



Education for disaster resilience: Lessons from El Niño

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ABSTRACT

This paper calls for greater attention to the role of youth and children as development actors in the context of education for disaster management. Drawing on debates in disaster studies and children's geographies, we explore the possibilities offered by everyday formal education spaces, often overlooked in disasters management practice, to engage children in disaster preparedness and resilience planning. Using the case study of Peru, we examine the extent to which national responses to the restrictions that the COVID-19 pandemic placed on in-person teaching, opened-up opportunities to engage with disaster management in new ways. We draw on the case of an innovative digital curricula that uses intergenerational storytelling about the El Niño phenomenon to investigate livelihood opportunities and climate change pressures in northern coastal Peru, exploring how the phenomenon benefits desert populations. We assess the role of participatory virtual learning in facilitating disaster knowledge and climate adaptation awareness among students and critically examine the youth subjectivities that are constructed through these processes. We conclude calling for greater engagement with children's formal education spaces in climate adaptation strategies, while cautioning against conceptualising children and young people as only 'adults in the making', rather than as impacted individuals with current agency and everyday capacities.

1. Introduction

At the end of August 2020, teachers and students at the Daniel Alcides Carrión school, located in a small desert settlement in Sechura, northern Peru, were making final adjustments to a presentation for the regional school board's annual 'Education Innovation Prize'. At that moment, the name of their settlement, 'Mala Vida' (*Bad Life* in English), a locally contentious label, seemed to aptly capture the context around them. The district of 'Cristo Nos Valga', where Mala Vida is located, has experienced some of the highest levels of poverty in northern coastal Peru in recent decades.¹ Peru's contested second round of elections were underway and the country was making international headlines for having the largest COVID-19 death toll per capita in the world (Martínez, 2021; Reuters and Associated Press, 2021). The devastating impact of the COVID-19 pandemic, attributed mostly to a weak health system and a lack of locally targeted solutions addressing poverty, diversity and multi-generationality (Taylor, 2021), has exacerbated existing structural and geographical inequality in the country. Northern Peru is also

an iconic study site for the El Niño phenomenon and its impacts on societal vulnerability (French et al., 2020; Rubio, 2007).

El Niño is the warm phase of the El Niño-Southern Oscillation (ENSO), the dominant driver of climate variability on the planet. Fluctuations in the sea surface temperature in the eastern equatorial Pacific creates two opposite effects, the warm El Niño and the cold La Niña phase. Occurring on a quasi-periodic basis every 2–7 years, ENSO generates significant ecological and societal impacts across the globe (Glantz, 2000a; NOAA, 2023). In Peru the heavy rainfall phase is well known as a source of devastation along the otherwise dry coastal region (Morales and Canziani, 2000). The El Niño events of 1925, 1983, and 1997–98, as well as the more recent El Niño Costero (coastal El Niño) in 2017, (Ramírez and Briones, 2017; Takahashi and Martínez, 2019) have had a lasting effect on popular memory. We can only imagine the consequences of another El Niño event in the face of a social structure eroded by decades of marginalisation, climate change, and, newly, the pandemic.

Such a concert of compounding effects is especially detrimental to

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¹ According to the Ministry of Development and Social Inclusion 61.9% of the district's 4300 population live in poverty whilst 16.7% live in extreme poverty (MIDIS, 2013). Using the criteria of low levels of education, MIDIS also calculates social exclusion rates of between 40% and 60% in each district across the wider Sechura Province (population 79177).

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children, left without parental care or access to critical services. The preparations in Daniel Alcides Carrión school, however, negate a suggestion of hopelessness in this apparent disaster story. The presentation given to the School Board by the Mala Vida teachers and students showcased their new digital curriculum on the cyclical rains affecting coastal desert Peru during an El Niño event. After heavy rains the Sechura desert turns green and large temporary lakes form, including *Lagoona La Niña* a large expanse of water in the vicinity of Mala Vida, which is fed by the flooding River Piura (Laurie et al., forthcoming). This lagoon provides farming and fishing livelihoods for otherwise economically marginal households in the area for several years after the event. Following the El Niño of 1997–98 the Peruvian president described the lagoon as “the largest body of fresh water in Peru, after Lake Titicaca” (Fujimori, 2001:227).

The Daniel Alcides Carrión digital curriculum was developed in 2019 under lockdown when all education institutions were closed nationally for more than the school year. It responded to the government’s “*Aprendo en Casa*” (“I learn at home”) program (Ministerio de Educación, 2020), which introduced emergency measures to implement the national curriculum digitally, aided by the distribution of technological devices. This curriculum was generated as part of the school’s involvement in an interdisciplinary, cross-sectoral collaboration exploring the desert-El Niño-food system in Sechura.²

The curricula initiative built from the long-established co-operation between the Peruvian NGO Partner PRISMA (Laurie et al., 2023) and regional educational authorities in Sechura. It was launched when COVID-19 inhibited the in-person collection of oral histories about the experience of the El Niño rains in the Sechura desert by the British and Peruvian research team. In response, the project team collaborated with the school to deliver workshops and organise data collection on El Niño both digitally and remotely. The details of the livelihood opportunities that the El Niño phenomenon provides in the Sechura desert is little recognised beyond the desert settlements. Intergenerational storytelling therefore aimed to reflect on El Niño’s potential as a ‘phenomenon of opportunity’ that could give voice to desert communities in regional disaster resilience planning. The Daniel Alcides Carrión curriculum went on to win the regional education innovation prize in 2020, as well as being among the winners of the Ministry of Education’s national “Innovative Educational Projects” that same year.³

The story of success from the Sechura desert that our El Niño analysis recounts follows the shift in emphasis towards resilience in disaster studies. Rather than framing impacted individuals as vulnerable helpless victims, scholars demonstrate how disasters can highlight their role as active agents with capacities. Increasingly, recovery in disaster settings is being conceptualised to include the prevention of similar future impacts (Gaillard, 2007; 2019). As extreme weather events are exacerbated both in frequency and gravity by climate change and inequality, research in this field is growing. Cyclical rainfall events are of particular interest given their potential for simultaneous devastation on the one hand, and the potential benefits of “living with floods” (Wisner, 2003) on the other. The Peru setting is pertinent in this context, as attempts to maximise climatic variables for agricultural adaptation to El Niño in

² Funded by the Arts and Humanities Research Council (2019-22): ‘Fishing and farming in the desert? A platform for understanding El Niño food system opportunities in the context of climate change in Sechura, Peru (AH/T004444/1AH) where additional partners include the National Agrarian University, local municipal and district authorities, Peruvian NGOs PRISMA and CIPCA (see Laurie et al., 2023).

³ Co-produced curriculum materials were further developed and enhanced in a follow-on AHRC project ‘El Niño a phenomenon with opportunities: learning history and valuing community assets for an empowering digital curriculum in northern Peru’ (AH/V012215/1). This second phase of our research collaboration won a national Innovative Educational Projects award again in 2022, and in August 2022 was one of the top 3 winners of the prestigious *Ciudadanos al Día* (Today’s Citizens) awards.

northern Peru date back to pre-Colombian times (Caramanica et al., 2020). In the contemporary setting the need for agile climate adaptation strategies is recognised as an urgent agenda for the state and civil society alike (Ministerio de Medio Ambiente, 2015; El Comercio, 2021; OECD, 2020). Peru is among the countries with the highest exposure to natural hazards, ranging from geophysical to meteorological factors (French et al., 2020) and, in 2017, it was one of the 10 most disaster-affected countries in terms of economic damages, estimated at USD 3.2 billion (EM-DAT, 2018). This was the same year as the El Niño Costero event, which developed rapidly and unexpectedly in northern Peru (Ramírez and Briones, 2017). There is significant research on the detrimental impacts of the abundance of rain in the contemporary period (French et al., 2020; Dilley and Heyman, 1995; Caviedes, 1985) and on learning lessons from previous events such as the 1997–98 El Niño (Glantz, 2000b). This work includes a focus on the role of the state (Zapata and Sueiro, 2000) and NGOs in managing El Niño as a disaster (Mannucci, 2000). Nevertheless, little research has addressed the varied impacts El Niño may have on different landscapes in a beneficial sense (Seiner, 2001). As a result, limited attention has been paid to the role that disaster education could play in learning from these settings about the transformative potential of disasters for long-term community resilience.

The contribution of this paper is to uncover and explain how youth subjectivities are constructed in such settings, as a departure point for evaluating children’s agency in disaster education more widely in the future. The analysis builds on our geographical historical ethnography of El Niño in northern Peru (Laurie et al., forthcoming) and pieces together an understanding of disaster education in that context to help question its role in disaster risk management (DRM)⁴ more generally. It responds to the recent call for geographers working on development to engage critically in co-production and to “identify and confront the “embodied power relations ...[and] hegemonic knowledge systems” that operate between the different participants in co-production processes (Vincent 2021: 890). Co-production in this research relates to the production of the El Niño research agenda and plan of work between team members and project partners (universities, PRISMA, the Sechura School Board and local municipal governments) as well as to the educational outputs. These outputs include the mechanisms for aligning the research objectives with schools’ curriculum development (co-produced by the School Board, teachers and PRISMA) and the tasks undertaken, and materials produced by students as part of their schoolwork. These tasks and materials were supported by teachers and facilitated by workshops involving all research partners to varying degrees at different points in the research process and school year (Laurie et al., 2023).

The paper brings together approaches in disaster studies with work in children’s geography to highlight new avenues in disaster education. We use a scalar approach to map the context of relations within which the Daniel Alcides Carrión programme was developed and implemented. To do so, we first adopt an institutional-governance perspective to understand how disasters are managed nationally. We set this in the context of recent debates in children’s geographies that emphasise issues of agency and identity. In the second part we use this framework to explore a concrete example of a people-centred approach to DRM by reflecting on the Daniel Alcides Carrión curriculum experience.

2. Disasters and development

Two conventional views of disasters have come to dominate the field and continue to influence the implementation of DRM. Disasters were first seen as “extraordinary” catastrophic events characterised by

⁴ Disaster risk management (DRM) is used as opposed to disaster risk reduction (DRR) as it is best aligned to the Peruvian government’s National Disaster Risk Management System (SINAGERD).

extreme geophysical factors impacting humans, where recovery is a return to 'normal' social functioning (Gaillard, 2019). This separation of nature and society encouraged command and control mechanisms for risk reduction. Under this view, the naturalisation of disasters mobilises an interventionist logic that assumes that knowledge grants preparedness (Gaillard, 2019). The second perspective, provoked by the "vulnerability paradigm" of the 1970s, challenged these assumptions by recognising that disasters are shaped by the unequal distribution of power and resources in everyday landscapes (O'Keefe et al., 1976). Such a focus on geographical, social, political, and economic marginalisation as the mechanisms constructing vulnerability, conceptualises impacted individuals as active agents with capacities, rather than as helpless victims. The vulnerability paradigm is not without its critics, however, and the approach has been questioned for its Western imposition of priorities (Gaillard, 2010), as well as the way in which it homogenises the processes constructing risk (Bankoff, 2001). While these critiques have been widely accepted among researchers (Sou, 2019), practitioners nevertheless often still consider disasters as exogenous events. As a result, infrastructure investments and physical safety are often prioritised in adaptation and vulnerability is seen as a lack of knowledge and awareness (Williams and Webb, 2021). Given this framing, the topic of development has become increasingly necessary in disaster debates.

The recognition that long-term exposure to hazards is shaped by daily marginalisation underlines development's failures to address unequal power structures and poor quality of life (Ruszczky, 2019; Gaillard, 2010; Wisner, 2003). As a result, to alleviate disaster impacts, development is now widely included in precautionary planning to raise the standard of life (O'Keefe et al., 1976). Consequently, DRM agendas highlight the permanent emergencies of daily lives such as governance and democratisation; civil society participation; asset building and social protection; and public health and quality of life (Wisner, 2003). Addressing the chronic daily neglect of marginalised groups therefore posits wellbeing and quality of life as the end goal of both disasters and development (Wisner and Gaillard, 2009). Here the concept of resilience has taken on a specific role, deployed as a link between adaptation, risk reduction, and development (Tanner et al., 2019). While resilience has emerged as the dominant discourse in the international policy landscape since the mid 2000s (Matyas and Pelling, 2015), it has also been widely questioned.

2.1. Disaster resilience and its critics

Resilience has been at the forefront of enacting the vulnerability paradigm in DRM because it has shown how enabling the agency of the vulnerable provides more benefits than conventional, infrastructure-oriented approaches (Wilkinson and King-Okumu, 2019). Resilience approaches seek to mobilise the capacities of individuals through ground-up initiatives that account for the context-specific nature of disasters (Wilkinson and King-Okumu, 2019; Ensor et al., 2018). As such, resilience is now mainly understood as the capacity of a system to absorb and recover from shocks and return to 'normality' (Aldrich, 2015; Gaillard, 2010). Rather than simply being the opposite of vulnerability, resilience is seen as a more process-oriented approach (Matyas and Pelling, 2015), characterised by some scholars as *survival* - an absorptive resistance to change, *adaptation* - incremental adjustments at the margins, and *transformation* - an openness to change for recovery (Manyena, 2006; Gaillard, 2010; Bahadur et al., 2015). These dimensions have been further elaborated to shape recovery as either a 'bounce back' to status quo or a 'bounce forward' to transformation (Manyena et al., 2019).

Despite such attempts at explaining resilience, it remains a diverse and vague concept both in theory and practice, challenging its use across research and practice (Beauchamp et al., 2019). Resilience has also been criticised for focusing on small-scale, individual capacities, thus obscuring the structural and historical processes that create vulnerability (Cheek and Chmutina, 2021; Wilkinson and King-Okumu, 2019; Matyas and Pelling, 2015; Rivera, 2020). In turn, Bankoff (2019:228)

suggests that such approaches are "only rediscovering that people with local knowledge and expertise are the principal resource of the community". Critics call for more drastic structural changes to address deep rooted systems of power (Gaillard, 2010). Such scepticism has gained traction through parallels drawn between discourses of resilience and neoliberalism, where it is argued that resilience has been co-opted as an operational tool to devolve and neglect DRM responsibilities (Manyena, 2006). By naturalising disasters as inevitable, the state is hollowed out for non-state actors to fulfil public safety roles (see Ruszczky, 2019; Chandler and Reid, 2016; Wisner and Gaillard, 2009). Efforts are made to 'empower' the most marginalised to tackle the underlying problems of poverty, environmental degradation, and political abuse without being afforded the resources to do so. Here, the argument is that increasing self-reliance and shock-responsive approaches serve to maintain rather than challenge the status quo (Ulrichs et al., 2019).

Such processes of neoliberal devolution are also scaled at the level of the community and the individual. The devolution of DRM responsibility can be reinforced through participatory processes in which resilience-building is assigned to communities and devolved governance is maintained through notions of active citizenship. As such, discourses of systemic, public challenges shift to ones of private, household loss and self-blame, becoming a cornerstone of risk perception, which shapes civil engagement with DRM and thus reproduces the absolution of government authorities as guarantors of DRM (Sou, 2019). As we elaborate below, the devolution of DRM governance and authority in Peru provides a useful illustration of how constructions of good citizenship underpin approaches to disaster preparedness and shift responsibility away from the state.

2.2. Placing disaster preparedness and planning resilience in Peru

Peru has pledged its commitment to both the 2030 Sustainable Development Goals and the 2015–2030 Sendai Framework for Disaster Risk Reduction. Within this evolving policy backdrop, El Niño's cyclical occurrence has gained a central position in the nation's development planning structures. Research on specific El Niño events has shed light on the types of institutional mechanisms in place at any one time, highlighting a general lack of disaster preparedness around El Niño in Peru (Venkateswaran et al., 2017; Save the Children et al., 2018). In the 1997–98 event for example, Zapata and Broad (2000) highlight that although this was the first time that scientific forecasting was used to develop a governmental plan for prevention measures, the overly centralised administration negatively impacted its implementation, despite the six month-lead provided by accurate forecasts. In more recent times, French and Mechler (2017) have called for a move away from an emergency response towards more integrated DRM strategies in relation to El Niño and sought to identify where policy mistakes have been made. Their disaster forensic approach (French et al., 2020) pinpoints how socio-political institutional characteristics operate to undermine DRM in Peru, highlighting the role of decentralisation, sectoral division, and corruption in the national management of El Niño. Responsibility for immediate response is given to the Ministry of Defence (MINDEF), the National Institute of Civil Defence (INDECI), and a national system for disaster risk management (SINAGRED) has been created (French et al., 2020). Additionally, a budget for vulnerability reduction is deployed through the National El Niño Study (Estudio Nacional del FEN⁵). Collectively, these instruments portray El Niño as an extraordinary event whose uncontrollable nature inhibits direct premediated intervention, yet, at the same time, requires immediate reaction.

⁵ Estudio Nacional del Fenómeno "El Niño" -ENFEN-, Resolución Ministerial 120-77-PM/ONAJ; Resolución Suprema N° 053-97-PE del 12 de septiembre de 1997; Ley N° 29158, Ley Orgánica del Poder Ejecutivo a través del Decreto Supremo N° 007-2017-PRODUCE publicado el 23 de abril 2017. <https://enfen.gob.pe/>.

Public information dissemination campaigns and a reliance on early warning systems reflect this ambiguous situation. The example of pre-emptive media coverage predicting a large-scale El Niño event in 2016 (Fig. 1), part of the wider global 2014–16 event, illustrates some of the consequences of this situation. The article, in a leading Lima-based press, draws comparisons with the 1998 El Niño by showing an image of destroyed infrastructure and highlighting the high cost of the event in terms of the numbers of people and homes affected. It uses collective memories of past devastation to remind people about future imminent threats and prompt immediate action to prepare.

However, while the event did happen, it did not impact Peru as expected. By contrast the unanticipated 2017 coastal El Niño the following year caused significant and wide-spread destruction and could in part reflect a lack of clarity in NOAA's definition of ENSO over what constitutes a El Niño coastal event (Adamson, 2022, Ramírez, and Briones, 2017). French et al. (2020) point out that in light of Peru's substantial preparations the year before, this contrast raises questions about why such devastation occurred. In line with their critique concerning the decentralisation of DRM responsibility, they highlight that while public information and early warning systems have become a key feature of preparedness in Peru, the underlying social dynamics remain largely untouched (French et al., 2020). Rubio's (2007) has similarly argued that in Piura especially a technical response is not adequate given the context of complex vulnerability in that region.

Disaster scholars are increasingly seeing the need to realign the concept of resilience with a people-centred approach. There are growing calls for policy and practice priorities to recognise deep seated narratives that normalise inequality by situating resilience in social, political, and economic structures (Ensor et al., 2018) rather than outside everyday landscapes. While French et al.'s (2020) disaster forensics analysis makes important steps towards addressing this agenda by illustrating how silo thinking and governance forms mitigate against an integrated approach, it gives less attention to the actors on the ground. In response, we argue for the need to integrate the idea of disasters into the everyday, and,

crucially into the much-overlooked everyday spaces of education, especially the school. In this context it is important to understand better what disaster preparedness entails, who it targets, how it does so and to what effect as part of increasing resilience.

2.3. Targeting disaster preparedness and education in Peru: A children's geographies approach

The role of children has not featured much in disaster preparedness around El Niño in Peru, despite a child focus having long been included in disaster studies more generally, rooted in an emphasis on the processes that shape their vulnerabilities. For example, research highlights how political, economic, and social exclusion expose children to suffering, resulting from their physical and psychosocial exposure as well as dependence on adults (Peek, 2008). A lack of sensitivity to their personal growth and to their inclusion in research and decision-making arenas has also been noted (Muzenda-Mudavanhu, 2016). These forms of exclusion it is argued, threaten both child and community safety (Johnson et al., 2014; Mitchell et al., 2008). Others caution that an approach emphasising children's specific vulnerability as a marginalised group can perpetuate their portrayal as passive victims requiring assistance (Haynes and Tanner, 2015). However, the field of child-oriented DRM is new and diverse, thus lacking shared conceptual frameworks and approaches.

Globally, new initiatives are increasingly seeking to acknowledge children's unique capacities, improve their access to resources (Skelton and Aitken, 2019) and work towards a "culture of risk reduction" (Peek, 2008:13). Such approaches reflect and enact epistemological commitments in the field of children's geographies. For example, strategies focus on generating spaces for cognitive processing and emotional recovery (Akhter et al., 2015; Izadkhah and Gibbs, 2015) and streamlining children's rights in policy arenas (Muzenda-Mudavanhu, 2016). Other approaches seek to empower children as risk communicators (Mitchell et al., 2008) and advance reconstruction and livelihood stability (Peek,



Fig. 1. Pre-emptive media coverage predicting a large-scale El Niño event in 2016.

2008) through their holistic empowerment as agents of change (Ronan et al., 2016; Haynes and Tanner, 2015). Efforts to streamline DRM in formal education have also been noted (see Petal and Izadkhah, 2008), and there is increasing recognition of the need to integrate prevention, safety, and resilience into everyday life, including the lives of children (Burststein, 2006).

The field of children's geographies frames some of these issues in the context of geographical debates around agency and the construction of subjectivities. Children's geographies are increasingly recognising the dynamic and varied constitution of youth identities as something intrinsically spatial, shaped by networks of relations and experiences of social, economic, political, and historical context (Skelton and Aitken, 2019). The field has long sought to challenge the normative "global child/childhood" model through which children are held in a binary of innocent and passive recipients, contradicted by the need to enhance their autonomous agency (Ansell, 2019:54; Skelton, 2007:170). Researchers have associated these tensions with their relevance in globalised, neoliberal models of citizenship, particularly as children are conceptualised as "becoming" future adults (Aitken, 2019:33), or as "adults-in-waiting" (Skelton, 2007:177), as opposed to "being" in the here and now (Moosa-Mitha, 2019). Recent work has shown how these narratives of becoming are mobilised through education (Mitchell, 2019), thus arguing that the "best interest" of children is determined by the state, policy, and, therefore, adults (Moosa-Mitha, 2019). They are essentially taught to be efficient, self-governing citizens for a new generation of conforming and hard-working citizens (Staheli, 2019; Skelton, 2007).

To date, disaster preparedness in Peru has mainly targeted adults via informal capacity building. The NGO Practical Action's Flood Resilience Programme illustrates this type of approach well (Practical Action, 2023). The programme organises and trains community brigades, teams of local residents who know the area and the needs and make-up of its residents and so can play a role as a first line of response in emergencies. Community brigade members perform their responsibilities as 'good neighbours'. They are trained in providing emotional support and care for affected populations. In this way, they become a key component in operationalising early warning systems, including from a gender-sensitive perspective (Brown et al., 2019). They contribute to the "effective governance and the sustainability of strategies for building resilience against landslides and floods ... and are fundamental to disaster risk a management" (Ordoñez and Madueco, 2023). In such light, Practical Action sees the recent recognition of a brigade in INDECI's Operation's Centre for National Emergency as an important step in the process of institutionalizing community brigades and their role within Peru's wider National Disaster Risk Management System (SINAGERD) (Ordoñez and Madueco, 2023). In this way, informal capacity building in the shape of community brigades, comes to embody the neoliberal citizenship discourses around active citizenship and disasters discussed above.

By contrast, children largely only figure in disaster preparedness scenarios in terms of infrastructure reconstruction (schools) (Burbano et al., 2018) and/or as the recipients of the trickle-down benefits associated with the capacity development of caregivers and educators (Plan International, 2016). Scant attention has been given to children's agency in disaster management. Their formal education and curricula issues tend to sit outside current preparedness strategies. Education, and specifically environmental education, is separated into the Ministry of Education (MINEDU) and not included in the DRM governance structures discussed in detail by French et al. (2020) and outlined above. This situation contrasts with more global trends where the inclusion of DRM in formal education is centred around systematic, risk mitigating action and hazard awareness (e.g. Petal and Izadkhah, 2008; Shiwaku and Shaw, 2008) and often valued for facilitating child empowerment. Such approaches chime with the recent focus in children's geographies on the "postchild moment" (Aitken, 2019:39), which seeks to appreciate the complexities of childhood, and value children as legitimate social actors

(Ansell, 2019). The postchild turn recognises children's agency in terms of being able to speak and act as experiences are given meaning through networks of relations. Intergenerational geographies have thus become central to child studies, as they explore the interdependencies and fluidity of identities among generational groups (Vanderbeck, 2019; Hopkins and Pain, 2007).

These interventions are useful for reflecting on the potential contribution of learning from the Daniel Alcides Carrión digital curricula "Rescuing ancestral knowledge about the El Niño phenomenon in my community" (RECUST in Spanish⁶) for disaster education in DRM, to which we now turn in the rest of the paper. Our focus is on revealing the co-constitution of youth subjectivities in this curriculum and explaining how this process of construction relies on and, in turn, shapes disaster resilience. The curriculum is based on capturing intergenerational geographies through storytelling, an approach made possible through the national digital educational strategy responding to the COVID-19 pandemic. In contrast to work in children's geographies that emphasises how technological advances may inhibit the transmission of collective memory (Mitchell, 2019), our approach seeks to explore how digital technology can be used to gather and share the memories and voices that are otherwise in danger of being invisibilised through current El Niño disaster management strategies.

First, we first introduce RECUST as a digital curriculum that bridged national curriculum objectives and local necessities related to the El Niño phenomenon in northern Peru. Second, we adopt an institutional-governance perspective to understand how the national curriculum shapes child subjectivities using curriculum documents and actor analyses. Third, we explore the RECUST curriculum experience as an example of a people-centred approach to DRM education, aided by some indicative examples from the audio-visual outcomes of the programme. This scalar approach follows the development, implementation, and outcome of the programme as both a point of entry into the understanding of disaster education in Peru, as well as an example of methodological innovations in disaster management from research to practice more generally. In this way, by examining how youth subjectivities are constructed in disaster education settings, we address a significant gap in child-inclusion in DRM.

3. Learning Communities: A methodology for co-producing a digital disaster curriculum

The Daniel Alcides Carrión digital curricula aimed to gather collective memories about the 1983, 1998, El Niño events and the 2017 coastal El Niño in the northern Peruvian desert through teaching intergenerational oral history skills to secondary students. As a pilot programme, RECUST was carried out between the months of April to July 2020 through educational workshops with 2nd grade students (on average 13 years old) who independently produced knowledge through community engagement. The data used here comes from the range of materials they generated: 5 interviews, 8 videos stories, 9 written stories and 9 recorded oral stories along-side the formal curricula documents, workshop materials and workplans generated by the teachers and the Secura School Board. These sources of information were supplemented by mobile phone interviews with adults conducted also under lockdown by PRISMA staff in association with the Daniel Alcides Carrión parents' association as part of an 'opportunity mapping' exercise (10 interviews with adult residents/parents). In line with the wider collaborative research project that it emerged from, RECUST was based on the following three goals:

1. Addressing the lived experiences of El Niño and its localised impacts.
2. Questioning the fatalistic perspectives of El Niño as a disaster.

⁶ RECUST: "Rescatando los saberes ancestrales de mi comunidad".

3. Aligning with the newly implemented pandemic digital curriculum entitled “I learn at home” delivered as part of the national curriculum (RVM 093-2020).

RECUST was delivered through twelve teacher and practitioner-led workshops, as shown in Table 1, which were divided into three phases inviting children to discover how residents overcome and take advantage of El Niño. The first phase, workshops 1 through 9, sought to train and empower children to use technological and storytelling tools through direct teaching, as well as introducing the topic of El Niño experiences in the community. These taught children the logistics of what constitutes a good photograph or video and how to execute these to narrate a story. While teachers and independent consultants led these workshops, researchers (including the authors) and educational authorities often sat in, observing and learning about the challenges and successes of online schooling. The second phase, workshop 10, encouraged children to go out into their community to gather oral histories of El Niño experiences. In doing so, they interviewed community members and relatives, as well as accompanying them on their daily activities as they engaged in fishing, farming, and livestock handling. Additionally, they learned about the secondary processes of economic activities, including selling and transportation. This information was shared with the wider team and their teachers in the third and final phase, workshops 11 and 12, where the students created stories from the experiences they learnt about through fieldwork. As such, they were tasked with communicating the oral histories they discovered through digital means. They produced videos, posters, images, and interviews through which they demonstrated their learning about localised El Niño experiences.

The programme allowed students to learn about the causes and consequences of El Niño while reframing their interpretations through a localised and contextualised perspective. They received guidance on the use of oral history as a didactic resource to conduct interviews with older community members about their experiences of overcoming disasters. These discussed the immediate and long-term impacts of El Niño and recovery strategies. Students were thus able to interact with experiences made invisible both in disaster mitigation policies and in education, challenging dominant policy and curriculum disaster discourses through participative processes of knowledge production.

3.1. Schools for citizen formation

Like many places around the world, the COVID-19 pandemic triggered the implementation of contingency curricular amendments in Peru. The new national strategy - “Aprendo en casa” (I learn at home), was launched in April 2020. It sought to facilitate the maintenance of education despite circumstances of isolation and social distancing. This

Table 1

Sessions and workshops in Daniel Alcides Carrión digital curricula: “Using oral histories for learning”.

Sessions and workshops in the school programme “Using oral histories for learning”	
1. Capacity building workshop for technological skills.	7. Workshop: Tools for telling the best story.
2. Learning about historical sources and their importance in society.	8. Conversation: El Niño phenomenon in Piura.
3. Reading newspaper articles about the El Niño phenomenon.	9. Workshop: our record in colour.
4. Interpreting historical sources and relating them to their reality.	10. Fieldwork to collect oral sources about the El Niño phenomenon.
5. Creating an album about our personal history using virtual resources.	11. Elaborating a timeline about the events that happened in the community throughout the quarantine period.+ Socialising the stories.
6. Workshop: building a big story step by step.	12. Elaborating stories about the opportunities that the El Niño phenomenon generates.- Digital medium.

state programme provided guidance on the digital implementation of the curriculum through a framework of five core themes, outlined in Table 2, Examples of these include areas of “citizenship and coexistence in diversity” and “the country’s achievements and challenges in the bicentennial”⁷. Each of these themes was individually targeted for 3 to 5 weeks through specific “learning experiences” aligned with student ages.

These learning experiences demonstrate how the Peruvian curriculum proposes a series of competencies through which individual schools can then choose to address their own needs and interests thematically (see Laurie et al., 2023 for more details). As such, this contingent curriculum became a form of “governance from a distance” (Bankoff, 2019) through which a “hidden curriculum” (Regalsky and Laurie, 2007) of citizenship is introduced and maintained.

3.2. The hidden curriculum trickles down

The Peruvian curricular focus on citizenship and democratic participation highlights the framing of children as future adults and, more specifically, “not-yet-citizens” (Moosa-Mitha, 2019). As a result, seeing children as future productive citizens in turn defines resilience as long-term stability, both democratically and economically. As one of the parents said, they “organise with the school to modernise the coming youth, the children, to not be like [the older generation]”. In this way, the production of child subjectivities serves to place resilience within a neoliberal context as the individual ability to cope with shocks without requiring external assistance, thereby further placing an innocent hope on children for a better future. The programme thus facilitates educational institutions as a point of access for the localised implementation and enactments of state ideologies and globalised narratives of development, notably those of “socially-inclusive” neoliberal policies (Laurie et al., 2005).

PRISMA’s childhood education goals, in partnership with the

Table 2

“Aprendo en casa” (I learn at home) five core themes.

Core themes	Example titles of learning experience (Secondary)
Citizenship and coexistence in diversity	<ol style="list-style-type: none"> 1. We promote democratic participation and coexistence in diversity. 2. Elections as an opportunity to reflect on citizenship participation and coexistence in diversity 3. We promote an active and vigilant citizenship
Work and entrepreneurship in the 21 st Century	<ol style="list-style-type: none"> 1. We promote work and entrepreneurship with the sustainable use of our resources 1. We recognise and value advances and achievements obtained in our bicentennial 2. We build a better country 3. We reflect on the bicentennial to assume commitments in the construction of a better country 4. We assume commitments for the challenges of the bicentennial 5. Us Peruvians commit to the construction of a fairer society
Health and environmental conservation	<ol style="list-style-type: none"> 1. We strengthen the good use of information to be healthy and in harmony with the environment 2. We assume actions to preserve health and the environment
Discovery and innovation	<ol style="list-style-type: none"> 1. We recognise the creativity of Peruvians

Source: Perú MINEDU, 2021, Planificación I para Aprendo en casa - Educación secundaria, <https://repositorio.minedu.gob.pe/handle/20.500.12799/7214>.

⁷ The bicentennial refers to Peru’s 200 years of independence from the Spanish.

Sechura School Board, have always sought to align with the national curriculum's citizenship development aims. As such, the newly developed RECUST educational programme orientated itself with the government's digital strategy by addressing "personal and citizenship competency development". These aims focused on the personal development of children as "social people" and the curriculum's goals of empowering them to exercise democratic participation and "an active and vigilant citizenship". These values were mobilised through an historical understanding of the country's achievements and challenges. Therefore, children conducting oral histories on how marginalised communities live through and manage the El Niño phenomena fits within the national curriculum, as we illustrate in more detail below.

Analysing RECUST through a postchild framework reveals the importance of the networks of relations that structured its development. Implemented on the ground under the broader research title "Phenomenon of Opportunities", these networks draw on different histories of collaboration between partners that have built up shared agendas and mutual trust over time. In turn, these enable the students, as children, to "speak, act, and become" as part of RECUST. PRIMSA has been working in the Sechura region since 2016 when it first established a partnership with the regional School Board under the programme "Educating today for the future"⁸. This initiative was funded from 2018 to 2021 by FOSPIBAY (Social Fund for the Integral Bayovar Project). FOSPIBAY channels social compensation funds from locally based extractive industries⁹ into regional development activities to improve the attainment of individual students. It aims to enhance student retention and productivity in otherwise marginal public sector schools. It focused on strengthening educational institutions to improve learning outcomes in the area and included IE Daniel Alcides Carrión as one of the target schools. Illustrating this history, Fig. 2 maps the wider network of relations in which the Daniel Alcides Carrión's RECUST Educational programme is located.

Reflecting on these network connections, it appears that RECUST was forged through long term cross-sectoral relationships already established within trajectories of neoliberal professionalisation (Bondi and Laurie, 2005). The first educational prize that RECUST was awarded was the second won by Daniel Alcides Carrión school. Their first success was with another project under the framework of FOSPIBAY's "Educating today for the future", and reflects the wider long-term collaboration amongst municipal, non-profit, and private actors. Therefore, prior to the launch of RECUST, the space of the school was already being used to address wider social agendas by aligning curriculum development with locally and institutionally identified development challenges and by providing further professional training and support for teachers.

In this way, on the one hand, the Peruvian curriculum and its agents implement competencies of active citizenship for childhood development enacted through neoliberal professionalisation processes and prizes. On the other hand, as we explore below, understanding the curriculum's thematic flexibility, however, also allows us to see how local realities are manifested through the new digital curriculum. This dual perspective reveals some of the tensions and differences between the top-down and bottom-up co-constitution of childhood subjectivities.

3.3. Building a culture of intergenerational resilience? Economic youth as future adults

The RECUST programme sought to address the local realities of El Niño floods as a phenomenon which benefits rural communities in the Sechura desert, informed by prior investigations into fishing and

⁸ <https://www.prima.org.pe/proyecto/educando-hoy-para-el-futuro-secundaria/>.

⁹ Mostly phosphate and potassium, miski mayo - <https://fospibay.com/wpagina/informacion-financiera/>.

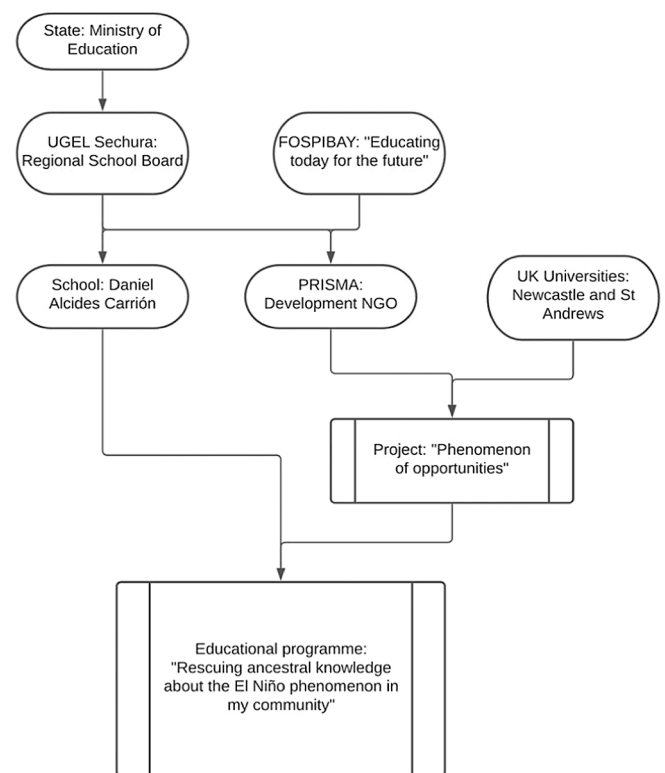


Fig. 2. The network relationships underpinning the RECUST educational programme.

farming in the area. Formal project objectives were based in participative methods focused on "rescuing" ancestral knowledge and improving students' oral expression competencies which had deteriorated because of the pandemic. By familiarising themselves with the locally lived experiences of El Niño through RECUST, children were able to engage with grounded perspectives of disaster and frameworks for resilience. RECUST, framed in a transformative light as "Phenomenon of Opportunities", employed storytelling and ethnographic methods to communicate local disaster narratives and challenge mainstream, catastrophic ones through intergenerational networks. Through the workshops and interviews they conducted with family members, students learned about thresholds at which so called hazards surpass 'normality' and become a danger, as well as mechanisms through which these can be made beneficial, outlined in the stories they created about their relatives' experiences. As they asked questions about El Niño experiences, parents discussed how extended periods of rainfall brought economic opportunities in the long-term, as fishing, agriculture and livestock activities thrived. The students made sense of these experiences, understanding the power of El Niño, as "[A]fter the phenomena, it is becoming a productive activity that is bringing much benefit to the community members in different sectors of the territory of the community of Sechura". Learning in this way from their elders, resilience was shaped as overcoming adversity for long-term transformation and stability. Instead of immediate risk management or mitigation, children learn from their elders about their community's reliance on El Niño rains as a resource for transformation, reiterating for example:

"My father works on a ranch where we harvest pumpkin, [chumuco], corn, watermelon, beans, sweet potato. We have to wait for the period of rain to sow, when the ranch gets wet, we take advantage of it."

The stories developed by the students recollected economic methods for reactivation after El Niño. In one video, for example, a student outlined:

“In 1983, we lost harvests of beans and corn, but it didn’t demotivate us. Afterwards, we recovered and used our shovels and made grooves. We started cleaning our fields to continue cultivation and used the tractor to produce our lands. I am thankful because that is where we take advantage of the water. Our land in Mala Vida is a wonder because from it we eat, and it also sustains our families to obtain economic income for the well-being of our family.”

Students learned about the economic activities through which El Niño’s resource abundance could be maximised. These included agricultural practices such as farming and harvesting, animal breeding, fishing, and selling practices. Therefore, rather than a return to the status quo, the storytelling approach illustrates Gaillard’s (2007) definition of openness and adaptability and is an example of incremental change at the margins (Gaillard, 2010).

The constitution of youth is central to Mala Vida’s localised framing of resilience. The dominant association of El Niño responses with economic activity, reflected in children being tasked with engaging in questions of agriculture, fishing, apiculture, animal husbandry etc., focuses on empowering children as future-adults capable of fulfilling economic duties successfully when they are of age. So, while students are acknowledged as competent development actors, their agency is largely seen in terms of their potential economic contributions in the long term to their community. As such, this aligns resilience with goals of long-term wellbeing and stability.

Interviews between children and adults were set up, with children following their parents in the field (Fig. 3) and bearing witness to economic activities as the next generation – an aspiring cohort of adult farmers, fishers, sellers. Students were tasked to ask background questions about occupation and time lived in Mala Vida, before inquiring “What was your lived experience of the El Niño phenomenon in 1983, 1998, 2017?”. The students then synthesised the data into stories of hope and positivity, which they then chose to frame with introductions

such as “I had the opportunity to interview my grandfather who is a farmer”. In this way, education and student development become a shared resource and matter of collective community concern. Seen in this light, they could be framed as responses to the call for more critical participatory development based in community engagement for social change (Kesby et al., 2005) or seen as examples of the type of critical co-production in development research sought by Vincent (2022) in the context of climate change pressures. Even so, a time-bound school project approach has limitations. It leaves out the ongoing process of learning and experience that shape the embodied realities of child identities (Skelton and Aitken, 2019). Such experiences include their potential in the present as risk communicators, as well as their capacity to carry out immediate action and provide broader social support in the event of disasters. There is therefore a tension in how to interpret what these changes mean in terms of agency and childhood subjectivities. The programme’s futuristic framing of resilience through economic productivity, disaster preparedness, and long-term household stability evokes a paradox of egalitarian politics of child inclusion while maintaining that they lack the skills and capacities to be effective political actors in the present (Staehele, 2019). The limited extent to which children were able to navigate their own experiences in RECUST potentially contributes to the static representation of the “global child”, which portrays youth as passive, naïve, and at the same time representing innocent hope. Ansell (2019:55) argues that such representations are especially attributed to rural children who are seen as the “ultimate passive child which survives rather than develops”. This demonstrates how the construction of children as future economic agents is deployed by state-informed (top-down) actors and echoed through local (bottom-up) actors seemingly working in concert. In this way, it could be argued that resilience as a globalising disaster and development discourse works through bottom-up activation. However as the final section illustrates this perspective is not the full story when seen in the wider context of how resilience is constituted through the



Fig. 3. Students in the videos they created, describing the agricultural landscape in the face of El Niño events. (Left: pumpkin, right: beans).

sustaining of community through intergenerational communication.

3.4. Resilience as community: situated individuals, stronger communities

RECUST instigated opportunities for students to carry out interviews and fieldwork with relatives and community members to produce stories around El Niño. In this way, intergenerational participation in the production of oral history became a didactic resource and a means of conserving collective memory. The storytelling task was explicitly framed with aged markers of 'identity' - 'students or 'children' were to engage with 'their parents', whose generational gap is implied by whether they have lived through and experienced El Niño event(s) or not. These interactive methods allowed both the children and their families to shape their sense of identity through relative categories of age (Vanderbeck, 2019). In doing so, the programme reflects a conceptualisation of age that is relationally produced (Hopkins and Pain, 2007). The independent production of stories gave children the space, both discursive and performative, to negotiate the definition of childhood among themselves and within their community. In this way, children were able to situate themselves within generational categories and their associated power hierarchies. By providing opportunities for new forms of intergenerational communication, the focus on collective histories moves some way towards deconstructing these power relations, challenging the binary of children versus adults through which economic obligations and citizenship are reproduced and enforced (Ansell, 2019). In addition, it prioritises collective over individual autonomy and in turn, highlights the context of dependence, care, and collective social organisation wherein capacities of being (speaking and acting) depend on networks (Aitken, 2019).

Reciprocal relations are crucial for long term stability and strengthening, which produce immediate benefits for community resilience (Aldrich and Meyer, 2015). As Skelton indicates, "separating children from inter-generational networks in the communities can have disastrous consequences. They are part of complex reciprocal relations that are invaluable at times of crisis or insecurity" (2007:174). Furthermore, in communicating their families' experiences of El Niño through an opportunistic framing, children's voices are acknowledged as meaningful because adults recognise that children have something to say, further cementing relational, generational community ties. RECUST thus channels the transformative potential of disasters for resilience through its use of participative narrative exchanges that reiterate the framing of resilience in the face of El Niño as one of community long-term stability.

The socialisation of children through a collective memory, built through intergenerational ties, produces individuals situated in the long-term continuation of communities. It is through oral transmission that RECUST overcomes the generational gap associated with El Niño to create community as a geographical imaginary, as the experiences gain continuity, becoming intergenerational and collective. Interviews show how this collective understanding becomes cemented as the residents of Mala Vida explicitly define themselves as "[their] community" when considering their shared experiences. This process is seen clearly in comments about prioritising resource production for subsistence. Adults interviewed by the children in oral histories deemed economic activities to be "important to the life of our community's members", pointing to their local consumption before being sold elsewhere, as reflected in a student's conceptualisation of "agriculture [as] something important for the inhabitants of this community because it provides to eat and also to sell the products". Furthermore, children's comments, such as "my dad is a rancher and I am very proud of it" followed by "breeding [herding] is very important to survive", indicate an appreciation of the collective maintenance of societal functioning and the emotive strengthening of inter-generational ties through pride in what the family does.

RECUST therefore reproduces a collective identity by legitimising the social ties which enact community through their use as a tool for and in knowledge transfer and production. The co-constitution of collective

identity and landscape is further demonstrated through phrases such as "my native land" and "my community's lagoons". Additionally, the videos the students produced were supported and engaged with by adults. Interviews with their parents informed the students' scripts. Informal comments caught both on camera and in recorded audio off camera, included whispered support and the correction of details where needed in outdoor settings. The teachers created a school website to promote and share the outputs produced by the students including their original videos and artwork. Later in a follow-on project¹⁰ this material also became the basis for a bi-lingual Spanish-English teaching resource on El Niño hosted by the Royal Geographical Society¹¹ (Healy et al., 2023). These mechanisms of social reproduction demonstrate the strength of community cohesion and return us to the argument of resilience as one of individual and community (local and global) responsibility. Furthermore, they illustrate how context mediates the embodiment of spatial and cultural landscape associated with wider expressions of climate change (Brace and Geoghegan, 2011).

4. Concluding thoughts

Children are particularly vulnerable to disasters and their exclusion from discussion and decision-making spaces only exacerbates potential damage and further invisibility. In Peru, such exclusion is prevalent and likely to be on-going in a governance context where institutions for DRM and education are mutually exclusive. In our analysis of RECUST, we have drawn attention to how, via the national curriculum and the actors involved with its implementation, children are framed within neoliberal conceptualisations of resilience. This is aligned with notions of "active citizenship", including in the context of the new emphasis on digital distance learning under COVID-19 and the "Aprendo en Casa" programme. With the devolution of DRM responsibility, children are cast as future economic agents – and adults in the making. On the other hand, the process of co-production in generating the research agenda and program of work, together with the varied curriculum outputs, revealed a complex web of intergenerational community relations which framed children as hope for a better tomorrow. The emergence of cultures of resilience are therefore shaped as long-term stability in the face of change.

Such findings contribute to scholarship which, rather than framing impacted individuals as vulnerable helpless victims, demonstrates how disasters can reveal their roles as active agents with capacities. Our analysis points to the understudied importance of children as actors with a voice and a story to tell in disaster education. Visually situating children in the adult spaces of daily economic productivity maps out how power hierarchies of age are negotiated through landscape, identity, space, and relationality (Punch et al., 2007). Importantly, this agenda engages with, and at the same time extends, the scale of educational spaces beyond classroom walls and into everyday landscapes (Holloway et al., 2010).

By complicating the integration of youth identities and community resilience, our analysis in this paper raises the question of how education should be used in DRM. The innovative integration of DRM into formal education spaces (Petal and Izadkhah, 2008) could perhaps be taken as a first step in establishing a normalised "culture of resilience" at all curricular levels (Ronan et al., 2016:51). However more research in other disaster settings that place importance on recognising the differentiated experience of constructing youth identities and agency would be required to address such a challenge. Our contribution to such a normative agenda would be to emphasise the importance of a relational approach to youth subjectivities in disaster education that is adaptable to the diverse social and cultural landscapes of disasters. As extreme

¹⁰ AH/V012215/1.

¹¹ <https://www.rgs.org/schools/teaching-resources/el-nino-phenomenon-of-opportunities/>.

weather events are exacerbated both in frequency and gravity by climate change and inequality, geographical research that takes seriously the possibilities presented by approaches to education for disasters based in co-production with children, their teachers, and wider communities of life is urgently needed.

5. Author statement

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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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