
Asynchronous activities CRAS Vila Bazú, Group 1 (exploratory phase), November 2020 and January 2021	Virtual getting to know each other and brainstorming on environmental issues	Introduction to disaster risk (what are disasters and causes)	Access to and use of water	Discussions and participant videos on 'my everyday life'	Waste and pollution	Environmental risks	Climate change and its impacts
Asynchronous activities CRAS Vila Bazú, Group 2, January 2021 to June 2021	Virtual getting to know each other	Brainstorming on environmental issues	Introduction to disasters, their causes, and oral history of flooding	Access to (healthy) food and local food production	Water usage and favourite places in the city	A city for young people?	Participatory risk mapping (invited researcher) and disaster prevention
Synchronous activities CRAS Lago Azul, Group 3, January 2021 to June 2021 (including an asynchronous component)	Virtual getting to know each other	Brainstorming environmental issues	Introduction to disaster and their causes (flooding and landslides)	History of flooding in Franco da Rocha	Climate change and virtual water	Healthy lifestyle, wellbeing and greening of cities	Earth Day: why are nature and the planet important for you?

range of emotions that people experience in the aftermath of disasters, from anxiety to gratitude, resignation, grief and anger [31]. [23] explore how local constructions of gender influence people's experiences and the ways in which they express emotional distress. Studies on the emotional impact of disasters have furthermore shown that psychological distress is often not derived only from the disaster itself but also from its *impact* on their immediate lives, such as displacement from flooding (Mort et al., 2018 in Ref. [2]:7). In terms of methods, [24] shows how storytelling can be used to explore people's individual experiences in post-disaster contexts to help survivors accept and face their pain [32] in Ref. [24] or for "remembrance/legend/oral history for awareness-raising" [24]:3112). Moreover, the importance of intergenerational memories of disasters has been acknowledged by [33] with a focus on the long-term intergenerational transmission of memories and trauma.

Especially in areas with recurring (seasonal) extreme weather events, disaster risk can become a continuous stressor to community well-being, adding another layer of precarity to the experiences of the everyday [3,34]. There is however still a lack of studies exploring (specifically young *people's*) perspectives, stories as well as emotional responses in *chronic* disaster risk situations, as a part of *prevention and preparedness*. Although the role of emotions in childhood (e.g., hope) has been discussed in geographies of childhood literatures [35,36], these discussions have been disconnected from disaster risk studies. The connection between disaster risk, climate change and child mental health only recently received more attention, mostly from a psychological and developmental perspective [37,38]. [37] for instance warn against the "impacts on human psychological health and well-being" (p.767) and they argue that "[children] and adolescents are at particular risk because of their rapidly developing brain, vulnerability to disease, and limited capacity to avoid or adapt to threats and impacts" (ibid.). They identify both direct and indirect pathways for an increased mental health risk due to (sub-) acute and chronic weather events and existential threats. Similarly, research by [1,39] has shown that children and youth are particularly vulnerable to ecological distress, hence the importance of paying attention to children's and young people's developmental, socio-physical, and psychological life stage [2,37].

Based on these considerations, I argue that disaster risk reduction strategies should include a focus on children's and young people's emotions, putting focus on "not only what children know in terms of content, but also how they experience this knowledge emotionally" [2] in [1]:94). As disaster risk literature has lacked clarity on *how* to do this, I propose looking at a more recent strand of literature on climate anxiety, ecological grief, and distress [4,6,37,40,41] that has given voice to the lived (emotional) experiences of young people in contexts of environmental uncertainty and distress.

3.2. *Learning from research on youth climate anxiety and ecological distress*

Among young people around the world growing up in a context of interconnected crises, the feeling of fear, despair, lack of hope in the future and sadness is widespread [4,6]. Emotions have moreover been recognised as being "intrinsic to learning processes, particularly for children, who use the body and senses as their primary tools to relate to the world" [1]: 93). This has required researchers, practitioners and educators to take young people's emotions seriously rather than dismissing their experiences, voices and perspectives [2,40]. In recent years, there has been a growing interest in exploring these psychological and emotional impacts of climate change on children and youth under the umbrella of "eco-anxiety" [4,6,10,37,39]:1).

'Eco-anxiety' has furthermore become a driving concept to understand young people's (lack of) engagement in climate activism [41–44]. [41] for instance trace the emotional journey of a young climate activist in her struggle for change to explore the emotional implications of activism on children and young people [37] argue that young people are more likely to worry about climate change in relation to other age groups, exacerbating mental health issues in response to "[exposure] to the effects of weather and changing climate systems" (p.770). They perceive that underlying existential threats can lead to "[worry], anxiety, anger, and frustration [...], including the current and anticipated destruction and loss of landscapes, biodiversity, ecosystems, traditional lands, and special places" (p.770). Similarly, [10] and [9] argue that an increased awareness of the climate emergency has generated "significant

Week 8	Week 9	Week 10	Week 11	Week 12	Week 13	Week 14	Week 15	Week 16
Agenda-setting for next topics (participant preferences)	Online community journal: creative exercise (text and photo)	Recycling and reusing	Plastic: reusing and recycling	Flood risk: causes, impacts and adaptation	Change: my neighbourhood in 5 years	Individual follow-ups with participants by video call	Food diaries	Community-based food production
Youth participation and youth voices for change (invited youth activist)	Earth Day and environmental solutions	Environmental solutions part II	Mobility, leisure and we–being	Mobility, leisure and wellbeing part II	Transport and mobility	Individual projects (air pollution, transport, flooding)	Final reflections	–
Participatory risk mapping (invited researcher input) and disaster prevention	Youth participation and youth voices for change (invited youth activist)	Impact of covid-19 on education and mobility	No activity (holiday)	CRAS -led activity	Access to healthy food	Use of backyard and gardens	CRAS-led activity	Transport and mobility

affective responses, such as psychological distress, anger, or despair" [10]: 1) in young people, causing emotions such as "worry, guilt, and hopelessness in anticipation of climate change" (ibid:1).

This is closely connected to the concept of 'eco-paralysis' which describes the emotional consequences of caring too much which may put people in a state of 'apathy' as a means of psychologcal and social protection [5]. To counter such reactions of withdrawal and apathy, [43,45] have explored the potential of 'hope' as a collective driving force that goes hand in hand with despair. The discussion on children and emotions such as hope is not new, as this has been amply discussed by authors such as [35] in his work on 'childhood hope'. The focus on hope has however now become relevant for preparing youth in and for an emotionally complex world facing the challenges of eco-anxiety, uncertainty, inequalities and violence [42]. In this sense, [45] address the role of "critical hope" or "collaborative solidarity" (ibid.) to overcome eco-anxiety and apathy [40] furthermore points out the importance of "compassion" as a

Fig. 1. Photo of a risk area (Luisa, 12).

way of developing hope by embracing the uncertainty of the future and our emotions.

There is however a need for establishing best practices to "[improve] young people's engagement with climate change" [37]:776) while 'normalising' a focus on emotional experiences. Both formal and community-based activities for disaster risk reduction education can play a key role in educating young people on climate change. This includes minimising exposure to hazards and reducing, while improving prevention, preparedness and early warning mechanisms to limit the adverse impacts of extreme weather events [1, 14]. As governments "fail to fully address the drivers of climate-related disasters, disasters preparedness and education for children should be considered for protection of children from disaster's risks" [16]:2). Yet, as established above, adequate strategies to influence children's behaviour and response to disaster, their awareness of and preparedness for disaster risk, and the integration of their knowledge into their families [15,16], including emotional responses, still need to be developed. I argue that a focus on emotions is particularly relevant for developing a "disaster culture" [46]:1) that improves social resilience in the face of hazards, especially in disaster-prone countries of the global South such as Brazil.

Self-reflection is one of the strategies that practitioners and educators have used for involving youth in learning on climate change – both inside and outside the classroom [6], transforming students into co-learners and co-producers of knowledge at the same time. In a recent study with educators conducted in eastern Australia, [6] propose four principles for discussing emotions around climate anxiety in educational spaces, which are: engaging, validating, supporting and empowering learners' emotions to engage with and respond to their ecological distress. Although these principles are useful, I suggest that a stronger focus on learning from the experiences in the global South is needed. The principle of self-reflection is also part of the foundations of Freirean-based community-based participatory research ('Pesquisa-ação') in Brazil to engage marginalised communities in processes of co-production of knowledge [47–49]. I suggest integrating the four principles for discussing emotions in climate change proposed by Ref. [6]; namely: engaging, validating, supporting and empowering, with the Freirean approach of reflective participation and collaborative learning, to develop new strategies for "[affective] learning" [17]. This includes problem posing and reflection, critical dialogue and active discussion, solution posing, and developing a plan of action. In addition, I propose connecting the as-yet unconnected work on (chronic) disaster risk, climate anxiety, and youth emotional experiences: by affirming that 'emotions matter' in understanding experiences with (chronic) disaster risk, we can not only generate new forms of emotional storytelling around hazards and disasters [17], but we may also improve empathy, hope, and coping behaviours that may "enable action competence and lifelong learning" [6]:143).

4. Learning from and with youth: everyday experiences with chronic disaster risk in Sao Paulo's urban periphery

In the following, I will present several vignettes from participatory youth research with youth aged 12 to 18 in the urban periphery of Sao Paulo in areas affected by chronic disaster to explore why and how their *emotions matter* as part of their *everyday* experience with disaster risk. I start off by discussing the importance of intergenerational memories in engaging youth in a self-reflection and participatory learning on disaster risk. I then turn to discussing the importance of engaging participants in a self-reflection on their everyday knowledge and experiences with chronic disaster risk, including technical content as well emotional experiences. In this context, I then proceed to exploring the risk of 'normalising' disasters and the use of different strategies to disengage with 'difficult' emotions. I also reflect on the role of collective hope for improving long-term emotional resilience in coping with everyday disaster risk. Based on the lessons learned from the vignettes, I then present the EMPOWER framework for integrating emotions into disaster preparedness. The framework aims to provide guidance on improving emotional resilience as part of disaster preparedness, in contexts of acute as well as chronic disaster risk.

4.1. Intergenerational memories and self-reflections on everyday disaster risk, climate change and emotions

Oral history (or the local history of disasters) coupled with intergenerational learning was a key element in the presented research on disaster risk in the municipality of Franco da Rocha . It enabled sparking an initial reflection while enhancing participant knowledges, skills, and risk perception [16]. Many of our participants aged 12 to 18 were too young to consciously remember previous floods in Franco da Rocha in 2011, 2016, or even in 1987. Tamara (15) shared some of her memories: "*I remember in 2016 when there was a very strong flood that practically destroyed everything, mud entered the shops, markets, etc.* ". Since young people had very little or no recollection of these past events, Laura (16) interviewed her mother and shared her memories:

> "*My mother remembers only the [flood] in 2011 and 2016 because in 1987 she was being born: the floods were always a problem in the city of Franco da Rocha because many people lost their homes, and those who did not lose their homes lost important objects, lost food and even cars, and many times caused erosion and landslides, it was a very bad situation for many inhabitants of the city, she said that for our family it was something a little easier to deal because we lived on a hill, the water just came into the yard, but we suffered for others who lost their things. This was my mother's account.*" (Laura, 16)

By engaging with the (often emotional) stories of their families, oral history set the scene for the importance of affective learning [17] where memories and stories are transmitted from one generation to the next and the history of disasters becomes entangled with life stories, while integrating risk knowledge into participant's families [24]. Exploring the local history of disasters also helped showcase the risk of recurrent disaster over time – with a higher intensity and higher frequency over time. In January 2022, a few months after the storytelling activities, the study area was again hit by major flooding and landslides.

Another aim was to engage participants in a reflection on their *everyday* experiences with chronic disaster risk events in the context of recurring extreme weather beyond a perception of disasters as 'one-time' events. Following the understanding that "'outer' transformations […] occur in conjunction with 'inner' ones" [50]: 38), group discussions included a 'dual focus' on (1) experiences, technical knowledge of the causes of disaster risk as well as exacerbating factors such as climate change and a reflection on measures to

improve disaster prevention, as well as (2) participants' emotional experiences with hazards and disasters. Discussions showed that participants displayed a sound knowledge of potential causes of disaster risk, including littering, deforestation, unplanned urban growth, and precarious housing at the edge of ravines with the risk of houses collapsing during the occurrence of heavy rainfall and mudslides. Ania (14) shared her experiences during the rainy season in the house where she used to live: "*When it rained, the mud would come down [the hill]. Our house flooded twice."* She explained how her mother told her to save the mattresses because they were their most valuable possession, although as she adds, "*we lost part of the bed because the wooden racket didn't dry*". The transmission of intergenerational knowledge and memories was again important in this context, as some of the participants' mothers were keen on sharing their experiences and even participated in some of the weekly activities by sending photos and videos. The precarity of living conditions that some of the young people grew up in is illustrated by Fig. 1, a photo taken by one of the participants of a risk area in the backyard of her house where mudslides have occurred previously.

Young people were particularly keen on discussing the issue of littering and irregular garbage disposal and its implications for disaster risk. They felt that due to clogged drains *"with a little rainfall a huge catastrophe occurs*" (Yonas, 16). Yonas' comment shows his anxiety and distress about the impact on the community while other participants expressed their frustration with lack the of caring communities and people's ignorance. Marcio (13) explained "*some people throw garbage in the streets because they are ignorant*", which shows young people's sense of separation from an interconnected community [6]. In addition, Marion (16) shared concerns about the local impacts of deforestation: *"The way they're deforesting here. And litte by little they're destroying nature."* Although young people were not always able to *name* or separate their distinct emotions and how they affected them [51], their contributions expressed a strong sense of frustration, grief and anxiety in relation to the current and anticipated destruction of their local environments and increased disaster risk [37].

Young people nevertheless did not bring up the issue of climate change as an exacerbating factor of disaster risk. When asked what they knew about climate change, they explained that they were taught about this at school. However, participants had little awareness of the immediate impacts of climate change on their own everyday lives. As [51] argues, this may be due to the "confusing, bewildering, subtle and/or elusive" nature of climate change, as "[we] do not always notice how climate change is affecting us, nor are we always able to name such experiences" (p.56), thereby undermining our self-reflective capacity. This argument also translates to disaster risk, which despite (or because of) its everyday presence can feel elusive, irrelevant, and hard to grasp. Gerardo (13) added "*I didn't know that this was something so interesting!*". This indicates a desire of young people to engage with, rather than dis-engage from, emotionally challenging topics such as disaster risk and climate change when these are presented in a way that connect with their everyday realities and lived emotional experiences.

4.2. 'Normalising' disaster risk and the role of humour in improving psychological wellbeing

Despite their willingness to engage with topics related to environmental challenges, without the knowledge of how to navigate, sit with, and express complex emotions, young people showed a tendency to 'normalise' and 'rationalise' disaster risk as a way of disengagement and self-protection from potentially distressing feelings [5,6]. Although participants were clearly concerned with the impact of disasters on human well-being, they shared rather 'matter of factual' accounts of their knowledge, often devoid of emotions, using expressions such as: "*the house can collapse*" or "*you can get hurt or die*" rather than expressing how this made them feel. This is also shown by Yonas' account (16): "*Yes, yes, when it rains, this little river will overflow and knock down everything in its path. [...] here where I live, on the street of my house, some environmental disasters have already happened, such as landslides.*" (Yonas 16).

During a remote participatory risk mapping activity, participants pointed out other areas as more at risk while perceiving the place where they lived as safe. Laura (16) observed: *"Here is a high place, so it doesn't flood"*. When asked to take photos of a risk area in their neighbourhood, some of participants shared Google Maps screenshots of risk areas in other parts of Sao Paulo, since their mobility was limited due to covid-19 restrictions, and they did not consider their immediate surroundings 'at risk'.

Participants also 'normalised' difficult experiences such as regular flooding and its impacts on their daily routine (e.g., disrupted

Fig. 2. Youth-led walking tour in flood risk areas in Franco da Rocha (source: the author).

travel to school, loss of school material due to heavy rain) as part of their reality. This was illustrated by a face-to-face discussion held at the beginning of the project before a guided tour around flood risk areas in proximity to the river (Fig. 2). Participants explained that during the rainy season, in some parts of town, flooding often hindered them from going to school or from coming back, as illustrated by *Participant 1: "If you are in school and it starts raining for at least a few hours, you will not go home."*

When describing what was going on in their lives, some of the participants struggled with explicitly expressing their emotional experiences with distressing situations. The below conversation with Marion (16) shows that putting individual experiences into words can be 'complicated' and requires educational strategies to encourage validating emotions [6].

> Interviewer: How are you?
>
> Marion (16): Apart from the rain everything's fine, what's up? [...] It was complicated. [...]. This is the second time the TV has been burnt. [The lightening] has blown up the router. It's complicated.

Hence, there is a need for educational practices that validate emotional experiences, encouraging participants to acknowledge and talk openly about their emotions rather than "brushing aside or trying to deny these emotions" [51]:141). The experience of engaging youth in remote discussions on disaster risk however indicated that this was challenging. Participants attempted to hide difficult emotions such as sadness, anxiety, despair or frustration behind humour rather than openly sharing challenging emotions through peer-to-peer exchange. Marion (16) for instance used humour as a way of coping and as an adaptive emotional defence mechanism [52] to disengage from emotions such as despair and hopelessness in situations of environmental adversity.

> Marion (16): "OK, people are coming to live and need a space, but there's a way to not destroy everything. I just see a city filling up hahaha."

Studies have however confirmed the importance of humour in improving psychological wellbeing in the face of stress [53]. As Yonas (16) explained: "*We like to make fun of it. For example, we like to joke that if we poured out a glass of water, it would flood.*" Moreover, humour was used by the participants as an icebreaker during face-to-face discussions about flooding to navigate emotionally complex topics, as illustrated by the discussion below. The conversation also shows how long-term intergenerational learning [33], in this case from grandparents' knowledge, is deeply embedded in young people's everyday experiences of chronic disaster risk.

> Participant 1: (...) Here you don't know if it really rains because the weather forecast says it will but most of the time it doesn't. There can be rain on the same day or one day later.
>
> Interviewer: And how do you know if it's going to rain?
>
> Participant 2: On the mobile phone, it will say if it's going to be sunny today or if it's going to be sunny tomorrow.
>
> Participant 1: My grandpa tells me when the sky is very grey at the bottom that it will rain. This has always worked. It has always worked.
>
> Interviewer: [...] How do you adapt?

Table 2
EMPOWER framework for integrating emotions into disaster preparedness.

EMPOWER principles	Action points	Examples from the participatory research project and literature
Engagement	Fostering engagement through peer- and intergenerational dialogue.	An oral history of disasters enabled learning from and with the experiences of parents and grandparents [16], especially about major flood events.
E**M**otions	Acknowledging, validating and engaging with *all* emotions. Openly sharing emotions through mutual dialogue.	Participants experienced a range of emotions, such as grief, guilt, sadness, hope and gratitude. Some of the participants struggled to engage with 'difficult' emotions and masked them through humour [6, 33].
Participatory practices	Integrating (art-based) participatory practices: knowledge co-production, critical thinking, self- and peer- reflection. Solution-focused. Hybrid practices.	Participants co-produced knowledge through remote group discussions, photo-voice and participatory video activities (using WhatsApp) [18]. Suggested in-person methods include youth-led walks, poetry, song-writing, and visual arts [54].
H**O**pe	Practising hope as a practice: translating despair into hope. Learned hopefulness and collectivising hope to cope with uncertainty.	Participants showed compassion and empathy and perceived collective action as important for generating critical hope, e.g., local pollution and tackling global issues such as deforestation [45,55].
Well-being	Improving subjective and collective well-being: empathy, dialogue, emotional learning and reflexivity.	Emotional learning approaches may improve (emotional) resilience [17] and for challenging youth to accept 'difficult' emotions [6], acknowledging rather than normalising or denying their experience.
Education	Integrating emotions of disaster risk into community-based and formal educational strategies.	Community-based participatory action research in local youth clubs enabled reaching marginalised youth and engaging them in everyday reflections [14].
Reflections	Engaging in self-and peer reflections on everyday emotional experiences.	Critical reflection on everyday chronic situations of disaster risk followed a (creative) co-production of knowledge approach based on the philosophy of Paulo Freire [43].

Participant 2: (…) Raincoat. […]

Participant 3: I'll stay home.

Laughter.

[…]

Participant 3: The best thing would be to buy a boat (laughs).

Other participants also expressed positive emotions such as gratefulness that no major physical damage occurred: "*The TV almost got wet, but only almost. There were a lot of plugs, and we could have received an [electric] shock but thank God, this didn't happen*" (Ania 14).

Openly engaging with emotions is fundamental in driving coping behaviour and preparation for disasters [2]. We therefore need to develop new strategies for encouraging youth to engage with their emotional experiences without minimising or denying their experience [6]. As I will discuss in the following, the concept of "critical hope" [45] can be helpful for driving individual and collective action, despite chronic situations of risk and environmental distress.

4.3. Between hopeless and hope for the future: the importance of collective action

Beyond their preoccupation with local disaster risk, participants expressed a generalised sense of eco-anxiety and dread about the future of the entire planet because of ecological destruction. Kaio (13) explained: "*What worries me in the future is deforestation and waste. […] The government should worry more about the rubbish, make people more aware of the rubbish that ends up with our environment and the planet.*" At the same time, participants maintained a sense of hope despite the uncertainties of the future. They expressed "the inner knowing that what we do matters" [40]: 274), both in terms of collaborative action by governments and "the power of small actions" [40]:271) at local level to make a change. Bianca (12) for instance observed that where she lives "*each neighbour does his own job. Each one cleans their door and recycles recyclable and organic waste, so each door is clean and so is the street*", and she hoped that at a larger scale, "*people both here and in the future will have a minimum of collaboration and will stop deforesting areas.*"

By identifying possibilities for individual and collective action, participants developed a sense of "critical hope" [45]. Identifying concrete steps for preventing disaster risk helped some of young people regain hope, engage proactively with disaster risk, and feel more empowered rather than disengaging from distressing situations. Participants mentioned actions such as building better and in safe areas, recycling and reusing (to avoid littering), unplugging electric devices (to reduce the risk of lightning strokes), collective neighbourhood action and community-based environmental education. Carlos (14) suggested: "*The most important thing is to guide people to not throw rubbish in the streets […] People think it's just a disposable cup, salty snack etc … But when the rain comes, it floods … […]. #rubbish in the bin.*" In addition, participants indicated that the municipality oversees cleaning the drains to avoid the clogging of sewers, and they argued that there was a need for improved flood barriers and drainage systems along the river.

Some participants however had a lack of faith in the willingness of people to contribute to disaster prevention and environmental protection. They expressed a sense of hopelessness concerning the impact of environmental action, which created a sense of powerlessness and apathy [5]: "*I don't think it'd do no good to warn anyone, because everybody knows when they're killing a place*" (Marion 16). However, there was a general perception among participants that collective action was possible.

Over the course of the project, participants' contributions also showed the importance of peer-learning and self-reflections in moving from a passive, at risk conception of youth to allow for their expression as active citizens [1]. Whereas participants such as Marion (16) initially were quite shy and expressed a sense of hopelessness, engaging with peers and invited stakeholders such as youth climate activists, enabled her to get a better understanding of her everyday agency [7]. Especially activities and techniques exploring and shaping alternative pathways for the future were very empowering for participants. They enabled participants to engage with disaster risk from a perspective of hope, rather than 'normalising' and disengaging from disaster risk and developing a sense of apathy [5,6]. For instance, after connecting to a youth climate activist from the urban periphery during one of the weekly activities, Marion (16) was able to engage with a sense of collective hope which helped her to feel more empowered: "*If a large group of people gets together and […], if everyone finds a way to use their voice to do something, and not just waits for things to be resolved.*" However, we also need to recognise that engaging with difficult emotions may require validating a sense of frustration and accepting that we do not always have the solutions.

5. Towards a framework for integrating emotions into disaster preparedness

The results of the analyses in this paper have indicated that in a context of global uncertainty and ongoing everyday crisis and often chronic disaster risk, designing interventions to improve long-term (emotional) well-being and resilience is fundamental. Rather than "*fixing problems out there*" [40]:7) when, as in the myth of Hydra, "*as we cut off one head from the monster, two more heads emerge*" (ibid: p.7), we need interventions that look both 'outward' and 'inward' to improve long-term emotional resilience. Hence, I have argued that a focus on technical knowledge and risk perception as part of disaster risk prevention needs to go hand in hand with exploring the emotional experience of everyday disaster risk. I have shown that young people had an important everyday knowledge of disaster risk of flooding and landslides, their impacts on resource availability and adaptive actions. In addition, they used different strategies to engage with their emotions of everyday disaster risk. Some of the participants openly expressed their anxiety and worry about the future while others attempted to hide difficult emotions such as sadness, anxiety and despair behind humour. Participants were however keen on sharing experiences and learning collectively from and with peers and family. At the same time, results indicate a need for capacity-building for both disaster risk researchers and practitioners to support communities, and particularly young people "to face and respond to ecological crises" [6]:132). Based on the lessons learned from participatory research on living with chronic

disaster risk in Brazil and literature on climate anxiety and ecological distress, I have developed the EMPOWER framework (Table 2). The framework sets out key principles for guiding interdisciplinary scholars in conducting (participatory) research to impact upon community-based strategies for disaster risk reduction and preparedness.

5.1. *Engagement: peer and intergenerational learning*

Intergenerational learning can be a key pillar to acknowledging, validating and engaging with emotions in preparedness and disaster risk strategies. The above analyses in this paper have shown how intergenerational approaches and peer-to-peer learning through participatory methods can provide a supporting and empowering platform for engaging with challenging experiences and emotions [6,33], through a process of both individual and collective self-reflection. As children reflect the emotional reactions of their caregivers [1]; [40] , intergenerational exchange can support the *giving back and giving forward* of knowledge and memories between generations. As a part of peer- and intergenerational approaches, I propose that openly *sharing* **emotions** (such as grief, anxiety, joy and hope) can help develop a basis for collective compassion and empathy among both adults and youth. As studies have shown, compassion as a four-stage process of "noticing pain and suffering, interpreting the suffering, feeling empathic concern or sadness, and acting to alleviate this suffering in some way" [56] can fundamentally change how we think and how we feel. Here, the development of a *mutual* dialogue between the researcher and the participants to share and reflect on their everyday experiences was essential for establishing reciprocity and empathy.

5.2. *Participatory practices: (arts-based) methods for knowledge co-production and critical reflection*

In developing approaches for such shared reflections, I propose participatory methods as a useful tool for emotionally engaged disaster preparedness strategies (both through community-based and formal education and research). Participatory approaches allow "social collectivity" [14]:399–400), including young people and their communities as co-producers of knowledge based on principles of "innovation, discovery, and dialogue" (ibid.). As one of the participants summarised: "*The one word that describes [the project] is 'exciting'. It was a very different experience, out of the ordinary*" (Marion, 16). As I have shown, participatory methods for individual and collective self-reflection can enable individualising personal experiences beyond generalised perceptions of helplessness and passivity [57] of communities living with disaster risk. For future disaster preparedness research and practice, I propose introducing non-spoken (or non-written) tools of expression such as creative, arts-based approaches, or embodied methods such as body-mapping [54,58] or community-based poetry and song writing as tools for emotional storytelling. Due to the mostly remote nature of the presented research, the possibility for integrating such approaches through WhatsApp was limited. Art-based participatory interventions may foster critical reflections while collectivising hope, based on their potential to stimulate creativity, community, connectivity, and courage [4]. Although face-to-face interventions may provide more leeway for participatory engagement through creative methods, it is important to consider that remote means of communication such as WhatsApp may provide flexibility for designing accessible, inclusive and sustainable methods that help reduce the carbon footprint in an increasingly digital age.

5.3. *Hope as a practice: learned hopefulness and collectivising hope*

I argued that hope-based psychological strategies [55] and "hope as a practice" [6]: 134) should be a central element in disaster risk preparedness to cope better with climate worry and everyday disaster risk [59]. Here, I understand hope as both a feeling and collective action [6] which emerges from and feeds back into this feeling, as shown by participants' recognition of the importance of collective action for developing a sense of hopefulness. Brazilian traditions of participatory co-production of knowledge, inspired by the educator Paulo Freire, point to the importance of such a *Pedagogy of Hope*. By treating our despair as "object of curiosity" [43]:436) and learning from it, rather than avoiding or minimising it, we can then 'educate' our hope (ibid.). In chronic situations of disaster risk, resource scarcity and urban crises in Brazil's urban peripheries, translating despair into collective hope can generate local and global collaboration (as expressed by the participants) and collective environmental action which will ease the burden for future generations. This learned hopefulness may help us perceive the importance of small everyday actions [35], as observed by one of the participants: "*It's the little things you do that can create a nicer environment*" (Tamira, 13). I furthermore suggest that compassion should be an essential element in such pedagogies of hope when facing disaster risk, since compassion can lead to hope and improve the ability to embrace uncertainty [40] by recognising the impermanence of our feelings.

5.4. *Self-reflections: prioritising emotions in both community-based and formal education for well-being*

Finally, I propose that emotions of disaster risk should be integrated into both formal **educational** strategies as well as community-based research and education to improve **well-being** in disaster risk situations. However, I recognise that both researchers and educators may be "unfamiliar or uncomfortable" [17] with emotional learning approaches and may therefore require additional support for recognising and integrating emotions into disaster risk reduction and preparedness. I suggest that engaging in a process of "'continuous and critical reflexivity'" [60]:190 in [54]:908) may be helpful for discussing sensitive topics with participants in situations of vulnerability. As disaster risk practitioners or researchers, accepting 'negative' emotions such as anxiety, grief or despair in oneself and the participants (while being empathetic and present) may lead to a more open dialogue [6,54] and an increased well-being of the participants. Again, using arts-based methods for exploring the wide range of emotions of disaster risk - from grief, hopelessness and despair to more positive and humorous reflections - may encourage both educators/researchers and participants to validate and engage with their personal feelings of living with disaster risk, to reclaim their agency, and to move to collective hope.

6. Conclusion

The discussions in this paper have shown that today's 'new normal' of acute and everyday disaster risk, interconnected with (multiple) urban crises, requires new ways of adapting to and preparing for risk. I have shown how, by engaging with their everyday emotions through a process of individual and collective self-reflection, young people may transform their experiences with (chronic) disaster risk into opportunities for transformative change. With the tools at hand that empower them to acknowledge, validate and engage with their emotions, youth can then learn to cope better with the uncertainties of disaster risk as the new normal by recognising their agency without minimising or denying their experience. Here, the proposed EMPOWER framework can provide fundamental guidance for (interdisciplinary) scholars and practitioners to better attend to emotions in their work, across the different temporal frames of disaster risk – from acute to chronic disaster risk as well as inter- and intragenerational memories. I have argued that to make an impact on the ground and to devise adaptation strategies for those who live with risk, we need to place people's emotions at the centre of disaster risk reduction and preparedness when trying to understand how risk is experienced. How we feel influences how we act; hence, learning to acknowledge, validate, and engage with our emotions is fundamental for coping better with chronic and acute disaster risk. Finally, I reiterate that transformative change can only happen collectively; hence, peer- and intergenerational approaches for openly engaging with and sharing emotions (such as grief, anxiety, joy and hope) across researcher/educator/participant divides are fundamental for developing critical reflexivity and collective hope as a praxis of disaster preparedness.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

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