Defining disaster: The need for harmonisation of terminology

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Abstract

There is a need to harmonise the definitions for disaster terms from a wide range of glossaries and other sources, to build a more unitary foundation for further research, policy and practice. As a first step in a wider programme of research, we present an analysis of the term disaster. Definitions for disaster were obtained from glossaries found in books, reports and internet sites. One of these sources was the National Library of Medicine (NLM), USA which contained 62 disaster related glossaries. A total of 110 glossaries were found containing disaster terminology however, only 52 identified contained definitions for the word disaster. Leximancer software was used to analyse consensus between the different definitions identified, by mapping the connectivity of words and associated concepts. 128 different disaster definitions were identified and included in the analysis, which detected main themes of: disruption; ability; widespread; event; outside; damage; property; and overwhelm. Hence the most consistent definition for disaster appeared to be 'the widespread disruption and damage to a community that exceeds its ability to cope and overwhelms its resources'. This paper reports on only one term, namely disaster, for which there seems to be little consensus throughout the research and wider community. A number of other limitations are outlined, which are being considered for the ongoing analysis of over 100 disaster-related terms.

Keywords: *text analysis, disaster, terminology, definitions, glossary*

Disasters have traditionally been classified as natural or man–made and more recently other categories have been used, such as: toxicological; technological; major; complex; foreign; and catastrophic. Almost on a daily basis, there are reports in the media of a disaster or an extreme event. Disasters appear to be becoming more frequent and are thus having a greater impact on people, systems and structures which are exposed to the destruction released in such situations. Further, events seem to be more likely to impact on people and surroundings given where people live and how they live - thus causing even more disruption and damage.

There are many glossaries of disaster and related terms. A number of publications exist that have focused on collating key disaster related terms such as work by Thywissen (2006, 2010) and more recently, Marre (2013). These publications have shown how many definitions can exist for one word such as *disaster*. Al-Madhari & Keller (1997) and the earlier work of Quarantelli (1985) emphasised that without an accurate and consensual definition for the word disaster, research in this area becomes difficult. They also listed the many definitions available for the word disaster, which they have grouped under respective professional backgrounds. Although these authors did not offer a universal definition for the word disaster, given differing professional requirements, they did stress the need for standardisation of definitions to provide a consistent framework from which to report events, collect data and plan.

There is, therefore, a need to better harmonise the definitions for many disaster terms, to build a more consolidated foundation for both research and practice. The current research aimed to collate as many English language definitions of the word disaster as could be found and use text analysis software to produce a *consensus* definition; based on the descriptive words used most often in the available glossaries. This paper provides a first step in a programme of research which aims to establish greater consensus and improved harmonisation of wider, disaster-related terminology.

Methods

The information on disaster terminology presented below is the result of an extended study which commenced

in 2009. This initial and ongoing work has involved collecting numerous glossaries from a wide range of sources, dealing with many aspects of disasters.

Data collection

There were two principal sources of information. Firstly, the current research used the Disaster Information Management Research Centre (DIMRC) – Disaster Glossaries site from the National Library of Medicine (NLM) in Washington, USA, which now lists 55 disaster related glossaries. A number of glossaries that were previously listed by NLM but which are no longer listed on their site were also included in the analysis. In total, there were 62 English language glossaries used from the NLM collection.

The second main source was an independent search related to disaster which identified 54 available English language glossaries. Sources included: scientific literature databases, including Medline and others; books; published papers; manuals; and publications from emergency organisations; alongside any relevant publications from the World Health Organisation (WHO) and the United Nations International Strategy for Disaster Reduction (UNISDR). All of these documents contained at least one glossary of disaster related terminology.

Of the 54 glossaries, five had also been identified from the DIMRC and one was the DIMRC site itself. Hence a total of 48 glossaries were found in non-NLM sources. A number of books had been totally devoted to disaster terminology while other books on topics related to disasters also contained smaller glossaries, with definitions for selected disaster related words. In the latter case, only words that were referenced back to a dictionary were included into our study. All internet, NLM collection and other sources used for this analysis were re-checked and updated on an annual basis. In sum, although 110 glossaries were available for this study, only 52 contained applicable definitions of the word '*disaster*'.

Text analysis

Once the definitions of disaster had been collected, several selection processes were applied to this research data. Disaster related definitions were categorised into three groups, being: the word itself; disaster types; and disaster-related terms. A number of document authors had included contextual or other comments that were not clearly definitional in their definitions of the word. These comments were removed before further analysis.

A software program called Leximancer (version 4, 2011), was used to analyse the collated definitions. Leximancer is a text analysis program which helps analyse the textual content of documents by combining the analysis of semantic structures, such as synonyms and antonyms, with syntactical linkages, i.e. how different words are positioned together in text. The program produces two sets of information: *concepts*, which semantically group all words from the text; and *themes* which in turn group concepts by the way they are placed throughout the text. Smith & Humphreys (2006) have outlined the way that concept mapping research utilising Leximancer works and have demonstrated the validity of this approach. According to Angus, Rintel, and Wiles (2013), other researchers have used Leximancer to analyse polling and political commentary, evaluate incident reporting and explore communication strategies. Leximancer has also been used as a powerful tool for developing evidence-based analyses of international trends (Angus, Rintel, &Wiles, 2013).

Leximancer output includes an analytical display that can be presented both graphically and in table format as the analysis progresses. This is how Leximancer displays the main concepts and themes from the text and how these are related. The output of Leximancer analysis can be set at different percentage levels for both concepts and themes. For the analysis presented in this paper, the level for concepts was set at 100%, which provided a greater body of information for the analytical display. The higher the theme percentage, the more the information is grouped on the display. The lower the theme percentage, the less grouped information hence, displaying a more finely grained analysis. Theme analysis was set at 20, 33 and 50% levels for the current analysis.

All data was cleaned prior to entering the original Microsoft Word (2010) file of data into Leximancer. Duplicate definitions, all numbers referring to dates or page numbers, all names of authors or places and all abbreviations were removed; none of which were part of the definitions. As the word being analysed, 'disaster' was also removed from the definition. This left only key descriptive words and relevant surrounding text as data for the analysis. After entering the data, the program produced a graphical display and table of the main concepts and themes associated with all definitions. This output was then used to produce a unitary, computer-

generated definition, which was checked against existing definitions for an identical match.

Results

Existing definitions for the word disaster

Of the 52 glossaries that had definitions for the word 'disaster', only 39 glossaries were actively used because the remainder (13) contained duplicate definitions. Most glossaries had between 1 to 3 definitions while three glossaries had from 4 to 14. One glossary had 57 different definitions. An overall total of 197 definitions were found, of which 69 were exact duplicates. This left 128 different definitions available to be analysed.

Strong differences and similarities were noted during analysis. Similarities tended to be found when definitions were discipline specific. Differences tended to be found when definitions appeared to be general or generic in the disaster field. Examples of the variety of definitions are shown in Table 1.

Concepts and themes

Leximancer displays a list of ranked concepts, where more frequently occurring words and their synonyms are given a higher ranking. The most frequently occurring word, 'community' was marked as having 100% relevance. 'Event', 'social', 'disruption', 'society', 'ability', 'human', 'life affected', 'damage', 'resources' and 'loss' all appeared in the top 50%. This concept list did not change as the theme percentage, detailed below, was adjusted.

Results grouped by theme were displayed as percentages, showing that 40% of themes had little connectivity. There were however some differences between the three levels tested. Several themes were consistent throughout the three levels for the word 'disaster' and were above a 40% threshold. Themes showing the greatest connectivity were 'community', 'ability', 'event', 'society', 'affected' and 'damage'.

Table 1
Examples of definitions for the word disaster

Author / Source (year)	Definition
Australian Emergency Management Institute (2011)	A condition or situation of significant destruction, disruption and/ or distress to a community.
Biby (2005)	Any natural or man-made event that negatively impacts people, property, or critical resources.
cited in Blanchard (2008)	Disasters do not cause effects. The effects are what we call a disaster. (Dombrowsky, 1998) A disaster is a normatively defined occasion in a community when extraordinary efforts are taken to protect and benefit some social resource whose existence is perceived as threatened. (Dynes, 1998) An occurrence that has resulted in property damage, deaths, and /or injuries to a community (FEMA, 1990)
IPCC (2012)	Severe alterations in the normal functioning of a community or a society due to hazardous physical events interacting with vulnerable social conditions, leading to widespread adverse human, material, economic, or environmental effects that require immediate emergency response to satisfy critical human needs and that may require external support for recovery.
O'Leary (2006)	A state or condition of severe destabilization but not complete failure of a social system or its parts.
Oxford English Dictionary (2015)	A sudden accident or a natural catastrophe that causes great damage or loss of life
Sundnes & Birnbaum (2003)	A serious disruption of the functioning of society, causing widespread human, material or environmental losses which exceed the ability of affected society to cope using only its own resources.
cited in Thywissen (2006)	"For a disaster to be entered into the database of the UN's International Strategy for Disaster Reduction (ISDR), at least one of the following criteria must be met: – a report of 10 or more people killed – a report of 100 people affected – a declaration of a state of emergency by the relevant government – a request by the national government for international assistance" (IRIN/OCHA, 2005, p.23)
UNISDR (2009)	A serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources.
Washington State Department of Health (2009)	A large emergency event that is beyond the community's ability to address within its own and mutual aid resources.
World Health Organization (2011)	Situation or event, which overwhelms local capacity, necessitating a request to national or international level for external assistance.

Discussion

The following is an initial attempt to produce a universal English definition from the current analysis, using main concepts and themes produced through the Leximancer analysis. A possible definition for the word *disaster*, based on key concepts and structural patterns identified amongst a wide range of available, pre-existing scientific and professional glossaries could be: 'the widespread disruption and damage to a community that exceeds its ability to cope and overwhelms its resources.' Given that the key terms appearing in this draft definition are related to the majority of glossaries sampled, it is likely that a majority of scientists and policy makers would agree with this definition.

The definition presented here closely resembles many that already exist. However, a number of these definitions have three additional words at the end: 'requiring outside assistance'. This concept was not included in proposed consensus definition because it had been implicitly identified amongst many other definitions surveyed. Many existing definitions reflect the definition proposed in this study and state that a disaster 'causes losses that overwhelm the local ability to cope'. When communities are unable to cope, it could be assumed that outside assistance will be required so we argue that the phrase 'requiring outside assistance' is generally redundant.

The initial definition produced in the current research may not satisfy all disciplines and professions. The definition remains specific to a particular point in history, and may also be too general to be used in some contexts and situations. However, we argue that it has the advantage of being produced by an empirical analysis of the most commonly used definitional words in professional and scientific glossaries available over an extended period. This analysis has removed many potential biases and preferences, while emphasising components of disaster definitions which many experts would agree upon.

The current definition very closely matches an existing UNISDR definition: "a serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources" (UNISDR, 2009, p.9). The current, research-based definition was arrived at in a much less politically complex context than the UNISDR iteration. However the similarity between the current and UNISDR definitions suggests that the UNISDR may have used particularly egalitarian processes to arrive at their definition. It also appears, with reference to the current analysis, that the UNISDR was able to incorporate a rich foundation of scientific and practical knowledge, within which a range of relevant definitions have been documented.

Conclusion

As outlined in the introduction, the argument that there is a need for a consensus definition for the word 'disaster' is not new. Quarantelli (1985) and Al-Madhari & Keller (1997) have previously highlighted the need for harmonisation of this word and of disaster terminology in general - in order to progress scientific research and international guidance for disaster management. There are many glossaries of disaster terms which cover a wide range of disciplines, but offer little consensus about the definition of the word disaster. A number of other authors have also collated many definitions for the word disaster, highlighting the fact that there have been many definitions and little consensus.

We have therefore presented a computer generated definition for the word disaster based on over 120 pre-existing definitions: 'the widespread disruption and damage to a community that exceeds its ability to cope and overwhelms its resources.' In contrast to similar definitions, the need for outside assistance appears to be implicit and was not included in the current definition. The definition produced through analysis nonetheless bears a striking similarity to an existing definition used by the UNISDR (2009). This similarity with the current, analytically produced definition may be interpreted in terms of the quality of the UNISDR definition.

Although the current research was developed over an extended period of time, there is a possibility that some definitions have been left out from the analysis. An extensive search has been carried out, to access all possible glossaries related to disaster and include all definitions of the word disaster identifiable to date. Care was taken to include all definitions and not to exclude any information. However, only glossaries in English were collected and used for this research. Although it was beyond the scope of the current research, the authors recognise that there are valuable disaster related glossaries in other languages. Likewise, the program used for analysis could only be used for the English language, with an analysis at the level of single

words, rather than phrases and more tacit, linguistic and discursive dimensions of those phrases.

Only one key term has been analysed and discussed in this initial work. The next phase of our programme of research on terminology consists of analysing over 100 other terms related to disaster and generating further definitions through software text analysis. Like the term disaster, many related terms have numerous definitions. In this way, the current research has paved the way for other terms to be analysed, including: 'risk'; 'risk reduction'; and 'disaster risk reduction'. Each of these terms have their own unique definitions and sets of glossaries which are being analysed using the same method. We hope that software generated definitions will help eliminate duplication and confusion regarding the definition of such key words which are used frequently in the area of disaster. We hope that these analyses will also help to emphasise the definitional words used by a majority of our expert colleagues. This approach is therefore likely to provide a form of consensus based on scientific and expert publications and documents which, at the very least, will highlight common elements being discussed and put into practice in our field.

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