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Learning from COVID-19 First Responders' Experience in a Medical Humanitarian Emergency Response Organisation. A contribution to the conception of training environments for emergency preparedness and response in conditions of resource scarcity

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FACULTÉ DE PSYCHOLOGIE
ET DES SCIENCES DE L'ÉDUCATION

Learning from COVID-19 First Responders' Experience in a Medical Humanitarian Emergency Response Organisation

A contribution to the conception of training environments for emergency preparedness and response in conditions of resource scarcity.

Par Olivia Scannell

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RESUME

This dissertation, conducted within the theoretical course-of-action framework, examines the activity of front-line humanitarian responders of a medical INGO, during the first phase of the COVID-19 pandemic. By better understanding their experience, the study aimed to contribute to the design of training environments to prepare humanitarian actors for complex unpredictable challenges, inherent in emergency response. We analysed the way a medical manager, in a central African context, dealt with the intractable problem to meet his hospital's oxygen needs, considered emblematic of the first wave's unprecedented resource scarcity. The concept of unruly problems helped identify the temporal complexity he faced. From a prism of resilience engineering, we found that a negative capability allowed him to navigate and tolerate the uncertainty, enact his environment, and use temporary solutions to create situational opportunities, until an innovative technical solution was found. Avenues for training design are proposed, according to a notion of Emergency Preparedness II.

Déclaration sur l'honneur

Je déclare que les conditions de réalisation de ce travail de mémoire respectent la charte d'éthique et de déontologie de l'Université de Genève. Je suis bien l'auteur-e de ce texte et atteste que toute affirmation qu'il contient et qui n'est pas le fruit de ma réflexion personnelle est attribuée à sa source ; tout passage recopié d'une autre source est en outre placé entre guillemets.

Versonnex, 20 aout 2021

Olivia, SCANNELL

Personal interest and acknowledgements

Let me first give a brief overview of my personal interest in emergency response training. As a humanitarian worker, I have participated in emergency responses in Africa and the Middle East as well as supporting several others from Headquarters (HQ). As with many (or most) HQ staff my motivation is to support the current field personnel and enhance the quality of operations to help relieve unnecessary suffering. There is a never-ending ambition to achieve more and do it better. But I remember the intensity, the frustration, the blockages, the doubts and sometimes the fear. To counter that, there was the sense of responsibility, the feeling of being part of a team, working with competent colleagues who were willing to share their understanding of how things worked "locally" or their experiences from other missions, bonding over working sessions that would last well into the night or early starts as the sun rose. Yet there were always the pressure and tensions of work, that could last for days or weeks. It became an obvious career motivation for me to help others navigate more easily the ups and downs of humanitarian work.

I therefore work as a learning partner in the Learning and Development unit of Médecins Sans Frontières[1] (MSF), helping to develop a learning strategy and adapted learning solutions for HR and Finance field staff. MSF is first and foremost a medical operation; this research was a chance to contribute to and understand more deeply an important issue for the organisation: what is the nature of the challenges faced by MSF staff during emergency responses in the changing global context, and how do we better prepare and train our staff to respond to them? It was also a chance to connect directly with front-line medical responders, curious to understand their experiences, the meaning they attribute to the challenges encountered, resources perceived, their preoccupations and feelings. Their willingness to participate and spend time talking to me during busy and important schedules, as well as their eagerness to transfer their learning was inspirational and much appreciated. I am grateful for the encouragement from the Head of L&D, William Empson, for his support of innovation through research, which is a new and exciting departure for myself and a contribution to the unit's work. I also thank Iza Ciglenecki, MSF's Medical Research Coordinator who guided me through the intricacies of the MSF Ethical Review Board approval process.

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[1] Doctors without Borders in English, https://www.msf.org/

A second interest was as a student working with the UNIGE CRAFT[2] team. Through the challenging but inspiring interactions with the members of the team, and their infinite patience and generosity, I discovered a new horizon and approach – understanding an activity from the point of view of the person that enacts their environment, acting in situ, contextualised and temporally open ended. Not without several headaches and questions about my capability to achieve this memoire, I was supported by people whom I respect for their knowledge, culture, sensitivity and finesse to decorticate and advance conceptual understanding, coupled with a passion to apply it to real training environment design. The fact that three members of the CRAFT team committed to perform the research in which I participated, allowed me the chance to learn and profit both personally and for the MSF organisation. This dissertation is a small contribution to that research, and largely fashioned from the work, discussions and ideas from the team. My thanks then to Dr Simon Flandin, Professor Germain Poizat and Mrs Elleke Ketelaars, doctoral student, without whom I could not and would not have completed it. My thanks also to Dr Cecilia Mornata, who has previously accompanied me both professionally and in the seminar of preparation for the dissertation, for having agreed to bring her knowledge of MSF and her scientific rigour to the jury.

These acknowledgements would be incomplete without recognition and thanks to my family, who agreed to support me through the extended timeframe of my studies. There were many notable parallels of challenges in navigating through uncertainty and my need for improved negative capability during the dissertation process!

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[2] https://www.unige.ch/fapse/craft/

Sculpture "Negative Capability" by Alex Rane[3]

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[3] http://alexrane.com/negative-capability

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List of acronyms

Biomed	Bio-medical
COVID-19	Coronavirus Disease 2019
EPrep	Emergency Preparedness
HCP	Health Care Professional
INGO	International Non-Governmental Organisation
ICU	Intensive Care Unit
IPC	Infection Prevention and Control
MAM	Medical Activity Manager
MOH	Ministry of Health
MOU	Memorandum of Understanding
MSF	Médécins Sans Frontières, Doctors without Borders
NAM	Nursing Activity Manager
PC	Project Coordinator
PMR	Project Medical Referent
PPE	Personal Protective Equipment
SARS-CoV-2	Severe Acute Respiratory Syndrome Coronavirus 2
SOP	Standard Operating Procedure
UN	United Nations
UNHCR	The office of the United Nations High Commissioner for Refugees
WHO	World Health Organisation

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On 30 January 2021, the day after the Director General returned from a visit to China, the WHO[4] declared the novel coronavirus Severe Acute Respiratory Syndrome Coronavirus 2 (SARS COV-2), that causes the disease known as COVID-19, to be a public health emergency of international concern. This is the WHO's highest level of alarm. At that time, there were 170 deaths reported in Wuhan China and 98 cases and no deaths in 18 other countries. In only 8 cases from 4 countries was there evidence of human-to-human transmission.
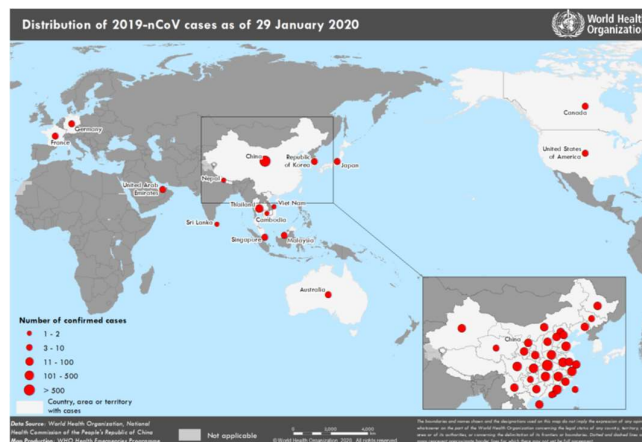
By the 31st March 2020, the WHO reported global cases of 750,890 and 36,405 deaths, of which 9 percent had occurred in the last 24 hours. The rapid global reach was evidenced by the number of countries with confirmed cases that rose from 4 to 196 (all except 2) in the first 2 months. It is now recognised as a once in a generation pandemic. The uniqueness of the global events provided researchers with an opportunity to study the experiences of responders from a variety of approaches, theoretical frameworks and with different objectives.
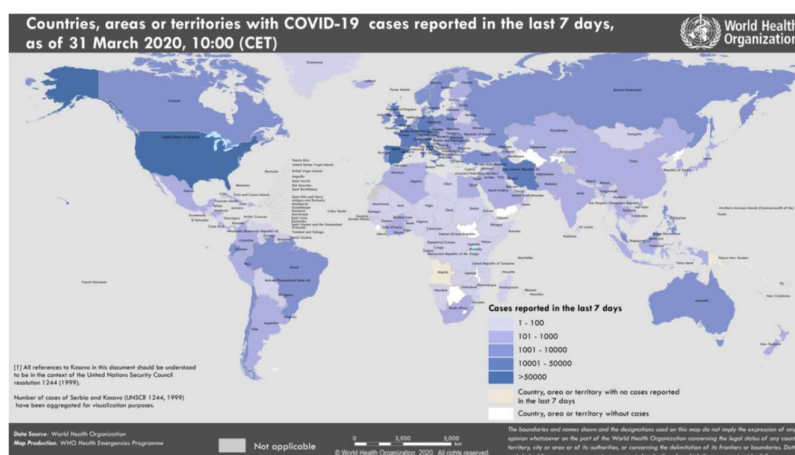
Most initial research (and media headlines) focussed on high income countries that struggled to meet the surge in patients, despite robust and existing well-resourced health systems. At the same time, humanitarian sector actors braced themselves to meet the needs of vulnerable people already affected by natural disasters, conflict and forced displacement. They knew, that with little existing access to

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[4] Situation reports from World Health Organisation, https://www.who.int/

nutrition, clean water and health care services, the pandemic could ravage entire populations. The combination of an unpredictable infection trajectory, no proven diagnostic, prevention or treatment protocols, competing global demands on medical response resources and geographical impact both at field mission and management centre levels, provided a singular test to a sector used to managing in challenging and insecure environments.

Humanitarian workers are first and foremost professionals in their technical domain - doctors, nurses, public health experts, nutritionists, logisticians etc. Humanitarianism is not a "profession" and rare are the academic opportunities to prepare for a career in this field[5]. Recruitment criteria depend on professional diplomas backed up by relevant professional experience, with a screening based on transversal competencies such as behavioural flexibility, stress management, cultural awareness, initiative, analytical thinking etc. A further criterion is a demonstrable commitment to humanitarian principles, which becomes a more important filter with increasing responsibility in the functional hierarchy, i.e. evidence of a commitment to provide relief to suffering populations based on the humanitarian principles of humanity, neutrality, impartiality and independence, first proclaimed by the Red Cross in Vienna 1965 (ICRC, 1986).

Each humanitarian context is unique and whilst policies, protocols and standards[6] exist for natural, manmade and complex emergencies[7], the combination of circumstances with which a humanitarian actor is faced will inevitably provide unique dilemmas that s/he will need to navigate in each mission. Humanitarian actors work in volatile contexts. A planned operation that is appropriately dimensioned and resourced may tip from a regular response to an emergency at short notice. How then can humanitarian actors prepare for such complex and unpredictable challenges?

First phase COVID-19 research highlights lessons learned and makes recommendations in two key spheres: firstly in the technical medical domain which is out of the scope of this memoire, covering diagnosis, infection prevention and control, patient care and clinical treatment; and secondly in response management at individual, local structure, community, organisational, and systemic levels. Many of the findings and recommendations strengthen our understanding for response to a similar

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[5] Notable exceptions are
the Humanitarian Leadership Academy https://www.humanitarianleadershipacademy.org/,
CERAH- https://humanitarianstudies.ch/, BioForce - https://www.bioforce.org/en/

[6] E.g. Sphere Standards - https://spherestandards.org/
[7] See Annex 3 for a brief explanation of the different types of humanitarian emergency

pandemic event, but if the unprecedented nature of COVID-19 was a significant test for front-line actors, what can be learned to prepare people to manage future unforeseen unique events.

Few papers (at the time of writing) adopt a prism of training in their analysis (Bar-On et al., 2021; Blanchet et al., 2020; McGlinchey et al., 2021; Tan et al., 2020) and there is little emphasis on deriving new training design orientations in the COVID-19 literature. The COVID-19 pandemic provided an opportunity to document the first-person experience of humanitarian health care professionals, with the aim of contributing to general principles to prepare and train individual actors for new and uncertain emergency response contexts to improve their performance and their wellbeing. It was a chance to explore the way actors identified, demarcated and navigated the challenges they faced. How did they recognise the emergence of problems and (re)adapt as the impacts of their own activity became clear? What strategies did they use to explore, as well as dealing with the challenges they faced? These questions seem pertinent to inform emergency training.

This dissertation is set in the context of a master's degree in educational science. It is underpinned by the theoretical Course-of-Action framework (Theureau, 2006, 2010) and focuses on how front-line humanitarian actors in a medical INGO apprehended and coped with a generalised and accentuated case of resource scarcity during the COVID-19 pandemic response. To reduce the analysis to a manageable size, it focuses on one case study from the large data corpus but occasionally invokes other participants' experiences where useful for clarification or where representative of a wider finding in relation to the research questions. The document is structured in the following way:

Chapter 1: Literature-informed conceptual background

Looking at existing COVID 19 research, we highlight the general characteristics of the pandemic that constrained the front-line responders' work. The chapter then notes challenges and coping strategies identified in the literature, without pre-figuring the problems that would be identified by the actors themselves in the results section. A final section exposes the (limited) recommendations regarding training.

Chapter 2: Problematisation and research questions

The problematisation identifies the issue of resource scarcity as a constraint unique in its manifestation during the COVID 19 pandemic. This chapter highlights the relevance of resilience training to prepare front-line humanitarian responders. Looking at emergency preparedness through a prism of the Safety I and II model (Hollnagel, 2006, 2017; Hollnagel, Wears, & Braithwaite, 2015) and enacted sensemaking (Weick, 1988). The pertinence to

analyse the lived experience of front-line humanitarian actors leads to the research questions in relation to training.

Chapter 3: Theoretical framework

We present the main premises of enaction and experience, underpinning the theoretical foundation and empirical methodology of the Course-of Action framework (Theureau, 2006, 2010).

Chapter 4: Methodology

This chapter resumes how this dissertation is situated within a wider research framework (ROTSCO project, MSF-CRAFT training research partnership), the missions chosen and the participation criteria. It explains the participants role profiles, the data collection and treatment methodologies, the analytical process and the choice to delimit the results to a manageable scope in this dissertation.

Chapter 5: Results and empirical analysis

The results are presented as a monography of *The Oxygen Problem* as experienced by the Project Medical Referent (PMR) in the Cameroon mission. The case was highlighted by the research team as emblematic of the predicaments faced due to resource scarcity, over the period of the first wave of the COVID-19 response.

Chapter 6: Discussion

The discussion proposes an analysis of the characteristics of the problems encountered by the PMR through the concept of Unruly Problems (Ansell & Bartenberger, 2016; Ansell & Boin, 2019), identified as a pertinent categorisation during the analysis phase. After looking at the positive strategies used to navigate the Oxygen Problem, it then identifies that a further, negative capability (French, 2001; Simpson, French, & Harvey, 2002) was instrumental in navigating the unruly problem encountered during the case study.

Chapter 7: Implications for training

This chapter proposes a discussion on the conception of Emergency Preparedness II as a training paradigm for humanitarian organisations; design principles to encourage the ability to deal with unruly problems using a negative capability; considerations for implementation; limits of the study and perspectives for future research.

A final consideration - humanitarian work is by nature a multi-cultural and multi-lingual domain. Whilst this dissertation is written in English, it is founded on notions developed in a francophone research framework with both francophone and anglophone participants. Consequently, we take the liberty to include some French quotations where English equivalents were not found, or when deemed necessary to remain true to the orginal author or actor's expression.

1. Literature-informed conceptual background

A choice was made to concentrate a review on published COVID-19 research to inform the system of challenges and constraints surrounding the frontline COVID-19 responders' work. Technical medical research papers were discarded from the outset for three main reasons – firstly the nature of the work experiences recounted by the participants did not directly relate to specific medical procedures or protocols, secondly the research question seeks to generalise training principles to prepare professionals for unexpected emergency contexts, rather than improved technical competency development and thirdly, the research team had no medical competencies or ambition to make a contribution in this area.

It was not feasible to cover the entirety of the wide-ranging COVID-19 research results. The focus of the review findings presented below was oriented by the overarching research objective, and refined based on emerging themes during the interim analysis. The first section covers characteristics that describe the exceptional nature of the COVID-19 pandemic. The lack of resources was highlighted as a defining feature that posed various challenges for the actors, which are treated in more detail in the second section. The review then searched for actors' "coping" strategies before finally looking at some limited findings and recommendations in relation to training. The aim of this research is to contribute to training conception to prepare individuals or collectives for emergency response, rather than improvement to work environment, organisational structure or practices.

1.1   Characteristics of the COVID-19 pandemic

Sasangohar, Moats, Mehta and Peres (2020) highlight that the "challenges during the pandemic response and recovery are significantly different than with other kinds of disasters". They esteemed

that the context created "a sociotechnical DM system with complex organizational work subsystems and various human and technological components." (p. 1062). In this section we cover some of the key characteristics of the pandemic that combined in a unique way to constrain the front-line responders' activity on multi-dimensional levels.

Global impact

Sasangohar et al. (2020) note that "pandemics by definition are widespread, typically involving multiple countries or continents (if not global, as in the case of COVID-19), necessitating large-scale logistics needs" (p. 1062). The combination of high transmissibility, uncertain infection fatality rate[8] and modern interconnected travel routes meant that the scale of the COVID-19 pandemic was greater than previous disasters (pandemic or otherwise) in the lived experience of the active front-line responder population.

Timeframe

Some countries were severely affected by the first wave of COVID-19 whilst others seemed to have "dodged a bullet" in the words of one MSF Head of Mission[9]. The impact on front-line responders was nonetheless over a long timeframe and very intense, "in a pandemic the timeline of the "event" is remarkably extended from mere days to months as in the case of COVID-19 (such as working 12–18 hr shifts for extended days; Nuamah & Mehta, 2020; Rao et al., 2020)" (Sasangohar et al., 2020, p. 1062).

Dynamic scope – uncertain evolution

The rapid onset of the pandemic and different regional evolution meant high uncertainty about the anticipated case load, and made preparations difficult, requiring dynamic adjustments. Bar-On et al. (2021) reported that whilst Sheba Medical Centre, Israel's largest medical centre, prepared for "a small number of patients from the Diamond Princess ship patients, we rapidly found ourselves in an extremely dynamic scenario with a changing caseload both in the number and severity of patients" (p. 5).

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[8] Infection Fatality Rate estimated at 0.5-1% in Europe (Okell et al., 2020)
[9] Conversation with Ukraine Head of Mission, 21.05.20.

Novelty

At the start of the pandemic, the nature of the respiratory infection was unknown, without clear testing and treatment protocols. Bar-On et al. (2021) report that "The novel nature of the contagious virus challenged operational planning (medical, organisational, logistical, surge capacity)" (p.5).

Expected severe impact on vulnerable populations

The experience of Ebola virus outbreaks provided certain resources in fragile African contexts that could be leveraged to deal with the threat of COVID-19. Ayebare et al. (2020) noted that countries in Eastern and Central Africa had made significant investment in infection surveillance, infection prevention and control (IPC), clinical case management of and therapeutic research into Ebola. These included risk communication platforms, community outreach networks, sample collection and international referral diagnostic testing systems and PPE logistics to protect health structure supplies from public panic buying. They also highlighted that "hospital-based clinical case management teams that have received training in care for critically ill patients are a resource to leverage to bridge the gap for COVID-19" (p.3).

Lessons were highlighted after the 2014 Ebola outbreak in Liberia by Chertow, Kleine, Edwards, Scaini, Guiliani & Sprecher (2014) warning of "resistance by infected people to voluntary admission will persist unless the treatment facilities are seen as a place to go for treatment and recovery and not as a place to die isolated from loved ones and the community" (p.3). Regarding the same concern Human Rights Watch[10] (2020) recommended "involving locally respected individuals and institutions and communicating in local languages to explain the disease, its prevention, and the response efforts should be central when seeking to contain viruses as contagious and dangerous as Ebola or Covid-19".

Several authors point out that the virus's impact on people affected by humanitarian crises could potentially be even more severe and treatment services more challenging than for those in high income countries (Dahab M et al., 2020; Garry et al., 2020).

Dahab et al. (2020, p. 1) identify three mechanisms to back up their expectations at the time of writing

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[10] https://www.hrw.org/

(i) higher transmissibility due to larger household sizes, intense social mixing between the young and elderly, overcrowding in urban slums and displaced people's camps, inadequate water and sanitation, and specific cultural and faith practices [..]; (ii) higher infection-to-case ratios and progression to severe disease due to the virus' interaction with highly prevalent co-morbidities, NCDs[11], [..] undernutrition, tuberculosis[7] and HIV; and (iii) higher case-fatality due to a dire lack of intensive care capacity, especially outside large cities. Moreover, extreme pressure on curative health services could result in indirect impacts resulting from disrupted care for health problems other than COVID-19 (p. 1).[8]

Garry et al. (2020) point out the issue of fragile supply chains, "COVID-19 treatment services may prove particularly challenging in settings with low baseline healthcare capacity, fragile supply chains and limited access to testing." (p. 1).

Resource scarcity

In August 2020, Garry et al., considered that resource scarcity would be particularly problematic for crisis affected populations (forcibly displaced, affected by conflict, facing exceptional food insecurity and/or natural disasters), "Delivering COVID-19 treatment services in crisis settings will likely entail complex trade-offs between offering services of clinical benefit and minimising risks of nosocomial infection, while allocating resources appropriately and safeguarding other essential services."

Resource scarcity provided a prism to assess the emerging dilemmas faced by the actors and how they apprehended and dealt with it, and hence it is treated in more detail in the next section.

1.2   Challenges due to resource scarcity

The theme of resource scarcity became an overarching global singularity of the first phase of the COVID-19 pandemic. It was noted in much of the published research (Kearns, 20201122; Khot, 2020; Khoury, Azar, & Hitti, 2020; Mason, 2020; Vincent & Creteur, 2020). We propose to distinguish three types of resource scarcity[12] that affected the COVID-19 response: physical supplies, human resources

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[11] Non Communicable Diseases

[12] By resource scarcity we imply situations where the resources are limited and insufficient to permit normal functioning according to established prescriptions or norms.

and virtual resources (flows of reliable information, policies, protocols etc.). The first two were caused by the global disruption of supply chains due to international and local border closures: intermittent stock and equipment shortages over extended periods such as bio-medical equipment, medical consumables, PPE, testing capacity, general supplies…) and human resources (competencies, number of health care professionals (HPCs), reduced mobility, sickness and death). The third virtual resource scarcity was in large part due to the novel nature of the virus. The dynamic nature of the knowledge base (diagnostics, treatment protocols, IPC) led to rapidly changing information for front-line responders. They faced contradictions between guidance from different reference organisations (e.g. WHO versus local governmental Health Ministries) or contrary to professionals' clinical experience. This section will look at the problems linked to resource scarcity identified in recent research.

Recognition of the "tipping point" of resource scarcity

The decision of how to allocate resources stems from the situation of resource scarcity described above. At the start of the pandemic, Angus Dawson et al. (2020) anticipated the ethical dilemmas posed to front line medical staff by creating a decision-making guidance framework, made publicly available on April 3rd, 2020 in Australia. They recognised that "Much will be left to expert judgement in response to different circumstances as they arise" (p.1). The aim was to structure relevant questions and answers (who should decide, how to decide, which patients to prioritise and based on what criteria, should the pandemic response take priority over non-COVID-19 individual patient needs, should the standard of care change?) to provide practical guidance. The main principles are defined as *equal value to all, getting the most out of resources* and *giving priority to those in need*.

This approach aimed to help the professional to investigate the context and to recognise what they define as ""tipping point" where decisions are no longer made under the conditions of normal care because there is a requirement to implement "best value" use of the relevant resource due to that scarcity" (Dawson et al., 2020, p. 4). The notion of a "primary obligation" to gain of "best value" from expending resources is controversial to clinicians, and indeed Dawson et al.(2020) highlight that adjusting to this mode of functioning too early, when the scarcity might only be temporary, potentially compromises patient care. The definition of "best value" must be contextualised, but advice was to decide collectively and openly communicate the decision-making criteria to avoid pressure on an individual practitioner or the need to defend specific decisions. Recognition of the tipping point is therefore important, and "should be reviewed constantly as resource levels fluctuate" (p.4), along with an assessment of projected delivery probability.

Pandemic response versus safeguarding essential medical services

Whether to prioritise the COVID-19 response or the existing medical services is a dilemma mentioned across different studies in different contexts with varying prioritisation given. According to Sasangohar, Moats, Mehta and Peres (2020) emergency response and management faced unique sociotechnical challenges during the pandemic, noting a change in the traditional role of Disaster Management (DM): "In a pandemic, the role of the DM is still to respond, but the goal of the response is to minimize and prevent further spread of the contagion, which requires different coordination activities from traditional responses." (p. 1062). This view is that the containment and response to the pandemic must take priority over other essential health services, in order to prevent overwhelming the overall health system.

Bar-On et al. (2021) emphasise the need to preserve existing health care capacity during the pandemic response. "The primary goal of a medical facility in routine times is to provide optimal care to patients. In the contagious outbreak setting, additional goals of preventing the spread of disease and staff protection gain utmost importance [... and] preserving continuity of care to patients with non-COVID" (p. 5). Indeed, Karl Blanchet et al. (2020) highlight that in low and middle-income countries "An important concern for actors then is that decline in supply and demand for non-COVID-19 essential routine health services may exacerbate the general health situation and lead to excess mortality beyond what is directly attributed to the pandemic" (p. 2). As an example, modelling research by Walker et al. (2015) from the Ebola epidemic of 2014-5 in West Africa highlighted the indirect impact on morbidity due to untreated malaria cases showing that excess mortality superseded Ebola deaths. Indeed, MSF's internal COVID-19 update on 07/04/20 illustrated this fear, reporting that the Chadian authorities decided to postpone a measles vaccination targeting 24 districts and 800 000 children due to the COVID-19 situation, despite around a thousand measles cases being detected in Goundi.

Prioritisation of healthcare objectives

Garry et al. (2020) highlighted a similar concern to support healthcare professionals prioritise between essential routine services when allocating scarce resources.

> While the World Health Organization (WHO) has published clinical management guidelines and ethical guidance for supporting decision-making in outbreaks, we focus here on supporting decision-makers in balancing resource allocation across the spectrum of population healthcare needs until vaccination is widely locally available. (p. 2)

They emphasised healthcare decision making dilemmas: individual versus population, individual versus overall health system, health intervention design efficacy versus community acceptability, mitigation of direct versus indirect morbidity and mortality, prevention versus treatment. They propose the following decision-making considerations:

> allocation of resources to COVID-19 treatment services and the design of clinical services should be based on community preferences, likely opportunity costs, and a clearly articulated package of care across different health system levels. Moreover, appropriate service planning requires information on the expected COVID-19 burden and the resilience of the health system. (Garry et al., 2020, p. 1)

A primary medical principle derived from the Hippocratic oath is *primum non nocere* or "Do no harm". Accordingly, when planning a health care intervention, a scope is defined based on the resource availability and expertise within the structure. Gary et al. (2020) render visible the dilemma via a principle of *beneficence*.

> Care offered, particularly outside the home and in settings where patients are separated from their families, should offer an evidence-based clinical benefit where available (including documented, publicly-available clinical experience) to the type of patient for whom it is intended – for example, critical cases, severe but non-critical cases, or non-severe with known risk factors. Accordingly, COVID-19 inpatient facilities should admit patients whose severity profile they are equipped to mitigate, which will depend on resource availability and expertise / experience. (p.2)

When considering a fundamental humanitarian aid principle that *human suffering must be addressed wherever it is found, with particular attention to the most vulnerable,* a tension is created for humanitarian actors. For example, in the hospital, confronted with cases for which they are not equipped to deal, and knowing that the overall health system does not have the resources to treat the vulnerable, what should frontline carers do? We shall see this in the case study below.

Resource allocation dilemmas

Ethical dilemmas arising from the need to prioritise access to Intensive Care Unit (ICU) treatment in the case of acute shortages were highlighted by Vincent & Creteur (2020), recommending the development of clear triage rules, reserving lifesaving equipment for those most likely to benefit.

Many patients with COVID-19 require some form of respiratory support and often have prolonged ICU stays, which results in a critical shortage of ICU beds. It is therefore not always physically possible to treat all the patients who require intensive care, raising major ethical dilemmas related to which patients should benefit from the limited resources and which should not (p. 1).

Rational decision-making guidelines for resource allocation are proposed in certain papers. Blanchet et al. (2020) make the case for

a rational approach to public sector health spending and decision making during and in the early recovery phase of the COVID-19 pandemic. Based on ethics and equity principles, it is crucial to ensure that patients not infected by COVID-19 continue to get access to healthcare and that the services they need continue to be resourced. (p. 1)

Another example is for Personal Protective Equipment (PPE) which emphasised the dilemma of rationing limited resources wisely. PPE stock conservation in the context of a global supply shortage, whilst maintaining adequate protection levels was a generalised preoccupation. Apart from stock availability, responders' decisions to ration PPE usage were based on evolving IPC policy, increasing knowledge of the viral spread mechanisms, investigation into staff exposure events, risk assessments based on type and length of staff activity and exposure to patients. (Bar-On et al., 2021, p. 4; Garry et al., 2020). Indeed healthcare providers even resorted making public pleas (for example via social media) to reduce pressure and secure adequate supplies of PPE (Ranney, Griffeth, & Jha, 2020).

Lack of health structure capacity

The increase in volume of ICU patients, and the need to separate infected and non-infected patients, meant that it was common need to increase COVID ward and ICU capacity, including expanding physical space. For example in Sheba Medical Center, Tel Hashomer, Israel: "Later in the process, SMC expanded its capabilities by adapting multiple structures and wards to serve as designated COVID-19 facilities. These included converting an underground emergency facility (which usually serves as a parking lot) into an 80 bed ICU" (Bar-On et al., 2021, p. 5).

Impact of resource scarcity on mental health

Emily Glinchey et al. (2021) examined the lived experiences of ten HCPs working in the first COVID-19 wave in Northern Ireland, using a phenomenological analysis aimed at understanding the effect on their mental health. They identified 3 themes:

> Theme one centred on specific challenges of HCPs working during the pandemic, such as redeployment, isolation from loved ones, infection concerns, lack of PPE and impact on patient interpersonal care. Theme two offered insights into the mental health and wellbeing of HCPs, while many experienced feelings of fear, sadness and hypervigilance, all also demonstrated a marked resilience. Finally, many felt undervalued and misunderstood, and wished to press upon the general public the seriousness of the disease. (p. 1)

McGlinchey et al. (2021) highlighted the ongoing impact on physical health of rationing PPE. The HPCs (nurses, doctors, ambulance, mental health, mid-wives and social care workers) "expressed that they often had to take each week as it came, with some not knowing whether they would have enough PPE resources for the week ahead" (p.7). They expressed guilt around PPE usage, but pointed out that action to avoid PPE wastage sometimes meant a compromise to the protection of their own health. For example, nurses were able to take 1 hour of break in a 12-hour shift, ideally twice times 30 minutes. Given the lengthy PPE donning and doffing procedure, they reduced this to once break of 60 minutes, leaving them prone to dehydration, fatigue and headaches. As one participant said: "it's very hard to tolerate" (p.8).

Physical exhaustion of PPE and long working hours, as well as redeployment away from their existing working teams and relationships, along with the uncertainty due to a lack of stable and trustworthy information also impacted on mental health. HPCs expressed confusion over "mixed messages" from the UK government and management regarding PPE, social distancing and impact on daily life logistics. "Such confusion created feelings of uncertainty and anxiety, as well as frustration as 'everybody needs to be taking a similar approach'" (McGlinchey et al., 2021, p. 7)

1.3   Coping strategies

Two aspects were construed when looking for actors' "coping" strategies. Whilst coping implies a reactive ability to deal with arising issues, a second dimension is the ability to appraise, project ahead and proactively mitigate the challenges and their impact. The intention is not to analyse according to these dimensions or to discuss conceptually the notion of coping, widely used in the literature, but to

indicate that both facets were of interest to us when we looked at what made a successful coping strategy.

Continuous reassessment

According to Bar-On et al. (2021), the dynamic nature of the infection led to a need for constant reassessment during the period that resource capability was exceeded.

> However, once the patient with COVID-19 load exceeded the capabilities of the designated facility with the need for surge capacity, we had to change this strategy with continuous assessment necessary to find the correct balance between COVID-19 and non-COVID-19 zones and adjust the separation policy accordingly. (p. 5)

Adaptation and improvisation

Sasangohar et al. (2020) classify the widespread and highly contagious nature as a "once in a generation" pandemic and highlight that US disaster management agencies were established by people without lived experience of such a scenario, resulting in a significant gap in systems and guidelines. They note that "in the absence of mental models for professionals to leverage for addressing the challenges imposed by this virus outbreak, a significantly increased demand for adaptation and/or expert improvisation is necessary where traditional responders must perform in non-traditional roles." (p. 1062-1063).

Bar-On et al. (2021) noted need for agility to "provide rapid solutions to arising problems through collaboration between medical, organisational and logistical divisions with orchestration by hospital leadership" (p. 5) as a key success factor for the set-up phase.

Innovation

Closely linked to adaptation and improvisation, we noted the importance of innovation in the COVID-19 response.

> Innovation in health care is itself difficult, balancing the competing concerns for patient and operator safety, infection control, resource conservation and cost. The current pandemic has exacerbated these restrictions, but ironically made it all the more urgent that efficient and

innovative solutions are sought out to address surging patient loads and high infectivity. (Tan et al., 2020, p. 2)

An example was seen in the account from front line responders in the Sheba Medical Center, Israel, where the requirement to minimise the risk of contagion through contact between patients and caregivers led to the rapid expansion of nascent multimodal telemedicine solutions (Bar-On et al., 2021).

1.4 Training

At the time of preparing this dissertation there were limited specific references to training based on the Covid-19 pandemic, we would expect further publications to follow. We therefore note specific references to challenges and learning during the first wave, where we found them, recognising this is not a comprehensive list.

Nelson, Hubbard & Norman (2021) note that training was seen as a protective factor by nurses which improved their feelings of being valued and safe. "Protective factors in the Wuhan studies were the role of nurse leadership in proactive, supportive interventions (Zhang et al., 2020), ensuring disaster training (Liu et al., 2020; Tan et al., 2020), and the expectations for securing PPE, training in its appropriate use, and reduction of the isolating experience of wearing full PPE or masks" (p. 132).

Bar-On et al. (2021) remark the rapid implementation of technical innovation posed challenges related to competency acquisition in the Sheba Medical Centre, Israel:

> However, putting our telemedicine programmes into practice on a short notice was challenging. Some of the technologies used were previously unfamiliar to the staff and an additional difficulty was the need to instruct patients on initial use of the devices remotely. These problems were resolved by designating staff from the telemedicine department as integral team members of the centre for disaster medicine team (p. 4).

In a similar vein, the dynamic evolution of protocols posed challenges for responders regarding of acquisition of knowledge. Bar-On et al. (2021) point to the rapid update and communication of standard operating procedures, placing the importance on frequent and regular briefings. They remark a culture of on the job learning, despite the intensity of the outbreak:

Due to the dynamic nature of the outbreak, the learning curve and influx of information regarding treatment and the changing needs and availability of diagnostic tests and PPE, we initiated constant on the job learning processes and, consequently, changes in SOPs and directives, communicating them to the staff by frequent briefings. (p.5)

Whilst not directly related to training, Garry et al. (2020) also highlight the need for communication of projected patient needs and health system capacity, a dynamic monitoring, "appropriate service planning requires information on the expected COVID-19 burden and the resilience of the health system". We can see in other research that the dynamic nature of standards, protocols, forecasted patient numbers and state of the healthcare system posed challenges for the actors to plan, but also in their confidence in the information available.

2. Problematisation and research questions

There were limited findings in the COVID-19 literature regarding training. Few publications mentioned what training was conducted during the first avec of the pandemic with the exception of IPC and community Information and Education (IEC) (Bar-On et al., 2021; Khoury et al., 2020; Nelson et al., 2021). At the time of writing we did not find any extension of the results towards improvement of training conception and design. This illustrated that when improvements were recommended, they were rarely formulated with a training perspective in mind, which is the focus of this dissertation.

There is also very little qualitative scientific research on the real work activity[13] of humanitarian actors during first phase emergency response. In INGOs, as in other organisations that have faced a crisis, it is common practice following an emergency to perform a response evaluation, which includes a lesson learned exercise. Attention is largely focussed on the identification of failings – i.e. in what way the response was deficient, understanding the causes and ideally putting in place recommendations to mitigate the risk of future occurrences. The accent is on how to improve or reorganise work systems, adjusting guidelines, procedures and task instructions to the same or similar failings. Whilst this

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[13] We use the term activity in the sense used in French scientific literature as "what people do when they are engaged in a job task" (Filliettaz, Billett, Bourgeois, Durand, & Poizat, 2015, p. 25). All that an actor does and experiences in complex real work, not the breakdown into elementary processes in work prescriptions.

describes a largely reactive model to past adverse events, it is also linked with a forward-looking risk analysis for future analogous situations. What such exercises cannot do however, is to adequately prepare for unknown, unthought of, unpredictable and/or novel predicaments.

This study and problematisation is inspired by research, using the course-of-action framework perspective, to foster resilience in organisations through training in the domain of safety concerned organisations (Flandin, Poizat, & Durand, 2018; Flandin, Poizat, Durand, & CRAFT, 2017; Flandin, Salini, Drakos, & Poizat, 2020). We therefore took an approach to identify what human factors contributed to the resilient management of an emergency response.

> Resilience is an expression of how people, alone or together, cope with everyday situations – large and small – by adjusting their performance to the conditions. An organisation's performance is resilient if it can function as required under expected and unexpected conditions alike (changes/disturbances/opportunities). (Hollnagel, 2017, p. 14)

According to Hollnagel (2017), resilience requires "an ability to adjust performance to the conditions, an ability to respond to changes, disturbances and opportunities, and an ability to do so in a flexible and timely manner" (p. 26). Inspired by Safety I & II paradigms (Hollnagel 2014, 2015, 2017) we will first look these notions for increasing resilience in safety-concerned organisations before presenting our understanding of their relevance to the domain of humanitarian emergency response organisations.

Safety I

The Safety I approach assumes work can be described by separate processes and prescribed based on a model where each component is bimodal – either it works or doesn't work. Safety management therefore relies on ensuring as few things as possible go wrong. (Hollnagel et al., 2015). It assumes that adverse outcomes can be eliminated through identifying the causes of failures and implementing mitigation actions (put up barriers) to prevent the components failing (technology, systems, procedures, human error), until an acceptably low risk of negative incident occurrence is achieved. The key questions are "what went wrong?" and "how do we reduce the likelihood of them happening again and/or reduce their impact?"

Hollnagel criticism of the Safety 1 approach (2015; 2017), is that is does not consider complex couplings which lead to a natural variability of work, or that multiple coupled "acceptable variations" can combine to produce an unpredicted adverse outcome. With increasing success (lack of adverse

events) then there is less to monitor, and visibility of how to improve safety diminishes. The safety 1 paradigm is typically linked to a curricular training approach that progressively imparts knowledge and skills for known crises based on increasing difficulty. It is unlikely then, to be entirely successful to prepare actors for novel, unpredictable or uncertain emergency scenarios.

> Les recherches montrent que l'approche curriculaire du risque, qui consiste à concevoir des formations à partir de la connaissance des crises passées et des crises anticipables, échoue à préparer les formés à intervenir efficacement dans des situations imprédictibles, qui paradoxalement caractérisent les milieux à risque. (Hollnagel, 2014, in Flandin, Poizat, Durand, 2017).

Safety II

The Safety II approach assumes work situations cannot be described precisely, due to a natural variability, intractability, and complexity – with complex interactions and couplings that cannot be separated into individual components. The paradigm focuses on identification of the positive means by which safety is ensured in most cases. Key questions are "What goes right in normal variable work situations? How can we ensure it goes right even in difficult complex situations that are "difficult or impossible to monitor and control?" Such situations "emerge" from transient phenomena (specific circumstances that could not be predicted but combine in a way to impact the outcome). The causes may be "impossible to eliminate or contain in the usual manner, but it may still be possible to control the conditions that brought them into existence, provided we understand how work normally is done" (Hollnagel et al., 2015, p. 26).

In a Safety II approach, the human actor is not seen as a key fallible element that deviates from an idealised standard performance. Rather, an actor anticipates and makes constant necessary adjustments to promote a high probability of a positive outcome in the variable conditions in which they operate. These variations may be small, not defined in any prescription and result in adjustments that are sometimes transparent, even to the actor themselves. Hollnagel (2009), identifies four aspects that the human actor brings to resilience:

> (1) monitoring or exploring the system's function and performance, (2) responding or reacting to events or conditions, (3) anticipating or foreseeing future events and conditions, and (4) learning or reorganizing system knowledge […] Together these provide a description of resilience in the context of human-scale complex, adaptive systems. (Fairbanks et al., 2014, p. 378)

As an example, Carayon *et al*. (2014) describe how healthcare workers use strategies that include work-arounds and safety violations, to either adapt their behaviour to achieve their objectives, or actively adapt an ill-fitting work system.

Application of the Safety I & II model to emergency preparedness

> "Resilience is about how organisations perform, not just about how they remain safe." (Hollnagel, 2017, p. 15)

Hollnagel's broader definition of resilience seems as applicable to humanitarian actors and organisations as to that of safety-concerned ones; (although elements of insecurity are also, unfortunately, all too present in humanitarian response contexts). Humanitarian organisations work with a model of Emergency Preparedness (EPrep), looking both at organisational preparedness (systems, policies, procedures, resources, e.g. prepositioned stocks) and preparing their human resources (recruitment, development and training of staff and partners). They determine a level of typicity of emergencies that can be "planned and prepared for" on an individual, team and organisational level. As such, looking from the perspective of the Safety I and II notions, then INGOs mainly use the Safety 1 approach to Emergency Preparedness. Knowledge management systems and training are based on lessons learned and ensure sharing of best practices and updated procedures and protocols.

There remains the question of how to prepare people for an atypical emergency response or unpredictable situations arising during a typical response, since we subscribe to the view that real contexts will always differ from prior or imagined responses? We can cite some notable prior examples that took humanitarians off guard based on the scale (e.g. Tsunami), context (Balkan war), negotiating safe access with non-traditional warring elements (Islamic State) or epidemics (Ebola). The premise developed in the FOResilience project is that a complementary non-curricular training approach can be developed based on the Safety II paradigm, focussing on what to encourage in human "operator" reactions to the natural variability in work practices on top of typical Safety I training. In the same vein, we can consider a need to train and prepare humanitarian actors, focussing on the successful

human factors that allow actors to cope with unique and unpredictable situations that arise in humanitarian emergencies[14].

Enacted sensemaking in crises

In this section we will look at how actors enact their environment in a crisis. Karl Weick, an American organisational theorist, takes the perspective that people enact the environments that constrain them (Weick, 1988). He identified a dilemma whereby the actions to explore and make sense of a crisis may in turn adversely affect or intensify the situation itself. Weick proposes that exploratory actions are driven by the actor's preconceptions, their expectations and their judgement of their "appropriateness" which may be partially constructed to validate earlier reasoning (Weick, 1988, p. 306). The sense made by the actors impacts on their behaviour which in turn inputs to and defines the problems, opportunities and constraints that they face. Each individual enacts the crisis situation in a unique way, the progression of the situation evolves based on the stimulus provided by the person's actions and is not independent of the him/her.

> "To sort out a crisis as it unfolds often requires action which simultaneously generates the raw material that is used for sensemaking and affects the unfolding crisis itself. There is a delicate trade-off between dangerous action which produces understanding and safe inaction which produces confusion" […] "The assumptions that underlie the choice of that first response contribute to enactment and the second stimulus. As action continues through more cycles, the human responses which stimulate further action become increasingly important components of the crisis" (Weick, 1988, p. 308-309).

In his updated reflections on the Bopal Disaster he explains the enacted sense making as comprising the following process elements:

> Disorder + confusion + insecurity = trouble; Trouble + thinking = sensemaking; Probing for plausible stories that explain trouble = enacted sensemaking. (Weick, 2010, p. 543)

This probing for plausible stories echoes the "continuous reassessment" found in the COVID-19 research and mode of functioning by abductive reasoning, see (Flandin et al., 2020; Frankfurt, 1958),

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[14] See Annex 4: What is a Humanitarian Emergency?

where partial inferences lead to working hypotheses. It alerts us to be vigilant to the cumulative impact of the actors' efforts to make sense of their environment and the resulting impact on the evolution of the problem, the crisis environment not being independent of the actor themselves.

Unpredictable situations are caused and cause problems for the actor not only by the nature of the crisis then, but also by the temporal evolution of those problems in link with the actor's own activity and their consequences. The Safety II model, oriented us during the study to look for "what went right", how actors adjusted in order to maintain a balance and ensure organisational performance when confronted with unexpected conditions? The analysis of the corpus focussed on understanding the ways the actors coped with the resource scarcity, with the aim to discern elements that will inform more generalised principles for Emergency Preparedness training. The COVID-19 literature showed the importance of strategies such as continuous assessment, inquiry and recognition of tipping points of resource scarcity, expert judgement as circumstances arise, expert improvisation, adaptation, agility, but gives few concrete ways to develop these dispositions in front-line response actors.

Faced with unprecedented challenges of an emergency, we recognise that actors adjust their standard operating guidelines, procedures (work as imagined or work as prescribed), in a timely fashion. What are their real practices (work as done) in order to ensure they meet their objectives in their specific context? Braithwaite, Wears and Hollnagel (2016) explain the distinction between work as imagined/prescribed and work as done in that "expectations or descriptions of how work should be done never will match how work is actually done. Not necessarily because of ill will, arrogance or ignorance, but simply because there never will be enough time and enough information." (p. xxiv). The distinction is important as it implies that we need to study work as actually done in order to prepare actors for the reality of emergency work.

The temporal dynamic and complexity are destabilising and impactful on the actors' efficacy where an emergency presents novel and challenging dilemmas. Such problems are inherent in humanitarian emergency response. How then can actors can be prepared, through training, to apprehend and navigate such problems more effectively and with less discomfort?

The two main goals of the research study were to

i)   Contribute to the comprehensive understanding of the lived experiences of COVID-19 first responders.

ii)   Contribute to the design and conception of training for emergency response and preparedness.

An important finding from recent COVID-19 research was that the measures taken to contain the spread of the COVID-19 infection (social distancing, national lockdowns, closing international borders) also had a direct impact on resource availability for the health response (impact on production, supply chains, movement of human resources) (Khoury et al., 2020; Ranney et al., 2020), as well as concerns for responses in humanitarian contexts already that were already resource poor (Blanchet et al., 2020; Singh et al., 2020). Challenges were faced by healthcare professionals even in in high resource settings, that suffered from resource scarcity for which they were not prepared or accustomed (Mason, 2020). The conditions of resource scarcity were also prominent in the empirical data collected during the study. We supposed that challenges and dilemmas linked to resources would be pertinent for training and preparation of humanitarian professionals who operate in traditionally under-resourced contexts, but for whom the pandemic provided unusual global supply shortages for medical equipment, supplies and human resources.

The COVID-19 pandemic, as lived by humanitarian workers based in developing or conflict settings, therefore offered a research context of an unprecedented emergency, from which to learn and generalise training principles to prepare emergency response actors for novel challenges. The COVID-19 pandemic, therefore, is not the specific object of the research.

The problematisation led to two specific research questions for this dissertation.

1. How did the front-line responders deal with the situation of resource scarcity over time during the first phase of the COVID 19 pandemic?
2. What can we learn from front-line emergency responders' lived experience of the COVID 19 resource scarcity during the first phase, to contribute to the improved design of effective training environments for emergency management?

Before proceeding to the context and methodology for the study, the next chapter presents the theoretical framework employed during the research.

3. The course-of-action theoretical framework

The research is set within the "course-of-action" research framework (Theureau, 2006), inspired by the Francophone ergonomic tradition. It englobes empirical, technological and philosophical components, applied to the humanities and social sciences. This chapter sets out a brief overview of the ontological hypotheses, enaction and pre-reflexive consciousness, and the notion of activity-sign, foundation of the scientific empirical methodology to study human activity.

3.1   Enaction

What is known is brought forth (Maturana & Varela, 1987, p. 255)

Rooted in biological investigations into the origins of cognition, phenomenology and Buddhist philosophy, the hypothesis of enaction was developed by biologist Humberto Maturana with Francisco Varela, Professor of Cognitive Science and Epistemology (1980, 1987). Theureau (2006) borrowed and adapted the notion as the theoretical foundation of the Course-of action research framework. Theureau (2015) resumes the consequences of the hypothesis of enaction on the conception of human activity:

> L'activité humaine est cognitive, c'est-à-dire met en œuvre et crée des savoirs, et consiste en une interaction asymétrique (ou encore en une dynamique de ces savoirs conçus comme couplage structurel asymétrique) entre le corps de l'acteur et son environnement, y compris social (p 4).

According to the enactive hypothesis, an actor and their environment constitute an autopoietic living system. By autopoietic[15] we mean they are characterised by the fact that they are continually self-reproducing as an autonomous system (operationally closed). The interaction between an actor and their environment (material and social) results from a coupling that modifies the actor's structure at each moment according what perturbs him/her. The dynamic is temporarily open-ended, combining past, present and future. "We speak of structural coupling whenever there is a history of recurrent interactions, leading to the structural congruence between two (or more) systems" (Maturana & Varela, 1987, p. 75). The coupling is described as asymmetric ″in the sense that the actor's internal

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[15] Autopoiesis is derived from the Greek word auto (self) and poiesis (production or creation).

organisation at each instant specifies potential disturbances coming from the environment and models appropriate responses". (Poizat, Durand, & Theureau, 2016, p. 237)

According to the premise of enaction, then, there is no objective external "environment". What is perceived (consciously or unconsciously) by the actor depends on their personal history, aptitudes and expectations. In this way the actor brings forth his/her own version of the world[16] moment by moment, according to those elements make sense and are pertinent for him/her. The history of the couplings with his environment constitute possibilities for his/her future action, orienting his/her activity which will in turn transform the environment. This dynamic "dialogue" between actor and their environment is situated - meaning that it is singular and takes place in a specific cultural, social, temporal, emotional and corporal context.

Embodied cognition

All doing is knowing, and all knowing is doing – a circularity between action and experience
(Maturana & Varela, 1987, p. 26)

Maturana & Varela (1980) characterize cognition as "an effective action, an action that will enable a living being to continue its existence in a definite environment, as it brings forth its world" (p29). Human cognition then, is not conceived as the mind acquiring information about an independent external world. Instead, it is the bringing forth or "enaction" of a world in and through embodied cognition, conceptualised as the concrete activity of an entire organism whose sensory, motor and cognitive dimensions form an inseparable ensemble that make up the body's sensorimotor capacities (Poizat (D), Durand, & Theureau, 2016, p. 5). An actor is learning and uses what s/he has learned at each moment. The dynamic interaction with his/her environment results in a transformation of their internal structure in a process of appropriation and individuation. "Certain transformations are short lived. Others are irreversible, in such a way that afterwards, the activity is never the same, in which case we speak of learning and/or development" (Durand, 2011, p. 40).

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[16] *monde propre* in French

3.2   Experience

The notion of a pre-reflexive consciousness

Theureau (2006, 2010) borrowed the notion of a pre-reflexive consciousness (Sartre, 1943) that accompanies the lived experience of human activity at each moment. Using the hypothesis of enaction, he took the perspective that through a "surface effect" of the asymmetric structural coupling, an actor has a partial awareness and understanding of their experience i.e. of him or herself doing something, according to what is significant as the situation unfolds. This partial awareness is concomitant with the activity, meaning it accompanies the actor at each moment.

Activity Analysis

> La conséquence de l'hypothèse de l'énaction prise isolément pour l'étude empirique de l'activité humaine est essentiellement négative. (Theureau, 2015, p. 15)

According to Suchman (1987), when recounting a past experience, the reflexive consciousness reports on their activity in a "selective" way; An actor's awareness falls "victime de l'illusion rétrospective de l'action comme réalisation de plans nés dans sa tête" (L Suchman in Theureau 2015, p15). This is a natural reinforcement of a coherent sovereign self (Sartre, 1943). From the hypothesis of enaction, the structural coupling between an actor and their environment has changed from that which it was at the moment the activity took place, since the actor is engaged and structurally coupled with the new environment (e.g. in a conversation or interview).

The consequence of enaction is that it is impossible to comprehend human activity through external observation, recording or by simultaneous verbalisation or questioning (which interrupts the structural coupling with the targeted activity). Instead, it requires a specific empirical method to access a person's pre-reflexive awareness of his/her activity. Theureau proposed that under certain conditions, notably through the re-enactment of a specific experience based on material traces, an actor can show, commentate and recount the significative elements of their activity. Poizat et al. (2016) describe succinctly that the unit of activity analysis is

> (a) an *interaction* between the actor and the environment (including the social), and not an action, behaviour or reaction; (b) a *dynamic* and not a subject, an agent or a stable and reified collective entity; (c) a *totality*, and not a bundle of isolated separated processes (decision-making, regulating motivation, etc.); and (d) *asymmetric*, in the sense that the actor's internal organisation at each

instant specifies potential disturbances coming from the environment and models appropriate responses. (p. 5).◎

The notion of "activity-sign" - semiosis

According to the Peirce (1978) human cognition is a construction of meaning (semiosis). Applying the hypothesis of enaction, then human activity, synonymous with cognition, is a dynamic construction of signification emerging from the structural coupling of an actor with their environment described above. Theureau (2006, 2010) took the notion of activity-sign as the foundation of the data analysis methodology in the course-of-action framework. It allows the researcher to describe the what the actor's pre-reflexive consciousness expresses of the transformations in their organisational structure.

Peirce defined three registers of being: Possible, Actual and Virtual that exist at each moment, and allow us to conceive of activity as open ended, encompassing the history, actual and possible future configurations. According to Poizat (2016)

> The Possible category is the potential dimensions of a continuous present, rooted in the past and allowing one to imagine what may occur in the future. The Actual category manifests the emergence of certain elements of the Possible in relation to the here-and-now incursion of events. The Virtual category corresponds to the mediation between these two categories, where habits or dispositions towards acting are constructed, and it thus prefigures the future. (p. 238)

Theureau (2006) enriched these three registers, proposing an analysis according to six (hexadic) signs. These are as follows

Possible: preoccupations and engagement in the situation (E), structures of anticipation (A), reference knowledge, experience or competencies convened and mobilised (S)

Actual: the Representamen (R) – elements in the environment that are perceived, and which are significant to the actor

 Virtual: the Interpretant (I) which represents the constitution of knowledge, generalisations, habits, and norms of action during the episodes described.

4. Methodology

There was a practical and methodological pertinence to analyse work as done front line humanitarian responders in the COVID-19 pandemic. It was a unique opportunity to draw up lessons from the actors' experiences, for training purposes. A qualitative approach was used to facilitate access to the phenomenological apprehension of the challenges in by the actors in the COVID-19 emergency as they emerged, rather than the investigation of problems pre-identified in prior research. As such, the study's grounding in Theureau's Course-of Action framework is adapted since his proposed methodology places the focus on the significant events as identified from the actor's point of view. Due to COVID-19 constraints, the research team adjusted the recognised method of establishing a re-enactment interview through material traces. This will be explained below.

4.1   Research context

The study contributes to the body of COVID-19 research by documenting and analysing lived experience of significant moments, as defined by front line actors of the first wave of the COVID-19 response in a medical International Humanitarian Organisation (INGO). It falls under the umbrella of the ROTSCO[17] research carried out by the CRAFT team of the University of Geneva. The programme aims to contribute to a comprehensive understanding of security and resilience and to propose improvements to design principles for resilience training on human factors (rather than technical skills and competencies) for professionals that need to cope with unexpected, unpredictable and even unprecedented situations, which are often the cause of accidents. The premise of this research is that lived experience is a valid unit of analysis to contribute to improving existing training.

This COVID-19 study also falls within the remit of a research and training development partnership between the CRAFT team and the Médecins Sans Frontières (MSF) Learning & Development unit, that has the objective of advancing training through the analysis of interventions/experiments in humanitarian contexts, and humanitarian action through training. MSF ethical review board approval was required for the study protocol (see Annex 1).

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[17] Resilience-Oriented Training for Safety-Concerned Organizations, funded by the FNSNF

4.2   Participants

The study collected data on the lived experiences of seven participants from four MSF country missions involved in the preparation and response to COVID-19 between March and July 2020. Participants were recruited during May to July 2021 on a voluntary basis using purposive sampling with the following eligibility criteria.

Operational Projects were selected based on the criteria that:

- they were in the preparedness or response phases of the COVID-19 response
- they were supporting patients from a vulnerable group to COVID-19, in hospitals or in the community
- there was management approval

Eligible role profiles were:

- Medical staff with significant coordination responsibilities (e.g. PMR – Project Medical Referent, MedCo – Medical Coordinator, RMP – Responsible Medical Programmes)
- Frontline medical staff caring for patients (e.g. Doctor, Nurse)
- Health workers engaging with the community in IPC activities (e.g. Health Promotor)

An initial meeting was held with all participants to explain the objective; the intended use of the research; the need for their informed consent including the right to withdraw; data protection measures; methodology; anticipated time commitment; and available psychological support through MSF should any relived experience highlight significant distress.

Four Project Medical Referents, one from each mission, a Health Promotor from Burkina Faso, a Medical Activity Manager from Cameroon, a Project Coordinator from Ukraine and a Nursing Activity Manager from Yemen were recruited.

4.3   Data collection

It was impossible to gain direct access to observe and film the actors' work due to risk of contagion and impossibility to travel. The data collection method was adapted, taking advantage of digital means of distance communication (Microsoft Teams, Zoom Pro). Participants were requested to record one or two diaries (journals) of self-reported experiences per week over a period of one to two months (video, audio or written, about 15 mins) with the following instructions:

Table 1 Video journal instructions

Instructions

We ask you to come back to any part of the Covid19 episode that seems particularly "salient" or significant to you. These may be "good moments" (efficient coordination, impression of efficiency, decision-making, feeling of having the necessary resources, feeling prepared to cope), "bad moments" (moments of incomprehension, difficult ethical choices, dilemmas, difficulties in coordination, refusal of colleagues), moments of unexpected success, moments of improvisation, moments of great intensity, etc.

There are 2 steps to your recording

1. Describe the context of the situation to which you wish to return
2. Tell the story of what happened and comment on your experience during this "significant" situation for you (concerns, expectations, knowledge, elements taken into account, actions and interpretations in the moment...).

The level of description of the participants' activity and the timeframe covered, varied considerably from participant to participant as the instruction to focus on "significant experiences" was intentionally vague. The participants were informed in advance of the general follow-up questions to be used in the subsequent interview through the sharing of an interview reference tool (see Annex 3) based around Theureau's hexadic signs. The aim was to participants towards a re-enactment of the significant episodes they recounted in the video diaries.

Follow-up online interviews were recorded using an adapted re-enactment interview based on the video journals and grounded in the Course-of-Action empirical research framework (Theureau 2006, 2009, 2015) (see Annex 3). A total of 19 interviews equating to 16.76 hours (1006 minutes) were recorded, with a breakdown given in the table below.

Table 2 Participant profiles and interview times

#	Mission	Role	International staff (IS) / Local staff (NS)	First Mission (FM) / Experienced (XP)	# interviews	Duration (minutes)
1	Ukraine	Medical Activity Manager (MAM)	IS	FM	3	108
2	Ukraine	Project Coordinator (PC)	IS	XP	2	93
3	**Cameroon**	**Project Medical Referent (PMR)**	**IS**	**XP**	**4**	**284**
4	Cameroon	Medical Activity Manager (MAM)	IS	XP	3	127
5	Burkina Faso	Project Medical Referent (PMR)	IS	XP	4	193
6	Burkina Faso	Health Promotor (HP)	NS	XP	1	68
7	Yemen	Nursing Activity Manager (NAM)	IS	FM	2	128
Total					**19**	**1006**

4.4   Data processing

The data was processed by the 4 researchers, who each created concise "vignettes" or thumbnails of the significant moments experienced by the 7 actors separating them by challenge or thematic identified by the actors.

Data treatment was performed according to the hexadic signs proposed by Theureau (2010). A modification was made to the data treatment proposed in Theureau's Course-of-Action methodology that uses the identification of elementary units of significance according to the actor during the course-of-action analysis, moment by moment. Following the example of Serre (2006), we documented the "non-elementary units of significance" (p. 141). This took into consideration the impossibility to have access to the minute by minute experience of the actor over such a long time period, as well as limiting the data treatment to manageable elements. In effect this allowed us to document the temporal evolution at a macroscopic level of signification over the period of the two-month study. It brought to

the fore links between important moments and the emergence of related issues or events, as given weight by the actors from their point of view. It reduced the "sensitivity" of the analysis but ensured that significant moments were identified and then treated in greater detail via the hexadic signs.

The diagram below uses a heartbeat metaphor to show how with a lower sensitivity (in red) we analysed fewer units of higher significance (3 units) versus the use of a higher sensitivity (blue) which captures a finer granularity over time of the actor's experience but increases the volume of analysis (9 units).
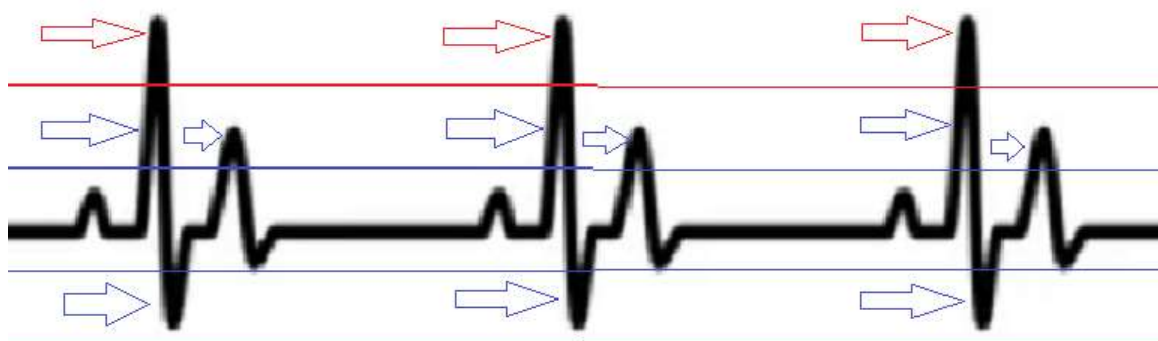
Figure 4-1 Non-elementary unit of experience over time, using a heartbeat metaphor

4.5   Data analysis

4.5.1   Stage 1 – collective analysis

The vignettes provided a standardised presentation of the challenges identified by the actors which were then discussed between the four researchers to identify emerging themes and analysis axes. As explained above, the « Course-of-Action » was not possible to reconstruct, but rather a course of significant "non-elementary" units, where references to past, present and future were taken into consideration to situate the influences on the activity. Elements of context and post experiential reflection were also considered.

4.5.2   Stage 2 – individual analysis

After various attempts to categorise the interim analyses by nature of the problems identified by the actors, transversal analysis and provisional categorisation of emerging themes, the decision was taken

to limit this dissertation to one case study. The choice to present the results as a monography was made in order to reduce the volume of the corpus to a manageable size for analysis during the dissertation. This pragmatic choice was nevertheless adapted to the objective of investigating the phenomenological and temporal aspects of how the actor dealt with the evolving challenges of resource scarcity in a naturalistic context.

The detailed analysis of the case study was led and written up by me. To do this, the video journals and interviews relating to the Oxygen problem for the principle actor that identified the issue in Cameroon, were then transcribed for use in the more detailed analysis.

4.6   Results – presentation by monography

The COVID-19 study generated a large and rich corpus of data. The issue of lack of sufficient oxygen supply, identified by the Project Medical Referent (PMR) in Cameroon mission, was chosen for its emblematic nature in respect and relevance to nascent and emerging research themes within the research team; the perceived pertinence for field application in humanitarian organisations; and the potential for wider generalisation for crisis response resilience training.

Nevertheless, comparisons and contrasts with other field mission actors' experiencing similar resource scarcity issues were instrumental in identifying and reinforcing our confidence in the themes that emerged during the case study described. As such, other actors' data will be convened occasionally where they clarify and/or support the argument in both the Results and Discussion chapters.

The monography is recounted in chronological phases according to significant moments identified by the PMR. These phases are based on the Non-elementary units of signification and incorporate the representamen identified in the data treatment. Each phase is then presented with two extra categories as a reduction of the other hexadic signs treatment; the first is "Assumptions" which group together the Engagement (preoccupations) and Structures of Anticipation (expectations); the second is "Strategies" which evoke the "coping" strategies in the literature-informed conceptual background chapter, and consolidates pertinent information from Referential (knowledge convoked) and the Interpretant (validation, invalidation and transformation of the actor's Referential).

5. Results - the oxygen problem case study from Cameroon

This section presents a specific case in the form of a monography. The case was chosen as emblematic of the resource scarcity context, though it should be noted that the strategies to respond to the lack of oxygen were singular to each setting. Hence the actual solutions in the following case are not the object of the analysis, but instead the strategies used to identify, investigate and cope with the situation. In the interests of accuracy, all quotations have been left in the original French language used by the actor(s).

Mission context

In Cameroon, the Ministry of Health (MOH) requisitioned the missionary hospital in Djoungolo, Yaoundé, on the 28th March 2020, in anticipation of an exponential increase in COVID-19 infected patients. At the MOH's request, MSF's Cameroon mission agreed to enter the hospital and construct new wards to rapidly increase capacity from 30 to 110 beds over a period of 3 weeks.

It became the medical structure with the largest overall COVID-19 capacity at that time. MSF's role was to provide supervision, technical and logistical support, whilst the MOH were to provide hospital staff and medical supplies. The initial mandate, defined by the minister, was to admit and treat all suspected or confirmed, mild to moderate cases COVID patients.

The case was recounted as one of the challenges identified by the PMR, a medical doctor, with experience as an International Staff in several different MSF country missions. His responsibilities are defined in the standard job profile[18], of which the primary accountabilities can be seen in annex 8.

The PMR's role accountabilities

The PMR's standard responsibilities cover medical activity assessment, planning, implementation (both internally and in partnership with external medical partners including the MOH), quality assurance, resourcing – supply and medical equipment management with the logistics department, medical staff recruitment, training, management and welfare. The balance of priorities changes during each mission context and through the importance accorded by the actor concerned. A full description of the standard Project Medical Referent accountabilities be found in Annex 8 along with a typical mission organigram.

The results are organised in 7 phases that represented significant moments for the Project Medical Referent (PMR) of the Oxygen problem.

5.1   Phase 1 - Problem awareness - forewarned is not necessarily forearmed

The briefing

The PMR arrived on mission on 30th March 2020 having been asked to contact his national coordination.

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[18] Standard Project Medical Referent Job profile

(117) Je me suis retrouvé dans mon pays, Cameroun, quand les frontières sont fermés et le siège nous envoie des messages a un certain nombre d'expatriés que pour les pays qui sont désormais en épidémie, qu'il faut contacter vos coordinations.

Normally he would have been deployed by HQ, with a veto on allowing International Staff to work in their home countries, so the unusual start framed "an exceptional mission". The process was relaxed to provide flexibility and increase human resource availability. The local coordination asked him on the Thursday to make himself available as PMR in Yaoundé on Monday morning. Whilst the speed of deployment did not mark the PMR, at his initial briefing he immediately integrated the problematic nature of the lack of resources.

(116) Même lorsque je suis venu, on m'a dit « ton gros challenge sera que tu n'auras pas forcement tous les moyens de faire ce que tu veux comme d'habitude souvent dans les projets MSF.

Assumptions

The problem of resources was clearly defined at the start of the mission and the PMR knew that he would need to manage as best he could with limited means, including limited Human Resources, equipment and supplies as the borders were closed. He was forewarned by the interim Head of Mission, a prior Medical Coordinator with emergency experience who was usually based in the Regional Management Cell, and in whom he has confidence.

(108) il faut commencer à se débrouiller d'abord avec les moyens du bord, avec la structure et matériel de la structure et éventuellement avec ce que l'état va nous donner en attendant que la commande internationale arrive, ou alors que le siège valide certains achats locaux.

The PMR did not, however, anticipate the scale of impact. In retrospect during interview, the PMR expressed the unusual and unexpected character of the resource problem.

(131) Bon dans les projets MSF, il peut avoir des ruptures [de stock], ça existe, mais pas à l'échelle que j'ai constatée ici.

Strategies

Probing the background

During briefing phase the PMR probed the historic of the situation. It was important for the PMR to understand why the problem existed.

(132) Après discussion pourquoi il y a autant de gaps, on m'a fait comprendre que la commande initiale du projet. C'était une commande backup en principe. Ça veut dire que MSF n'est pas en premier ligne mais en support au ministère

(142) J'avais demandé pourquoi nous on n'a pas de stock conséquent pour pouvoir combler ça ?

This questioning appears to provide several functions – to permit the PMR to understand and ensure that all supply options have been explored, but also to facilitate his adherence to act in a context with suboptimal resources that will directly influence his operational load, efficacy and capacity.

Making do – the PMR "tightens his belt"

The PMR managed his concern on a personal level through projecting himself into an anticipated near future, expecting a relatively quick problem resolution. He accepted the difficult and unpleasant situation without complaining, thinking that he would not need, or be able, to do anything to make things better.

(159) Ça m'a inquiété quand même. Mais je me suis dit, bon, c'est un challenge [...] C'est une histoire de trois semaines, un mois. On serre les dents, et le pire va passer.

The PMR's assumptions influenced his planned initial response strategy: the decision to adopt a holding pattern without any expressed intention of investment in searching for new solutions. Indeed, the PMR's first response was in line with the standard mission procedures or norms: wait for the international order to arrive and make do with existing stock in the hospital. Although he was warned of the resource shortfall, he did not at this stage recognise the impact it would have on his workload or the ability to provide patient care. He also limited the scope of his analysis to the medical structure and the MSF project in which he was working.

5.2   Phase 2 - Insufficient resources for both existing and COVID-19 operations

The PMR took up his position two days after the hospital was requisitioned. He was responsible for a hospital that had no time to prepare, with limited capability and where patients arrived directly afterwards for COVID 19 treatment.

> (58) L'état a mis à disposition un hôpital missionnaire, mais aussitôt, la décision a été prise le samedi, le lendemain il y avait les premiers patients.

As the PMR was directly confronted with a high number of suspected and confirmed cases. More patients than expected needed oxygen. He started to project into a future where the "grin and bear it" approach would not be enough to hold on. He wanted to manage the patient flow and organise an increase in oxygen capacity.

> (64) il n'y avait même pas d'extracteur[19] dans le pays

Assumptions

The PMR expected patient numbers would increase, with a need for O2 despite the mandate for mild and moderate cases. He knew there was a shortage locally of the key oxygen therapy equipment and deduced that since the international order was only partially received with no extractors, the international border closures meant the international order would not be completed, creating a foreseeable shortfall of essential equipment.

Strategies

Diversion of existing resources from the emergency stock – should we rob Peter to pay Paul?

He first implemented a strategy of diversion of existing MSF resources to complement the hospital's insufficient stocks. This is a standard solution employed during temporary stock shortages that are part of mission norms.

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[19] An extractor or concentrator is a device that extracts oxygen from the surrounding air and makes it available at a programmable rate and humidity according to each patient's needs.

(64) Il a fallu trouver une solution. Finalement le seul qu'on a trouvé était un de 10L dans le stock des urgences EPrep [Emergency Preparedness] de MSF. Donc c'est cet extracteur de MSF qu'on a pris.

The first trade off became visible early on as the PMR weighed up the anticipated effects in the future from his actions. We start to see his concern for the interconnected nature of his actions on other problems. Diversion of existing resources was balanced against the need to protect existing MSF operations and capability for which they were intended. The PMR logically accepted to take a concentrator from EPrep stock – which exists specifically for use in an emergency, but for other stock shortages he "borrowed" supplies only as a temporary standard coping mechanism, aware that it was not sustainable as he could not replace the stocks in the usual way.

(69) … le souci de ne pas créer de problèmes, c'est-à-dire les autres projets avaient leur systèmes (nutrition et autre... XX) il ne fallait pas prendre leur matériel XXXX pour affecter à COVID au risque de les déstabiliser.

Increasing oxygen therapy capacity through simple technical adaptation

Next, he adapted the equipment to increase treatment capacity through the local purchase of a system of tubing, to share the airflow from one extractor to 2 patients.

(74) Les gymnastiques qu'on a pu faire au début, c'était que comme c'est un 10L, on a acheté [des petits tubes] qui permettent de distribuer de l'oxygène de 10L à deux patients qui chacun puisse avoir 5L. Donc pour 2 patients à un certain distance, on pouvait les approvisionner à deux avec les prolongateurs.

Note: this can be considered as a transgression of a medical protocol. The PMR did not state where the idea came from, Knowledge of how to ensure quality of oxygen delivery and manage the very real technical risks (ensuring the pressure is balanced to meet the individual flow rate needed for each patient) does exists within the organisation, but the PMR did not mention if he was aware of that, by whom the exception was authorised (MSF or MOH) or what he put in place to mitigate the risks. This omission seems revelatory of a comfort with deviating from protocol.

5.3 Phase 3 - Overwhelmed: recognition that a new solution is needed

Up to this point, the PMR was focussed on direct problem resolution by MSF. The situation was evidently unsatisfactory to him and he had a feeling of being overwhelmed from the start.

(80) le sentiment d'être submergé avait même commencé avant parce qu'un seul extracteur ne pouvait être suffisant…. Je pense que tout le monde savait

The hospital was put under an administrative closure by the authorities for two weeks, due to quality of service concerns. With the help of the Coordination team he expanded his search for supplies outside the sphere of MSF. The PMR introduced himself to two seemingly trustworthy key contact visitors on site. The first was the WHO[20] delegate who had a formal UN mandate to offer significant levels of help. The PMR assessed the delegate's behaviour on site and remarked his "solve all" grandiose approach.

(321) Il est venu quand le site est en chantier, il fumait, il faisait des choses, après il a commencé à faire des grosses promesses, « oh vraiment Djoungolo sera un grand site, un site de référence, dis-moi vos difficultés, l'OMS va prendre beaucoup de choses en charge, on va vous envoyer du matériel, on va vous envoyer du staff, des spécialistes et autre ».

The PMR and his team spent 72 hours writing a funding proposal to the WHO which represented an intense investment of time and effort. He then reinvested more time, even after the delegate missed a meeting, due to what the PMR estimated as a pretext of "missing information".

(325) Et il donne un faux rendez-vous au Chef de Mission et quand on lui demande, qu'est-ce qui se passe, il dit « vous n'avez pas chiffré ». Donc on chiffre. C'est encore un travail de fou [..] Et après, jusqu'à ce jour il n'a rien donné.

Aware of his prejudices / biases about officials, the PMR nevertheless showed an open mind to discuss with a second contact, a delegate from the Ministry of Health. He formed an opinion after discussion on the problems and the delegate's subsequent actions.

(293) Donc très vite on est rentré en contact au début du projet. On s'était présenté, on échangeait sur des thèmes importants, le fonctionnement du site, les primes du personnel et autres [..] C'est

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[20]WHO : World Health Organisation = OMS : Organisation Mondiale de la Santé

lui qu'on poussait, parce que c'est un ancien MSF. Il a une manière de travailler un peu différente, je dirais, de certains membres de l'administration. Il est conscient de certains risques, et lorsqu'il y a des solutions, il agit en urgence.

(336) lors de ces échanges, j'ai vu sa manière de réfléchir, assez précis, assez claire sur certaines choses, et j'ai vu les actes qu'il a posés par la suite.

At the end of the administrative closure, the ministry delivered 5 concentrators through the agency of this second contact. The solution, however, was insufficient to match the scale of the problem – the volume of patients needing oxygen was too high.

(78) La chance que nous avons eue, c'est effectivement, qu'après notre mise en service, après peut-être une semaine on nous a renforcé avec 5 extracteurs et voilà. Après on s'est aussi retrouvé débordé.

Assumptions

The PMR expected that more concentrators would be needed for the actual and projected increase in number of patients, although he does not state on what information he based this assumption, apart from numbers of patients coming to the hospital. Indeed, decision making in emergencies is often based on limited and sometimes unreliable information. He realised the internal means to resolve the problem had been exhausted, although he was still hoping for an international order delivery and validation for local purchases. He became prepared to ask for external help. Through the coordination team, the PMR helped/was aware of increasing efforts to advocate to the Ministry of Health (MOH) to provide oxygen concentrators.

Strategies

Mobilise the existing MOH partnership protocol

The PMR first mobilised the agreement signed when the ministry asked MSF to take over the technical supervision of the hospital. The MOH was responsible for technical supplies, hence the request for extra concentrators.

Persistent follow-up of opportunities

Despite misgivings, the PMR invested time and effort in planning, writing, and costing a funding and support proposal to the WHO. The failure did not dissuade him from following up other opportunities, such as with the MOH.

Creation of a contact network – trust and mistrust

The PMR proactively networked with local actors. He evaluated the efficacy and reliability of the two contacts, which appears to be a habit for him when meeting someone new.

> (329) Comme je disais tantôt, à première vue, les deux je peux les faire confiance de pars leurs positions. Mais….

> (306) chaque collaborateur que j'ai eu en face de moi, c'est la première impression. Très vite en discutant avec chacun, je peux savoir si je peux compter sur celui-ci ou pas.

The repeated stalling by the WHO representative, coupled with under delivery – or rather "non-delivery", reinforced the PMRs mistrust of "officials" (fonctionnaires) and contributed to his appreciation of "pragmatism" as a key evaluation criterion.

> (314) Pour moi, d'abord il y a le pragmatisme.

This is confirmed by his confidence in the MOH representative.

> (332) il est un fonctionnaire qui parle vrai. Quand il dit que c'est pas possible, c'est pas possible !

The PMR also commented on the need to develop mutual confidence, i.e. to ensure that he is trustworthy in the eyes of the collaborator. He explained how he respected the collaborator's position and time, only calling on him when necessary.

> (339) Je pense que lui aussi il a gagné confiance avec moi, parce que [..] quand j'ai un certain niveau de problème, pour ne pas briser la chaine de communication, je commence par son collaborateur, mais après, si ça ne va pas, je vais remonter vers lui en fait.

Although not overtly planned, we will see that the PMR mobilised this MOH contact during phase 5, the management of an acute crisis, which would not have been possible without prior networking.

5.4   Phase 4 - Difficult choices lead to a break in protocols

Very quickly after, the hospital received critical patients requesting admission who were not accepted elsewhere. The PMR received pressure from families to admit patients outside Djoungolo's mandate, whilst other hospitals refused his referrals or did not answer the phone. His feelings of being overwhelmed and anxious were accentuated. It is worth noting that oxygen was not the only scarce resource during this period. The PMR's preoccupations were constantly turned towards palliating the lack of important materials for patient care or staff protection. It became a new norm, but one which was barely sustainable and difficult to live through.

> (153) C'est fou quoi. Chaque jour c'était un combat […] il y avait une rupture de quelque chose ou alors un défaut de quelque chose. Soit il n'y avait pas un médicament qui était important pour les patients soit il n'y avait pas le matériel suffisant pour le personnel. C'était la routine en fait.

He noticed that patients' clinical prognosis was not consistent, and even contrary to the protocol. It assumed that over 90% oxygen saturation, the patient would be stable and have low need of oxygen therapy, whereas those below 90% saturation would be unstable severe cases and should be sent elsewhere. With even those above 90% saturation susceptible to rapid desaturation, and those below 90% being stable and therefore admitted, the PMR experienced not having enough O2 capacity to treat the clinical need.

> (632) dès le départ, il a été convenu que nous n'admettions pas des patients désaturés à moins de 90%. Mais la réalité a été très vite autre.

The PMR realised he did not have enough oxygen to meet the patient treatment requirements if he adhered to the mandated protocol, so he derogated from the MOH treatment protocol, rationalising oxygen according to clinical need.

Adjustment / transgression of the admission protocol

The lack of oxygen therapy and intensive care capacity made it impossible to comply with the MOH treatment and admission directive to hospitalise all those with light or moderate COVID, with oxygen saturation of 90% or above. The PMR therefore felt obliged to diverge from the strategy and mandate allocated for the Djoungolo hospital. Firstly by changing the treatment protocol (rationalising oxygen only for those with clinical need), and secondly the admission criteria – he accepted severe patients. This was a major deviation given the mandate comes from the ministry of health, but the PMR does

not mention discussions or validation from any external authority (MOH, MSF coordination or management cell medical specialist).

> (635) il a fallu faire des choix difficiles.

> (375) on a dérogé à la stratégie parce qu'on ne pouvait plus la respecter.

The PMR explained that this derogation led to unforeseen consequences linked to patients' deaths

> (396) les premiers patients qu'on a pris, à ce niveau-là comme ça, ils sont décédés. Certaines d'entre eux sont décédés. Et on s'est retrouvés en train de gérer les corps et c'était compliqué.

Assumptions

The PMR revised his assumptions of who needs to receive oxygen therapy – notably patients with clinical signs of being at risk of rapid desaturation. The PMR had ethical preoccupations to protect hospital capacity versus treating the individual patient in distress. The shortage of intensive care capacity was inconsistent with the rising needs and evolving understanding of the patients' clinical progression. The PMR assumed that the other health structures were protecting their own capacity through refusing certain severe patients that should have been within their mandate.

> (389) ils avaient commencé à rentrer dans un petit jeu vicieux, où en fonction du type de malade, même parfois qu'ils avaient 1 ou 2 places, ils refoulent le malade.

Strategies

Transgression and adaptation of the protocols

Resource limitations demanded constant adaptation, according to the PMR, to which he became accustomed. We can hypothesise that this need for constant adaptation prepared and predisposed him to a need for greater flexibility and agility as the mission progressed, and hence for the larger protocol adaptations that followed. The need for adaptability was one of the main takeaway lessons that the PMR explicitly remarked on from his mission.

> (486) je suis arrivé au travail, et tu sais que tu vas trouver une nouvelle situation chaque jour. Il faut s'adapter.

5.5   Phase 5 - Critical patient – an urgent challenge

The team was confronted with the arrival of a desaturating patient in the hospital carpark.

> (263) Un soir, c'était une expérience positive, on a eu une situation d'urgence…il n'y avait plus de lits, et on s'est retrouvé avec un patient, qui nous a été référé, et pour lequel l'urgence était vraiment l'oxygène, […] il désaturait, et dans le site on a un coordinateur de site qui dépend de la délégation de la santé avec qui je travaille en étroite coordination. Et lui et moi, on a commencé à passer des appels de tous les côtés parce qu'on n'avait pas d'endroit où l'envoyer.

The PMR was confronted with a seemingly unresolvable situation – how to save the critical patient, ensuring the right to impartial access to medical assistance, but knowing that he did not have oxygen capacity (or ICU staff) to provide appropriate quality of care. The PMR contacted the MOH representative in whom he had confidence.

> (345) je m'autorise à appeler son collaborateur et dire « il faut qu'on l'appelle ». Et il me dit oui, je pense qu'il faut qu'on l'appelle.

The MOH representative rapidly brought a concentrator to the site, and then left it with the Djoungolo hospital.

> Et ce jour, exceptionnellement, il y a une des responsables qui dit je vais venir avec une des extracteurs que je vais vous emprunter […] (il) est venu avec un appareil neuf. Il a dit c'est un prêt. On a sauvé le patient. C'est jamais reparti - on a gardé l'appareil !

Assumptions

The PMR was aware that critical patients were being refused from other hospitals; hospitals were protecting their ICU capacity, referral processes were complicated, that there was limited patient transfer capacity (no available ambulances with Oxygen therapy) and that patient and family pressure to admit him would be strong. Although not in the forefront of his mind, the PMR was also conscious that a single critical incident could have a significant impact on the wider hospital service if not handled well, due to public unrest.

> (350) Et s'il meurt dans la voiture c'est un scandale à l'hôpital…

(355) Il y a des préoccupations même sécuritaires derrière. Parce que ça peut vraiment dégénérer. Il y a des hôpitaux ou ça a dégénéré à cause de situations comme ça.

Strategies

Prioritise urgent life-saving action – "I know just the person!"

Faced with an urgent and critical case, he prioritised immediate life-saving action, despite knowledge of the hospital's ICU limitations. The PMR deemed the situation worthy of calling, in extremis, on the MOH representative. Despite the urgency, he still respected the usual communication lines, but urged the MOH site coordinator to make an emergency call to his trusted contact.

(301) Voila. C'est la personne qu'il faut toucher. Quand on se faisait vraiment coincé, moi je me disais, c'est vraiment celui-là qu'il faut toucher.

Proactive communication with the patient

The PMR does not shy away from directly dealing with patients and their family. He proactively goes to discuss when he deems it necessary, despite personal security concerns.

(359) Bon, en réalité, quand je vais face à la situation, j'y pense après. (363) Pour moi la priorité est d'expliquer aux gens ce qui se passe. Parce que beaucoup ne comprennent pas les enjeux.

5.6   Phase 6 - Knock-on effects lead to reinstatement of the protocol

The change in protocols and acceptance of critical patients over and above the hospital capacity and competency led to other problems – the precedent seemed to encourage increasing numbers of such referrals, as well as the need to manage deaths with emotional, physical and complex administrative repercussions. The PMR reached a "tipping point" after the critical incident. He and the team realised that the hospital could no longer manage in this way.

(404) Et ça a été un enseignement pour nous de dire : si on commence à prendre des patients par complaisance…

(407) On peut se retrouver vraiment en train d'enchainer ses rudes décès parce que les autres structures vont se dire, chaque fois qu'ils vont à Djoungolo, chez MSF, on les prend toujours. Et il a fallu vraiment casser cette dynamique.

Assumptions

After realising that the protocol change had produced an unsatisfactory solution, the PMR accepted that the solution found was temporary and was willing to consider further adaptation. He assumed that without further change, then the number of deaths would increase.

Strategies

Reinstatement of an adjusted protocol

The PMR focussed on advocacy to wider system & MOH to push them to fulfil their designated mandate of accepting severely affected COVID-19 patients, protecting the Djoungolo hospital's capacity and reducing turbulent impacts for his team. He nevertheless reinstated the protocol with a level of flexibility to manage urgent critical patients on a temporary timescale as he was still faced with similar critical cases.

(458) et dans la solution ultime ils vous disent, non prenez le cas, nous on ne peut pas ...voilà. Soit il n'y a plus de place, soit à ce temps c'est pas possible on ne peut pas vous trouvez une ambulance pour le faire partir. Et voilà, on est conscient que vous n'avez pas tous ce qu'il vous faut, mais faites comme vous pouvez.

He adapted the admission protocol to enable temporary admission for 24 hours, but even this was unsatisfactory.

(463) On a eu des situations où ils nous disaient, stabilisez le malade pour qu'il voie le lendemain matin, et après on le récupère. Mais le lendemain quand tu commences à appeler et écrire, parfois les gens ne décrochent plus le téléphone et ils ne répondent plus aux messages.

Patience with different work rhythms

In retrospect during the interview, the PMR identified that he needed patience to deal with different speeds and reactivity levels, especially with partners (e.g. MOH) who might not be used to working at the emergency rhythm.

> (474) dès que l'état est impliqué, il faut, même dans l'urgence, avoir une certaine patience. Il faut intégrer ça, parce que, ils n'ont pas forcément le même rythme des urgences que MSF par exemple, qui est une ONG structurée, et qui fait ça depuis des années.

Use of networks

The PMR showed resistance and tenacity when following up with partners.

> (285) on nous dit qu'il n'y a pas de place, à force d'harceler un peu, on nous a trouvé une solution.

A semi-formal WhatsApp group for referrals or urgent cases was set up for referrals, though there was not always a response. The PMR perceived its use to call directly those he viewed as having decision-making authority.

> (442) Mais en dehors de l'écrit, j'appelle parfois certains responsables quoi. Parce que j'ai le numéro de certains patrons d'autres structures et même de certains cadres de la délégation.

5.7 Phase 7 - An idea germinates into a local technical solution

The final phase shows what appears to be a resolution, although we cannot be sure of the evolution after the end of the study period. During a pre-budget planning meeting, the PMR exposed the issues surrounding the oxygen problem. Without his knowledge, the Medical Activity Manager (MAM), an experienced colleague who was also concerned and dissatisfied by the situation, had asked a trusted colleague and member of the management cell from Dakar to be present[21], expecting he might have useful input, though not knowing what exactly.

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[21] Interview 1, MAM Cameroon, 20/7/20, 59".

(522) … nos référents à Dakar qui ont demandé une réunion pour savoir comment se passait les activités. Et surtout quelles sont les problèmes que l'on rencontrait […] et pour moi, le problème de l'oxygène était l'un des problèmes majeurs.

(530) on lui a dit que, voilà, avec les extracteurs on a perdu patience, parce qu'on sent que c'est bloqué de partout.

The cell manager proposed the transfer of technology experimented from another mission and authorised the mission to construct a mini oxygen-generating station.

(528) Réfèrent : pour moi, vous avez le OK pour aller acheter les bombonnes d'oxygène. Moi j'ai déjà vu ailleurs, et je pense que vous pouvez mettre ça sur pied.

(529) PMR : Il y a eu beaucoup de joie dans la salle ce jour-là, parce que on s'est dit voilà une alternative.

The PMR then took advantage of a chance encounter with a bio-medical expert (biomed) from the Spanish MSF operational section, from whom he gained important technical knowledge to manage the implementation of the mini oxygen-generating station.

(535) Ensuite, il y a eu un réfèrent de Médecins Sans Frontières Espagne qui était de passage, avec qui on a fait une visite de site. Et il nous a donné beaucoup de conseils techniques, beaucoup, sur comment est-ce qu'il faut mettre les bombonnes, les abris, les rechanges, les circuits en lui-même, comment faire la maintenance, entre autres.

Assumptions

The PMR had confidence in his colleagues and hierarchy, to expose his difficulties in a collaborative manner, rather than searching for top down direction. Similarly he trusted the technical advice from the biomed expert from a different MSF section, this latter, being another example of opportunistic networking.

Strategies

Collective problem sharing

The PMR exposed the problem with management cell, coordination team, project staff and external partners. The distributed problem awareness enabled a collective assessment of the options and finally brought a technical solution to increase supply.

Flexibility

The PMR revisited a previous decision not to renovate old oxygen circuits based on a longer experience of the stubborn supply problem; the impetus for acceptability being the testimony from a different mission, authorisation from the hierarchy and new technical information from the MSF Spain biomed expert.

> (547) Bien avant ça, dans l'ancien structure d'hôpital on avait trouvé des anciens circuits. Et on avait demandé à notre bio-méd. à l'époque d'évaluer si ça pouvait remarcher, mais il nous a dit que ce n'était plus possible.

Risk acceptance

The PMR showed a willingness to accept and manage the associated safety risks and recognised a need to provide training, ensure collaboration of the different teams involved and a substantial but unknown budget increase.

> (609) Il faut avoir une logistique ou un service de maintenance bien formée pour éviter des risques d'accidents. Moi, ce qui m'a marqué dans les briefings, à la fois du référent MSF et de l'entreprise, c'est que voilà, en cas d'explosion, une seule bouteille peut détruire la moitié du batiment. Ça veut dire que ça va faire plus de dégâts de ce que le COVID va faire à nos patients.

> (564) la nécessité de prévoir un budget conséquent pour les bouteilles à recharger. Et puis la collaboration entre l'équipe médical et logistique

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The table below gives a summary the PMR's main strategies.

Table 3 Summary of the PMR's strategies by phase of the oxygen problem

#	Phase	Strategies
1	Briefing	Probing the problem background Making do – tightening your belt
2	Insufficient resources for all projects	Diversion of resources from emergency stock - rob Peter to pay Paul? Increase oxygen therapy through simple technical adaptation
3	Overwhelmed: recognition that a new solution is needed	Mobilise the existing MOH partnership protocol Persistent follow-up of opportunities Creation of a contact network – trust and mistrust
4	Difficult choices lead to a break in protocol	Adaptation Adjustment / transgression of the treatment and admission protocols
5	Critical Patient – an urgent challenge	Prioritise urgent life-saving action – "I know just the person!" Proactive Communication with the patients & family
6	Knock-on effects lead to reinstatement of the protocol	Reinstatement of an adjusted admission protocol Patience with different work rhythms Tenacious use of network
7	An idea germinates into a local technical solution	Collective problem sharing Flexibility Risk acceptance

6. Discussion

The two main goals of the overall research study were to i) contribute to the comprehensive understanding of the lived experiences of COVID-19 first responders and ii) contribute to the design and conception of training for emergency response and preparedness. This dissertation focuses on the specific aspect of resource scarcity, given its importance during the first wave of the COVID-19 response. From the case study above, these objectives will be revisited separately. **Chapter 6** will discuss the first research question - How did the front-line responders deal with the situation of resource scarcity over time during the first phase of the COVID 19 pandemic? In **Chapter 7** we then propose implications of the results to answer the question - What can we learn from front-line emergency responders' lived experience of the COVID 19 first phase resource scarcity to contribute to the improved design of effective training environments for emergency management?

6.1   Oxygen scarcity - a trigger for an unruly problem

The medical challenge of treating COVID 19, a novel respiratory infection requiring oxygen treatment, was not particularly technical or new (notwithstanding the uncertainties of treatment protocol evolution – e.g. hydroxychloroquine, treatment of co-existing morbidities...). The global nature of the pandemic impacted the organisation's supply chain, Human Resources mobility, the headquarters' capability to support the field, as well as funding availability. The combination created unplanned challenges on multiple dimensions for first line responders. During the data analysis, a conceptual question emerged, about how to categorise the nature of the problems identified by the PMR, due to the O2 resource scarcity? We remarked on their interconnected nature and the importance of their temporal evolution due to the O2 resource scarcity. The concept of "unruly problems" appeared appropriate, to reduce and label the progression and diversity of the PMR's problems.

Ansell and Bartenberger (2016) discuss unruly problems as challenging problems that are easy to conceptualise, but

> often arise in surprising ways, refuse to sit still as we try to analyse them, and behave badly when we try to solve them. Unruly problems often arise in turbulent conditions or they themselves produce turbulence. They are "situations where events or demands interact in a highly variable, inconsistent, unexpected, and/or unpredictable manner". (p. 107)

As such, they share many characteristics with wicked problems (Rittel & Webber, 1973) and messes (Ackoff, 1997) but are notably characterised by the temporal dimensions of complex problems. Ansell and Bartenberger (2016) identify six categories of temporal factors associated with unruly problems: "surprise, discontinuity, temporal misalignment of problems and solutions, variability or volatility, time-indexed causation or diffusion, and vicious cycles". (p. 112)

This section uses the concept of unruly problems to discuss the results.

The supply problem – an unexpected scale and timeframe

Phase 1 - The PMR initially interpreted the border closures as a short-term issue. The scale and length of the supply problem were unforeseen (and unwelcome) surprises for him. Ansell & Bartenberger (2016) noted that unruly problems occur in surprising ways. "In a general sense surprise is a function of both expectations and information" (p. 113). His expectations seem to be based on norms constructed during prior missions. In several interviews we saw he had a high level of trust in MSF, for example in MSF's logistics capability and the local and regional coordination teams (although there was a more generalised mistrust of the flexibility and response times from HQ). According to Longstaff and Sung-Un (2008), counterintuitively, trust in one's own organisation can reduce resilience:

> It appears that organizations that have high levels of trust in their own groups have reduced levels of preparedness for a crisis [...], we can speculate that it might be an unwarranted confidence (in retrospect) in one's own team or in the ability of the organization to bounce back from a crisis. An unwarranted trust in the group or its technical capability would actually reduce its resilience and that of the populations that it is trying to serve. (p. 15)

From this case, we will see later that creation of trust in fact was an important part of dealing with the complexity of the problem. At the start though, trust in MSF coloured the PMR's expectations and delayed his apprehension of the scale and timeframe of the problem.

[before] *'oxygen in a hospital was a matter of opening the valve on the wall'*

The Nursing Activity Manager (NAM) had never been faced with an oxygen shortage before. COVID patients used oxygen at an unexpected rate, so cylinders were brought to the ward. She was faced one of the first oxygen bottles running out unexpectedly as she did not anticipate the high consumption rate. The bottle could not be replaced since no one knew where the key to open the valve was. The urgency, to ensure continuity of supply to the patient, caught her off guard, and required rapid improvisation to enable the changeover.

To me, getting oxygen in a hospital was a matter of opening the valve on the wall of the room. I didn't even wonder where it came from, or how, or how much it would cost. It was just basic and essential in the hospital rooms; but not in countries like Yemen. Obtaining oxygen here is the challenge of every day and not only because there is not enough production, but also because it is not produced in the hospital itself and it must be transported

Lack of oxygen – varying intensity over time

A lack of enough oxygen was a constant problem during the PMRs mission. The effects, however, were felt more or less intensely at different moments, manifesting in different forms. During the administrative closure, Phase 3, the impact on patients was negligible but present as an anticipated shortage, whilst it came to the forefront as an urgent problem in the Phase 5, with the need to save the desaturating patient's life.

Anticipated and materialised knock-on effects on other projects and the hospital

The lack of oxygen caused knock-on effects during several phases:

Phase 2 - The PMR identified the issue of impact on other projects from using their allocated supplies. His forethought prevented impacts on other projects but in turn meant compromising on the available resources for the COVID-19 operation.

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[22] Written testimony, 31/08/20, NAM, Yemen

Phases 3-5 - In these phases, the oxygen constraint lead the PMR to initially change the treatment protocol to consider the patients' clinical need rather than using the official treatment protocol. Then he changed the admission protocol to consider the resource scarcity in the wider hospital system. His actions created a host of knock on effects, notably culminating with COVID-19 patient deaths, which cascaded into complicated physical, emotional and administrative management of corpses as well as dealing with other patients' reactions to them (evacuation by the patients of a hospital ward, where a COVID-19 corpse lay over the weekend). It increased the turmoil and pressure for both the PMR, his team, and the hospital capacity overall.

Phase 5 – the PMR anticipated another potential knock-on effect when faced with the risk of a critical patient in the carpark. If he were to die due to preventable oxygen desaturation, the hospital might face a wider security problem through public unrest and violence, as seen in other hospitals.

The multiple impacts have been conceptualised as "spill over effects", characteristic of unruly problems (Ansell & Bartenberger, 2016, p. 116). Instead of seeing the PMR as solving multiple consecutive problems, the unruly problem analysis highlights the connected nature. The analysis of the PMR's lived experience through the lens of enaction was particularly relevant to perceive how the actor associated the different effects to the one underlying oxygen scarcity challenge.

Turbulent impact of the protocol transgression

In Phase 4, As described above, the impact of transgressing the protocols quickly impacted on the hospital structure and staff. It produced a « turbulence » (Ansell & Boin, 2019) that generated new, unforeseen, interconnected problems linked to patient deaths: storage of corps, complicated COVID death registration procedures, management of distressed and sceptical families. These consequences were unforeseen and therefore a form of surprise for the PMR.

> At first glance the idea of unintended consequences may imply a relatively straightforward "stimulus-response" feedback. However, feedback effects can themselves be complex, triggering gnarly forms of turbulence. This may be particularly surprising when attempts to produce order inadvertently produce chaos (Kurtz and Snowden 2003) […] Unintended consequences are often an unexpected or unanticipated side effect of a particular problem-solving strategy (Ansell & Bartenberger, 2016, p. 113).

The links between the challenges faced meant that as one aspect of the oxygen problem was addressed with a certain compromise, then another unforeseen problem would be generated – in what Ansell and

Bartenberger describe as cascading effects. We will look at challenges related to the temporal complexity for the PMR in the next section.

Oxygen supply lagged behind the need - misaligned temporality between problem and solution

Without the means to resolve the supply problem, the PMR's solutions were temporally misaligned. Most obviously in phase 2, the borrowing of equipment from the emergency stock and the simple adaptation of each concentrator to deliver oxygen to two patients, were insufficient for the increase in oxygen demand. The PMR then spent time advocating an increase in the supply of concentrators during the administrative lock-down in phase 3, where he became overwhelmed and looked outside MSF to increase the supply. We also see temporal misalignment in the partner organisations' responses – notably when the MOH took time to supply 5 concentrators, and in phase 3 when WHO was slow to reply to the funding proposal. Ultimately a sustainable solution to the underlying oxygen scarcity was only found and implemented in phase 7, with the idea and implementation of the mini oxygen-generating station.

Political agendas impacted on the temporal dynamic

Ansell & Bartenberger (2016) point out that the "question of temporality is often a political question with different actors trying to impose their own time horizon on the problem (Brunnengräber et al. (2007)" (p. 115). The impact of an unstable or shifting public interest could be seen from how the capacity of the healthcare system became a priority when the pandemic affected all strata of society. In this case, the hospital was commissioned and put into service in 2 days during phase 2, not long enough to prepare for a quality service. We see that the administrative shutdown during phase 3 was triggered by advocacy from well-connected patients about the sub-standard service.

The PMR's understanding of the disease's clinical progression and adaptation of the treatment protocol in phase 4 was in advance of the MOH protocols, which was problematic for the PMR e.g. which patients needed oxygen, but also the prescription of Hydroxychloroquine that was not recommended by WHO but enforced due to local acceptability by the MOH.

MSF will always take the patient – a vicious cycle problem

The PMR perceived a "jeu vicieux" (a vicious game), whereby other hospitals protected their hospital bed capacity for patients with less co-morbidities and more promising prognostics. By adapting the protocol and accepting patients outside the MSF hospital's remit, the PMR assumed that he had

inadvertently encouraged other hospitals to refuse or refer complex cases and hence avoid the spill over effects of managing deaths in their own structures. Whenever the PMR accepted such a patient, he thought this reinforced the other hospitals' reliance on the goodwill and flexibility of MSF. He therefore invested time, energy and advocacy to break the precedent. Ansell and Bartenberger (2016). describe this as a vicious cycle from which the difficulty to escape is inherent to the nature of unruly problems:

> A vicious cycle problem is one in which the effects of a problem eventually feedback to aggravate or deepen the original problem. Feedbacks create vicious cycles when they are "deviation amplifying"—when the feedback pushes some normative standard further from its desired state (Masuch 1985). A vicious cycle also implies that there is a degree of lock-in, reinforced either by a logic internal to the cycle itself or by contextual conditions external to it. (p. 119)

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The table below summarises the PMR's characteristics of the unruly problem aspect of the oxygen scarcity.

Table 5 Summary of the oxygen scarcity unruly problem characteristics

Characteristics	The supply problem – an unexpected scale and timeframe
	Lack of oxygen – varying intensity over time
	Cascading spill over effects
	Unexpected and turbulent impacts of the protocol transgression
	Oxygen supply lagged behind the need - misaligned temporality between problem and solution
	Political agendas impacted on the temporal dynamic
	MSF will always take the patient – a vicious cycle problem

6.2   Recognising the tipping point and coping with the oxygen scarcity

We have characterised the oxygen shortage as an unruly problem with a temporal complexity that makes it hard for the PMR to grasp and deal with. Progressive and iterative responses created further

spill-over predicaments and challenges. One of the points in apprehending the temporal complexity of an unruly problem, is making sense of the information and being able to recognise when a problem requires a change in strategy to deal with it. In this section we will look at the notion of "tipping points" and how they are recognised and dealt with.

In phase 1 we saw that the PMR was alerted to the resource scarcity but that he then continued to struggle to fill the gaps using standard coping mechanisms (borrowing from other projects, small technical adaptations to the concentrators, requesting extra concentrators from the MOH). He progressively recognised the importance and scale of the issue which manifested through the increasing anxiety and tension as he anticipated an increase in number of patients. In phase 3, he finally recognised that he needed a new solution, but it was not until phase 4 that he made a major adjustment to the treatment and admission protocols, realising that a normal rationalisation of resources would no longer be possible.

According to Ansell and Bartenberger (2016) unruly problems may occur due to discontinuities e.g. an abrupt event (such as natural disaster or sudden conflict in a humanitarian context), but more commonly arise from a conjunction of slowly changing factors that reach a "tipping point" as described by complexity theory. They explain:

> One type of discontinuous change described by complexity theory is a "tipping point," in which a system makes a sudden transition from one state to another. Tipping points are often characterized as "a small perturbation producing a large change in a system" (Lenton 2013, 5). […] They may occur because a small perturbation catalyzes non-linear system interactions or result from a linear accumulation of small effects over time until a "threshold" is reached. (p.114)

In fact the slow, almost imperceptible increase in pressure, both on the resources and the PMR, made it difficult to recognise exactly when the tipping point occurred. It reinforces Dawson et al.'s (2020) analysis that healthcare professionals need guidance to investigate the data available and their context to recognise what they also define as "a tipping point where decisions are no longer made as they normally are – on the basis of clinical guidance alone" (p. 4), (See also Section 1.2). We can suppose that recognition at a timely moment would facilitate the actor moving appropriately to what we call an emergency mode of action.

To avoid needless repetition, we will present only briefly the elements that echo the approaches already enunciated in section 1.3 Responders' coping strategies. We will expand where points add new elements to our comprehension.

6.2.1   Search and inquiry: preventative probing

As remarked in section 1.3, continuous reassessment was a coping strategy due to the dynamic evolution of the pandemic. The PMR did not lose sight of the primary cause, that of the oxygen scarcity, which he came back to again and again. Without this connection, it is likely that he would not have continued to focus on the origin of the adversity, that eventually led to a workable stable solution in phase 7.

Ansell and Bartenberger (2016) propose two different strategies to deal with unruly problems, prevention (early warning systems, weak signal analysis, dark logic models) and strategic real time learning and experimentation through a probing strategy called READS (rapid, exploratory, adaptative, distributed, and small character of experimental probes). Borrowing from this model, this allowed us to reconfigure our understanding of "continuous reassessment" to account for the experimental nature of the strategy of "probing the environment" – what we saw as inquiring to draw out sense and meaning from the situation.

- Phase 1: Understanding the history of the problem
- Phase 3: Probing information from external information resources – sharing his analysis and learning from the MOH representative.
- Phase 5 – The PMR's connection with his local culture and news allowed him to make sense of the risks if the desaturating patient died in the carpark - i.e. knowing that other hospitals had experienced violence in similar circumstances.

Table 6 An Example of probing from the Cameroon Djoungolo MAM [23]

At this point, we will invoke a point made by the from the same project. The Medical Activity Manager (MAM) explained how he gave importance to communication and transparency with the patients and their families. He organised collective open briefing sessions with the patients, opening the floor to question on the treatment regime. He also made time to speak individually to those with complaints. He saw it as an opportunity to make sense of what was going on in the hospital, assure the credibility

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[23] Interview 1, MAM Cameroun, 20/07/20, 45"

of MSF. He noted that this improved the patients' trust in MSF their treatment. For him the patients in Djoungolo were educated ("instruits").

This attitude of attention and respectful discussion with patients is not self-evident for all medical staff in all cultures. The notion of respect for a doctor's knowledge follows a strong hierarchical tradition and communication with patients has become an increasingly active training focus in MSF. Probing contributed to reducing the likelihood that missing information might exacerbate the "unruly" nature of the problems.

Search and inquiry through preventative probing was an important mechanism for gathering information from the PMR's environment.

6.2.2 Recognition of the inadequacy of the protocols

One of the ways to recognise the tipping points in this case was the PMR's recognition that he needed to change the protocols. In humanitarian agencies, there are often pre-determined adjustments to policies or procedures for "emergencies", for example supply procedures are relaxed and financial validation limits raised. A common situation is that staff do not recognise the need and resist moving towards an adapted prescription at an appropriate moment, even when it does exist, let alone adapting in a novel way as in this case. Norms, protocols and SOPs can be considered as virtual resources, that support performance at work. When an actor perceives them as inadequate s/he is faced with a "virtual resource scarcity".

Below is a representation of the oxygen scarcity episode to help visualise the progression of the episode. It gives an estimated level of significance for the PMR, based on an analysis of the interview data.

Figure 6-1 Significant moments of the oxygen problem for the PMR Djoungolo, Cameroon
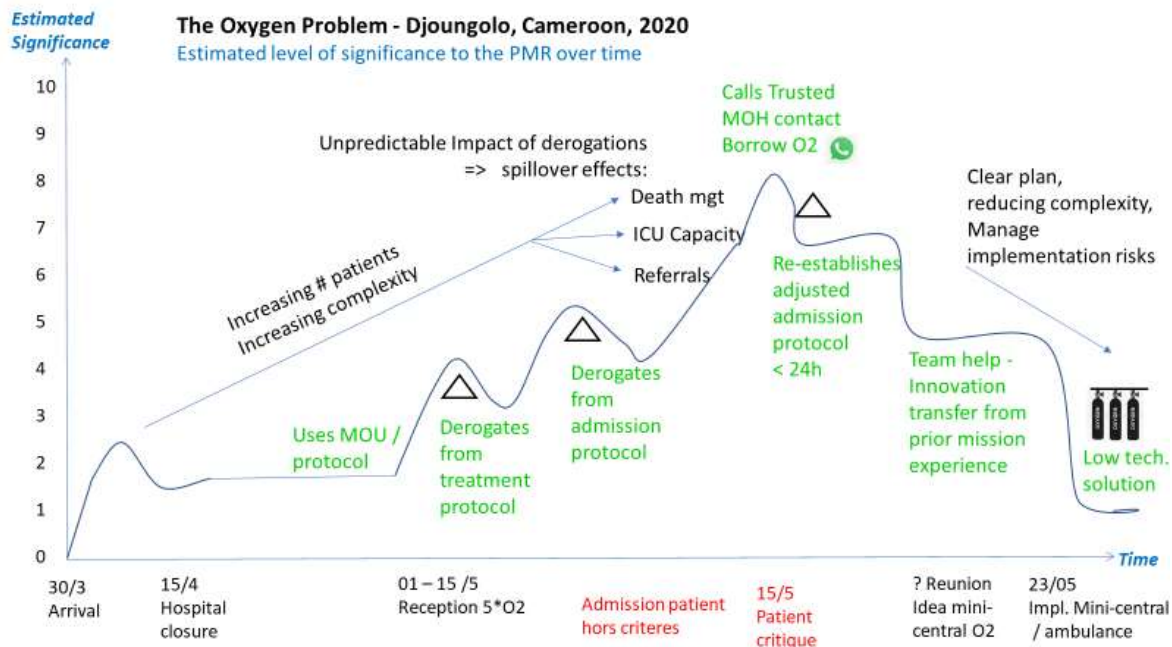
The point at which the PMR first significantly derogates from the protocols (treatment and admission) corresponds to an increase in significance of the problem. What led the PMR to recognise (consciously or subconsciously) the need to deviate from the protocols and/or normal functioning? At this point the PMR perceived the following elements:

- Feelings of being overwhelmed
- Clinical data and experience did not match with the protocol assumptions - observed difference between work as done versus work as imagined
- Perceived constraints - the protocol did not serve the primary objective (patient care)
- Anticipated increase in problem intensity (increasing number of patients)

He then realised the new admission protocol is not adapted. What made him change again?

- The urgency of the crisis (phase 5 - critical patient incident) perturbed the ongoing response and helped him clarify that further change was needed. The urgency was a significant contrast versus dealing with the problem on an ongoing routine basis.
- The increasing number of spill-over effects from patient deaths, and the level of complexity caused for his staff, hospital organisation and other patients.

- Perception / assumption of other actors' responsibilities and capacity (referring to MSF severe patients that they should have treated)
- Consultation with and pressure from MSF

In the next section, we will look briefly at how the PMR dealt with the inadequate protocols, once recognised.

6.2.3   Adaptation, improvisation and innovation

Once the scarcity was recognised as acute, with a high impact, it appeared to free up the PMR to step outside protocols and norms. By reaching the tipping point, it was like a spring released after being under tension, appearing to encourage a disposition to adapt and innovate.

Adaptation - the PMR's disposition to transgress the protocol

What helped the PMR decide to transgress and adapt the protocols and take risks?

- Pragmatism - Realisation and acceptance that there cannot be a perfect solution. The PMR could not meet all goals – critical patient care, protection of health structure and staff capacity.
- Perceived permanence of the adaptation – temporary solutions seemed easier to impose, as they are perceived not to reduce future options.
- He had a sense of agency to adapt and readapt the protocols, seemingly comfortable to make the decision.
- A capacity to contain the risk – for his own anxiety (aware that the MOH has mandated the protocol, later on – the risk of the oxygen station exploding) and those of his team (dealing with the staff and contractors fears related to the infection and the mini oxygen-generating station risks).

We also have the impression that organisational culture in MSF tends towards an acceptance of risk (open acceptance that each field context is unique, clear primacy to operational goals, patient care, humanitarian values, actors in the hierarchy have field emergency experience, a stated aim to reduce "bureaucracy" and empower the field).

Improvisation

In addition to the progressive adaptation of protocols, the PMR also used an improvised method to increase treatment capacity using a low-tech solution (a system of tubing) so one concentrator to treat two patients. The use of social communication tool WhatsApp to form an inter-organisational communication tool – WhatsApp group was presented, although we do not know if the PMR was instigator or recipient of this innovation.

Table 7 An example of improvised activities during the hospital shutdown, NAM, Yemen[24]

The Ibb MOH hospital, supported with technical expertise by MSF, had to close for several weeks due to lack of oxygen supply. The Nursing Activity Manager (NAM) directed her team to use the time to solve another supply issue by making improvised makeshift PPE, based on a model from the internet. The model was sent to her by a family member, who was also a medical professional.

Technical innovation - transfer of experience from other missions

Novel adaptation and innovation are prominent in the study corpus. Plato (2008) wrote in The Republic "yet the true creator is necessity, who is the mother of our invention" or more commonly cited in the English proverb, "necessity is the mother of invention". In order to achieve a semi-permanent resolution, the ongoing oxygen scarcity necessitated a technical innovation (innovation for the local mission) in Phase 7 - with the implementation of an oxygen mini-central, the management of which included significant technical challenges. We mention this point only briefly here, since will look further at some of the aspects of this local innovation in section 6.3.

Table 8 Examples of innovation transfer - the testing problem in Cameroon and Ukraine

In Djoungolo hospital Cameroon, suspected COVID-19 patients waited up to 10 days for a test and another 10 days for the result. With prior experience from Ebola missions, the MAM proposed to

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[24] Interview 1,Yemen NAM, 31.08.20

reduce the testing time to 48h by rehabilitating the hospital laboratory and doing the tests on-site, rather than remaining reliant on MOH capacity. They remained dependent on the MOH for the results, which were still delayed.[25]

In Ukraine, the PC[26], had previous experience of capacity building with partners and communities. Encountering similar delays in testing, she agreed with the MOH to use MSF resources to deliver tests and worked with the 3rd party lab to change their shift patterns and provided the workers with lunch and taxis home at night. This was initially paid for with MSF funds before handing over to the community to manage. Delays were reduced, and in exchange for the logistical help, the PC negotiated an increase in the breadth of the testing regime to suit MSF understanding of the needs.

Below is a summary table of the PMR's strategies.

Table 9 Summary of recognising and dealing with resource scarcity tipping points

Tipping Points of resource scarcity	Search and inquiry: preventative probing
	Recognition of the inadequacy of the protocols
	Adaptation, improvisation &
	Technical innovation – transfer of experience from other missions

The unruly problem analysis brought to the fore the temporal dimensions of the complexity and uncertainty – the surprising timeframe, the variations in manifestation and intensity of the problem, the recognition of a tipping point where a new solution was needed, unexpected spill over effects and a vicious cycle with expectations from the other hospitals. The strategies of search and inquiry, adaptation and innovation described above reinforced the results of prior COVID-19 research. There are surely others at a systemic or organisational level, for example coordination between different agencies, organisational decision making, flexible resourcing, teamwork and collaboration, but the focus in this dissertation was on the significant elements as defined from the actor's point of view. The

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[25] Video 1, Cameroon, MAM, 09.07.20, Interview 20/07/20

[26] Videos 2 & 4, Ukraine PC, 20 & 28/06/20 Interview 14.07.20

positive strategies above, however, did not reflect the full extent of what made the PMR successful in dealing with adversity over the prolonged first wave period.

Approaching it from a new perspective, we asked, what have we missed? What has not been decorticated from the case? Indeed, the recognition of a "lack" of adequacy in a protocol could be described from a negative perspective, rather than as a positive ability. Virtually pre-figuring the key finding below, this process was like reversing our viewpoint to look at the negative spaces in the story - those that gave form to the positive narrative above. Some outstanding questions remained with us, oriented by the Safety II approach, to find out how the PMR avoided the lack of oxygen turning towards a disaster.

- What allowed the PMR to cope with the anxiety and tension in his position as responsible for the COVID-19 operation?
- What can we learn from the PMR's experience of navigating the temporal complexity?

6.3   Navigating temporal uncertainty and complexity – a negative capability

The unruly problem analysis brought to the fore the temporal dimensions of the complexity and uncertainty – the surprising timeframe, the variations in manifestation and intensity of the problem, the recognition of a tipping point where a new solution was needed, unexpected spill over effects and a vicious cycle with expectations from the other hospitals. The PMR mobilised positive abilities but as explained at the end of the previous section, they do not appear to account for all the PMR's response strategies to the oxygen scarcity.

The PMR showed an additional aptitude to deal with the uncertainty, contain his anxiety, remain connected to the problem evolutions despite the complexity, and so act in a way that prevented an adverse situation, seemingly without issue, from degrading to a crisis. We found that such a capacity has been conceptualised by French (2001) as a *negative capability* in the domain of organisational change management.

The term negative capability was first proposed by English poet John Keats in 1817, in a letter to his brothers. Inspired by Shakespeare's work, he used it to describe a poet as being "capable of being in uncertainties, mysteries, doubts, without any irritable reaching after fact and reason" (French, 2001, p. 481). Wilfred Bion then used it to describe the state needed by a psychoanalyst to be able to "stand alongside" their patients, to bring about change (Bion, 1978, 1984, 1990, 1991). French then applied

the concept to change managers and leaders, having noted a "family resemblance" (Wittgenstein, 1953) in the qualities required. French (2001) describes the notion in the following way:

> Negative capability indicates the capacity to live with and to tolerate ambiguity and paradox, to ``remain content with half knowledge'', (Ward, 1963,p. 161) and, therefore, to engage in a non-defensive way with change, resisting the impulse merely to react to the pressures inherent in risk-taking. It implies the capacity to integrate emotional and mental states rather than dissociating oneself from aspects of emotional experience or attempting to cut oneself off from such experience altogether." (p. 482)

In the next section we will investigate the aspects of negative capability shown in by the PMR.

6.3.1   Tolerance to tension and temporal uncertainty due to the oxygen scarcity

The PMR's endurance in the face of the seemingly intractable oxygen problem

There are frequent references in the case to the build-up of anxiety and pressure. We can see that the PMR's tension came from the actual impacts of the oxygen scarcity, from his appraisal of future demand and anticipated increasing shortage, from the failure of his repeated efforts to find a solution and managing the consequences of the initial actions taken to investigate and palliate the supply problem. Until the final phase, he did not see a satisfactory means to resolve the problem, and during the process had no visibility of how long it would last.

- Phase 1: The PMR was immediately alert and anxious faced with the likely resource shortfalls and accepted them as a challenge.
- Phase 2/3: "a feeling of being overwhelmed" because the usual solutions were not adequate to meet anticipated needs.
- Phase 3: Seventy-two hours of intense work to develop the WHO proposal despite having evaluated there to be a risk that it would not bear fruit.
- Phase 4: the feeling of being overwhelmed is accentuated due to multiple scarcities "Chaque jour était un combat" and when he found himself managing deaths and corpses "c'était compliqué!"

The PMR was aware of and acknowledged his feelings of anxiety openly. What is notable is the way he withstood the strain of the temporal uncertainty. He continued meeting daily shortfalls, whilst remaining engaged in solving the underlying oxygen supply problem with both proactive and opportunistic actions.

The disposition to tolerate the complexity and uncertainty[27] appeared to be an enabling factor to the actor's sensemaking dynamic, permitting him to continue to search out means to deal with and affect an environment that might overwhelm others. Negative capability was important to live with the state of uncertainty, contain the resulting frustration and anxiety and be able to wait, perceive and act (rather than react) at the appropriate time. We interpreted this capacity to tolerate adversity as necessary to render possible the conditions for actor to use his "positive abilities". According to French (2001), without negative capability, emotional tension is released in unhelpful ways:

> If we don't have "good enough" negative capability, this can lead to "dispersal". Needleman uses the simple term 'dispersal' to describe the complex ways we behave when we cannot tolerate the emotional impact of the ``uncertainties, mysteries and doubts'' that life inevitably and constantly throws at us. Rather than waiting, holding the tensions and anxieties, living with problems that maybe intractable, accepting paradoxes and dilemmas for what they are, and conserving our energies - in other words, rather than developing and relying on our negative capability - we 'disperse' our energies. (p. 482)

Table 10 An example of dispersal from the PMR, Ukraine mission[28]

The Ukraine PMR reflected at the end of his mission on the effect of the frustrations he had felt regarding the oxygen supply. "It was not the pressure of work – I am a doctor; I am used to hard work and long hours. […] It was the not being able to perform my role. […] I no longer wanted to know how they resolved the supply quality […] Looking back at the videos, I realise I was tired, burned out".

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[27] For a discussion of the conceptualisation of Uncertainty Tolerance please see Hillen, Gutheil, Strout, Smets & Han (2017) who define is as "the set of negative and positive psychological responses - cognitive, emotional, and behavioural - provoked by the conscious awareness of ignorance about particular aspects of the world."

[28] Video 3, Ukraine PMR, 29.06.20

The PMR's patience with different rhythms

The PRM identified a need for patience and understanding of different rhythms with external actors. « Dès que l'état est impliqué, il faut, même dans l'urgence, avoir une certaine patience. […] les gens s'endorment » (471). The capacity to absorb and handle discordant rhythms of action, without cutting off from the different actors, was a form of temporal tolerance.

Perception of time availability

The PMR tolerated the ongoing difficulty faced with increasing oxygen supply, but when faced with the critical patient, he acted rapidly to find a solution. Linked to the ability to perceive different rhythms is the ability to assess time availability, which we saw changed according to the different actors. Recognising that the time to act is now, or there is time to continue searching was in this instance linked to the PMR's appreciation of urgency or whether there is time to follow standard procedures, but also to an assessment of future problem evolution and the assessment of the impact and risk of action versus inaction (patient death, insecurity if public unrest).

Table 11 An example from Ukraine of time perception - latent and crisis phases [29]

'The mind should be cool and hands warm'

In Ukraine, the PMR had a different estimation to his Project Coordinator, on whether to follow the usual strict supply validation process for a new (lower) grade of oxygen, in anticipation of a COVID-19 wave. This perception of time availability led to a conflict in prioritisation – whether to take time to obtain oxygen quality validation, or act to ensure a rapid increase in volume availability. The PMR gave the following testimony.

In an emergency, there's a latent phase and a crisis phase, before the crisis phase, when the emergency has begun and not yet reached crisis, maybe that is a very good time for us to do everything by protocol and follow the rulebook, because in crisis phase we won't be able to, there won't be any time". […] Let's be honest, oxygen is medicine. […] You cannot just give any substandard drug to a patient. I think HQ validation is fair – it gives us an assurance of the substance we are using. […] When I was in medical school, my favourite professor (paediatrician) told me –

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[29] Video 3, Ukraine PMR, 29.06.20

> *[your]mind should be cool and hands warm. Mind calm but actions swift. For me we could have acted and got validation and avoided conflict between me and the PC. It is all good now, but we should think about these things also.*

6.3.2   Temporary solutions

A willingness to revise decisions

The PMR employed temporary solutions (maximisation of existing insufficient oxygen concentrators, a break in the admission protocol to respond to a critical patient that could destabilise the hospital security). He showed a humility about his decisions, a capacity to retain an open mind, without over investing in the solution adopted, enabling him to perceive their unsatisfactory nature. The PMR was able to reverse the decision when he deemed it necessary (admission protocol) and maintain a continuous inquiry for more adapted, longer term solutions (advocating for other health agencies to fulfil their mandates, presenting the problem in the budget planning meeting). He remained open to feedback from the environment and readjusted until a sufficiently satisfactory equilibrium between the tensions creating the dilemma was attained. He was able to see that the solution was imperfect, that the opportunities for a permanent resolution were not available, and was able to move forward, remaining open to new opportunities.

To put the nature of unruly problems into perspective, we found useful the exploratory typology of problems encountered by professionals, presented by Dr Simon Flandin from the CRAFT team (see Annex 7). It highlights the nature of unruly problems as being inherently difficult to solve (intractable), requiring professionals to make acceptable compromises. This case seemed to show that such compromises can take the form of dynamic oscillations. French cites Charles Simeon's thoughts that the truth can be in both extremes. In 1825, Charles Simeon, an Anglican evangelical clergyman and biblical commentator, wrote to a friend about how to deal with the dilemma of eating meat or fasting, according to the church's direction saying. He enters an imaginary dialogue with Paul:

> "Here are two extremes ; observing days, eating meats, etc. —
> 'Paul, how do you move ? In the mean way ? '
> ' No.'
> To one extreme?'
> 'No.'—

'How then?'

'To both extremes in their turn, as occasion requires.'" (Sanders, 2008)

Seeing the "truth in both extremes", coupled with his capacity to tolerate the paradox between them, allowed the PMR to oscillate between what appear to be contradictory decisions – breaking the protocol to deal with the needs of critical patients and prevent their deaths, and then reinstating it despite still receiving critical patients. Effectively, he achieves some equilibrium by re-instating a "revised" protocol. He accepts to temporarily stabilise patients before sending them to the reference hospitals. He knows, however, that there will still be occasions where the other emergency units will become mute the next day, leaving him once more to manage the problem. The effect on everyday performance of what the authors call a "paradox mindset" was a key finding in a management study by Miron-Spektor, Ingram, Keller, Smith, & Lewis (2018) on individuals' approaches to tensions.

> We identify resource scarcity (i.e., limited time and funding) as a source of tensions. We also demonstrate that a paradox mindset—the extent to which one is accepting of and energized by tensions—can help individuals leverage them to improve in-role job performance and innovation. Our results highlight paradox mindset as a key to unlocking the potential of everyday tensions. (p. 1)

We have the impression that the PMR's strong vision of his sometimes-contradictory goals (to save patients whilst protecting the organisational capacity) facilitates these oscillations between extremes, using temporary solutions as acceptable interim compromises. We return to Charles Simeon who states in the preface to the *Horae Homileticae* "as wheels in a complicated machine may move in opposite directions and yet subserve one common end, so may truths apparently opposite be perfectly reconcilable with each other" (Sanders, 2008).

6.3.3   Situational opportunity creation

Engineering good fortune by creation of a trusted network

Development of mutual trust with the MOH representative before the acute crisis in Phase 5, simplified the PMR's decision to call for urgent help and facilitated the positive experience to receive the concentrator rapidly.

> According to Longstaff & Sung-Un (2008),

For individuals and organizations, trust often requires a "deep and constant engagement" (K. Chin unpublished manuscript), a give and take that builds faith in the other(s) over time. It cannot be established on the first day of a disaster. This leads to the conclusion that trusted communication must be planned. (p. 3)

In this case, however, we see that the PMR does not have time to plan but rapidly developed trust in contacts during the 2-month period. We can see it as a negative capacity that accompanies his daily interactions with new contacts - "c'est la première impression. Très vite en discutant avec chacun, je peux savoir si je peux compter sur celui-ci ou pas." (306). He does not develop the trust with a specific aim or request in mind, but it opens possibilities for unknown future situations of need, increasing the likelihood of advantageous outcomes.

According to Flandin, Poizat & Perinet (2021) trust is a strategy to cope with complexity, in that it provides a filter on the number of perceived future possibilities. In a similar way the built-up mistrust of the WHO representative was also a simplification for the PMR, who categorised him as an unreliable contact.

La complexité est synonyme de multiplicité des possibles. Pour agir, il faut réduire cette multiplicité. C'est précisément ce que permet la confiance : elle consiste à ne pas tenir compte volontairement d'un certain nombre de possibilités pour le futur. C'est en ce sens qu'elle est un mécanisme de « réduction de la complexité » […] « La complexité du futur est réduite par l'acte de confiance. En faisant confiance, on s'engage dans l'action comme s'il n'y avait que certaines possibilités dans le futur » [Luhmann 1979, p. 20] » Quere (2001) » (Flandin et al., 2021, p. 34)

According to the course of action framework, trust is not intuitively created, but is the result of a "concatenation of signs" perceived by the actor, who selects from their environment that which perturbs them. If we analyse what the PMR considered when deciding or not to trust another actor, we can identify such criteria as:

- the person's professional profile and history (rather than just their current role / institution) in relation to the PMR's previous experience (e.g. trust in an ex-MSF, mistrust of UN official)
- perceived competence through direct, open communication and assessment of difficulties (MOH representative, MSF Spain bio-med)
- the perceived pragmatism of responses to those issues
- reliable communication of the limits of capabilities/capacity and if promises were fulfilled
- if the person was perceived to act at speed in an emergency

Creating space in which to act

In the introduction to the case study, the PMR's role profile gave a feeling for the extent of his responsibilities. He had a multitude of preoccupations of which lack of oxygen was just one, if very important, issue to deal with. The study method necessarily tends to smooth out the depth and density of his experience, which would be impossible to document in this way over such a long timeframe. We did, though, gain an insight into the complexity he faced via the other videos and issues he identified (e.g. COVID-19 test sampling, managing personnel, strike risks due to lack of pay, his standard responsibilities …).

Despite conflicting priorities and demands on his resources, the PMR was able to keep the impacts of the oxygen problem at bay using temporary solutions. He seemed to be pushing back against the flow, to create space in which to focus on the problem. We have the impression that he continuously fought to find a tenuous

Figure 6-2 A journey through light and shadow © TangYauHoong

equilibrium, which progressively created more time and mental & emotional space to act.

It culminated in the PMR exposing the problem during the planning meeting, where the idea of the mini-central was a significant ray of light, a new perspective, creating joy at the prospect of a sustainable resolution to the problem. The building of an oxygen mini-central needed time, human and financial resources, consultation with an expert, a subcontract for construction, organisation to train and manage ongoing maintenance and associated significant risks. Without the capability to create space, the PMR would not have been able to tackle such a consequential endeavour.
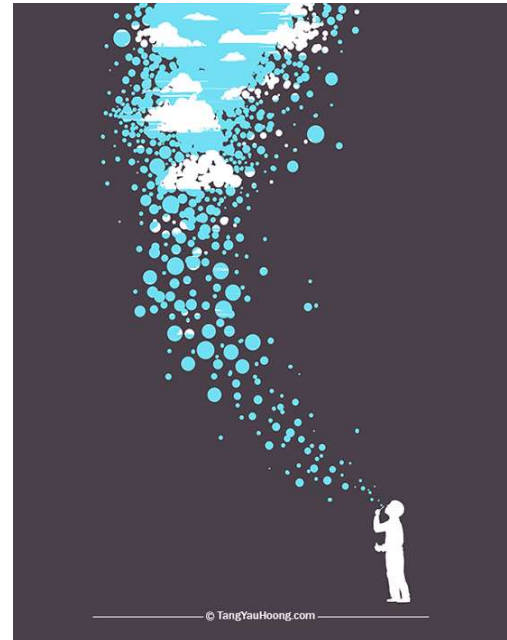
Table 12 An example of situational opportunity creation, MAM Cameroon[30]

In phase 7: the Djoungolo MAM was instrumental in provoking a meeting with the management cell when faced with patient problems that were not being resolved locally. He asked help from, a trusted colleague, a flying IPC, from the management cell.

Pour accéder à la cellule 3, comment j'ai fait ? J'ai discuté avec lui, car on logeait dans la même résidence. Faut qu'on gère tous ces problèmes ! Je veux que tu contacte le cellule… je voulais qu'il puisse stimuler une réunion… que je sois présent… Finalement la cellule a réagi positivement pour l'alimentation des patients, achat local d'équipement biomed et PPR.

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Table 13 Summary of navigating temporal uncertainty & complexity – a negative capability

Tolerance to tension and temporal uncertainty	Endurance in the face of the seemingly intractable oxygen problem Patience with different rhythms Perception of time availability
Use of temporary solutions	Willingness to revise decisions Recognising the truth in the extremes
Situational Opportunity Creation	Engineering good fortune through trust and networks Creating space in which to act

Simpson, French and Harvey (2002) analysed the implications of the "complex interaction between positive and negative capabilities" in leadership theory and practice. They note that risk-taking involves raising the threshold of uncertainty, it sets up precisely the conditions in which negative capability may be demanded" (p. 1223-4). In the same way, we have seen that unruly problems set up conditions that require a level of negative capability. Indeed unruly problems are not ones that are

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[30] Interview 1, MAM Cameroon, 20/7/20, 59".

resolved in the short term, if at all, and hence require a level of negative capability to tolerate the problems, make space to enable meaning to emerge, and patience to treat the iterative spill over problems whilst finding a more sustainable solution. The coupling of negative capability with the unruly problem analysis can thus be seen as a counter model to usual positive problem resolution approach.

Simpson et al. conclude by questioning and calling for research to understand the ways in which leaders acquire, develop and access negative capability in the required moment. This questioning directs us back to the core research question of what can we learn from the experience of the COVID 19 first responders to improve training and preparation for future unprecedented and uncertain emergency responses?

7. Implications for training

There is an increasing awareness that Humanitarian organisations need to prepare all staff to operate in emergency response, since projects globally are based in volatile contexts that could tip into an emergency with little or no notice. The question of how to prepare humanitarians to shift to and operate with an emergency "mindset" or "mode", and what that means in practice, are open questions for organisations such as MSF. Section 7.1 looks at the proposition to conceive Emergency Preparedness training using inspiration from Hollnagel's Safety I and II paradigms. Sections 7.2 and 7.3 look at training design and implementation using the specific results from the case study.

7.1   Training conception - emergency preparedness paradigms I and II

Emergency Preparedness training often uses a curricular approach (for example in MSF learning solutions are separated into 4 levels of progressive competency development) according to emergency typology and technical skillsets. This includes:

- understanding the most common evolution, challenges and treatment per type of emergency e.g. a cholera epidemic, acute malnutrition, trauma &mass casualty…
- knowledge of standards, procedures, tools and prior lessons learned, through training and knowledge management systems

- knowledge of controls and barriers against known or anticipated difficulties or risks.
- Shared reflection and analysis of past experiences.

Humanitarian organisations are accustomed to operating in widely varying and dynamic contexts. They have a certain tolerance for uncertainty and adaptation. As noted above, sharing of past experiences is encouraged. In the main, though, the focus is on what difficulties did we face? What could we have done differently? What lessons did we learn from prior "adverse events"? Indeed – evaluation mechanisms, internal audits, policies, procedures, tools and controls are mainly developed, with the aim of managing anticipated risks and transferring organisational learning to prevent known failures.

There is also an increasing interest on transfer of best practices through "communities of practice" to achieve a quality of performance. To date these mechanisms have mitigated success. A focus on what went right is rather counter intuitive to the western action-oriented problem-solving culture, accustomed to the discussion of difficulties faced, rather than a focus on everyday successful resilience strategies. In the oxygen problem case, many of the actors' responses were based on previous missions (borrowing resources from other projects, local capacity building, adapting the project scope). This implies that there is also much to learn for resilience training from successful experiences of normal work situations as well as past successful emergency responses.

Building on the concepts of Safety I and Safety II security approaches then, we can consider that most existing humanitarian emergency preparedness training approaches fall under a "Preparedness I" model[31]. The idea is that understanding the theory and reasons behind the procedures, as well as case studies / simulations and sharing of past complex experiences will prepare actors for when they are faced with such emergencies. They don't however prepare for "unexpected" novel adverse configurations. The results of this research tend towards the need to reinforce the preparation of individual actors to be resilient in the face of unforeseen scenarios. For example, the case showed that humanitarian organisations can, like others, experience functional challenges that require individuals to cope without expected resources and support.

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[31] A "semi-exception" are the EPrep workshops, which combine lessons learned, operational scenario planning and are linked to everyday work since they are situated in the likely emergency context and involve the actors (internal and external to the organisation) that will be involved in a response, if or when it will occur.

The comprehension, acceptability and adherence to a Preparedness II model needs to be considered. Inspired by Hollnagel's four resilience potentials (Hollnagel, 2017), below we represent how an Emergency Preparedness II paradigm might be presented to humanitarian actors, making links to the well accepted notions of project and learning cycles.

Figure 7-1 Preparedness II resilience potentials
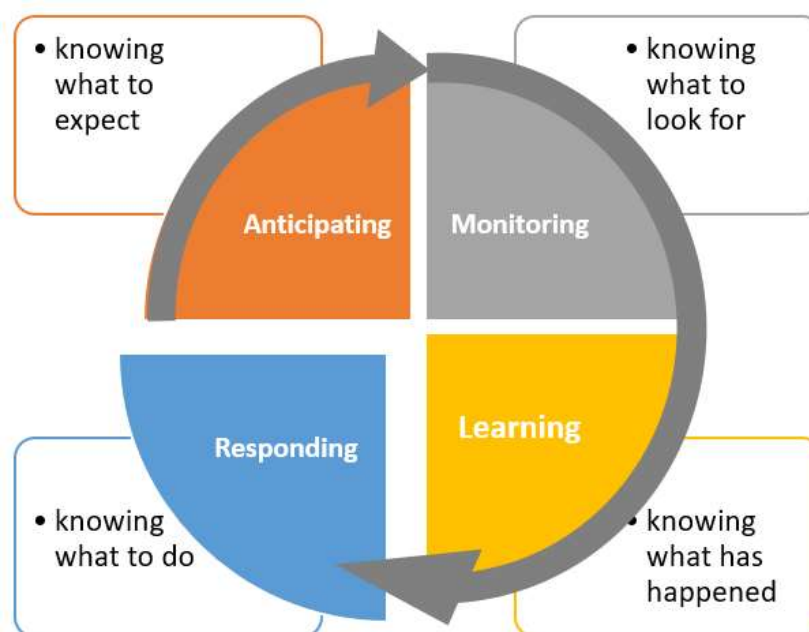
From this study we could distribute the findings related to unruly problems coupled with negative capability to the different potentials, which would then help us in the design of training. Below is a non-exhaustive attribution, to visualise the idea.

Figure 7-2 Preparedness II unruly problems - negative capability
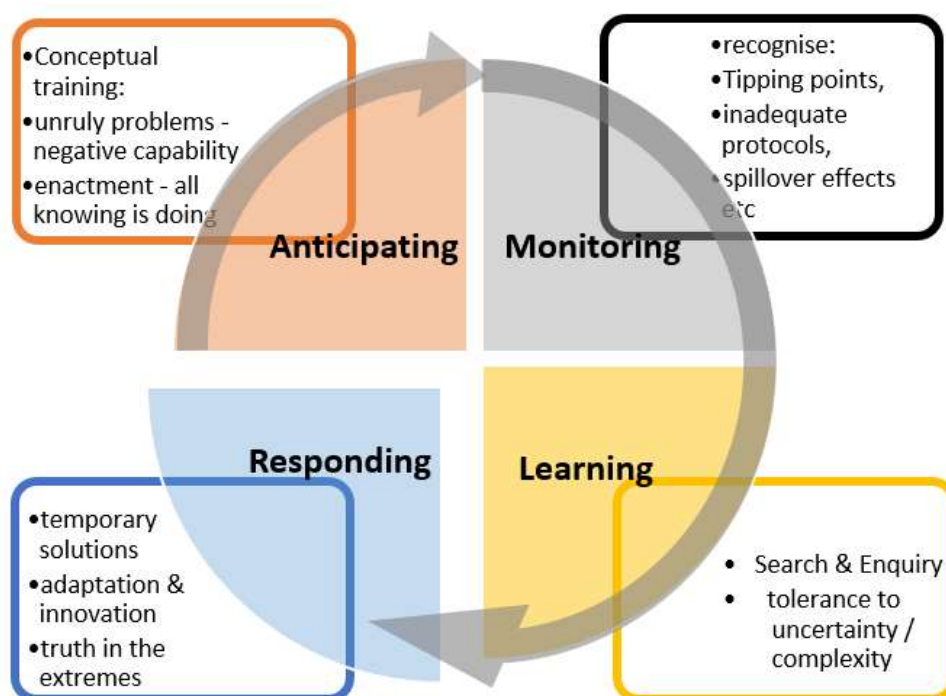
7.2   Training design

Experienced humanitarian actors have expressed the view that "you can't train people for this", implying it is an innate character trait or "comes with field experience". When faced with a complex real-life experience problem in training, "it depends" is a classic answer from the facilitator, an honest answer - but it tends to frustrate learners. According to the Head of L&D, MSF, William Empson[32], MSF training experience for field staff using complex case studies led to frustrations expressed by both facilitators and participants regarding lack of clarity where the scenario response did not respond to all the dilemmas posed. This led them to readapt the cases to encourage clear resolution at the end. From the lived experience during this study though, complexity and uncertainty seems representative of the reality faced during the early emergency response phases, and therefore worth transparently acknowledging and considering when preparing responders.

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[32] Personal discussion September 2020

Keeping this approach in mind, we will look at training design to encourage sense-making to support emergency responders in navigating the uncertainty and complexity inherent in unruly problems and novel configurations of adversity.

7.2.1   Training objects – unruly problems - negative capability

Unruly problems

We have described the particularity of unruly problems by their temporal complexity, as well as by their intractable nature. They are inherently difficult to resolve, and those actions that are taken may create cascading spill over effects that exacerbate the issues faced. This echoes Weick's notion of enacted sensemaking in a crisis, whereby the actions taken during a crisis to understand it, may in fact aggravate the situation, propelling it towards disaster.

Trainings often have the objective to prepare responders for typical emergency scenarios or challenges, so they can recognise them and learn the known ways to deal with the challenges. Unruly problems appear to be a promising training object to prepare emergency responders for the process of search and inquiry itself, which is useful in identifying the tipping point into an emergency configuration (often difficult to recognise), to investigate the nature of a problem, in particular, when faced with complex interactions that combine to form a novel configuration of adversity. Unruly problems then, seem propitious to train people on the process of dealing with an emergency (not an acute crisis), rather than to know the outcome of an envisaged scenario.

- Opportunity to pre-figure the nature of unruly problems and recognise when faced with such a configuration.
- Recognition of the different temporal challenges (surprising timescale, varying intensity, misalignment between problems and solutions, vicious circles).
- Experience the unpredictable turbulent feedback loops that require continuous enquiry, preventative probing
- Know under what circumstances and encourage a disposition to adaptation, improvisation and innovation. A means to encourage a disposition to reconfigure past experiences for innovative transfer into new emergency scenarios.
- An environment to understand the notion of enactment, and how it can open possibilities of action in an emergency (individual and collective).

As shown by the case, they appear to require a certain tolerance to deal with them, and so provide a propitious training scenario to encourage a disposition of negative capability.

Negative capability

Behavioural competencies such as analytical thinking, decision making, flexibility, agility and adaptability, cultural sensitivity, security, change management, safety and duty of care are recognised as important in humanitarian work. They are encouraged through leadership and professional development programmes[33] and are habitually included in personal appraisal processes. Situational awareness is often included in this list. The Course-of-Action framework challenges this idea, rejecting the notion of an objective environment disconnected from the actor, rather, the actor enacts their environment according to the meaning and significance s/he attributes to the elements that perturb his/her internal organisation. This then orients their activity and hence the feedback from their environment.

This study implies that if an actor is "capable of being in uncertainties, mysteries, doubts, without any irritable reaching after fact and reason" (French, 2001, p. 481), it contributes to their ability to enact their environment. A disposition to tolerate prolonged periods of uncertainty / complexity is an enabler to investigate the environment and continue the dynamic of sense-making and hence the creation of opportunities. From the case study presented we deduced that negative capability is a necessary but often transparent capability when navigating uncertain and complex dynamic emergencies.

The dominant organisational training model is to train responders for action. As Simpson et al. note, "[in a] performance-oriented context, the active and the technical dominate over the passive and the humane" (2002, p. 14). The results of our study imply that negative capability would be a relevant training object with regards to improving resilient performance, especially in the face of unruly problems. This conclusion joins French's analysis that with negative capability can be increased through exposure to situations that require it, and that this in turn will prepare an actor for the future by enhancing their tolerance to remaining connected to the moment. According to French (2001)

> If we or the system, the group or the organization, have developed sufficient negative capability, we may be able to stay with the moment and, by doing so, discover a new thought, a new idea, a

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[33] See for example WHO Health Emergencies (WHE) Learning Strategy, 2018, p.13

new possibility, however slight: we may learn something. In so doing, we may also increase our negative capability, that is, we may enlarge our capacity to cope with such encounters in the future and to contain the uncertainty of not-knowing. (p. 486)

Negative capability could be understood as a an inherent characteristic of an individual, but it is a capability that is developed by artists (a refined connection with their internal and external worlds, perception of negative space) and psychoanalysts (attention to what is not being said and finding resonances with their internal perceptions). This gives weight to the postulate that negative capability can be encouraged. If we can put people in a state where they need negative capability to navigate through adversity, then what are the conditions to stimulate an awareness of, an adherence to its significance and a disposition to act with such negative capability?

7.2.2 Design

There are aspects of unruly problems and the disposition to act with negative capability that do not easily lend themselves to conceptualisation, mental and physical simulation, or training evaluation – notably the effect of installation of fatigue, discomfort, doubt, the timeframe to allow inquiry with multiple temporary solutions and innovative responses. Nevertheless we note here some design principles that appear through the activity analysis in this study: This study implies possible training avenues to prepare humanitarian emergency responders using an unruly problem-negative capability coupling.

A Preparedness I approach could include curricular trainings based on

- o Conceptualisation of Unruly problems, and link to resource scarcity.
- o Conceptualisation of negative capability as an enabler of a "deep receptiveness" in order to increase opportunities when facing intractable unruly problems
- o Link to everyday work adjustments – to identify how adjustments to policies and protocols are decided and implemented in everyday work. Awareness of the role of adaptation and innovation in emergency response.
- o Understanding the notions of enacted sensemaking

A Preparedness II approach then could be used as a complement (not a replacement!) to lessons learned and thematic knowledge gained through a Preparedness I model. We propose notably to build on research already developed by the CRAFT team members, (Flandin et al., 2020). We add elements to

the four resilience-oriented principles they propose for the design of training situations which we borrow to propose principles for Emergency Preparedness II training from this case study:

1) Encourage mimetic experiences – link with targeted work conditions
   a) Conception of scenarios that challenge organisational policies, protocols, procedures or SOPs, that invite adaptation and innovation
   b) Use of intractable unruly problems based on emergency work, e.g. resource scarcity – to invoke the need for a negative capability

2) Pay attention to attention and concernedness
   a) Focus on the temporal aspects of the <u>process</u> of inquiry and recognition of tipping points
   b) Experience of negative capability as an enabler of a "deep receptiveness" in order to increase opportunities when facing intractable problems.
   c) Use of metaphors and work testimonies based on temporal aspects of dealing with unruly problems. E.g. For the need to circle a round-about to find the route to take / or take a U-turn when necessary, the artist's perception of negative space allows him to interpret in a new way what others don't see, finding the stillness in the eye of the storm to observe what is happening.

3) Perturb and turn into an event
   a) Add elements intractable problems, or those that require adjustments to protocols and/or innovation.
   b) Extending the timeline of scenarios to provide options for temporary solutions[34] to gain time to deal with the fundamental problem. This will allow re-adaptation based on the enactment of the training environment and the resulting linked spill-over effects.
   c) Start the training with a perturbation – e.g. wrong "directions (prescription) to the training and discuss how did they recognise, feel, deal with it?

4) Support participatory-sensemaking and collective sense-making
   a) Use of training environments to investigate and debate the recognition and adaptation of non-adapted organisational policies, protocols, procedures or SOPs, and under what conditions adaptation and innovation are required responses.
   b) Encourage the disposition to "think outside the box" through expansion of sense-making.

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[34] We could see this as a response to temporary hypotheses formed during abductive reasoning processes when enacting their environment. See Flandin, Salini, Drakos, & Poizat (2020)

7.3   Considerations for training implementation

7.3.1   Methodologies

Existing training exploited by humanitarian organisations is by and large conceived through what we have called a Preparedness I paradigm. This section exposes a non-exhaustive list of adaptations and additions inspired by considering the Preparedness I & II paradigms and the propitious nature of the unruly problem – negative capability coupling to prepare responders for novel forms of adversity.

Table 14 EPrep I & II Training propositions based on unruly problems - negative capability

Training solution	Existing	Propositions for development	Comments
Behavioural competencies knowledge development	Knowledge based curricular training (Classique curricular). E.g. Flexibility, agility and adaptability	Addition of Negative capability. (EPrep I) Inclusion of negative capability to competency-based handbooks and tools	Conceptualisation for the actors of negative capability, unruly problems E.g. use of metaphors – e.g. round about to create opportunities of significations.
Testimonies, Anecdotes	Circulation of professional experience	Use of storytelling from analogous emergencies to show the different enactment according to the actor. Use of the dramatic story telling structure (Freytag's Pyramid, e.g. see (Shree, 2020)) to engage emotions and encourage transparency of the process of inquiry and influence of negative capability.	for inclusion in all modalities
Debate on work practices and controversy - between professionals	Reflexive experience sharing	Identification of conditions that lead to step outside the usual schema? Identification of trigger points leading to innovation How are adjustments made in normal work &	Training is a protected space to permit free circulation of contraventions, adaptation of the "prescription" NB - can encourage debate about "ordinary work" and application / projection into emergency situations

Training solution	Existing	Propositions for development	Comments
		emergencies to prevent deterioration?	for those without lived experience of emergencies
Case studies / Tabletop Simulation	Table top exercises – with various different objectives (test, train, interorganisational collaboration)	Add unruly problems to scenario – with multiple routes and options. Feedback based on the participant choices. Extend the timeframe for the scenarios - evolution and iterations of feedback based on participant choices & lived experiences (Ebola, COVID), especially "unforeseen consequences" that provide new challenges. Promotion of complex search and inquiry – including use of real network actors to provide input on request, orientation towards existing communities of practice. Add an element of resource shortfall that limits the possibility to implement the prescription or protocol.	For example – interactive scenarios as per "game books" – this could be via eLearning, virtual reality (increasingly used in humanitarian simulation training), or during physical case studies and simulations. Agile and adaptable to context - Implies the need for a "maitre de jeu" with capacity for reactivity and agility to provide feedback based on the choices made by the participants. Implies preparation of a wider network of organisational actors to be prepared to help with participant questions during the search & inquiry. This could be a motor to build awareness and encourage use of communities of practice.
Simulations	Full scale simulations (notably ICRC and the UNs, but rare due to lack of resource allocation, usually for experienced or senior	Consider unruly problems in scenario building Include a level of complexity and uncertainty that incites anxiety and pushes towards acceptance that rule transgression is a valid option. Encourage	This challenges the requirement for psychological security and may require design of accompanying support. NB "Strategic Crisis Management - training taught "by exploring

Training solution	Existing	Propositions for development	Comments
	humanitarians with key decision-making responsibilities. E.g UN security training)	collaborative creativity to navigate the challenges. Participative scenario conception – this process in itself could be defined as an unruly problem – and conceptualised as the participants go through the process. Encouragement of use of participants' real professional networks (in & outside MSF) as resources during the trainings. but could be expanded to case study resolution).	short- and long-term consequences, preferably through the creation and assessment of multiple scenarios" but not fit for conditions of deep uncertainty, where leaders are faced with "unknown unknowns"" (Ansell & Boin, 2019, p. 1080)
Eprep workshops	Learning from prior responses, prefiguration of likely scenarios and organisational response preparation	Include extra step - elements of "spoke in the wheels" scenario to test / prefigure reactions to the unexpected. As above – real network building	Partner organisations could be present. Useful environment to develop trust between individuals and organisational partners who will work together in emergency responses
On the job learning	Emergency response experience	Peer-mentoring / coaching to include an attentiveness to dealing with unruly problems requiring a negative capability.	The COVID-19 reduced HR mobility meant locally based staff took on new roles. A rapid response peer mentorship scheme was implemented in MSF to support them, which could be replicated to future emergency contexts.

7.3.2   Implications for the role of the trainer/facilitator/mentor

The results of Implies that negative capability could be a training object for preparing facilitators of EPrep II trainings. Such trainings will require a conceptual knowledge but also a practical application and tolerance to uncertainty, for trainings based on participant experience, inquiry, spillover effects

etc that are not pre-defined by a training scenario. Unruly problems - Negative capability could therefore form a relevant training object in "Training of Trainers / Facilitators" programmes. It could also be integrated into peer mentor/coach training programmes as mentioned in the table above.

The facilitator will need to expand enactment opportunities for participants – encouragement of using all senses including emotions to increase perception (perception of emotional state, self-awareness, awareness of resource persons and how to recognize them, disposition to recognize limits, when to adapt and change strategy…)

Negative Capability- family resemblances

- Poet
- Psychoanalyst
- Change manager / leader
- Emergency / Crisis Manager
- Preparedness II Training facilitator

The facilitator will themselves need a strong level of "negative capability" – to cope with the uncertainty of evolution of the scenario and ability to promote learning opportunities both conceptually and by adjusting the scenario responses. Also training to conceptualise and be able to explain and link it to the participants' experience as needed.

### 7.3.3 Implementation cost – benefit considerations

The question of value for money will surely be a concern for implementation of the propositions above. Would the investment make a real difference to how actors are prepared for future emergencies? It raises the question of how to prioritise investment, and how to measure the impact of the propositions above. This study cannot answer those questions, but we can suppose that certain elements would be more costly than others (time, human resources, money) and that effectively, proving capability development will not be straight forward. The following is a non-exhaustive list of elements to consider

- Optimising the timeframe of the training (likely 5 days max and constraints / cost for travel). Note – timeframe can also be asynchronous elongation during scenarios
- The impact of COVID-19 on opportunities for face-to-face trainings, synchronous and asynchronous virtual trainings etc.
- Consideration of participant profiles according to who would gain most per methodology

- Monitoring and evaluation mechanisms would need development. How to evaluate impact in subsequent real emergencies

Below we propose a tentative mapping of the developmental potential of the different propositions versus the investment required by the organisation.

Figure 7-3 Implementation matrix – investment vs transformation potential
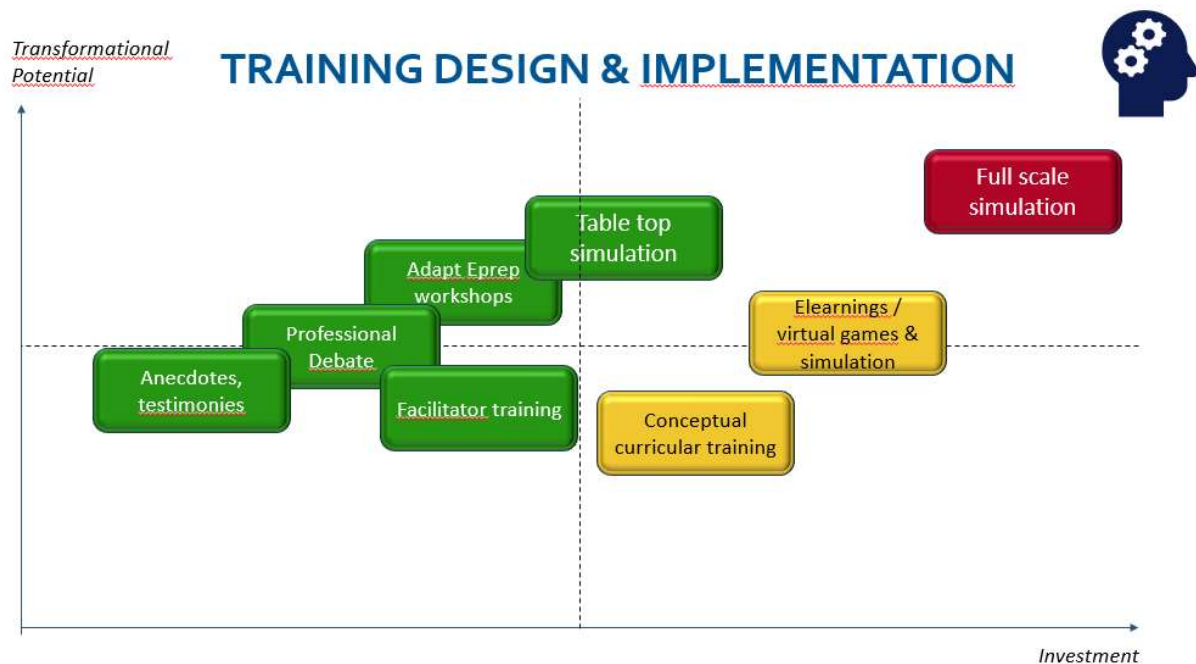
Mechanisms in green appear to have an attractive cost-benefit ratio, followed by those in amber, then red.

7.4   Limitations and further research

Limitations

The enforced data collection at distance meant that there was no access to direct observation, recorded video data or extrinsic description that characterizes activity on the basis of external factors from the observer's point of view (e.g. spatial, temporal, organizational, artefactual elements; performance determined by the execution/non-execution of certain important actions and the time taken to execute them; collective achievement; bodily involvement in work: postures, gaze, gestures; co-worker behaviours, etc.). This provided a challenge for the actors to be in a state to "relive" the experience

during the narration, with enough detail to promote access to pre-reflexive consciousness without recorded traces of the activity.

We planned to collect video diaries two to three times per week during the participants' response activity. Most videos were done retrospectively, and the data collection was less regular than originally imagined. The primary reason is linked to the participants' limited time and energy concurrent to their primary operational response activities. We followed with each participant until they assessed they had exhausted the significant experiences from their point of view.

Further research

Expand on the participant and mission profiles

The participant recruitment response rate was approximately 50%. Other missions and profiles were suggested by the researchers, but either deemed too busy by the management cell, or did not respond to direct requests for participation. This suggests that the experiences may not represent those from the most intense responses. Additionally, an intention was to prioritise local staff in the research as this population is under-represented in emergency response trainings, only 3 participants were working in their home countries; one of these was an MSF expatriate locally recruited due to international border closures. It could be interesting to expand the corpus posteriori to include local actors to identify any additional significant experiences, preoccupations and learning from high intensity responses.

Many of the participants talked about the challenges and advantages of working with the Ministry of Health employees in the different countries, specifically due to a perceived difference in response rhythm. Research to understand the lived experience of staff from partner organisations and their interactions with INGOs would be useful to enhance training by incorporating specificities of their experiences and the coordination between the humanitarian agencies and their governmental counterparts.

Tipping Points

This study identified the importance of recognising the tipping point of resource scarcity and its link with recognising the need to break protocols and adapt or innovate when moving to an emergency mode of action. Further analysis to understand in more detail how actors recognise such tipping points would be of use in the design of efficient training environments.

The results from the research identified a promising training object, that of the development of disposition of negative capability through a coupling with unruly problem scenarios. Some propositions for training conception and design were made in sections 7.1 – 7.3. More research would be needed to test what training conditions and environment are most propitious to encourage the development of this disposition, how we could measure it and whether it in fact enhances efficacy during novel and/or uncertain emergency response conditions.

7.5   Conclusion

The study's methodology, analysing the front-line responders lived experience giving primacy to the actors' point of view, permitted us to see how the different manifestations of the lack of oxygen were linked together. Indeed, it was the PMR that associated the different issues in one episode recounted as "the oxygen problem". We therefore conceptualised resource scarcity as one unruly problem that took different forms impacting in diverse ways on the PMR's activity and over time. The problem manifested itself according to the way he enacted the problem - the unruly feedback loops varied according to the PMR's interpretation of his environment and what he perceived as issues at any point in time. This in turn coloured his vision of the need, or not, to inquire further or to act. In different phases, his responses varied according the opportunities he saw and/or created and tended towards resolving or creating new spill over problems. This is consistent with the hypothesis that an actor enacts his environment, forming one system, due to the asymmetric (or loose) structural coupling proposed by Maturana and Varela (1987) and used in Theureau's Course-of-Action framework (2006).

This study proposes that a negative capability accentuated the actor's capacity to connect with his environment of adversity, complexity and confusion that caused emotions such as anxiety and fatigue, that can cloud and actor's vision. This capability of tolerance and availability to remain in the situation enhanced opportunities to create meaningful situational opportunities and navigate and perform his role and activity successfully, creating space to finally find and implement an innovative solution.

We propose that front-line emergency responders can be better prepared for unknown, complex, intractable emergency challenges by complementary training elements based on the concept of Emergency Preparedness II, inspired by Safety II resilience paradigm (Hollnagel 2009, 2015, 2017). The coupling of unruly problems and negative capability is proposed as a promising training object,

through the development of conceptual understanding and experiential learning. This could be introduced as an alternative mode to "problem-solving", impotent in the face of intractable problems and which can lead to energy-consuming "dispersal". We propose including the recognition of unruly problem characteristics, recognising and dealing with resource scarcity tipping points, use of temporary solutions and situational opportunity creation as means towards developing a disposition of negative capability.

Bibliography

Al-Dahash, H, Thayaparan, M and Kulatunga, U. (2016). Understanding the terminologies : Disaster, crisis and emergency. *Proceedings of the 32nd Annual ARCOM Conference, ARCOM 2016*, 1191-1200. Manchester: Association of Researchers in Construction Management (ARCOM). Consulté à l'adresse https://openresearch.lsbu.ac.uk/item/872x5

Ansell, C., & Bartenberger, M. (2016). Tackling Unruly Public Problems. In *Governance in Turbulent Times* (p. 107-136). Oxford University Press. https://doi.org/10.1093/acprof:oso/9780198739517.003.0005

Ansell, C., & Boin, A. (2019). Taming Deep Uncertainty : The Potential of Pragmatist Principles for Understanding and Improving Strategic Crisis Management. *Administration & Society*, *51*(7), 1079-1112. https://doi.org/10.1177/0095399717747655

Ayebare, R., Waitt, P., Okello, S., Kayiira, M., Atim Ajok, M., Nakatudde, I., … Lamorde, M. (2020). Leveraging investments in Ebola preparedness for COVID-19 in Sub-Saharan Africa. *AAS Open Research*. https://doi.org/10.12688/aasopenres.13052.1

Bar-On, E., Segal, G., Regev-Yochay, G., Barkai, G., Biber, A., Irony, A., … Kreiss, Y. (2021). Establishing a COVID-19 treatment centre in Israel at the initial stage of the outbreak : Challenges, responses and lessons learned. *Emergency Medicine Journal : EMJ*. https://doi.org/10.1136/emermed-2020-209639

Blanchet, K., Alwan, A., Antoine, C., Cros, M. J., Feroz, F., Guracha, T. A., … Johansson, K. A. (2020). Protecting essential health services in low-income and middle-income countries and humanitarian settings while responding to the COVID-19 pandemic. *BMJ Global Health*, *5*(10), e003675. https://doi.org/10.1136/bmjgh-2020-003675

Braithwaite, J., Wears, R. L., & Hollnagel, E. (2016). *Resilient Health Care, Volume 3 : Reconciling Work-as-Imagined and Work-as-Done*. CRC Press.

Carayon, P., Wetterneck, T. B., Rivera-Rodriguez, A. J., Hundt, A. S., Hoonakker, P., Holden, R., & Gurses, A. P. (2014). Human factors systems approach to healthcare quality and patient safety. *Applied Ergonomics*, 14. https://doi.org/10.1016/j.apergo.2013.04.023

Chertow, D. S., Kleine, C., Edwards, J. K., Scaini, R., Giuliani, R., & Sprecher, A. (2014). Ebola Virus Disease in West Africa—Clinical Manifestations and Management. *New England Journal of Medicine*, *371*(22), 2054-2057. https://doi.org/10.1056/NEJMp1413084

Cotter, C. (2020, avril 23). From the 'Spanish Flu' to COVID-19 : Lessons from the 1918 pandemic and First World War. Consulté 25 juillet 2021, à l'adresse Humanitarian Law & Policy Blog website: https://blogs.icrc.org/law-and-policy/2020/04/23/spanish-flu-covid-19-1918-pandemic-first-world-war/

Dahab M, vanZandvoort K, Flasche S, Warsame A, Spiegel PB, Waldman RJ, & Checchi F. (2020, mars 20). COVID-19 control in low-income settings and displaced populations : What can realistically be done? Consulté 19 juin 2021, à l'adresse LSHTM website:

https://www.lshtm.ac.uk/newsevents/news/2021/covid-19-control-low-income-settings-and-displaced-populations-what-can

Dawson, A., Isaacs, D., Jansen, M., Jordens, C., Kerridge, I., Kihlbom, U., … Skowronski, G. (2020). An Ethics Framework for Making Resource Allocation Decisions Within Clinical Care : Responding to COVID-19. *Journal of Bioethical Inquiry*, 1-7. https://doi.org/10.1007/s11673-020-10007-w

Durand, M. (2011). Self-constructed activity, work analysis, and occupational training : An approach to learning objects for adults. In *The Routledge International Handbook of Learning*. Routledge.

Fairbanks, R. J., Wears, R. L., Woods, D. D., Hollnagel, E., Plsek, P., & Cook, R. I. (2014). Resilience and Resilience Engineering in Health Care. *The Joint Commission Journal on Quality and Patient Safety*, *40*(8), 376-383. https://doi.org/10.1016/S1553-7250(14)40049-7

Filliettaz, L., Billett, S., Bourgeois, E., Durand, M., & Poizat, G. (2015). *Conceptualising and Connecting Francophone Perspectives on Learning Through and for Work*. Dordrecht: Springer.

Flandin, S., Poizat, G., & Durand, M. (2018). Improving resilience in high-risk organizations : Principles for the design of innovative training situations. *Development and Learning in Organizations: An International Journal*, 9-12. https://doi.org/10.1108/DLO-03-2017-0027

Flandin, S., Poizat, G., Durand, M., & CRAFT, É. (2017). Peut-on former à des situations imprédictibles? Une piste théorique. *Entre pressions institutionnelles et autonomie du sujet: quelles analyses de l'activité en situation de travail en didactique professionnelle*.

Flandin, S., Poizat, G., & Perinet, R. (2021). Proactivity and reactivity : Two approaches to the design of professional development activities for industrial safety. *Cahiers de la Sécurité Industrielle*, *2021-01*. Consulté à l'adresse FonCSI.org/en

Flandin, S., Salini, D., Drakos, A., & Poizat, G. (2020). Training design fostering the emergence of new meanings toward unprecedented and critical events. *@ctivités*. Consulté à l'adresse https://hal.archives-ouvertes.fr/hal-02890036

Frankfurt, H. G. (1958). Peirce's Notion of Abduction. *The Journal of Philosophy*, *55*(14), 593-597. JSTOR. https://doi.org/10.2307/2021966

French, R. (2001). "Negative capability" : Managing the confusing uncertainties of change. *Journal of Organizational Change Management*, *14*(5), 480-492. https://doi.org/10.1108/EUM0000000005876

Garry, S., Abdelmagid, N., Baxter, L., Roberts, N., le Polain de Waroux, O., Ismail, S., … Checchi, F. (2020). Considerations for planning COVID-19 treatment services in humanitarian responses. *Conflict and Health*. https://doi.org/10.1186/s13031-020-00325-6

Hillen, M. A., Gutheil, C. M., Strout, T. D., Smets, E. M. A., & Han, P. K. J. (2017). Tolerance of uncertainty : Conceptual analysis, integrative model, and implications for healthcare. *Social Science & Medicine*, *180*, 62-75. https://doi.org/10.1016/j.socscimed.2017.03.024

Hollnagel, E. (2006). *Resilience engineering concepts and precepts*. Aldershot: Ashgate.

Hollnagel, E. (2017). *Safety-II in Practice : Developing the Resilience Potentials*. Taylor & Francis.

Hollnagel, E., Wears, R., & Braithwaite, J. (2015). *From Safety-I to Safety-II : A White Paper*. https://doi.org/10.13140/RG.2.1.4051.5282

Human Rights Watch. (2020, mars 26). Congo's Ebola Fight Has Lessons for Covid-19. Consulté 3 septembre 2020, à l'adresse Human Rights Watch website: https://www.hrw.org/news/2020/03/26/congos-ebola-fight-has-lessons-covid-19

Humanitarian principles—UNHCR|Emergency Handbook. (s. d.). Consulté 23 juillet 2021, à l'adresse https://emergency.unhcr.org/entry/44765/humanitarian-principles

ICRC. (1986). The Fundamental Principles of the International Red Cross and Red Crescent Movement—ICRC. Consulté 26 avril 2021, à l'adresse https://www.icrc.org/en/doc/resources/documents/red-cross-crescent-movement/fundamental-principles-movement-1986-10-31.htm

Kearns, A. J. (20201122). The principle of salvage in the context of COVID-19. *Nursing Inquiry*. https://doi.org/10.1111/nin.12389

Khot, U. N. (2020). Navigating Healthcare Supply Shortages During the COVID-19 Pandemic : A Cardiologist's Perspective. *Circulation. Cardiovascular Quality and Outcomes*, *13*(6), e006801. https://doi.org/10.1161/CIRCOUTCOMES.120.006801

Khoury, P., Azar, E., & Hitti, E. (2020). COVID-19 Response in Lebanon : Current Experience and Challenges in a Low-Resource Setting. *JAMA : The Journal of the American Medical Association*, 548-549. https://doi.org/10.1001/jama.2020.12695

Longstaff, P. H., & Sung-Un, Y. (2008). Communication Management and Trust : Their Role in Building Resilience to "Surprises" Such As Natural Disasters, Pandemic Flu, and Terrorism. *Ecology and Society*, *13*(1). Consulté à l'adresse http://www.ecologyandsociety.org/vol13/iss1/art3/

Mason, D. J. (2020). Lessons From COVID-19 About Rationing Care. *JAMA Health Forum*, *1*(9), e201207-e201207. https://doi.org/10.1001/jamahealthforum.2020.1207

Maturana, H. R., & Varela, F. J. (1980). *Autopoiesis and cognition : The realization of the living*. Dordrecht ; Boston etc.: D. Reidel.

Maturana, H. R., & Varela, F. J. (1987). *The tree of knowledge : The biological roots of human understanding* (p. 263). Boston, MA, US: New Science Library/Shambhala Publications.

McGlinchey, E., Hitch, C., Butter, S., McCaughey, L., Berry, E., & Armour, C. (2021). Understanding the lived experiences of healthcare professionals during the COVID-19 pandemic : An interpretative phenomenological analysis. *European Journal of Psychotraumatology*, *12*(1), 1904700. https://doi.org/10.1080/20008198.2021.1904700

Miron-Spektor, E., Ingram, A., Keller, J., Smith, W. K., & Lewis, M. W. (2018). Microfoundations of Organizational Paradox : The Problem Is How We Think about the Problem. *Academy of Management Journal*, *61*(1), 26-45. https://doi.org/10.5465/amj.2016.0594

Nelson, H., Hubbard Murdoch, N., & Norman, K. (2021). The Role of Uncertainty in the Experiences of Nurses During the Covid-19 Pandemic : A Phenomenological Study. *Canadian Journal of Nursing Research*, *53*(2), 124-133. https://doi.org/10.1177/0844562121992202

Okell, L. C., Verity, R., Watson, O. J., Mishra, S., Walker, P., Whittaker, C., … Bhatt, S. (2020). Have deaths from COVID-19 in Europe plateaued due to herd immunity? *The Lancet*, *395*(10241), e110-e111. https://doi.org/10.1016/S0140-6736(20)31357-X

Peirce, C. S., & Peirce, C. S. (1978). *Ecrits sur le signe*. Paris: Seuil.

Plato. (2008). The Republic. Consulté 18 août 2021, à l'adresse https://www.gutenberg.org/files/1497/1497-h/1497-h.htm

Poizat (D), G., Durand, M., & Theureau, J. (2016). The challenges of activity analysis for training objectives. *Le travail humain*, *Vol. 79*(3), 233-258.

Poizat, G., Durand, M., & Theureau, J. (2016). The challenges of activity analysis for training objectives. *Travail humain (Paris)*, *79*(3), 233-258. https://doi.org/10.3917/th.793.0233

Ranney, M. L., Griffeth, V., & Jha, A. K. (2020). Critical Supply Shortages—The Need for Ventilators and Personal Protective Equipment during the Covid-19 Pandemic. *The New England Journal of Medicine*, *382*(18), e41. https://doi.org/10.1056/NEJMp2006141

Rittel, H. W. J., & Webber, M. M. (1973). Dilemmas in a General Theory of Planning. *Policy Sciences*, *4*(2), 155-169. https://doi.org/10.1007/BF01405730

Sanders, F. (2008, juillet 15). Oscillating, Not Vacillating : Simeon at Both Extremes. Consulté 22 juillet 2021, à l'adresse The Scriptorium Daily website: https://scriptoriumdaily.com/oscillating-not-vacillating-simeon-at-both-extremes/

Sasangohar, F., Moats, J., Mehta, R., & Peres, S. C. (2020). Disaster Ergonomics : Human Factors in COVID-19 Pandemic Emergency Management. *Human Factors*, *62*(7), 1061-1068. https://doi.org/10.1177/0018720820939428

Serres, G. (2006). *Analyse de la construction de l'expérience professionnelle au gré des diverses situations de formation initiale des enseignants du second degré* (Thèse de Doctorat en Sciences de l'Education). Université de Blaise Pascal - Clermont Ferrand.

Simpson, P. F., French, R., & Harvey, C. E. (2002). Leadership and negative capability. *Human Relations (New York)*, *55*(10), 1209-1226. https://doi.org/10.1177/a028081

Singh, L., Singh, N. S., Maldonado, B. N., Tweed, S., Blanchet, K., & Graham, W. J. (2020). What does 'leave no one behind' mean for humanitarian crises-affected populations in the COVID-19 pandemic? *BMJ Global Health*, *5*(4), e002540. https://doi.org/10.1136/bmjgh-2020-002540

Tan, Z., Khoo, D. W. S., Zeng, L. A., Tien, J.-C. C., Lee, A. K. Y., Ong, Y. Y., … Abdullah, H. R. (2020). Protecting health care workers in the front line : Innovation in COVID-19 pandemic. *Journal of Global Health*, *10*(1), 010357. https://doi.org/10.7189/jogh.10.010357

Theureau, J. (2006). *Le cours d'action méthode développée*. Toulouse: Octares.

Theureau, J. (2010). La constitution de savoirs dans l'action. *Intellectica*, *53*(1), 95-127. https://doi.org/10.3406/intel.2010.1180

Theureau, J. (2015). *Le cours d'action l'énaction & l'expérience*. Toulouse: Octares.

Vincent, J.-L., & Creteur, J. (2020). Ethical aspects of the COVID-19 crisis : How to deal with an overwhelming shortage of acute beds. *European Heart Journal. Acute Cardiovascular Care*. https://doi.org/10.1177/2048872620922788

Walker, P. G. T., White, M. T., Griffin, J. T., Reynolds, A., Ferguson, N. M., & Ghani, A. C. (2015). Malaria morbidity and mortality in Ebola-affected countries caused by decreased health-care capacity, and the potential effect of mitigation strategies : A modelling analysis. *The Lancet. Infectious Diseases*, *15*(7), 825-832. https://doi.org/10.1016/S1473-3099(15)70124-6

Weick, K. E. (1988). ENACTED SENSEMAKING IN CRISIS SITUATIONS. *Journal of Management Studies*, *25*(4), 305-317. https://doi.org/10.1111/j.1467-6486.1988.tb00039.x

Weick, K. E. (2010). Reflections on Enacted Sensemaking in the Bhopal Disaster. *Journal of Management Studies*, 537-550. https://doi.org/10.1111/j.1467-6486.2010.00900.x

<center>Annexes</center>

Annex 1: Study protocol and ERB approval

Study Protocol

0 COVID-19 Actor
experience L&D rese

Ethical Board Review Approved Submission

1%20MSF%20ERB%
20L&D%20COVID%2

Annex 2: PMR Cameroon interview transcription

Transcription%20en
tretien%201.docx

In this file are the interview transcriptions with line references used in the Chapter 5: Results

Annex 3: Interview guideline

Table 15 Interview Guideline

Activity Analysis Interview Reference Guideline	
Explanation	**Questions**
(UNE) Significant moment (s)	What are you doing here? What are you saying to whom? What do you feel? How do you live that?
(R) Sign taken into account by the actor (perception of something in the environment – a thing, person, communication, (e.g. specific souvenir), self-perception)	What are you paying attention to, what are you focusing on? What do you consider in the situation? What are you interested in? What aspects are salient for you at this time?
(E) What are your preoccupations or interests in the situation?	What is happening to you? What are you trying to do? What are you worried about?
(A) What the actor's expectations are right now	What did you expect? Did you expect it? That surprises you?
(S) Knowledge from past action course	What led you to do that? What makes you say that? How did you know that ...? What are you saying to yourself? How do you see the situation?
(I) (In)Validation and construction of learning (types) "Every activity is accompanied by learning".	Did you expect it? That surprised you? Did you know that before? What will you differently because of this situation

Annex 4: What is a humanitarian emergency?

There are three main types of humanitarian crisis with direct and indirect impact:

1. Man-made crises: e.g. armed conflict
2. Natural disasters: e.g. including geophysical (e.g. earthquakes, tsunamis and volcanic eruptions), hydrological (e.g. floods, avalanches), climatological (e.g. droughts), meteorological (e.g. storms, cyclones), or biological (e.g. epidemics, plagues)
3. Complex emergencies: generally a combination of both man-made crises and natural disasters. The inter-agency standing committee (IASC) defines a complex emergency as: "a humanitarian crisis in a country, region or society where there is total or considerable breakdown of authority resulting from internal or external conflict, which requires an international response that goes beyond the mandate or capacity of any single agency, and which has been assessed to require intensive and extensive political and management coordination."

Complex emergencies are typically characterised by:

- Extensive violence and loss of life
- Displaced populations
- Widespread damage to societies and economies
- A need for large-scale, multi-faceted humanitarian assistance
- The hindrance or prevention of humanitarian assistance by political and military constraints
- Significant security risks for humanitarian workers in some areas.

Humanitarian agencies respond to humanitarian crises whilst respecting humanitarian principles that are derived from international humanitarian law. A succinct summary of the humanitarian principles can be found on the UNHCR website[35]:

Underlining all humanitarian action are the principles of humanity, impartiality, neutrality and independence. These principles, derived from international humanitarian law, have been taken up by the United Nations in General Assembly Resolutions 46/182 and 58/114. Their global recognition and relevance is further underscored by the Code of Conduct for the International Red Cross and Red Crescent Movement and Non-Governmental Organizations in Disaster Relief and the Core Humanitarian Standard on Quality and Accountability.

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[35] https://emergency.unhcr.org/entry/44765/humanitarian-principles

For a more extensive review outside the humanitarian landscape, see "Understanding the terminologies: Disaster, crisis and emergency". The aim of this article is to systematically and critically review the arguments and counterarguments about the definitions of disaster, crisis, and emergency to date. (Al-Dahash, H, Thayaparan, M and Kulatunga, U, 2016)

_____

For more data on current humanitarian crises see the ACAPs website. ACAPS[36] was established in 2009 as a non-profit, nongovernmental project with the aim of conducting independent, ground breaking humanitarian analysis to help humanitarian workers, influencers, fundraisers, and donors make better-informed decisions.

The INFORM Severity Index is a regularly updated, and easily interpreted model for measuring the severity of humanitarian crisis globally. It is currently used, among others, by the Foreign, Commonwealth & Development Office of the UK Government (FCDO), and USAID's Bureau for Humanitarian Assistance (BHA) to support evidence-based decision making.

Access the INFORM Severity Index - July 2021

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[36] Assessment Capacities Project – although this name is no longer used. https://www.acaps.org/

Annex 5: Previous pandemics

[37]Looking at the history of respiratory pandemics, we can see that COVID 19 is the largest experienced by modern humanitarian organisations which were mostly created after the second world war – with the notable exception of the Red Cross / ICRC.

Cédric Cotter of the ICRC writes that he 1918 'Spanish Flu' provides hard-won lessons for the COVID-19 crisis on the relationship between armed conflict and pandemics.

Wars weaken the ability of a country to prevent, detect, or fight outbreaks of infectious disease, and leave the civilian population incredibly vulnerable'. Of course, the outbreak of

Figure 7-4 History of Pandemics Infographic by Visual Capitalist

COVID-19 did not originate in a country at war; but its impact is disastrous wherever there are armed conflicts or other situations of violence. (Cotter, 2020)

Etienne Gignoux, Epicentre[38], noted in his presentation to MSF staff in July 2020 "These countries have less robust government health systems, poor water and hygiene conditions, co-morbidity of other infectious diseases often compounded by malnutrition. It is a challenging environment leading to complex coordination with governmental agencies and other armed groups."
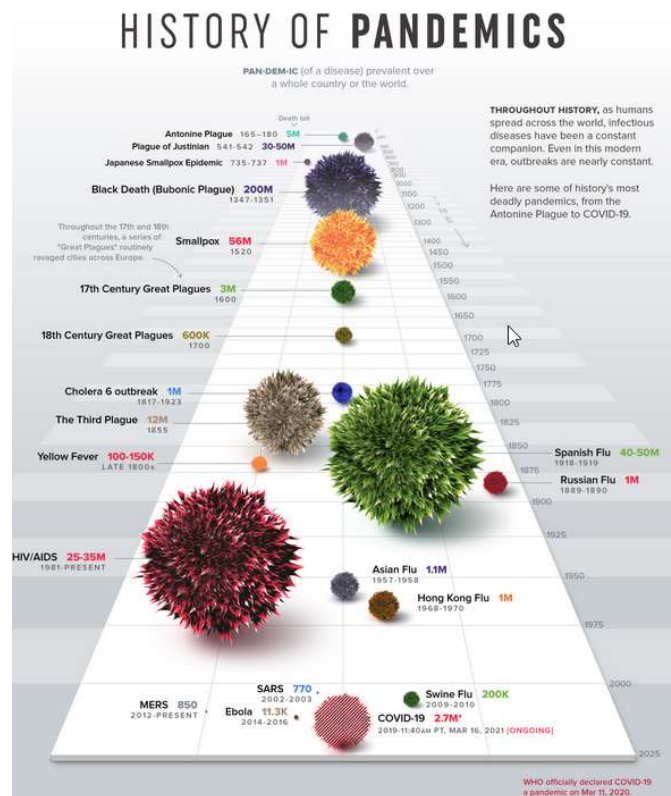
[37] Visual Capitalist

[38] https://epicentre.msf.org/

**Shining   a   light   on   the   use   of**

negative space

Negative space is needed for the eye to process what it sees. A balance with positive space allows an observer to perceive and focus without getting confused or overwhelmed.

It draws attention to the positive space and may even become positive space itself. This is called figure-ground reversal, where the foreground and background swap places to change perspective and interpretations.

Negative space adds to the structure. When space is asymmetrical it actively leads the observer's gaze to where you want them to concentrate.

"Reality is created as much by habits of perception as by any underlying physical or literal truth"
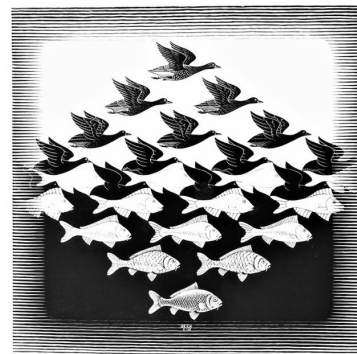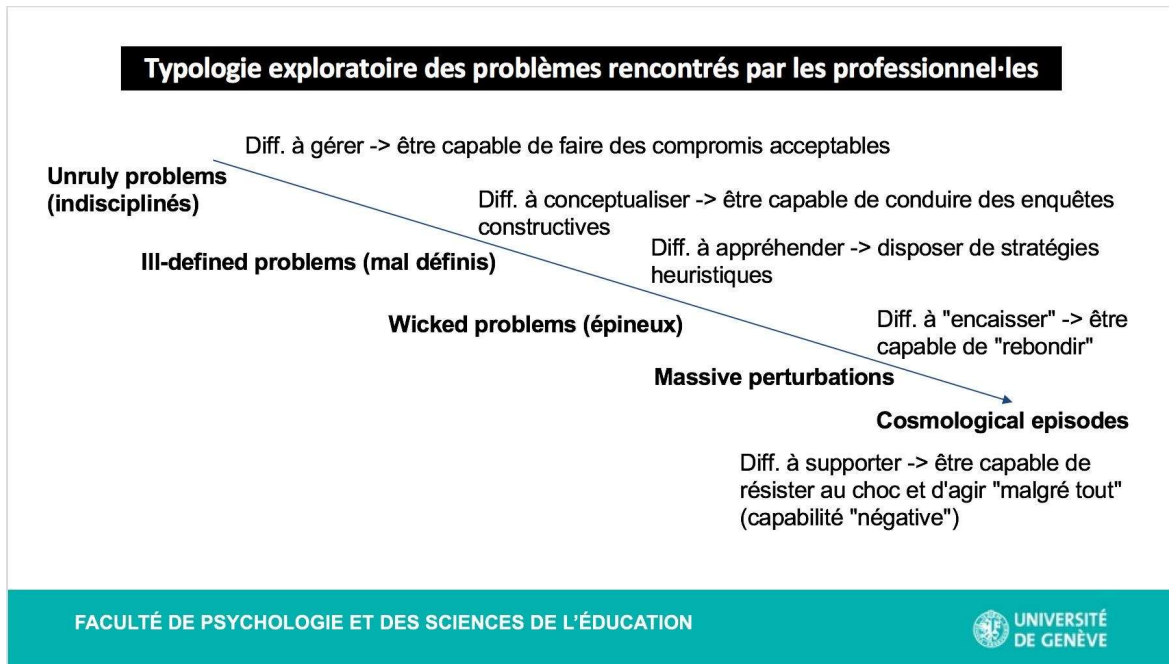

(Jones, 2019)

Figure 7-5 Sky and Water I, M.C. Escher

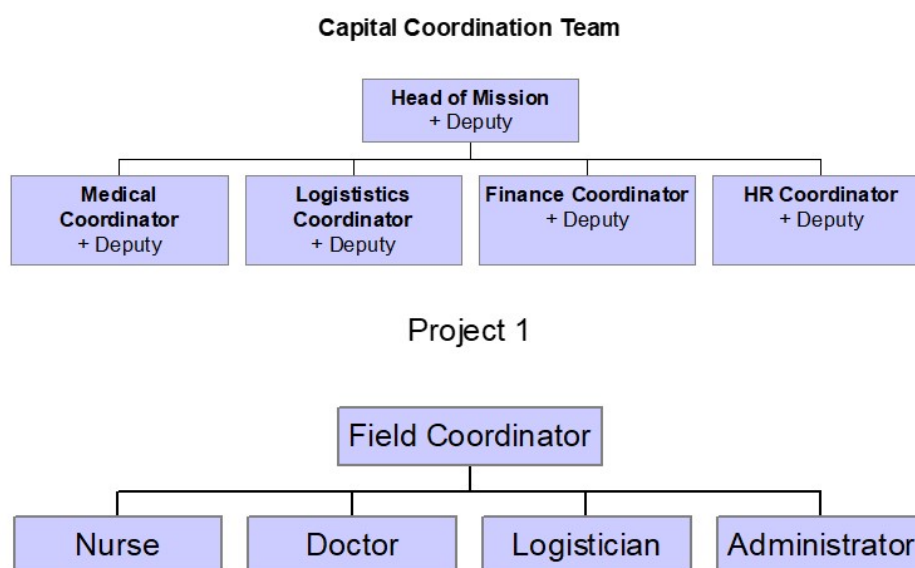# Annex 7: Typology of problems encountered by professionals

Figure 7-6 Exploratory typology of problems encountered by professionals, S Flandin

Simon Flandin, CRAFT team

Annex 8: Project Medical Referent accountabilities

The Project Medical Referent is the key medical manager in the local project. The project leadership team varies according to the context, but a generic structure can be seen below. This structure is replicated at mission coordination level, and again at management cell level in a regional base or HQ. (see example diagram below, where we can read Doctor as the PMR)

Capital Coordination Team

```
                    Head of Mission
                      + Deputy
    ┌──────────────┬──────┴──────┬──────────────┐
  Medical      Logististics    Finance        HR Coordinator
  Coordinator   Coordinator    Coordinator    + Deputy
  + Deputy      + Deputy       + Deputy
```

Project 1

```
                  Field Coordinator
    ┌──────────────┬──────┴──────┬──────────────┐
   Nurse        Doctor       Logistician      Administrator
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Project Medical Referent accountabilities

- In collaboration with the Project Coordinator and the rest of team, the Medical Coordinator and MoH partners, defines, implements and monitors medical activities, according to MSF project plans, standards and protocols. Participates in exploratory missions, situation assessments (defining medical operational priorities when needed) and the development of the project policy, annual plan, budget review and project proposal and reports to donors. Ensures regular contact with MoH and other local medical actors
- Is responsible for the medical data collection, analysis and reporting to the Medical Coordination in the capital in order to ensure a proper monitoring of the program
- Provides technical support to medical personnel in the field through self-knowledge and policies, ensuring compliance with the protocols of MSF medical activities.

- Coordinates, supervises, coaches, supports and evaluates the medical team members' performance to improve the medical components of the project and ensure compliance with MSF protocols and standards as well as MoH protocols.
- Plans and supervises, in close coordination with the Project Coordinator, the associated processes (recruitment, training, induction, performance evaluation, development and internal / external communication) of the medical staff of the project in order to ensure both the sizing and the amount of knowledge required and improve staff capabilities.
- Supervises an efficient management of the MSF field pharmacy and medical equipment, in collaboration with the Logistics department and project biomedical service and in consideration of program directions and protocol changes. Monitors consumption and preparation of medical orders to provide drugs, medical materials, medical devices and consumables at all circumstances and avoid stock shortage.
- Implements the health policy for international and national staff, providing all prophylactic and preventive necessary measures, structures and emergency plans, managing any medical evacuation in order to ensure MSF staff health.