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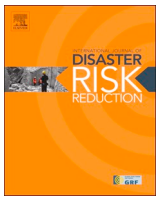

Analysing changes in disaster terminology over the last decade

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A B S T R A C T

Disaster researchers devote considerable attention to concept formation in an attempt to steer DRR terminology towards greater definitional coherence. Many researchers and policy makers frequently turn to UNISDR and their oft-cited terminology guide to ensure that concepts are employed consistently between agencies and research projects. An update to this guide introduced in 2017 introduced a range of new terms while removing and redefining others that featured in the 2009 edition of the guide. Taking a comparative look at the changes introduced, this paper sets out to reflect on the direction in which the conceptual landscape in the DRR field is headed. Whether the sum of the terminological updates made by the open ended intergovernmental expert working group is positive or negative will probably depend on the stakeholder group in question. For researchers in particular, some of the new definitions should be welcomed as they are more precise and allow for better discrimination. However, as yet other definitions are more ambiguous, some researchers may prefer definitions from the 2009 guide, definitions from elsewhere, or their own stipulated definitions that suit their research needs.

1. Introduction

Disaster risk reduction (DRR) research is increasingly developing its own technical vocabulary as part of efforts to establish the field as a distinct profession and academic discipline [1–3]. Although the study of hazards and disasters was initially—at least for the most part—carried out within the traditional academic disciplines of geography, sociology, anthropology, development studies, political science and engineering, among others, DRR is slowly making progress towards establishing itself as a distinct inter- and intra-disciplinary field of research and practice. An essential but often overlooked aspect of this process has been the way in which DRR terminology has evolved over time as part of this maturation process.

Disaster researchers devote considerable attention to concept formation and problematisation to steer the emerging discipline of DRR towards greater terminological coherence. This work may also prove essential for phasing out jargon stemming from its disciplinary roots, with the added benefit of facilitating inter-disciplinary collaboration, as well as rendering the field (at least somewhat) more accessible to practitioners. Yet, this path has been long and difficult. The usefulness of past scholarly debates surrounding the concept of 'disaster' (cf [3–9]. has been questioned due to inability to arrive at a definitional consensus. Similar discussions on the meaning of 'vulnerability' (cf. [10–13], definitions of 'resilience' (cf [1,14–16]. or 'preparedness' [17–20] have produced consensus on some aspects of terms while not on others.

Aiming at providing guidance on some of these contested terms, The United Nations Office for Disaster Risk Reduction (UNISDR) has repeatedly produced guiding documents on 'Terminology on Disaster Risk Reduction', the most recent of which was updated in 2017 was based on the input of an 'open-ended intergovernmental expert working group' [21]. UNISDR—whose mandate revolves around coordination, campaigning, advocacy, informing, and monitoring DRR policy, data, and research—has been producing terminology guides in an effort to streamline DRR vocabulary since the early 2000s [2,22]. Many disaster scholars and policy makers frequently turn to the UNISDR terminology guide (a Google Scholar search for "UNISDR (2009)" yields 3930 results at the time of writing) to ensure that concepts are employed consistently between agencies and research projects. Having a closer look at some of the changes that have been made to this go-to document will, therefore, be of interest to all those who were regular users of the 2009 edition of the terminology guide. In addition, analysing the changes that have been made to some of these popular definitions will also provide a good overview of the direction in which the conceptual landscape in DRR work is headed.

Progress in the sciences is contingent upon adjusting old knowledge to new insights. William [23] asserted that progress in the social sciences hinges on conceptual innovation. Such conceptual innovation can take many forms: concepts can be broadened, deepened, problematised, clarified, replaced, or abolished [24,25]. In other words, two competing conceptualisations of a term, such as 'disaster', is not necessarily a bad thing. Rather, having a diversity of conceptualisations of—or perspectives on—a concept may render it increasingly multi-dimensional and rich. Conversely, conceptual innovation may also be considered to be

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heading in a negative direction in some instances. Such judgements are ultimately a product of personal judgement and are likely to depend on the underlying aim of the conceptual shift in question. Whereas some conceptual shifts may be traced to new empirical insights, theoretical problematisation, political changes, or feedback from practitioners or policy makers, others may, in hindsight, appear to have been unproductive, or what Outhwaite (1983: 26) referred to as 'verbal innovations of a very fast rate of obsolescence'. An example of the former is the realisation that the term 'natural disaster' is, in fact, a misnomer, as disasters are more a product of historical patterns of vulnerability creation rather than the natural phenomena (hazards) that seemingly trigger them (see Ref. [26] or [27]. Examples of the latter are prone to contestation and an example will not be provided here but will instead be left to the imagination of the reader.

This paper reflects on recent conceptual progress and directions in the field of DRR by contrasting the updated 2017 edition of the UNISDR terminology guide [28] with the previous 2009 edition, with the aim of assessing trends and patterns in definitional changes. In so doing, the study is particularly concerned with identifying definitions that have become more precise as well as definitions that have become more ambiguous over time. Because the UNISDR terminology guide arguably plays a central role in DRR research and the implementation of the Sendai Framework for Disaster Risk Reduction [29], this paper is inspired by a desire for more critical discussions on not only the nature of individual cases of definitional change, but also on the overall direction and patterns of such changes.

This text is structured as follows. The next section elaborates on the changes between the 2009 and the 2017 terminology guides, focusing on concepts that have been added or removed as well as definitions that have been changed or that remain unaltered. Section three concludes the paper by placing these changes within the broader context of DRR research and practice by reflecting on patterns, directions, and trends in definitional changes, while also reflecting on a set of potential practical and political implications of the terminological updates.

2. Changes made to the UNISDR terminology guide

The changes between the 2009 terminology guide and the newly published 2017 definitions can be broken down into a few handy categories, which also serve as the structure for this section. First, and perhaps most interestingly, there are twelve new entries that have been added for which the 2009 edition offered no definition. Second, an even larger number of terms have been omitted from the 2017 update, seventeen to be exact. Third, eighteen terms remain but with significantly changed definitions. The last category of terms has not been omitted or redefined but has instead been merged with a broader term (e.g., 'capacity development' now being under 'capacity', rather than having a separate entry). There are also six terms that remain completely unchanged.

2.1. New additions

The 2017 update to the UNISDR terminology guide introduces sixteen new definitions for terms that were either absent from or phrased differently in the 2009 edition (see Table 1). Some of these concepts have played a central role in the field but did not feature in the previous edition. Three notable examples are 'affected', 'build back better', and 'underlying disaster risk drivers', whose introduction points to the mainstreaming of vulnerability and resilience perspectives. It also appears as though the UNISDR has abandoned the term 'risk' in favour of 'disaster risk', and 'risk management' has therefore been removed in favour of 'disaster risk management'.

Interestingly, the 2017 guide also introduces some terms that are arguably redundant. While 'reconstruction' and 'rehabilitation' (or 'build back better') are two distinct concepts in many ways, they also overlap greatly. Similar questions are likely to arise when trying to distinguish 'disaster risk governance' from the existing term 'disaster risk management', which, upon close examination, overlap greatly. We also find examples of the 2017 terminology guide being more specific in the way it now defines concepts like 'evacuation', 'economic loss', and 'critical infrastructure', terms that are frequently used but were less contested than some of the more theoretically-laden concepts like 'underlying disaster risk drivers'.

Table 1
New entries in the 2017 edition of the UNISDR terminology guide.

New entries	Comment
Affected	New entry
Build back better	New entry
Critical infrastructure	Replaces 'critical facilities'; definition changed
Disaster loss database	New entry
Disaster management	Replaces 'emergency management'; definition changed
Disaster risk assessment	Replaces 'risk assessment'; definition changed
Disaster risk governance	New entry
Disaster risk information	New entry
Economic loss	New entry
Evacuation	New entry
Extensive disaster risk	Replaces 'extensive risk'; definition changed
Hazardous event	New entry
Intensive disaster risk	Replaces 'intensive risk'; definition changed
Reconstruction	New entry
Rehabilitation	New entry
Underlying disaster risk drivers	New entry

2.2. Omitted concepts and definitions

Seventeen pieces of vocabulary were taken out of the 2017 update to the UNISDR terminology guide (see Table 2). This means that we are now left with a smaller number of overall entries in the glossary. Some of the omitted terms are what the 2009 edition of the terminology guide refers to as 'emerging new concepts' [30]: 30). The now abandoned term 'socio-natural hazard' is an example of such an 'emerging new concept'. Other such concepts have lost their status as full entries in the glossary and have instead become sub-categories of existing concepts, such as 'corrective disaster risk management', now listed as a sub-category of disaster risk management.

Vocabulary connected to climate and the environment has also largely been abandoned in the 2017 update. Terms like 'adaptation' and 'greenhouse gases' are already defined by the Intergovernmental Panel on Climate Change (IPCC), United Nations Framework Convention on Climate Change (UNFCCC), and United Nations Environment Programme (UNEP), respectively. However, and as echoed by a range of DRR researchers, it is arguably in many ways artificial to maintain a schism between DRR work and adaptation work (cf. [31–33], and whether UNISDR's move away from vocabularies of climate change signals a move towards further fragmentation or just a desire to leave the defining to its sibling agencies is unclear.

2.3. Terms with clarified or broadened definitions

A range of existing definitions of terms has been broadened or clarified in the 2017 update to the terminology guide (see Table 3). In this process, some terms have therefore become more ambiguous (which for some may be a positive change) while others have become more precise. The concept of DRR is arguably an example of the former: in the 2009 glossary, it is defined as 'the concept and practice of reducing disaster risks through systematic efforts to analyse and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events' [30]: 10). In the 2017 update, this definition has been changed to 'disaster risk reduction is aimed at preventing new and

Table 2
Omitted definitions in the 2017 edition of the UNISDR terminology guide.

Entries that have been removed	Description
Acceptable risk	Now under 'disaster risk'; no longer defined, just described
Adaptation	Removed
Biological hazard (and other hazards)	Including also the entries for 'geological hazards', 'hydrometeorological hazards', 'natural hazards', and 'technological hazard', which are no longer defined, just described (see section 2.4)
Climate change	Removed
Corrective disaster risk management	Now under 'disaster risk management'; no longer defined, just described
Critical facilities	Replaced by 'critical infrastructure'; definition changed
Disaster risk reduction plan	Removed
Ecosystem services	Removed
El Niño-Southern Oscillation phenomenon	Removed
Emergency management	Now under 'disaster management'; no longer defined, just described as a synonymous term
Emergency services	Now part of the entry on 'response'
Environmental degradation	Removed
Environmental impact assessment	Removed
Forecast	Removed
Greenhouse gases	Removed
Land-use planning	Removed
Prospective disaster risk management	Now under 'disaster risk management'; no longer defined, just described
Public awareness	Removed
Risk	Removed
Risk management	Removed
Socio-natural hazard	Now under 'hazard'; no longer defined, just described
Sustainable development	Removed

Table 3
Terms that have been redefined in the 2017 edition of the UNISDR terminology guide.

Redefined terms	Degree of definitional change
Building code	Minor change[a]
Capacity	Moderate change[b]
Contingency planning	Significant change[c]
Critical infrastructure	Significant change[c]
Disaster	Moderate change[b]
Disaster risk	Moderate change[b]
Disaster risk management	Significant change[c]
Disaster risk reduction	Significant change[c]
Early warning system	Significant change[c]
Exposure	Significant change[c]
Extensive disaster risk	Significant change[c]
Hazard	Moderate change[b]
Intensive disaster risk	Significant change[c]
Mitigation	Moderate change[b]
Preparedness	Moderate change[b]
Prevention	Moderate change[b]
Recovery	Significant change[c]
Resilience	Minor change[a]
Response	Moderate change[b]
Vulnerability	Significant change[c]

[a] The updated definition is essentially the same.
[b] The updated definition retains parts of its original formulation.
[c] The updated definition does not resemble the old definition.

reducing existing disaster risk and managing residual risk, all of which contribute to strengthening resilience and therefore to the achievement of sustainable development' [28]. One can argue that defining a term through two essentially contested concepts like resilience and sustainable development renders this new definition ill-suited for re-search purposes.

In contrast, the definition of 'contingency planning', previously defined as 'a management process that analyses specific potential events or emerging situations that might threaten society or the environment and establishes arrangements in advance to enable timely, effective and appropriate responses to such events and situations' [30]: 7), is now more concisely defined as 'a management process that analyses disaster risks and establishes arrangements in advance to enable timely, effective and appropriate responses' [28]. The question of whether the overall conceptual terrain is shifting in a positive or negative (more ambiguous) direction will be dealt with in the last sections of the paper.

2.4. Merged terms

The 2017 update to the UNISDR terminology guide may, at first sight, appear as though it contains fewer terms. While it boasts fewer glossary entries, it also sports a larger number of definitions and conceptual clarifications in total. This is because many terms that previously had their own entry have now been merged and more extensive categories of terms have been created under the remaining entries (see Table 4). The term 'residual risk', for example, is listed as a distinct entry in the 2009 terminology guide. In the 2017 update, however, 'residual risk' is placed under 'disaster risk' but remains unaltered otherwise (hence 'residual risk' being listed both in Table 4 and Table 5).

Other terms have been placed under an umbrella concept. Take the entry for 'hazard', for example, which now consists of six sub-entries: multi-hazard, biological hazards, environmental hazards, geological or geophysical hazards, hydrometeorological hazards, and technological hazards. Whereas these hazard types now fall under the 'hazard' entry, these hazard types used to have separate entries. However, it should be noted that, as these entries are now sub-categories, some are no longer defined and are instead only described (the ones that are no longer explicitly defined are listed both in Table 2 and Table 4).

Table 4
Merged terms in the 2017 edition of the UNISDR terminology guide.

Merged terms	Now listed under
Coping capacity	Capacity
Capacity development	Capacity
Acceptable risk	Disaster risk
Residual risk (also listed)	Disaster risk
Prospective disaster risk management	Disaster risk management
Corrective disaster risk management	Disaster risk management
Biological hazards	Hazard
Geological or geophysical hazards	Hazard
Hydrometeorological hazards	Hazard
Technological hazards	Hazard

Table 5
Unaltered terms in the 2017 edition of the UNISDR terminology guide.

Unchanged terms
National platform for disaster risk reduction
Residual risk
Retrofitting
Risk transfer
Structural and non-structural measures

2.5. Unaltered terms

Even though the open-ended intergovernmental expert working group has changed most entries present in the 2009 terminology guide, some definitions remain unaltered (see Table 5 below). The remainder of this paper will focus on what these changes (and lack thereof) might imply for DRR research, policy, and practice in a broader sense.

3. Concluding remarks: changes in the terminological landscape

The 2009 edition of the UNISDR terminology guide introduced six 'emerging new concepts', described as concepts that 'are not in widespread use but are of growing professional relevance', also noting that 'the definition of these terms remain to be widely consulted upon and may change in the future' (sic) [30]: 30). These are: corrective disaster risk management; disaster risk reduction plan; extensive risk; intensive risk; prospective disaster risk management; and socio-natural hazard. Among these, none are listed as distinct entries in the 2017 edition of the terminology guide, and the term 'disaster risk reduction plan' has been abandoned. Some of the terms, such as 'socio-natural hazard', are also no longer defined and are instead mentioned under other terms (see Tables 2 and 4). In some ways one could argue that the 2017 terminology guide is more concise and gives a better overview than the 2009 edition due to the decision of the open-ended expert working group to merge similar concepts and list specialised terms under more general terms (e.g. describing 'socio-natural hazard' under 'hazard' or 'coping capacity' under 'capacity'). However, frequent users of the 2009 terminology guide should know that many previously defined terms, such as the 'emerging new concepts', are no longer provided with explicit definitions, perhaps as a result of their low uptake among DRR scholars and practitioners. The term 'socio-technical hazard', for instance, has under 60 results on Google Scholar while 'prospective disaster risk management' has 61 mentions. Hence, even though some authors have argued for the usefulness of some of these emerging new concepts, their general update has been low and the decision to no longer list them as explicit entries may be a reflection of their low popularity in the research and policy community.

Another notable change in the 2017 edition of the terminology guide is that the term 'risk' has been completely abandoned in favour of the term 'disaster risk'. It should be noted that the 2009 edition defined both 'risk' and 'disaster risk', as well as 'risk management' and 'disaster risk management'. The 2017 update does not contain listings for either 'risk' or 'risk management' (see Table 2). While the exact rationale for this decision is not evident from the reports of the open-ended intergovernmental expert working group, we can infer part of the reason by reflecting on how the 2009 edition of the terminology guide distinguished between 'risk' and 'disaster risk':

- Risk is 'the combination of the probability of an event and its negative consequences'.
- Disaster risk is 'the potential disaster losses, in lives, health status, livelihoods, assets and services, which could occur to a particular community or a society over some specified future time period'.

As can be inferred from the above, the 2009 edition's definition of 'risk' is based on the probabilistic definition provided by the International Organization for Standardization (ISO). The main conceptual difference between these entries in the 2009 edition appears to be the tendency for the former (risk) terms to stress the role of probabilities, uncertainties and consequences—a rather technical way of considering risk and risk management, whereas the latter (disaster risk) entries focus on vulnerabilities, potential disaster impacts and coping capacity. The definition of disaster risk through its focus on not only disaster losses and loss of lives, but also on livelihoods and assets, is clearly an attempt to highlight the multidimensional nature of disaster risk within the vulnerability paradigm (cf [34,35]. Because few scholars in the DRR field employ probabilistic definitions of risk in their work, this could be one of several explanations for why the more technical terms 'risk' and 'risk management' are no longer listed. It is also likely that listing 'risk' and 'disaster risk' as well as 'risk management' and 'disaster risk management' was seen as redundant. Either way, the move arguably signals a growing schism between the field of risk management and DRR.

Whether the sum of the terminological updates made by the open-ended intergovernmental expert working group is positive or negative will probably depend on the stakeholder group in question. For researchers, in particular, some of the new definitions should be welcomed as they are more precise and allow for better discrimination. Other definitions are however significantly longer and more ambiguous. Some researchers may therefore prefer definitions from the 2009 guide, definitions from elsewhere, or their own stipulated definitions that suit their research needs. After all, dozens of glossaries and encyclopaedias now exist within the field of DRR. Perhaps the most worrying trend for researchers in need of clear and concise definitions is the increasing tendency to define an abstract concept using equally or even more contested terms. The new definition of DRR serves as a good example. It is now defined both in terms of resilience and sustainable development, which are perhaps two of the most discussed and contested terms used in the DRR conceptual terrain. Such developments jeopardise making policy-driven terminology guides and efforts at standardisation less relevant for research purposes, but also calls for increased participation by researchers in the process of streamlining DRR terminology across regions, systems, practices, and disciplines.

To conclude, at least three salient points can be drawn from the preceding observations and reflections. First, disaster researchers ought to take on a more active role in policy making fora such as the open-ended intergovernmental expert working group as a means of combating or mitigating the tendency for policymakers to place excessive emphasis on consensus-approaches to definition, which in turn risks definitions ending up too broad for either research or policymaking. Second, even though the UNISDR terminology guide remains a go-to source for definitions, it may be worthwhile to double check whether the 2009-edition or other glossaries offer more precise or framing-relevant entries. Third, a number of terms that are still actively used by disaster researches (e.g. public awareness) have been removed for no obvious reason. Fourth, the theoretical streamlining of the 2017-edition is arguably a step in the right direction as far as coherence in the terminological landscape is concerned. Whereas the 2009 edition to some degree mixed hazards-centred and probabilistic risk/consequence conceptions with vulnerability-focussed ones, the 2017 update represents a notable effort at removing or redefining terms so as to reduce this seeming contradiction. Lastly, the removal of terms like 'climate change', 'environmental impact assessment' and 'sustainable development' signals a desire for greater UN system-wide coherence by leaving the defining of these terms to agencies whose glossaries already covered these terms.

In sum, the overhaul of the UNISDR terminology guide has resulted in some definitions becoming clearer and some becoming more ambiguous. One could argue that the overall theoretical and conceptual coherence of the glossary has been enhanced by taking a clearer stance away from the 'hazards-paradigm' and being more consistent with the 'vulnerability-paradigm'. Further, by shifting the focus away from

probabilistic notions of risks and their management rationales, the 2017 update to the UNISDR terminology guide in many ways represents a mixed bag of welcome and undesirable changes. Chief among the undesirable changes is the tendency to perpetuate existing ambiguities by making definitions longer, wordier and including in them already ill-defined terms.

High-quality research and sound policies obviously depend on far more than simply applying precisely defined terms. Still, researchers may have reasons to worry when contested terms—which are in many ways concept-metaphors in and by themselves—such as resilience, are employed as part of definitions of other contested terms, such as DRR. Definitional fallacies of this sort may not only in some ways represent a textual manifestation of our inability to fill our most central concepts with meaning, but also serves as a powerful reminder to researchers that employing a terminological system largely shaped by policy-makers at the UN-level (and our respective national-level civil protection or emergency management agencies) may be problematic for research purposes.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ijdrr.2019.101161.

References

[1] D.E. Alexander, Resilience and disaster risk reduction: an etymological journey, Nat. Hazards Earth Syst. Sci. 13 (11) (2013) 2707–2716.
[2] I. Kelman, Lost for words amongst disaster risk science vocabulary? Int. J. Disaster Risk Sci. 9 (3) (2018) 281–291.
[3] R.W. Perry, Defining disaster: an evolving concept, in: H. Rodríguez, W. Donner, J.E. Trainor (Eds.), Handbook of Disaster Research, second ed., Springer, Cham, 2018, pp. 3–22.
[4] R. Dahlberg, R. Olivier, M.T. Vendelø, Disaster Research: Multidisciplinary and International Perspectives, Routledge, Abingdon, 2016.
[5] E.L. Hsu, Must disasters be rapidly occurring? The case for an expanded temporal typology of disasters, *Time & Society*, advance online publication, 2017.
[6] I. Kelman, What Is a Disaster? Lecture, University College London (UCL), 2 October, London, 2018.
[7] A. Oliver-Smith, Theorizing disasters: nature, power, and culture, in: S.M. Hoffman, A. Oliver-Smith (Eds.), Catastrophe & Culture: the Anthropology of Disaster, School of American Research Press, Santa Fe, 2002, pp. 23–48.
[8] R.W. Perry, E.L. Quarantelli, What Is a Disaster? New Answers to Old Questions, Xlibris, Philadelphia, 2005.
[9] E.L. Quarantelli, What Is a Disaster? Perspectives on the Question, Routledge, Abingdon, 1998.
[10] G. Bankoff, Rendering the world unsafe: 'vulnerability' as western discourse, Disasters 25 (1) (2001) 19–35.
[11] J. Birkmann, Measuring vulnerability to promote disaster-resilient societies: conceptual frameworks and definitions, in: J. Birkmann (Ed.), Measuring Vulnerability to Natural Hazards: towards Disaster Resilient Societies, second ed., United Nations University Press, Tokyo, 2013, pp. 9–54.
[12] S.L. Cutter, Vulnerability to environmental hazards, Prog. Hum. Geogr. 20 (4) (1996) 529–539.
[13] G. Wilches-Chaux, The global vulnerability, in: Y. Aysan, I. Davis (Eds.), Disasters and the Small Dwelling, James & James Science Press, London, 1992, pp. 30–35.
[14] C. Folke, S. Carpenter, T. Elmqvist, L. Gunderson, C.S. Holling, B. Walker, Resilience and sustainable development: building adaptive capacity in a world of transformations, AMBIO A J. Hum. Environ. 31 (5) (2002) 437–440.
[15] R.J. Klein, R.J. Nicholls, F. Thomalla, Resilience to natural hazards: how useful is this concept? Glob. Environ. Chang. B Environ. Hazards 5 (1) (2003) 35–45.
[16] S.B. Manyena, The concept of resilience revisited, Disasters 30 (4) (2006) 434–450.
[17] D.F. Gillespie, C.L. Streeter, Conceptualizing and measuring disaster preparedness, Int. J. Mass Emergencies Disasters 5 (2) (1987) 155–176.
[18] Y. Hémond, B. Robert, Preparedness: the state of the art and future prospects, Disaster Prev. Manag.: Int. J. 21 (4) (2012) 404–417.
[19] A. Kirschenbaum, Disaster preparedness: a conceptual and empirical reevaluation, Int. J. Mass Emergencies Disasters 20 (1) (2002) 5–28.
[20] R. Staupe-Delgado, B.I. Kruke, Preparedness: unpacking and clarifying the concept, J. Contingencies Crisis Manag. 26 (2) (2018) 212–224.
[21] UN, Report of the Open-Ended Intergovernmental Expert Working Group on Indicators and Terminology Relating to Disaster Risk Reduction, A/71/644 United Nations, New York, 2016.
[22] UNISDR, Living with Risk: A Global Review of Disaster Reduction Initiatives, United Nations Office for Disaster Risk Reduction, Geneva, 2004.
[23] W. Outhwaite, Concept Formation in Social Science, Routledge & Kegan Paul Ltd, London, 1983.
[24] G. Goertz, Social Science Concepts: A User's Guide, Princeton University Press, Princeton, 2006.
[25] G. Sartori, Guidelines for concept analysis, in: G. Sartori (Ed.), Social Science Concepts: A Systematic Analysis, SAGE, Thousand Oaks, 1984, pp. 15–85.
[26] P. O'Keefe, K. Westgate, B. Wisner, Taking the naturalness out of natural disasters, Nature 260 (5552) (1976) 566–567.
[27] B. Wisner, P. Blaikie, T. Cannon, I. Davis, At Risk: Natural Hazards, People's Vulnerability and Disasters, second ed., Routledge, Abingdon, 2004.
[28] UNISDR, Terminology on Disaster Risk Reduction, (2017) Retrieved from: https://www.unisdr.org/we/inform/terminology.
[29] UN, Sendai Framework for Disaster Risk Reduction 2015-2030, United Nations, New York, 2015.
[30] UNISDR, 2009 UNISDR Terminology on Disaster Risk Reduction, United Nations Office on Disaster Risk Reduction, Geneva, 2009.
[31] J. Birkmann, K. von Teichman, Integrating disaster risk reduction and climate change adaptation: key challenges—scales, knowledge, and norms, Sustain. Sci. 5 (2) (2010) 171–184.
[32] I. Kelman, J.C. Gaillard, J. Mercer, Climate change's role in disaster risk reduction's future: beyond vulnerability and resilience, Int. J. Disaster Risk Sci. 6 (1) (2015) 21–27.
[33] J. Mercer, Disaster risk reduction or climate change adaptation: are we reinventing the wheel? J. Int. Dev. 22 (2) (2010) 247–264.
[34] J.C. Gaillard, Disaster Studies inside Out. *Disasters*, advance online publication, 2018.
[35] B. Wisner, Vulnerability as Concept, Model, Metric, and Tool, (2016) Retrieved from: http://oxfordre.com/naturalhazardscience/view/10.1093/acrefore/9780199389407.001.0001/acrefore-9780199389407-e-25.