

Review

Emergency and Disaster Management, Preparedness, and Planning (EDMPP) and the ‘Social’: A Scoping Review

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Abstract: The importance of emergency and disaster management, preparedness, and planning (EDMPP) is ever increasing with COVID-19 being one recent EDMPP challenge. EDMPP is impacted by and impacts the ‘social’ of individuals and societies. Therefore, a thorough understanding of the ‘social’ is important for providing EDMPP. Marginalized populations are over-proportionally impacted by emergencies and disasters and often overlooked in EDMPP. Therefore, it is especially important to understand the lived experience of marginalized groups and to involve marginalized groups in providing knowledge for EDMPP. Technologies such as artificial intelligence and machine learning and reasoning, e-coaching, other decision support systems and Bayesian belief networks are increasingly employed for EDMPP. However, biases and other problems in the use of technologies for EDMPP are noted. Understanding the ‘social’ of marginalized populations and others is essential for designing algorithms and other technologies that are not biased towards marginalized populations and others. The phrase “equity, diversity, and inclusion” (EDI), other EDI linked phrases, and EDI frameworks are increasingly employed in workplaces to improve research, education, and workplace environments for marginalized groups such as women, Indigenous Peoples, visible minorities, racialized minorities, disabled people, people with disabilities and LGBTQ2S+. EDMPP actors are workers. Using EDI in EDMPP could improve the EDMPP situation of marginalized groups by encouraging knowledge production by and about marginalized groups related to EDMPP. The main objective of this study was to map out the engagement with the ‘social’, EDI and marginalized groups in the EDMPP-focused academic literature in general and the EDMPP academic literature covering disabled people, patients, technologies and COVID-19. A scoping review using the academic databases SCOPUS, Web of Science, and the databases accessible under Compendex and EBSCO-HOST were employed to fulfill the objectives. The study found little coverage of marginalized populations and EDI phrases and frameworks, and a lack of many terms linked to the ‘social’ in the literature searched. These gaps need to be filled given the importance of EDMPP to the ‘social’ of individuals and societies.

Keywords: emergency management; disaster management; social; marginalized groups; technology; COVID; artificial intelligence; machine reasoning; machine learning; equity, diversity and inclusion



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1. Introduction

Emergency and disaster management, preparedness, and planning (EDMPP) is ever-increasing in importance [1–7] with the latest challenge being COVID-19 [8–10]. Emergencies and disasters and all stages of EDMPP impact the ‘social’ reality of individuals, social groups and societies. Marginalized groups are often underserved in EDMPP although they are more severely impacted by emergencies and disasters [11] and already encounter more problems in their ‘social’ reality. Therefore, by making use of many indicators of the ‘social’ and measures of well-being [12,13] that contain sets of indicators of the ‘social’, the first

objective of this study was to map out how and to what extent the EDMPP, e-coaching, decision support systems, and Bayesian belief network focused academic literature covers the ‘social’.

Individual concepts such as equality, diversity, equity, belonging, dignity, justice, dignity, accessibility, accountability and decolonization [14–35] that make up the phrase “equity, diversity, and inclusion” (EDI), other EDI linked phrases, and are used in EDI frameworks are engaged with in academic literature in conjunction with EDMPP; to give a few equity related references: equity [36–50], social equity [51,52], procedural equity [53], environmental equity [54] and COVID-19 and equity [55,56]. However, actions driven by any one individual EDI concept have limitations and as such EDI phrases containing more than one concept and EDI frameworks [12,14,57–61] are increasingly employed in workplaces including universities to improve the ‘social’ in the area of research, education, and general workplace environments for members of marginalized groups such as women, Indigenous Peoples, visible minorities, racialized minorities, disabled people, people with disabilities and LGBTQ2S+ [14]. Given that EDMPP is performed as part of one’s work, whether as a first responder, policy developer, or coder, to name a few, the second objective was to map out whether EDI phrases and frameworks and marginalized groups covered in EDI discourses are present in the EDMPP, and e-coaching, decision support systems, and Bayesian belief network focused academic literature.

Many technologies are envisioned to be employed in EDMPP, such as e-coaching and other decision support systems [62–67], artificial intelligence, machine learning [68–78], Bayesian belief networks and machine reasoning [79–88], and quantum technologies [89–92]. However, the usefulness of the data depends on the quality of the data. For example, to develop algorithms for EDMPP, the coder’s knowledge of the ‘social’ and EDMPP in general and concerning marginalized groups is essential to prevent biased algorithms. Therefore, the third objective was to map out how literature focusing on artificial intelligence, machine learning, machine reasoning, and quantum computing used for EDMPP covers the ‘social’.

The study asked three questions: (1) Which terms, phrases, and measures that cover aspects of the ‘social’ are present in the EDMPP, e-coaching, decision support systems- and Bayesian belief network- focused academic literature? (2) Which terms, phrases, and measures that cover aspects of the ‘social’ are present in the EDMPP academic literature that focuses on technologies, especially artificial intelligence, machine learning, machine reasoning, and quantum technologies? (3) Which marginalized groups engaged within EDI and which EDI phrases and concepts are covered in the EDMPP, e-coaching, decision support systems-, and Bayesian belief network- focused academic literature?

1.1. EDMPP and the ‘Social’

Emergencies and disasters are multifaceted and ever-increasing [11,93]. Emergency and disaster management stages include prevention, mitigation, preparedness, recovery, and reconstruction [93–95]. Emergency and disaster management, preparedness, and planning (EDMPP) are impacted by and impact the state of the ‘social’ that individuals, social groups and societies experience. Therefore, a thorough understanding of the ‘social’ is needed, and we applied many indicators, terms and measures related to the ‘social’ [12,13]. It is noted that various biases such as cognitive biases [96], funding biases [97], optimistic biases [98], data selection biases [99] and data generation biases [100,101] can impact the usefulness of EDMPP. A thorough understanding of the ‘social’ might counter some biases and support the debiasing process.

The goals and objectives outlined in the 2022–2025 strategic plan of the UN Office for Disaster Risk Reduction (UNDRR) suggest that there is not enough good evidence and best practices on risk [11]. As well, that public advocacy and interactions with stakeholders on DRR need improvement and results have to be monitored better [11]. To fix these identified problems it is important to engage with- and understand the ‘social’.

In the 2022–2025 strategic plan of the UN Office for Disaster Risk Reduction (UNDRR), it is noted that the ones impacted the most by disasters and emergencies are the ones least

causing the problem [11]. Furthermore, in the report Emergency Management Strategy for Canada Toward a Resilient 2030, it is acknowledged that different variables impact groups differently [93] and that a “whole of society approach” is needed [93] (p. 4) to deal with emergencies and disasters. Given the diversity of impacts, it is important to understand the ‘social’, especially for marginalized groups who already encounter more problems in their lived experience.

The UN Office for Disaster Risk Reduction (UNDRR) goals and strategic objectives, especially the identified goal to take into account marginalized groups [11], as well as the “shift in focus to proactive prevention/mitigation efforts and forward-looking recovery measures” [93] (p. 3) identified in the report Emergency Management Strategy for Canada Toward a Resilient 2030 [93] needs knowledgeable people including leaders [102] to be involved in EDMPP. To be knowledgeable must include the ‘social’ of EDMPP.

1.2. EDMPP and the Social: The Case of Marginalized Groups and of EDI

One goal mentioned in the 2022–2025 strategic plan of the UN Office for Disaster Risk Reduction (UNDRR) is to consider marginalized groups [11]. Although the report mentions gender and disabled people dominantly, the strategic plan recognized that a “whole of society approach” that “leaves no one behind” [11] (p. 5) is needed. Therefore, the strategic plan also applies to other marginalized groups, including all marginalized groups covered extensively under EDI [14].

To take into account marginalized groups makes sense. Marginalized populations are differently impacted [103], encounter many problems in relation to emergencies and disasters [6,11,39,40,104–155] including being dismissed [116], ignored [105–112,119] or overlooked [41,104] in emergency and disaster discussions and actions and the EDMPP literacy level about marginalized groups is low [113,114,119,149,155–158]. Marginalized people can contribute needed EDMPP-relevant data on the ‘social’ to decrease the gap in the literacy of people involved in EDMPP. The knowledge of the ‘social’ is also needed to train and de-bias EDMPP actions, including machine learning models used in EDMPP [159]. Given the outlined problems within EDMPP, there is a need to map out the ‘social’ of disasters and emergencies for marginalized groups.

It is argued that an “increased diversity and inclusion across all workstreams of the organization [UNDRR] [11] (p. 9) is needed. The acknowledged EDMPP problems indicate that a systematic application of an EDI lens would be useful at all workplaces and work engaging with EDMPP.

EDMPP education is flagged as having many problems in relation to marginalized groups [129,151,160], as have fields that should cover EDMPP, such as environmental education [161]. Using an EDI lens will be useful to flag problems in the teaching of EDMPP. Teaching about the ‘social’ of marginalized groups within the EDMPP context could give students the knowledge that allows them to self-assess their biases.

The “United Nations 2018 flagship report on disability and development: realization of the Sustainable Development Goals by, for, and with persons with disabilities” is a recent report that might be useful for people involved in EDMPP to increase their literacy in relation to disabled people. It outlines many problems disabled people are facing related to emergencies and disasters, such as that many still believe that a general approach will be enough for disabled people and that disabled people are rarely consulted although they want to be involved [114]. Another problem flagged is that, disabled people often do not disclose themselves as a disabled person due to fear of stigmatization, discrimination, abuse and lack of being part of the community [114]. The report outlines many steps on pages 245–246 to ensure disability-inclusive disaster risk reduction and response as well as disability-inclusive humanitarian action [114]. To be aware and be able to address the problems disabled people face in relation to emergencies and disasters, the people engaged with EDMPP need a thorough understanding of the lived experience the ‘social,’ of disabled people.

1.3. COVID-19 and the Social: The Case of Marginalized Groups and EDI

According to the UN Research Roadmap for the COVID-19 Recovery [8] report, COVID-19 “disproportionately impacted marginalized populations” [8] (p. 51). It is noted that disaster and public health emergencies have historically impacted “racially and ethnically diverse and socioeconomically disadvantaged communities” [162] (p. 1546) more than other populations and that efforts were made to decrease that discrepancy during the COVID-19 pandemic [162,163]. However, analysis of the pandemic revealed that many equity, diversity, and inclusion issues remained in the COVID-19 responses to date [164].

The COVID-19 pandemic is also recognized to have disproportionately impacted persons with disabilities [115,155,165]. Disabled people can be impacted by COVID-19 and its aftermath in many ways:

1. as potential users of COVID-19 protection measures (protection product bought by disabled people or deployed by others to be used by disabled people);
2. as potential non-therapeutic users (consumer angle of non-COVID-19 products);
3. as potential consumers of COVID-19 knowledge;
4. as potential producers of COVID-19 knowledge;
5. as potential therapeutic users (as patient, getting treated);
6. as potential diagnostic targets (diagnostics to prevent ‘disability’ which might increase in the aftermath of COVID-19 due to changing family circumstances);
7. by COVID-19 protection guidelines (staying at home, no visitors in group home)
8. by changing societal parameters caused by COVID-19 aftermath (how do we act toward each other? See for a positive possibility);
9. by changing societal parameters caused by COVID-19 aftermath (how do certain companies act toward disabled people?);
10. more non-disabled people competing with disabled people for existing jobs after COVID-19;
11. increasing autonomy of a product or process (e.g., AI/ML judging disabled people, see algorithm bias in health insurance . . .) [166].

The UN Research Roadmap for the COVID-19 Recovery report lists over 30 population groups as experiencing the highest degree of marginalization, including all the groups normally covered under EDI [8]. The report identified five pillars to achieve a socio-economic recovery from the pandemic, which are (a) health systems and services; (b) social protection and basic services; (c) economic response and recovery programs; (d) macroeconomic policies and multilateral collaboration; social cohesion and community resilience [8] (p. 13). The report sees equity as the main guiding principle for all actions and considers the engagement with intersectionality as essential making the strong statement that,

“Advancing equity requires actively transforming norms, policies, laws, systems, and institutional practices so that all people have fair and just opportunities to thrive. For research to support these efforts, it must take an intersectional and human rights-based approach.⁶⁵ Intersectionality promotes the understanding that people’s identities are shaped by complex interactions and relationships among multiple co-existing factors, including their age, gender, sex, race, ethnicity, Indigeneity, sexual orientation, geography, disability, socio-economic status and migration status.⁶⁶ ⁶⁷ In turn, these intersecting factors interact with a complex set of social and institutional power structures and systemic forms of discrimination and oppression. Research to support an equitable recovery from COVID-19 must grapple with these complex systems, assess human rights implications, and centre the voices, experiences and concerns of the populations they marginalize [RP3.1.4]”. [8] (p. 90)

The report argued that “Research is needed on all aspects of research ecosystems, including the impact of different funding practices, methodological approaches, partnership structures, advisory systems and translational strategies on different outcomes and in different contexts” [8] (p. 112). All key inquiries listed in the report need a thorough

understanding of the ‘social’ for all the marginalized groups it mentions. To make the research ecosystem more equitable, diverse and inclusive has to include to make the research questions more equitable, diverse and inclusive which includes more engagement with the ‘social’ of marginalized groups.

1.4. EDMPP, Marginalized Groups, EDI and TECHNOLOGY

Many studies highlight the usefulness of technologies for EDMPP. To focus on a few technologies; various studies describe the utility of artificial intelligence [167–192] and machine learning and reasoning [69,71,80,168,169,193–210] for EDMPP including for the evaluation of societal implications [211]. If it is seen as useful to evaluate societal implications, the data must contain high quality information on the ‘social’, especially in relation to marginalized groups.

Problems are noted in how technologies including artificial intelligence and machine learning and reasoning are used in EDMPP [114,150,153,212–231] such as lack of data and biased data [96–101], algorithm/algorithmic bias in relation to marginalized groups [159,232–247], and the “siloe nature of the domains of fairness, machine learning, and disaster informatics” [231] (p. 201040). There is no one algorithm that fits every situation and problem [248]. It is argued that “decisions based on algorithmic, machine learning models can be unfair, reproducing biases in historical data used to train them” [242] (p. 1). While computational techniques are developed to address these problems they face many implementation problems [242] especially for marginalized groups [242]. A systematic EDI lens and data on the ‘social’ of EDMPP might help to deal with the non-technical side of the problems.

It is argued that one should select an algorithm based on its prior use in a similar problem [248]. That however demands that the prior algorithm already covered the ‘social’ problems marginalized groups experience. Otherwise, using prior algorithms increases the problem. It is noted that for disaster risk reduction to work one has to ask the “right questions on who creates the risks and who suffers the consequences of risk” [193], but, are the right questions asked in relation to marginalized groups?

One subset of technologies are decision support systems [249] employed in emergency management such as knowledge-based decision support systems [250], stress monitoring assistants as a user-focused decision support system [86], systems linked to the activity of daily living [251], virtual coaches [229,252], conversational agents [84,253], and robots [253]. Some performance measures for decision support systems are: quality of the collaborative relationships between the user and the technology, context-awareness, how well it is tailored to a person and intelligence [88], risk detection and evaluation, trust, and bias [84,87,88]. It is argued that “if ethical, legal, and social implications are addressed appropriately, affective computing technologies may bring a real benefit to society by monitoring and improving people’s mental health” [88]. One study set up a Bayesian network that uses three kinds of reasoning: What is? What if? and Why? [88] Question is: How are these questions answered if the right data for marginalized groups do not exist?

Many science and technology concepts and ethics fields emerged to engage with the recognized reality that scientific and technological advancements have social, legal, ethical, and economic consequences [12,13,254–262]. It is argued that computational fairness, AI fairness [263], and ML fairness [247] are needed. Data on the ‘social’ is needed to discuss the social impact of technologies in EDMPP and to ensure fairness.

2. Materials and Methods

In this section we first outline the study design and research questions, then the data sources and inclusion criteria for the searches, then the search strategies to obtain the data for analysis and lastly how the analysis was performed. Thoughts on limitations are at the end of the discussion section.

2.1. Study Design and Research Questions

Scoping studies are useful in identifying the extent of research that has been conducted on a given topic [264,265]. In this case, the aim was to answer the following research questions: (1) Which terms, phrases, and measures that cover aspects of the ‘social’ are present in the EDMPP, e-coaching, decision support systems- and Bayesian belief network- focused academic literature? (2) Which terms, phrases, and measures that cover aspects of the ‘social’ are present in the EDMPP academic literature that focuses on technologies, especially artificial intelligence, machine learning, machine reasoning, and quantum technologies? (3) Which marginalized groups engaged with within EDI and which EDI phrases and concepts are covered in the EDMPP, e-coaching, decision support systems-, and Bayesian belief network- focused academic literature?

The study employed a modified version of a scoping review outlined by Arksey and O'Malley [266] and in [12].

2.2. Data Sources and Data Collection Inclusion and Exclusion Criteria

On 4 March 2022, the databases Web of Science, SCOPUS (which incorporates the full Medline database collection), the 70 academic databases accessible through EBSCO-HOST and the databases accessible through Compendex, which include IEEE sources were searched with no time restriction.

These databases contain journals that cover a wide range of topics from areas of relevance to answer the research questions. They cover journals focusing on emergency and disaster, science and technology, and many journals that cover societal aspects of science and technology governance content. As inclusion criteria, the search focused on English language abstracts. As to article categories, scholarly peer-reviewed journals were included in the EBSCO-HOST search and reviews, peer-reviewed articles, conference papers, and editorials from SCOPUS. The Compendex search was set to all document types. Peer-reviewed articles, conference papers, review papers and book chapters were included from Web of Science. Everything else was excluded.

2.3. Data Sources and Search Strategies

Table 1 identifies the search terms and strategies that were used to generate abstracts for manifest coding online and manifest coding of downloaded abstracts.

2.4. Data Analysis

To answer the research questions, a descriptive quantitative analysis approach [267,268] (manifest coding [269,270]) was performed, generating hit counts for the search term combinations of the strategies (Table 1). To generate the abstracts for the manifest coding of EDMPP related content, 75,23 abstracts were generated by searching for the terms “disaster management” OR “emergency management” OR “emergency planning” OR “disaster planning” OR “disaster preparedness” OR “emergency preparedness”, as a starting point (strategy 1, Table 1)

Next, five approaches were used to perform the manifest coding of the 75,243 abstracts. In the first approach various keywords (see result tables) were used to perform searches of the abstracts obtained from the four databases without downloading any content. The sum of the hits from the four databases for each keyword was recorded and added up to one final number without eliminating potential duplications of hits due to the same abstract being present in more than one database. Then, four approaches were employed to obtain downloaded abstracts for analysis focusing on specific topics. The 75 543 abstracts were searched in the online search engines for technology terms (strategy 2, Table 1), disability terms (strategy 3, Table 1), the term “patient*” (strategy 4, Table 1), and the term “Covid” (strategy 5, Table 1).

Table 1. Search strategies used to obtain abstracts (first search term) for manifest coding of terms related to the ‘social’ (second search term).

Strategy	Sources Used	First Search Term (Abstract)	Second Search Term (Abstract)	Initial Count of Abstracts Downloaded (Strategies 2–5 and 7–8) and Count for Abstracts Available for Manifest Coding in Search Engine (Strategies 1 and 6)	Final Count of Downloaded Abstracts for Coding after Elimination of Duplicates (Strategies 2–5 and 7–8)
Strategy 1	SCOPUS/EBSCO-HOST/Compendex/Web of Science	("disaster management" OR "emergency management" OR "emergency planning" OR "disaster planning" OR "disaster preparedness" OR "emergency preparedness")	-	75,243	-
Strategy 2	SCOPUS/EBSCO-HOST/Compendex/Web of Science	("disaster management" OR "emergency management" OR "emergency planning" OR "disaster planning" OR "disaster preparedness" OR "emergency preparedness")	("artificial intelligence" OR "machine learning" OR "robot*" OR "quantum*" OR "machine reasoning")	1482	656
Strategy 3	SCOPUS/EBSCO-HOST/Compendex/Web of Science	("disaster management" OR "emergency management" OR "emergency planning" OR "disaster planning" OR "disaster preparedness" OR "emergency preparedness")	("disabl*" OR "disabili*" OR "impairm*" OR "deaf" OR "neurodiver*" OR "autism" OR "adhd" OR "impair*")	1121	529
Strategy 4	SCOPUS/EBSCO-HOST/Compendex/Web of Science	("disaster management" OR "emergency management" OR "emergency planning" OR "disaster planning" OR "disaster preparedness" OR "emergency preparedness")	"patients"	3993	2686
Strategy 5	SCOPUS/EBSCO-HOST/Compendex/Web of Science	("disaster management" OR "emergency management" OR "emergency planning" OR "disaster planning" OR "disaster preparedness" OR "emergency preparedness")	"Covid"	1460	885
Strategy 6	SCOPUS/EBSCO-HOST/Compendex/Web of Science	("e-coaching") OR ("decision support system")	-	100,036	-
Strategy 7	SCOPUS/EBSCO-HOST/Compendex/Web of Science	"Bayesian belief network"	-	3492	2091
Strategy 8	SCOPUS/EBSCO-HOST/Compendex/Web of Science	("e-coaching") OR ("decision support system")	("equality" OR "diversity" OR "inclusion" OR "equity")	1328	800

By searching for the terms “e-coaching” OR “decision support system*”, 100,036 abstracts were generated by searching for the terms “e-coaching” OR “decision support system*” as a starting point (strategy 6, Table 1). We furthermore searched for the phrase “Bayesian belief network”, one coding process used for generating e-coaching and decision support systems applications, generating 2091 abstracts (strategy 7, Table 1), and used the obtained abstracts for desktop manifest coding. Finally, in strategy 8 we generated abstracts for desktop manifest coding, containing “e-coaching” or “decision support systems” and EDI terms (Strategy 8, Table 1).

In Step 2 the obtained abstracts (strategies 2–5 and 7–8, Table 1) were downloaded as part of the citations into Endnote software and the Endnote software was used to delete all duplicate abstracts and non-English documents. All these abstracts were exported from the Endnote software as one RTF file for each of the six search strategies (strategies 2–5 and 7–8, Table 1) and each was converted into a PDF. The manifest coding for the terms linked to the ‘social’ was performed within the PDF’s using the ‘CTRL F’ function of Adobe Acrobat software, making certain that the hitcounts reflected the number of abstracts and not the number of hits, as the searches in the web-based databases did. Both authors performed the manifest coding and no differences in the numbers were observed.

3. Results

In this section, the order of reporting our results is as follows: (1) presence of 31 social terms obtained from [12] (Tables 2 and 3); (2) presence of 21 wellbeing measure terms [12] (Table 4); (3) presence of the indicators of four of these measures selected (Social Determinants of Health, Better Life Index, Canadian Index of Well-being, and the Community Based Rehabilitation Matrix) [12] (Tables 5–8); (4) presence of EDI terms and frameworks (Table 9) and terms linked to marginalized groups covered under EDI efforts (Table 9); (5) presence of terms linked to science and technology governance discussions (Table 10) and (6) presence of terms and phrases containing “social” or “societal” (Table 11). For all tables, an “x” in a table means that the hit count in the abstracts was more than 100 and we did not look through the abstracts in the Adobe searches to record the actual abstract hits. If the hit count was below 100, we looked at every hit to only record the number of actual abstracts where the term showed up.

In short, the results suggest low to no engagement with concepts linked to the ‘social’ seen in Tables 2 and 3 and well-being measures in Table 4 and low to no engagement with many of the individual indicators of the four well-being measures (Social Determinants of Health, Better Life Index, Canadian Index of Well-being, and the Community Based Rehabilitation Matrix) (Tables 5–8). Furthermore, the terms ‘social’ and ‘societal’, as part of phrases, were rarely present (Table 11). We also found low to no presence of phrases linked to science and technology governance discussions (Table 10) and we found low to no presence of EDI terms and frameworks (Table 9) and terms linked to marginalized groups covered under EDI efforts (Table 9). Finally, we found that the term “patients” was 5 times more present in the literature covered than all the different terms used to find content related to disabled people not using the term “patients”.

Table 2 shows that within the downloaded academic abstracts only few to no hits were obtained for phrase containing the term ‘social’, concepts that engage with the ‘social’ such as health equity and the conventions and declarations that showcase the social problems of a variety of social groups. As to the abstracts searched online (strategies 1 and 6) the convention and declarations received 0 or less than 10 hits. Health equity generated 36 hits with strategy 1 and 4 hits with strategy 6. COVID-19 was present substantially. Terms like bias and phrases containing the term ‘social’ had over 100 hits. Relative to the number of abstracts searched online the hits were however few.

Table 3 shows that the term “stakeholder” was the term mentioned the most within the academic literature for almost all strategies followed by “privacy”, “identity”, “interdependence”, “justice”, and “autonomy”. In general, relative to the number of abstracts searched for each strategy, there were few to no hit counts.

Table 2. Hit counts for terms linked to the ‘social’ in the academic literature covered.

Terms	Strategy 1: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness”	Strategy 2: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” AND TECHNOLOGY Related Terms	Strategy 3: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” AND Disability Related Terms	Strategy 4: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” OR “Patient”	Strategy 5: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” AND “Covid”	Strategy 6: “E-Coaching” OR “Decision Support System”	Strategy 7: “Bayesian Belief Network”	Strategy 8: “E-Coaching” or “Decision Support System” and “Equity” or “Diversity” or “Inclusion” or “Equality”
Total # of Abstracts	75,243	656	529	2686	885	100,036	2091	800
“Health equity”	36	0	1	2	6	4	0	2
COVID	2050	15	25	125	ND	313	2	4
“Social implication*”	151	0	0	1	8	26	1	0
“Social impact*”	155	2	1	3	8	80	1	1
“Societal impact*”	43	0	0	0	0	10	0	0
“Societal implication*”	4	1	0	0	0	3	0	0
“Ethic*”	128	4	15	49	15	450	2	7
“Quantum ethics”	0	0	0	0	0	0	0	0
(“wellbeing” OR “well-being” OR “well being”)	646	2	14	27	33	209	7	
Bias	370	5	3	13	9	686	24	16
“Convention on the rights of Persons with Disabilities”	8	0	4	0	0	0	0	0
“Convention on the rights of the child”	3	0	0	0	0	0	0	0
“Declaration on the Rights of Indigenous Peoples”	0	0	0	0	0	0	0	0
“Universal Declaration of Human Rights”	0	0	0	0	0	0	0	0
“UN Framework Convention on Climate Change”	5	0	0	0	0	0	0	0
“transforming our world: the 2030 agenda for sustainable development”	0	0	0	0	0	0	0	0
“International Convention on the Elimination of All Forms of Racial Discrimination”	0	0	0	0	0	0	0	0
“UN flagship report on disability and development”	2	0	0	0	0	0	0	0

Table 3. Hit counts for other social indicators from existing literature [12,13] in the academic literature covered.

Terms	Strategy 1: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness”	Strategy 2: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster PREPAREDNESS” OR “Emergency Preparedness” and Technology Related Terms	Strategy 3: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and Disability Related Terms	Strategy 4: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and “Patients”	Strategy 5: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and “Covid”	Strategy 6: “E-Coaching” OR “Decision Support System”	Strategy 7: “Bayesian Belief Network”	Strategy 8: “E-Coaching” or “Decision Support System” and “Equity” or “Diversity” or “Inclusion” or “Equality”
Total # of Abstracts	75,243	656	529	2686	885	100,036	2091	800
Privacy	411	5	2	15	8	358	6	6
“Data protection”	31	1	1	0	1	29	0	0
“Technological deskilling” or deskilling	1	0	0	0	0	3	0	0
Solidarity	72	0	0	1	3	8	0	0
Dignity	36	0	3	0	3	4	0	0
“social wellbeing” or “social well-being” or “social well being”	14	0	0	0	1	5	0	0
“environmental wellbeing” or “environmental well-being” or “environmental well being”	6	0	0	0	0	1	0	0
“Subjective wellbeing” or “Subjective well-being” or “Subjective well being”	0	0	0	0	0	0	0	0
“Societal wellbeing” or “Societal well-being” or “Societal well being”	0	0	0	0	0	4	0	0
“Psychological wellbeing” or “Psychological well-being” or “Psychological well being”	2	0	0	0	2	3	0	0
“Emotional wellbeing” or “Emotional well-being” or “Emotional well being”	20	0	0	1	3	1	0	0
“Economic wellbeing” or “Economic well-being” or “Economic well being”	13	0	0	0	0	8	0	0
“social wellbeing” or “social well-being” or “social well being”	0	0	0	0	0	1	0	0

Table 3. Cont.

Terms	Strategy 1: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness”	Strategy 2: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster PREPAREDNESS” OR “Emergency Preparedness” and Technology Related Terms	Strategy 3: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and Disability Related Terms	Strategy 4: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and “Patients”	Strategy 5: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and “Covid”	Strategy 6: “E-Coaching” OR “Decision Support System”	Strategy 7: “Bayesian Belief Network”	Strategy 8: “E-Coaching” or “Decision Support System*” and “Equity” or “Diversity” or “Inclusion” or “Equality”
Identity	244	1	0	3	3	143	4	3
Interdependence	81	0	2	2	2	170	10	1
Interdependent	216	0	2	0	3	196	12	2
Stigma	53	0	2	5	6	16	1	0
Stereotype	11	1	0	0	0	12	0	0
Justice	493	0	13	3	13	83	1	0
Autonomy	166	12	3	12	6	260	7	6
Self-determination	12	0	1	0	0	3	0	0
“Good life”	5	0	0	0	0	2	0	0
“Social good”	2	0	0	0	0	0	0	0
Independence	131	0	9	2	1	480	22	3
Stakeholder	3555	9	17	24	49	2998	216 hits not abstracts	41

Table 4. Hit counts for the terms used for the various “measures” [12,13] in the academic literature covered.

Terms	Strategy 1: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness”	Strategy 2: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and Technology Related Terms	Strategy 3: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and Disability Related Terms	Strategy 4: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and “Patients”	Strategy 5: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and “Covid”	Strategy 6: “E-Coaching” OR “Decision Support System”	Strategy 7: “Bayesian Belief Network”	Strategy 8: “E-Coaching” or “Decision Support System*” and “Equity” or “Diversity” or “Inclusion” or “Equality”
Total # of Abstracts	75,243	656	529	2686	885	100,036	2091	800
Aqol	0	0	0	0	0	0	0	0
“Better life index”	0	0	0	0	0	0	0	0

Table 4. Cont.

Terms	Strategy 1: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness”	Strategy 2: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and Technology Related Terms	Strategy 3: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and Disability Related Terms	Strategy 4: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and “Patients”	Strategy 5: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and “Covid”	Strategy 6: “E-Coaching” OR “Decision Support System”	Strategy 7: “Bayesian Belief Network”	Strategy 8: “E-Coaching” or “Decision Support System*” and “Equity” or “Diversity” or “Inclusion” or “Equality”
“Brief Inventory of Thriving”	0	0	0	0	0	0	0	0
“Calvert-Henderson Quality of Life”	0	0	0	0	0	0	0	0
“Canadian Index of well being”	0	0	0	0	0	0	0	0
“Community based rehabilitation”	4	0	2	0	0	0	0	0
“Community based rehabilitation matrix”	3	0	0	0	0	0	0	0
“Community rehabilitation”	0	0	0	0	0	2	0	0
“Comprehensive Inventory of Thriving”	0	0	0	0	0	0	0	0
“Determinants of health”	45	0	1	3	4	6	0	2
“Flourishing Scale”	0	0	0	0	0	0	0	0
“Index of well-being”	0	0	0	0	0	0	0	0
“Perceived Life Satisfaction”	0	0	0	0	0	0	0	0
“Satisfaction with life scale”	3	0	0	0	0	0	0	0
“Scale of Positive and Negative Experience”	0	0	0	0	0	0	0	0
“Social determinants of health”	35	0	1	3	4	5	0	2
“The Disability and Wellbeing Monitoring Framework and Indicators”	0	0	0	0	0	0	0	0
“The Quality of Being Scale”	0	0	0	0	0	0	0	0
“Well-being index”		0	0	0	0		0	0
“Meaning in Life”	6	0	0	0	1	0	0	0
“Capability approach”	4	0	1	0	0	2	0	0

Table 5. Presence of Community Based Rehabilitation Matrix indicators in the academic literature covered. For terms that generate more than 100 hits in the abstracts (strategies 2–5, 7–8) we added a “x” and not the final abstract tally.

Terms	Secondary Indicator	Strategy 1: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness”	Strategy 2: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and Technology Related Terms	Strategy 3: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and Disability Related Terms	Strategy 4: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and “Patients”	Strategy 5: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and “Covid”	Strategy 6: “E-Coaching” OR “Decision Support System”	Strategy 7: “Bayesian Belief Network”	Strategy 8: “E-Coaching” or “Decision Support System*” and “Equity” or “Diversity” or “Inclusion” or “Equality”
Total # of Abstracts		75,243	656	529	2686	885	100,036	2091	800
Health		17,350	x	x	x	x	7963	x	x
	“Healthcare” OR “Health care”	5504	17	27	x	x	5108	26	x
	“Assistive technology” OR “Assistive technologies” OR “Assistive device” OR “Assistive devices”	16	1	7	1	1	54	0	1
	“Health promotion”	167	1	5	5	4	30	0	4
	“Health prevention”	17	0	0	1	0	0	0	0
	Rehabilitation	989	2	36	49	8	637	5 (not disabled people related)	8
Education		6072	16	x	x	62	1836	16	x
	“Childhood education”	0	0	0	0	0	4	0	0
	“Primary education”	4	0	0	0	0	1	0	0
	“Secondary education”	10	0	1	0	0	6	0	0
	Non-formal	2	0	0	0	0	0	0	0
	“Life-long learning”	2	0	0	1	0	6	0	0
Livelihood		762	4	2	1	11	87	10	3
	“Skills development”	11	0	0	0	0	8	0	0
	Self-Employment	3	0	0	0	1	3	0	0

Table 5. Cont.

Terms	Secondary Indicator	Strategy 1: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness”	Strategy 2: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and Technology Related Terms	Strategy 3: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and Disability Related Terms	Strategy 4: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and “Patients”	Strategy 5: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and “Covid”	Strategy 6: “E-Coaching” OR “Decision Support System”	Strategy 7: “Bayesian Belief Network”	Strategy 8: “E-Coaching” or “Decision Support System*” and “Equity” or “Diversity” or “Inclusion” or “Equality”
	“Financial services”	26	1	0	1	0	41	1	3
	“Wage employment”	0	0	0	0	0	0	0	0
	“Social protection”	40	0	0	0	2	11	0	0
Social		10,758	x	x	x	x	4099	x	x
	“Social relationship”	21	1	0	0	0	5	1	1
	Family	1934	1	29	39	23	855	18	12
	“Personal Assistance”	6	0	0	0	2	0	0	0
	Culture	1292	2	8	13	10	507	13	3
	Arts	ND	0	3	0	0	Too many FP	0	0
	Recreation OR Leisure OR Sport	513	0	2	2	12	377	11	4
	“Access to justice”	0	0	0	0	0	0	0	0
Empowerment		299	1	3	5	4	86	1	3
	Communication	11,256	x	x	x	79	4527	43	26
	“Social mobilization”	18	0	0	0	1	0	0	0
	“Political participation”	2	0	0	0	0	2	0	0
	“Self-help groups”	3	0	1	0	1	4	0	0
	“Disabled people’s organizations”	3	0	0	0	0	0	0	0

Table 6. Presence of Canadian Index of Wellbeing indicators in the academic literature covered. For terms that generate more than 100 hits in the abstracts (strategies 2–5, 7–8) we added a “x” and not the final abstract tally.

Terms	Secondary Indicator	Strategy 1: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness”	Strategy 2: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and Technology Related Terms	Strategy 3: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and Disability Related Terms	Strategy 4: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and “Patients”	Strategy 5: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and “Covid”	Strategy 6: “E-Coaching” OR “Decision Support System”	Strategy 7: “Bayesian Belief Network”	Strategy 8: “E-Coaching” or “Decision Support System*” and “Equity” or “Diversity” or “Inclusion” or “Equality”
Total # of Abstracts		75,243	656	529	2686	885	100,036	2091	800
“Social Relationships”		0	1	0	0	0	5	1	0
“Social engagement”		8	0	1	0	1	1	0	0
“Social Support”		261	0	6	11	11	43	0	1
“Community safety”		48	1	0	0	0	2	0	0
“Social norm*”		6	0	0	0	2	9	1	0
“Attitudes toward others”		0	0	0	0	0	0	0	0
“Democratic engagement”		0	0	0	0	0	0	0	0
Participation		2250	1	20	27	23	1291	22	24
Communication		11,256	x	x	x	79	4527	43	26
Leadership		1601	3	5	58	36	190	4	3
Education		6072	16	x	x	62	1836	16	x
Competencies		1402	0	3	29	13	379	1	5
Knowledge		9418	x	x	x	78	14,921	x	x
Skill		2411	x	x	x	29	1074	13	19
Environment		ND	x	x	x	x	ND	x	x
Air		ND	10	4	15 (many on air force/air transportation not part of 15)	9	ND	ND	ND
Energy		ND	ND			8	ND	ND	ND
Freshwater		ND	0	0	0	0	ND	ND	ND
“Nonrenewable material”		ND	0	0	0	0	ND	ND	ND

Table 6. Cont.

Terms	Secondary Indicator	Strategy 1: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness”	Strategy 2: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and Technology Related Terms	Strategy 3: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and Disability Related Terms	Strategy 4: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and “Patients”	Strategy 5: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and “Covid”	Strategy 6: “E-Coaching” OR “Decision Support System”	Strategy 7: “Bayesian Belief Network”	Strategy 8: “E-Coaching” or “Decision Support System” and “Equity” or “Diversity” or “Inclusion” or “Equality”
	“Biotic resources”	ND	0	0	0	0	ND	ND	ND
	“Healthy population”	2	0	0	0	0	0	0	0
	“Personal wellbeing”	0	0	0	0	0	0	0	0
	“Physical health”	70	0	1	3	1	0	0	0
	“Life expectancy”	13	0	0	0	1	73	2	1
	“Mental health”	1397	0	23	63	30	227	0	7
	“Functional health”	0	0	0	0	0	0	0	0
	Lifestyle	85	0	1	4	8	254	3	4
	“Public health”	6899	14	x	x	x	527	8	12
	Healthcare OR “Health care”	5504	x	x	x	x	5108	26	x
	Culture	1292	2	8	13	10	507	13	3
	Leisure	10	0	1	1	2	10	3	0
	“Living standard”	8	0	0	0	0	23	0	0
	Income	1192	4	29	21	20	601	18	14
	“Economic security”	0	1	0	0	0	0	0	0
	Time	ND	Not determined (ND)	ND	ND	ND	ND	ND	ND

Table 7. Presence of Better Life Index indicators in the academic literature covered. For terms that generate more than 100 hits in the abstracts (strategies 2–5, 7–8) we added a “x” and not the final abstract tally.

Terms	Strategy 1: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness”	Strategy 2: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and Technology Related Terms	Strategy 3: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and Disability Related Terms	Strategy 4: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and “Patients”	Strategy 5: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and “Covid”	Strategy 6: “E-Coaching” OR “Decision Support System”	Strategy 7: “Bayesian Belief Network”	Strategy 8: “E-Coaching” or “Decision Support System” and “Equity” or “Diversity” or “Inclusion” or “Equality”
Total # of Abstracts	75,243	656	529	2686	885	100,036	2091	800
Housing	1195	2	8	15	13	540	3	8
Income	1192	4	29	21	20	401	18	14
Jobs	285	4	2	2	3	591	3	1
Community	13,597	x	x	x	x	3894	x	x
Education	6072	16	x	x	79	1836	16	x
Environment	ND	x	x	x	x	ND	x	x
“Physical environment”	108	1	0	1	0	30	3	0
“Civic Engagement”	0	0	0	0	0	5	0	0
Health	17,350	x	x	x	x	7963	x	x
“Life Satisfaction”	16	0	1	0	0	1	0	0
Safety	9342	x	x	x	55	3411	x	33
“Work life balance”	0	0	0	0	0	0	0	0

Table 8. Presence of Social determinants of Health (SDH) indicators in the academic literature covered. For terms that generate more than 100 hits in the abstracts (strategies 2–5, 7–8) we added a “x” and not the final abstract tally.

Terms	Strategy 1: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness”	Strategy 2: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” OR “Disaster Preparedness” and Technology Related Terms	Strategy 3: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and Disability Related Terms	Strategy 4: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and “Patients”	Strategy 5: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and “Covid”	Strategy 6: “E-Coaching” OR “Decision Support System”	Strategy 7: “Bayesian Belief NET-WORK”	Strategy 8: “E-Coaching” or “Decision Support System” and “Equity” or “Diversity” or “Inclusion” or “Equality”
Total # of Abstracts	75,243	656	529	2686	885	100,036	2091	800
Income	1192	4	29	21	20	401	18	14
Education	6072	x	x	x	79	1836	16	x
Unemployment	67	0	2	0	3	35	0	1
“Job Security”	4	0	0	0	1	0	0	0
Employment	377	3	8	12	14	246	8	6
“Early Childhood Development”	0	0	0	0	0	0	0	0
“Food Insecurity”	0	0	0	0	6	30	2	0
Housing	1195	2	8	15	13	540	3	8
“Social Exclusion”	7	0	1	0	0	7	0	0
“Social Safety Network”	0	0	0	0	0	0	0	0
“Health Services”	870	1	10	33	12	259	0	9
“Aboriginal” OR “first nations” OR “Metis” OR “Indigenous Peoples” OR “Inuit”	76	0	1	0	1	20	3	2
Gender or Women	1127	1	19	26	14	271	6	4
“Women with disabilities” or “Disabled women”	14	0	3	0	0	0	0	0
Race or racialized	285	0	5	9	9	1	4	0
Immigration	47	0	0	0	0	21	1	0
Globalization	92	1	0	1	5	962	7	0
Coping	1005	2	11	18	19	346	3	0
Discrimination	135	0	5	4	6	459	5	5
Genetic	914	5	0	5	2	2236	32	29

Table 8. Cont.

Terms	Strategy 1: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness”	Strategy 2: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and Technology Related Terms	Strategy 3: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and Disability Related Terms	Strategy 4: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and “Patients”	Strategy 5: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and “Covid”	Strategy 6: “E-Coaching” OR “Decision Support System”	Strategy 7: “Bayesian Belief NET-WORK”	Strategy 8: “E-Coaching” or “Decision Support System*” and “Equity” or “Diversity” or “Inclusion” or “Equality”
Stress	1495	3	1 (many false positive)	21 (many more false positive)	25	1085	11	19
Transportation	27,911	29	23	42	11	2622	x	12
“Vocational training”	13	0	1	0	0	6	0	0
“Social integration”	7	0	0	0	0	0	0	0
Advocacy	219	0	13	17	5	20	0	0
Literacy	193	2	8	4	2	62	0	2
Ethnic	115	0	9	1	2	34	3	3
Walkability	0	0	0	0	0	19	0	0
“Physical environment”	81	1	0	1	0	30	3	0
“Social engagement”	8	0	0	0	1	1	0	0
“Social status”	44	0	1	0	1	6	0	0

Table 9. Presence of EDI terms in the academic literature covered. For terms that generate more than 100 hits in the abstracts (strategies 2–5, 7–8) we added a “x” and not the final abstract tally.

Terms	Strategy 1: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness”	Strategy 2: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and Technology Related Terms	Strategy 3: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and Disability Related Terms	Strategy 4: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and “Patients”	Strategy 5: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and “Covid”	Strategy 6: “E-Coaching” OR “Decision Support System”	Strategy 7: “Bayesian Belief Network”	Strategy 8: “E-Coaching” or “Decision Support System*” and “Equity” or “Diversity” or “Inclusion” or “Equality”
Total # of Abstracts	75,243	656	529	2686	885	100,036	2091	800
(“Athena SWAN” OR “See change with STEM Equity Achievement” OR “Dimensions: equity, diversity and inclusion” OR “Science in Australia Gender Equity” OR “NSF ADVANCE” OR “Equity, Diversity and Inclusion” OR “Equality, Diversity and Inclusion” OR “Diversity, Equity and Inclusion” OR “Diversity, Equality and Inclusion”)	0	0	0	0	0	ABS 0/full text 3	0	0
“Belonging, Dignity, and Justice” OR “Diversity, Equity, Inclusion and Belonging” OR “Diversity, Dignity, and Inclusion” OR “Equity, Diversity, Inclusion, and Accessibility” OR “Justice, Equity, Diversity, and Inclusion” OR “Inclusion, Diversity, Equity and Accessibility” OR “Inclusion, Diversity, Equity and Accountability” OR “Equity, Diversity, Inclusion, and Decolonization”	0	0	0	0	0	0/0	0	0
Equality AND inclusion AND diversity	0	0	0	0	0	0	0	0
Equity AND inclusion AND diversity	7	0	0	0	0	0	0	0
Equity	ND	1	6	5	16	ND	0	x
Equality	ND	3	5	0	3	ND	0	19

Table 9. Cont.

Terms	Strategy 1: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness”	Strategy 2: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and Technology Related Terms	Strategy 3: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and Disability Related Terms	Strategy 4: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and “Patients”	Strategy 5: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and “Covid”	Strategy 6: “E-Coaching” OR “Decision Support System”	Strategy 7: “Bayesian Belief Network”	Strategy 8: “E-Coaching” or “Decision Support System*” and “Equity” or “Diversity” or “Inclusion” or “Equality”
Diversity	ND	5	6	8	5	ND	x all bio-diversity	x
Inclusion		3	22	21	9		14	x
Groups focused on in EDI discourses								
“Gender” OR “Women”	1127	2	45	84	37	870	12	15
“Ethnic groups”	22	0	0	0	0	6	0	0
“Racialized minorities”	7	0	0	0	0	0	0	0
“Visible minorities”	3	0	1	0	0	0	0	0
Racialized	20	0	1	0	2	1	0	0
Ethnic		0	10	1	2	34	3	3
“People with disabilities” OR “Disabled people”	170	1	ND	4	13	38	1	0
“Person with a disability” OR “Disabled person”	202	0	ND	1	0	0	0	0
“Women with disabilities” OR “Disabled women”	14	0	3	0	0	0	0	0
“Impaired” OR “Impairment”	268	0	ND	ND	0	374	5	5
Deaf	23	0	ND	0	0	12	0	0
“ADHD” OR “Autism”	46	0	ND	0	0	80	0	0
“Mental health”	1397	0	x	x	x	227	0	0
“Neurodiverse” OR “Neurodiversity”	0	0	ND	1	0	0		0
Aboriginal OR “Indigenous peoples” OR “First Nations” OR “Metis” OR “Inuit”	76	0	0	0	1	7	3	2
“Minorit*”	427	3	10	10	15	124	4 (all false positive)	0
“minority group*”	29	0	0	11	4	13	0	0

Table 9. Cont.

Terms	Strategy 1: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness”	Strategy 2: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and Technology Related Terms	Strategy 3: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and Disability Related Terms	Strategy 4: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and “Patients”	Strategy 5: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and “Covid”	Strategy 6: “E-Coaching” OR “Decision Support System”	Strategy 7: “Bayesian Belief Network”	Strategy 8: “E-Coaching” or “Decision Support System*” and “Equality” or “Diversity” or “Inclusion” or “Equality”
“LGBTQ*”	17	0	1	1	3	0	0	0
Patient*	3993	12	ND	ND	x	12,371	X	X
Ableism	2	0	1	0	1	0	0	0
Sexism	3	0	0	0	0	0	0	0
Racism	28	0	1	0	1	1	0	1
Ageism	0	0	0	0	0	0	0	0
Intersectionality	3	0	2	0	1	0	0	0

Table 10. Presence of science and technology governance and ethics fields terms in the academic literature covered.

Terms	Strategy 1: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness”	Strategy 2: “Disaster management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and Technology Related Terms	Strategy 3: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and Disability Related Terms	Strategy 4: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and “Patients”	Strategy 5: “Disaster Management” OR “Emergency management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and “Covid”	Strategy 6: “E-Coaching” OR “Decision Support System”	Strategy 7: “Bayesian Belief Network”	Strategy 8: “E-Coaching” or “Decision Support System*” and “Equality” or “Diversity” or “Inclusion” or “Equality”
Total # of Abstracts	75,243	656	529	2686	885	100,036	2091	800
“Democratizing science and technology”	0	0	0	0	0	0	0	0
“Participatory technology assessment “	1	0	0	0	0	0	0	0
“Technology assessment”	8	0	1	1	0	31	1	3
“Parliamentary technology assessment”	0	0	0	0	0	0	0	0
“Anticipatory governance”	0	0	0	0	0	0	0	0
“Upstream engagement”	0	0	0	0	0	0	0	0
“Responsible innovation”	0	0	0	0	0	0	0	0

Table 10. Cont.

Terms	Strategy 1: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness”	Strategy 2: “Disaster management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and Technology Related Terms	Strategy 3: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and Disability Related Terms	Strategy 4: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and “Patients”	Strategy 5: “Disaster Management” OR “Emergency management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and “Covid”	Strategy 6: “E-Coaching” OR “Decision Support System”	Strategy 7: “Bayesian Belief Network”	Strategy 8: “E-Coaching” or “Decision Support System*” and “Equity” or “Diversity” or “Inclusion” or “Equality”
“Responsible research and innovation”	0	0	0	0	0	0	0	0
“Transformative vision assessment”	0	0	0	0	0	0	0	0
“Technology governance”	0	0	0	0	0	0	0	0
“Science and technology governance”	0	0	0	0	0	0	0	0
“AI-ethics”	0	0	0	0	0	1	0	0
“Bioethics”	12	0	1	2	2	0	0	0
“Computer science ethics”	0	0	0	0	0	0	0	0
“Information technology ethics”	0	0	0	0	0	0	0	0
“Nanoethics”	0	0	0	0	0	0	0	0
“Neuroethics”	0	0	0	0	0	0	0	0
“Robo-ethics”	0	0	0	0	0	0	0	0

Table 11. Presence of “social” or “societal” linked phrases in the academic abstracts downloaded including the ones already mentioned within other tables such as Table 2.

Terms	Strategy 2: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and Technology Related Terms	Strategy 3: “Disaster management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and Disability Related Terms	Strategy 4: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and “Patients”	Strategy 5: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and “Covid”	Strategy 7: Bayesian Belief Network	Strategy 8: “E-Coaching” or “Decision Support System*” and “Equity” or “Diversity” or “Inclusion” or “Equality”
Total # of Abstracts	656	529	2686	885	2091	800
“Social” linked phrases						
Social	240 hits not abstracts	289 hits not abstracts	260 hits not abstracts	519 hits not abstracts	275 hits not abstracts	212 hits not abstracts
Social network	7	2	3	5	13	9
Social science	2	3	1	4	2	2
Social media	51	3	8	47	2	3
Social effects	1	1	1	1	0	0
Social interactions	0	1	1	3	0	0
Social impacts	1	2	3	8	0	2
Social geodata	1	0	0	0	0	0
Social platform	1	0	0	1	0	1
Social benefit	2	0	0	1	1	1
Social challenges	1	1	2	2	0	0
Social and economic challenges	1	0	0	1	0	0
Social vulnerability index	1	0	0	6	0	0
Social connection	1	1	0	0	0	1
Social stability	1	0	0	0	0	0
Social worker					0	0
Social and economic disruption	1	0	0	0	0	0
Social robot	1	0	0	0	0	0
Social cognition theory	1	0	0	0	0	0
Social application	1	0	0	0	0	0
Social behavior	1	0	0	0	0	2
Social and environmental impact	1	0	0	0	0	0
Social big data	1	0	0	0	0	0
Social sensors	1	0	0	0	1	0

Table 11. Cont.

Terms	Strategy 2: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and Technology Related Terms	Strategy 3: “Disaster management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and Disability Related Terms	Strategy 4: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and “Patients”	Strategy 5: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and “Covid”	Strategy 7: Bayesian Belief Network	Strategy 8: “E-Coaching” or “Decision Support System*” and “Equity” or “Diversity” or “Inclusion” or “Equality”
social, economic, psychological, and demographic effects	1	0	0	0	0	0
social, political, and economic relationships	1	0	0	0	0	0
social and economic disparities	1	0	0	0	0	0
social and economic structures	1	0	0	0	0	0
Social data	1	0	1	0	0	0
Social governance	1	0	0	0	0	0
Social emergency management	1	0	0	0	0	0
social and environmental factors	1	0	0	0	0	0
Social justice	0	7	1	4	0	0
Social support network	0	1	1	0	0	0
Social determinants	0	3	3	4	0	1
Social policy	0	1	0	1	0	0
Social model of disability	0	2	0	0	0	0
Social environment	0	2	3	1	0	0
Social disparities	0	0	1	0	0	0
Social stigma	0	1	2	1	1	0
Social vulnerability	1	11	2	1	2	9
Social capital	0	3	1	3	5	3
Social isolation	0	7	0	3	0	2
Social grounds	0	1	0	1	0	0
Social resources	0	2	0	0	0	0
Social interaction	1	3	1	3	0	0
Social, economic, and cultural wellbeing	0	1	0	0	0	9
Social health	0	2	0	2	0	0
Social equity	0	3	0	0	0	5
Social participation	0	1	0	0	1	0

Table 11. Cont.

Terms	Strategy 2: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and Technology Related Terms	Strategy 3: “Disaster management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and Disability Related Terms	Strategy 4: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and “Patients”	Strategy 5: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and “Covid”	Strategy 7: Bayesian Belief Network	Strategy 8: “E-Coaching” or “Decision Support System*” and “Equity” or “Diversity” or “Inclusion” or “Equality”
Social services	0	2	3	5	0	0
Theory of social attachment	0	1	0	0	0	0
Social factors	0	5	1	2	2	4
Social groups	0	2	0	2	0	0
Social, political, economic, and cultural levels	0	1	0	0	0	0
Social changes	0	2	0	2	0	0
Social issues	0	2	2	3	0	0
Social needs	0	1	5	2	1	0
Social domains	1	0		0	0	0
Social inequalities	0	3	0	2	0	0
Social and environmental ecologies,	0	1	0	0	0	0
Social status	0	1	0	1	0	0
Social cohesion	0	2	0	3	1	1
Social views	0	1	0	0	0	0
Social indicators	0	1	0	0	0	0
Social infrastructure	0	1	0	0	0	0
Social situation	0	1	0	0	0	0
Social functioning	0	1	0	0	0	0
Social system	0	1	0	3	4	0
Social transformation	0	1	0	2	1	0
Social movement	0	1	0	1	0	0
Social responsibility	0	1	2	3	0	1
Social life	0	1	0	2	0	0
Social cost	0	2	0	0	1	0
Social care	0	0	5	0	0	2
Social and natural disaster	0	0	1	0	0	0
Social ties	0	0	1	1	0	0

Table 11. Cont.

Terms	Strategy 2: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and Technology Related Terms	Strategy 3: “Disaster management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and Disability Related Terms	Strategy 4: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and “Patients”	Strategy 5: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and “Covid”	Strategy 7: Bayesian Belief Network	Strategy 8: “E-Coaching” or “Decision Support System*” and “Equity” or “Diversity” or “Inclusion” or “Equality”
Social identity	0	0	1	0	0	0
Social resilience	0	0	1	1	0	0
Social and moral norms	0	0	1	0	0	0
Social marketing	0	0	1	1	0	0
Social taboo	0	0	1	1	0	0
Social anxiety	0	0	1	1	0	0
Social distancing	1	1	5	23	0	0
Social solidarity	0	0	1	1	0	0
Social safety	0	0	1	1	0	0
Social Medicine	0	0	0	1	0	0
Social Trust	0	0	0	1	0	1
Social risk	0	0	0	1	0	1
Social Dimension	0	1	0	1	0	1
Social security	0	0	1	1	0	0
Social welfare	0	1	0	6	1	1
Social dissatisfaction	0	0	0	1	0	0
Social Disruption	0	0	0	3	0	0
Social assistance	0	0	1	1	0	0
Social protection	0	0	0	1	0	0
Social injustice	0	0	0	1	0	0
Social disturbance	0	0	0	1	0	0
Social Insurance	0	0	0	1	0	0
Social restriction	0	0	0	1	0	0
Social Initiative	0	0	0	1	0	0
Social influence	0	1	0	1	0	1
Social cues	0	0	0	1	0	0
Social fissure	0	0	0	1	0	0
Social parties	0	0	0	1	0	0

Table 11. Cont.

Terms	Strategy 2: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and Technology Related Terms	Strategy 3: “Disaster management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and Disability Related Terms	Strategy 4: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and “Patients”	Strategy 5: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and “Covid”	Strategy 7: Bayesian Belief Network	Strategy 8: “E-Coaching” or “Decision Support System*” and “Equity” or “Diversity” or “Inclusion” or “Equality”
Social Background	0	0	1	1	0	0
Social development	0	0	0	1	0	2
Social learning	0	1	1	1	3	0
Social reality					1	0
Social process					1	1
Social innovation	0	0	0	0	1	0
Social and economic	0	0	0	0	13	0
Political, economic, social cultural and technological	0	0	0	0	1	0
Ecological, social and economic values	0	0	0	0	1	0
Social, environmental and economic dimensions	0	0	0	0	1	0
Social engineering	0	0	0	0	3	0
Social, and environmental impacts	0	0	0	0	1	0
Geological, engineering, economic, social, political and cultural factors.	0	0	0	0	1	0
Social dynamics	0	0	0	0	1	0
Social-ecological	0	0	0	0	16	0
(Integrating social, environmental and economic elements)	0	0	0	0	1	0
Social and economic terms.	0	0	0	0	1	0
Social contacts	0	0	0	0	1	0
Social neighbor hood	0	0	0	0	1	0
Social norm	0	0	0	2	1	0
Social pressure	0	0	0	0	1	0
Social computing	0	0	0	0	1	1
Social consideration	0	0	0	0	1	0

Table 11. Cont.

Terms	Strategy 2: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and Technology Related Terms	Strategy 3: “Disaster management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and Disability Related Terms	Strategy 4: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and “Patients”	Strategy 5: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and “Covid”	Strategy 7: Bayesian Belief Network	Strategy 8: “E-Coaching” or “Decision Support System*” and “Equity” or “Diversity” or “Inclusion” or “Equality”
Social interest	0	0	0	0	1	0
Livelihoods: natural, human, social, physical, and financial.	0	0	0	0	0	0
Social harmony	0	0	0	0	1	0
Social dysfunction	0	0	0	0	1	0
Social outcomes	0	0	0	0	3	0
Social entities	0	0	0	0	1	0
Social uses	0	0	0	0	1	0
Social aspects	3	0	0	1	2	0
Social inclusion	0	0	0	0	1	0
Social, economic, and environmental outcomes	0	0	0	0	1	0
Social capital	0	0	0	0	0	1
Social exchange theory	0	0	0	0	0	1
social software	0	0	0	0	0	1
Social control	0	0	0	0	0	1
Social skills	0	0	0	0	0	1
Social factors	0	0	0	0	0	4
Social amenities	0	0	0	0	0	1
Social care	0	0	0	0	0	3
Social and technical aspects	0	0	0	0	0	1
Social, economic and budgetary policy	0	0	0	0	0	1
Technology, social, human and environmental factors	0	0	0	0	0	1
Social and ecological priorities	0	0	0	0	0	1
Social and economic investigations	0	0	0	0	0	1
Biophysical, ecological, social, economic and cultural assets	0	0	0	0	0	1

Table 11. Cont.

Terms	Strategy 2: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and Technology Related Terms	Strategy 3: “Disaster management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and Disability Related Terms	Strategy 4: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and “Patients”	Strategy 5: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and “Covid”	Strategy 7: Bayesian Belief Network	Strategy 8: “E-Coaching” or “Decision Support System*” and “Equity” or “Diversity” or “Inclusion” or “Equality”
Environmental, social, cultural and economic datasets social and economic conditions	0	0	0	0	0	1
Social equity	1	0	0	0	0	4
Social hierarchy	0	0	0	0	0	1
Social development	0	0	0	0	0	1
Economic and social importance	0	0	0	0	0	1
Social acceptability /social acceptance	0	0	0	0	0	2
Social agent	0	0	0	0	0	1
Social demands	0	0	0	0	0	1
Social welfare	0	0	0	0	0	1
Ecological, economic and social suitability	0	0	0	0	0	1
Social influence	0	0	0	0	0	1
Technical, technological, economical, social, cultural, ecological and other aspects	0	0	0	0	0	1
Social, cultural, ethical, psychological, emotional, religious and ethnic aspects	0	0	0	0	0	1
Technological, technical, organizational, social, cultural, ethical, psychological, emotional, religious and environmental terms	0	0	0	0	0	1
Social concern	0	0	0	0	0	2
Social responsibility	0	1	2	3	0	1
Social dimensions	0	0	0	0	0	1
Social, economic, environmental and technical perspectives	0	0	0	0		1

Table 11. Cont.

Terms	Strategy 2: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and Technology Related Terms	Strategy 3: “Disaster management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and Disability Related Terms	Strategy 4: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and “Patients”	Strategy 5: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and “Covid”	Strategy 7: Bayesian Belief Network	Strategy 8: “E-Coaching” or “Decision Support System*” and “Equity” or “Diversity” or “Inclusion” or “Equality”
Social, economic, environmental and system aspects.	0	0	0	0	0	1
Social sensing	0	0	0	0	0	1
Social-learning processes	0	0	0	0	0	1
Socialization	0	0	0	0	0	1
Social cohesion	0	0	0	0	0	1
Social modelling	0	0	0	0	0	1
Social determinants	0	2	4	6	0	1
Social and ethical issues	0	0	0	0	0	1
Social connection	0	0	0	0	0	1
Social loafing	0	0	0	0	0	1
Social platform	0	0	0	0	0	1
Social livability	0	0	0	0	0	1
Social features	0	0	0	0	0	2
Societal						
Societal	11	8	6	13	18	5
Societal inequalities	0	0	0	1	0	0
Societal outcome	0	0	0	1	0	0
Societal level	0	0	0	1	0	0
Societal resilience	0	0	0	2	0	0
Societal norms	0	1	1	1	0	0
Societal Challenges	0	0	0	1	0	0
Societal differences	0	0	1	0	0	0
Societal disruptions	0	0	1	0	0	0
Societal concerns	0	0	1	1	0	0
Societal progress	0	0	1	0	0	0
Societal views	0	1	0	0	0	0
Societal implementation	0	1	0	0	0	0

Table 11. Cont.

Terms	Strategy 2: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and Technology Related Terms	Strategy 3: “Disaster management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and Disability Related Terms	Strategy 4: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and “Patients”	Strategy 5: “Disaster Management” OR “Emergency Management” OR “Emergency Planning” OR “Disaster Planning” OR “Disaster Preparedness” OR “Emergency Preparedness” and “Covid”	Strategy 7: Bayesian Belief Network	Strategy 8: “E-Coaching” or “Decision Support System*” and “Equity” or “Diversity” or “Inclusion” or “Equality”
Societal groups	0	1	0	1	0	0
Societal changes	1	1	0	0	0	0
Societal attitudes	0	1	0	0	0	0
Societal response	1	0	0	1	0	0
Societal emergency management	1	0	0	0	0	0
Societal value	1	0	0	0	0	0
Societal implication	1	0	0	0	0	1
Societal barriers	1	0	0	0	0	0
Societal reconstruction	1	0	0	0	0	0
Societal problems	1	0	0	1	0	0
Societal safety	0	0	0	0	1	0
Societal behavior	0	0	0	0	1	0
Societal consequences	0	0	0	0	1	0
Societal choice	0	0	0	0	1	0
Societal consequences	0	0	0	0	1	1
Societal drivers	0	0	0	0	1	0
Societal conditions	0	0	0	0	1	0
Societal aspects	0	0	0	0	0	1
Societal perspectives	0	0	0	0	0	1
Societal benefit	0	0	0	0	0	1

Table 4 shows that the term “determinants of health” was mentioned the most within the academic literature searched for all strategies followed by “social determinants of health” (if mentioned at all). Many of the measures only has one-two hits or none.

Table 5 shows that only generic terms such as “health” or “education” or “social” to name three received more than 100 hits (x in the table indicates more than 100 hits). For more specific terms the hits were low or no hits were obtained.

Table 6 shows that only generic terms such as “communication” or “knowledge” or “education” to name three received more than 100 hits (x in the table indicates more than 100 hits). For more specific terms the hits were low or no hits were obtained.

Table 7 shows that only generic terms such as “health” or “community” or “safety” to name three received more than 100 hits (x in the table indicates more than 100 hits). For more specific terms the hits were low or no hits were obtained.

Table 8 shows that only generic terms such as “transportation” or “stress” or “education” to name three received more than 100 hits (x in the table indicates more than 100 hits). For more specific terms the hits were low or no hits were obtained. Table 8 also had some EDI groups related terms. EDI group related terms are more engaged with under Table 9.

Table 9 shows that EDI phrases and frameworks were hardly to not all mentioned. As to EDI related groups the terms “gender or women” were mentioned the most. The term “patient” had the most hits by far. Terms covering Indigenous Peoples or other EDI related groups were found much less. We also searched for some negative isms linked to EDI groups finding few to no hits.

Table 10 shows that of the ethics fields covered the term “bioethics” was mentioned the most although even that term was not found with each strategy. Ai-ethics had only one hit with one strategy. All the other ethics fields generated no hits at all. As to the science and technology governance terms only “technology assessment” generated more than one hit although not every strategy generated hits. “Participatory technology assessment” generated one hit with one strategy. The other science and technology governance terms generated no hits.

Table 11 only covered the ‘social’ terms found in the downloaded abstract found with strategy 2–5 and 7–8. The table shows the generic term ‘social’ was present to some extent but with specific aspects of the ‘social’ indicated by phrases containing the term “social” the hits were much less. The term “social media” and “social network” generated the most hits. Many social containing phrases only showed up in one strategy and often only one time. The term “societal” was rarely mentioned and a given phrase containing “societal” even less.

4. Discussion

The objective of this study was to map out the engagement with the ‘social’, EDI and marginalized groups and technologies in the EDMPP-focused academic literature. In short, many of the ‘social’ terms and EDI phrases and frameworks were minimally mentioned or not at all. Marginalized groups covered within normally in EDI discussions were rarely mentioned. The term “patient*” was 5 times more present than the disability terms covered. In the remainder of the discussion, we cover EDMPP including COVID-19 first in relation to the ‘social’, followed by EDI, and lastly the issue of technologies.

4.1. EDMPP including COVID-19 and the Social

The COVID-19 research roadmap [8] mentions the term ‘social’ over 211 times and uses phrases such as “social protection”, “social cohesion”, social change and socio-economic recovery. The UN Office for disaster risk reduction (UNDRR) strategic framework 2022–2025 [11] mentions the term ‘social’ as part of its strategic objective 1 stating: “Faced with an increasingly complex and uncertain risk landscape, where climate change and systemic risks threaten our social, economic and financial systems, greater understanding of the interconnected nature of hazards, exposure and vulnerability will be critical for effective disaster risk reduction and for achieving the Sustainable Development Goals (SDGs)” [11]

(p. 11). It also contains the “Chart of the Sendai Framework for Disaster Risk Reduction 2015–2030” in its strategic framework document, which by itself mentions the social as part of the outcome, the goal and priority for action [11]. The United Nations Office for Disaster Risk Reduction in their strategic framework 2016–2021 argues that “managing disaster risks cannot be separated from the broader governance of social and economic development” [271]. Given these three documents we argue that a solid engagement with various aspects of the ‘social’ are needed.

However, our findings show that the engagement with the social (Tables 2–8 and 11) was very uneven with EDMPP in general (strategy 1) and COVID-19 (Strategy 5). Although our online search within the 75,243 abstracts (strategy 1), for the very term “social”, generated 10,758 hits and was over 100 times present in abstracts obtained with strategy 5, specific phrases linked to the ‘social’ were much less present. For example, the phrase “social implication*” was only found 151 times with strategy 1 and 8 times with strategy 5. Similarly, “social impact*” was mentioned 155 times with strategy 1 and 8 times with strategy 5 (Table 2). “Social protection”, mentioned in the COVID-19 research road map, generated only 40 hits with strategy 1 and two hits with strategy 5. “Social cohesion” was not found with strategy 5 and “social change” only twice with strategy 5 (Table 11). We also added as search terms the “UN Framework Convention on Climate Change” and the United Nations document “transforming our world: the 2030 agenda for sustainable development” which are about preventing the worsening of certain aspects of the ‘social’ linked to emergencies and disasters, whereby the first generated 5 hits with strategy 1 and none with strategy 5. The latter did not generate hits with strategies 1 and 5. Table 11 shows how little to no phrases containing the ‘social’ were present for strategy 5. Many terms could be used more such as the different well-being concepts, the concept of health equity, which includes the problems with the ‘social’ [13], and terms such as stigma, stereotype and “social norms” to name only a few. In Table 4, we list many wellbeing measures that contain sets of indicators of the ‘social’. Most were not mentioned at all using strategies 1 and 5. The findings in Tables 2–8 and 11 suggest that the literature we covered does not add to the understanding of the ‘social’ in relation to EDMPP. The findings are particularly problematic for marginalized groups that often experience problems with the ‘social’.

EDMP including COVID-19 and the Social: The Case of Marginalized Groups

Marginalized population are known to encounter many social and societal problems. In the UN Office for disaster risk reduction (UNDRR) strategic framework 2022–2025 [11] it is noted that human rights treatise can be used to deal with vulnerability. Our findings show that the human rights treatises “Convention on the Rights of Persons with Disabilities”, “Convention on the Rights of the Child”, “Convention on the Elimination of All Forms of Discrimination against Women”, “Declaration on the Rights of Indigenous Peoples”, “Universal Declaration of Human Rights” and the “International Convention on the Elimination of All Forms of Racial Discrimination” are not used in the literature covered to enhance EDMPP processes and actions. It is known that a major challenge for any EDMPP is that different groups are impacted differently by emergencies and disasters [103,105,109,113,114,135–150,272–274]. At the same time it is recognized that marginalized populations encounter many problems in relation to emergencies and disasters [104–121]. Our findings show a lack of engagement with many of the social terms present in Tables 2–8 and 11 which is especially a problem for marginalized groups.

It is acknowledged that the literacy in relation to marginalized groups is low [149] and that numerous biases [114,118,144,149,151–154,275] exist often due to a lack of data or bias in what data is produced [155,159]. Our findings related to the ‘social’ suggest that the data needed for increasing the literacy of- or decreasing the bias by people involved in EDMPP related to the social challenges faced by marginalized groups is not generated.

The results obtained through strategy 3 which covers disabled people in conjunction with EDMPP and strategy 4 that covers EDMPP literature using the term patient, both show the same lack of engagement with the ‘social’ (as outlined for the data obtained from

strategies 1 and 5). Therefore, the existing literature does not help to eliminate the lack of literacy and the negative bias in the literature that exists in relation to disabled people.

Given that existing literature shapes the knowledge of learners, the problems found must have an impact on EDMPP education [151], literacy, and unconscious bias of the learner. The bias and lack of coverage of disabled people is also noted in the literature around environmental education [161]. It is argued that increasing cultural competency, knowledge, skills, and abilities in emergency management higher education, will increase graduate students to be more credible, empathetic, relatable, and trustworthy, and less inclined to negatively apply biases, stereotypes, and pre-conceived notions [129,160]. However, data on the ‘social’ is needed to make one aware of the biases, which would hopefully lead to a decrease in the bias used in educational settings.

The “United Nations 2018 flagship report on disability and development: realization of the Sustainable Development Goals by, for and with persons with disabilities” outlines many steps to ensure disability-inclusive disaster risk reduction and response as well as disability-inclusive humanitarian action:

- Ensure that emergency information and services are inclusive and available in accessible formats in line with the principles of Universal Design. It is also necessary to strengthen the capacity of persons with disabilities in the area of disaster risk reduction and humanitarian response.
- Ensure that persons with disabilities participate in decision-making processes and are active stakeholders at all stages of disaster response and humanitarian action from planning to implementation, evaluation, and monitoring.
- Ensure that national policies and programmes include operational standards and indicators for the inclusion of persons with disabilities in emergency preparedness, planning and response.
- Ensure that emergency information, commodities, infrastructures, and services are inclusive and available in accessible formats.
- Mobilize adequate, timely and predictable resources to operationalize commitments for inclusive emergency preparedness and response.
- Raise awareness among persons with disabilities on disaster management planning at the local level.
- Enhance the capacities and knowledge of aid workers on the needs and strengths of persons with disabilities in humanitarian actions.
- Undertake evidence-based research and develop a data collection system on persons with disabilities relevant to conflicts and disasters [114] (p. 245).
- Furthermore, States should ensure that:
- All post crisis recovery efforts, including reconstruction and rebuilding, are inclusive of persons with disabilities, protection mechanisms are in place in emergency and post crisis contexts to recognize and respond to the heightened risk of persons with disabilities, particularly women and children with disabilities, to violence, abuse, and exploitation.
- Accountability mechanisms are implemented at the national level for acts or omissions leading to discrimination and exclusion of persons with disabilities in the context of humanitarian action and disaster response [114] (p. 245–246).

All these recommendations require engagement with the ‘social’ in conjunction with disabled people which was not found in our study. In relation to COVID-19, it is argued that disabled people can be impacted by COVID-19 and its aftermath in many ways and roles [166]. To deal with all these aspects, data on the ‘social’ of disabled people is needed. Instead, we found that COVID-19 and EDMPP literature lacks content on the ‘social’.

4.2. EDMPP including COVID-19 and EDI

Looking at our findings through an EDI lens (Table 9), it shows a lack of engagement with marginalized groups covered within EDI policies and actions such as women, racial

minorities, visual minorities, disabled people, Indigenous Peoples and LGBTQ2S+. Table 9 also shows that a term such as *minorit**, which covers more groups, was hardly present.

We also added negative isms linked to certain marginalized groups (ableism, sexism, racism, ageism) as search terms and intersectionality as a term depicting that one has more than one characteristic all of which gave few to no hits. Finally, the very EDI phrases and frameworks used to generate policies and actions related to EDI were not present either.

These findings suggest that the terms related to the ‘social’ that are found are not or rarely engaged with in conjunction with minority or marginalized groups. This is problematic given that EDMPP actions are done by all kind of workers and are influenced by research and education. EDI actions are meant to make the workplace, education and research agenda, more diverse, equitable, and inclusive [14]. The lived experience of marginalized groups that comes with a fulfilled EDI agenda adds to the literacy in EDMPP. If EDI is done right many of the problematic findings of our study could be eliminated.

The UN Research Roadmap for the COVID-19 Recovery sees equity as the main guidance principle for all actions [8].

This cannot be achieved given the missing engagement with the social, marginalized groups, and EDI phrases and frameworks we found in our study.

The UN Research Roadmap for the COVID-19 Recovery highlights several key lines of inquiry that research should consider such as how to be more equitable, diverse, inclusive, participatory, collaborative and how to be able to respond faster to emergencies and to improve on knowledge mobilization. Systems and open sciences approaches are seen as needed.

Engaging with and changing research agendas to include the ‘social’, EDI and marginalized groups fits within the roadmap and must be done.

4.3. EDMPP including COVID-19 and Technologies

Various studies describe the utility of artificial intelligence, machine learning and reasoning and other technologies in relation to EDMPP [69,71,80,167–211]. However, problems are noted how these technologies are used in EDMPP [96–101,114,150,153,212–231]. Our findings around technologies and EDMPP (strategy 2, 6–8) show the same problems outlined for the non-technology focused EDMPP literature found with the other strategies. For example, for the 800 abstracts obtained with the search strategy 8, “e-coaching” or “decision support system*” and “equity” or “diversity” or “inclusion” or “equality”, which already contains individual EDI terms, generated very few to no hits for EDI groups and terms such as *minorit** and intersectionality.

The UN Research Roadmap for the COVID-19 Recovery suggested the need to improve science strategies such as data infrastructure, implementation science, rapid learning systems, knowledge mobilization, and science of science [8]. Our data suggests that a change in research agendas is needed as part of this science strategy change.

It is well recognized that scientific and technological advancements have social, legal, ethical and economic consequences [12,13,254–262]. As such we used keywords depicting science and technology governance concepts whose discussions engage with the ‘social’ and ethics fields (Table 10).

Only the phrase “technology assessment” generated hits with more than one strategy. “Participatory technology assessment” had only one hit with one strategy and the other nine concepts did not generate any hits. For the ethics fields only bioethics generated hits beyond one strategy and AI-ethics generated only one hit in one strategy. The other five fields generated no hits.

That there is no linkage between science and technology governance and ethics fields in relation to EDMPP is another indicator of the systemic problem the EDMPP discourse has with the ‘social’. Furthermore, given the already noted problems in the literature around technologies including artificial intelligence use for EDMPP such as biases it is problematic that we did only find one hit with AI-ethics and none with computer ethics.

It is noted that no algorithm fits all. It is suggested that one must investigate which algorithm has worked best in similar circumstances before [248]. However, given the gaps in the ‘social’, EDI, and coverage of marginalized groups our study found, it is very likely that the algorithms that worked before were not meeting the needs of marginalized groups.

It is noted that for disaster risk reduction to work, one must ask the “right questions on who creates the risks and who suffers the consequences of risk” [193]. Our study suggests that the right questions have not been asked. It is argued that computational fairness, AI fairness [263], and ML fairness [247] are needed. However, for that to work an extensive knowledge of the ‘social’, especially in relation to marginalized groups, is needed as well as a research agenda that acknowledges and fixes the bias in existing models [237,242,263,276]. It is argued that one has to move from fairness to equity [237]. However, that cannot be achieved without the knowledge on the ‘social’ and marginalized groups. It is noted that “if ethical, legal, and social implications are addressed appropriately, affective computing technologies may bring a real benefit to society” [88] (p. 1). Our study showed that the ‘social’ and EDI and its groups are under-researched, and as such the data is missing for the effective computing technology to work on EDMPP. One research group suggested machine reasoning based on three questions: What is? What if? And Why? [88]. Our findings suggest that these questions will be answered badly given that right data on the ‘social’ of marginalized groups around EDMPP has not been generated.

4.4. Limitations

The search was limited to abstracts in selected databases and English language literature. As such, the findings are not to be generalized, which was also not the purpose of the study, to the whole academic literature, non-academic literature, or non-English literature. The hitcounts produced are based on the co-occurrence of terms and do not indicate whether the content is relevant to EDMPP and are a maximum and do not account for duplicate between databases and within abstracts. We also chose to search the data obtained with the search strategies for certain terms for example depicting ‘the social’ and EDI groups but our terms used are not exhaustive. Although this study has various limitations, the findings allow for conclusions to be made within the parameters of the searches and the character of the analysis.

5. Conclusions and Future Research

Our findings suggest low to no engagement with concepts linked to the ‘social’, as seen in Tables 2 and 3, and well-being measures in Table 4, as well as low to no engagement with many of the individual indicators of the four well-being measures (Social Determinants of Health, Better Life Index, Canadian Index of Well-being, and the Community Based Rehabilitation Matrix) (Tables 5–8). Furthermore, ‘social’ and ‘societal’ as terms and as part of phrases were rarely present (Table 11). We also found low to no presence of phrases linked to science and technology governance discussions (Table 10) and we found low to no presence of EDI terms and frameworks (Table 9) and terms linked to marginalized groups covered under EDI efforts (Table 9).

Our findings indicate many opportunities for broadening the EDMPP discourse to include the ‘social’, in relation to marginalized populations, and EDI. Given that technologies are important for EDMPP, our findings suggest opportunities to broaden the EDMPP discourse to engage with science and technology ethics and governance and vice versa. Collaborations could be made, ranging from people, groups and fields that focus on the many aspects of the ‘social’ and can involve academics, socially disadvantaged groups, practitioners, educators (formal, nonformal, lifelong learning), and policy makers.

The findings of the study indicate many potential research projects to close the gaps in our findings. We suggest four main areas: (a) increasing data on the ‘social’ (b) linking EDI to EDMPP, (c) covering extensively marginalized groups and (d) developing self-assessment tools that make one aware of knowledge one might not have.

By increasing the data on the ‘social’, one could give Tables 2–8 and 11 to individuals involved in EDMPP and ascertain their views on whether EDMPP and emergencies and disasters discussions impact the different indicators, whether EDMPP and emergencies and disasters discussions engage with the terms in the tables, how they envision technologies to be used in EDMPP, how they impact the different indicators of the ‘social’, and whether discussions around the use of technologies in EDMPP engage with the terms in the tables.

One can ask these questions in relation to EDMPP in general or for specific emergencies and disasters and specific stages of emergency and disaster management. These questions could also be raised for individuals involved in the development of technologies for EDMPP such as people coding algorithms for EDMPP, people that use technologies like decision support systems, and people involved in ethics and governance discussions of technologies used in EDMPP (such as artificial intelligence, machine learning, machine reasoning, and quantum technologies).

Research could be performed on the usefulness of understanding the ‘social’ as pedagogical tools in environmental education and EDMPP education of students, policymakers, and practitioners to increase literacy on and interest in the effect of EDMPP and emergencies and disasters on marginalized groups.

EDI is more than EDI of an individual’s background in the workplace. In academic settings, it is also about EDI of curricula material, EDI of research agendas, and EDI of knowledge. One can ask questions like: How are EDI activities impacting academic engagement with EDMPP and individual emergencies and disasters? Are the academic discussions around EDMPP and individual emergencies and disasters lacking in EDI? How can one best link EDI to discussions around EDMPP and individual emergencies and disasters? Mapping the ‘social’ could be a useful approach for the collaborations between the two areas.

Tools that allow people to become aware of biases they are exposed to and hold and the gaps in knowledge they have might be useful. Many of the terms in Tables 2–8 and 11, covering the ‘social’, could be used to trigger thought processes around the ‘social’ of marginalized groups in relation to EDMPP and ask: do you think that [add marginalized group here] face problems as to [a given term of the tables] in general or in relation to the short term or long-term effects of [add emergency or disaster here] or [EDMPP]?

Another tool one could use is the BIAS FREE (Building an Integrative Analytic System for Recognizing and Eliminating InEquities) framework [277,278]. The BIAS FREE framework lists 20 analytical questions, divided into three sets of problems: maintaining an existing hierarchy, failing to examine differences, and using double standards [278]. The BIAS FREE framework allows people to identify biases in the environment they are in [279] such as the EDMPP literature or EDMPP discussions they are exposed to. Reading the 20 questions could trigger the reader to become aware of biases within the EDMPP discussions and literature (academic, professional, policy, or lay) which might be useful in preventing biases or revealing already existing biases and with that improve bias literacy [279] in the reader. Answering the BIAS FREE framework questions might be useful for thinking about what to ask in designing the algorithms for various forms of decision support systems, including interview linked decision support systems [280]. The BIAS FREE framework might be a good tool for designers of Bayesian networks that reason based on What is? What if? and Why? [88].

The emergency and disaster literature suggests that there are many problems for marginalized groups, who do not fit ability norms and therefore do not do things in ways that are the norm. For example, one expects the ability to move freely in the community, be able to read written material, be able to hear oral communications, to have internet, and so on . . . However, many people do not have the ability to do certain things as expected [281,282]. Within any given social reality different abilities are taken for granted and most people are not even aware of the ability privileges they have [282]. Using questions that make people think about the abilities they take for granted and others might not have [283,284] and to think about ability based judgments, norms, and conflicts [285]

influencing EDMPP and caused by EDMPP might be a useful tool to increase literacy on the ‘social’ of EDMPP and to make people aware of the biases they hold. One could ask questions such as: What abilities do people in an emergency/disaster situation need? Can you name some ability privileges that might impact EDMPP? Which ability privileges do you think you have that have an impact on how you would experience emergencies and disasters? What ability expectation conflicts between people can you foresee to influence EDMPP and be caused by EDMPP? Do you think there might be ability expectation conflicts between groups in relation to EDMPP? Do you think EDMPP discourses exhibit enablism, disablism, passive disablism, ability inequity as in “unjust or unfair judgment of abilities intrinsic to biological structures such as the human body”, ability inequity as in “an unjust or unfair distribution of access to and protection from abilities generated through human interventions”, ability insecurity, ability identity insecurity, ability privileges, ability discrimination, or ability oppression [285]? One can ask whether artificial intelligence/machine learning/machine reasoning, used to deal with EDMPP, influences and is influenced by ability based judgments, norms, and conflicts [285].

One could identify problems of the ‘social’ identified in international documents linked to marginalizes groups such as “Convention on the Rights of Persons with Disabilities”, “Declaration on the Rights of Indigenous Peoples”, and “International Convention on the Elimination of All Forms of Racial Discrimination”, and ask participants which of the items mentioned in the international documents are an issue in EDMPP.

To conclude, our findings suggest many opportunities for needed research projects.

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