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Operational Ethics for Disaster Research

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Operational ethics for disaster research is suggested as an important area for further investigation. The main questions are suggested as:

1. Could carrying out disaster research interfere with disaster and risk management activities?

2. Could publishing disaster research interfere with disaster and risk management activities?

3. Should researchers take responsibility for the operational outcomes of their research?

The example of technical rescue illustrates how these questions might be addressed in order to better understand operational ethics for disaster research. Experiences from field work on active volcanoes are presented as a research area where operational ethics have been applied, although improvements are needed. Researcher good governance is an approach which consolidates many of the issues discussed. Although disaster researchers might feel that no further governance steps are necessary, these questions should be openly debated.

Key Words: disaster research, ethics, research agenda, technical rescue, volcanology

Background and Context

Introduction

From 30 April to 1 May 2004, the Disaster Research Center (DRC) at the University of Delaware, USA held a conference on "Disaster Research and the Social Sciences: Lessons Learned and

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Future Trajectories". This event celebrated DRC's 40th anniversary, highlighting the contributions which the center, and the researchers at it, have made to the field of disaster research from a social science perspective. Conference presentations incorporated past work, through lessons learned and the field's evolution, and future directions, asking where the field was heading and the opportunities available.

These questions are apposite, as self-reflection and self-critique are essential components of any field. Researchers are fortunate in having the luxury to think about their activities, to examine how they conduct their work, and to test and compare different methods of identifying and tackling problems. Is the value of this work in how many peer-reviewed papers are published in which international journals or its value in improving disaster and risk management policy and practice? Many researchers would select the latter, yet their professional success is evaluated on the former. If these two objectives clash, which should supersede?

This dilemma suggests examining the 'science of morals,' which defines ethics (OED 2005), for disaster research. Through questioning motives, actions, and interests, a deeper understanding could be gained of what disaster researchers wish to achieve. Indications should emerge of fundamental reasons for work undertaken and of how that work could be undertaken ethically.

Discussing ethics is therefore not a theoretical abstraction, but yields practical insights into topics to research, why those topics should be researched, and how those topics should be researched. One aspect to highlight is that disaster researchers are not necessarily pure observers for their work. The act of researching disasters could change the situation and data.

This practical challenge introduces the topic which this paper proposes should be on the disaster research agenda: researching the operational ethics of disaster research. First, by recognizing that even if the researcher does not wish to operationalize their research, the act of researching has operational outcomes. Second, by noting the wealth of research material which is available by being operational in a disaster situation in order to conduct research and to gather data.

Operational ethics for disaster research is exemplified by carrying out research during a disaster event, as the crisis or emergency

unfolds. Past work on research during a disaster has examined methodological and ethical issues in general (e.g. Killian 1956) or for specific circumstances such as war zones (e.g. Barakat and Ellis 1996; Silkin and Hendrie 1997). Topics covered include data collection, cultural sensitivity, confidentiality and politicization of information, and anonymity of interviewees. While the effect of disaster operations on research actions is sometimes noted, the effect of research actions on operations is less prominent and hence is the focus of this paper. To provide specific research examples, technical rescue is used to illustrate research during a disaster event.

Technical Rescue

Technical rescue refers, somewhat vaguely, to situations where someone needs to be rescued, or their body needs to be recovered, from a complex situation. Examples are a vehicle breaking through a frozen lake's surface (ice rescue), a child slipping into a raging river (swiftwater rescue), a hiker falling down a cliff to a ledge (high angle rescue), or a spelunker with a suspected spinal injury (confined space rescue, also pertinent to collapsed buildings). Challenging circumstances result, as illustrated by incidents in December 2004:

- Planning to recover a body from a deepwater (271 m) cave system in South Africa. In January 2005, another diver died while attempting this operation.
- Hoisting sailors to a helicopter from a ship sinking off Alaska's coast in a gale with waves breaking over the ship. The helicopter was hit by a wave and crashed, resulting in a further rescue operation and several fatalities.
- In bad weather, recovering bodies from a plane crash atop a New Zealand volcano.

The technical rescue literature is operationally-orientated, usually written in the form of trade magazines (e.g. *Technical Rescue*) operational guidelines or field guides (e.g. Ray 2002), training materials, textbooks (e.g. Phillips 2001), or standard operating procedures. ITRS (2004) is an example of technical rescue practitioners publishing their work in an academic format, but academic literature is limited for many technical rescue topics.

Rigg (2004) describes how most swiftwater rescue techniques evolved not through systematic study and analysis, but through trial-and-error, with error frequently meaning the death of a rescuer or rescuee. Nonetheless, some topics related to specific technical rescue areas have substantial academic work, especially emergency medicine (e.g. *Journal of Prehospital and Disaster Medicine*), the psychological trauma experienced by rescuers (e.g. McFarlane 2004; Violanti 1997), and earthquake rescue effectiveness (e.g Liao et al. 2005; Naghi et al. 2005).

Areas which could be examined from an academic perspective are:

- Improving equipment and techniques for specific technical rescue skills.
- Systematically analyzing the successes and failures of technical rescue operations.
- Understanding the causes and consequences of people's reactions while being rescued.
- Examining the effectiveness of training.
- Charting the history and progress of technical rescue overall or of individual disciplines.

Because many technical rescue situations involve risking lives to try to save lives, this topic is helpful for exploring why and how research should be carried out and how the results might be applied. Thus, researching operational ethics with respect to technical rescue would form a useful part of a disaster research agenda.

Operational Ethics Research

Research Questions

Scientific research is a "search or investigation directed to the discovery of some fact by careful consideration or study of a subject" (OED 2005). Little purpose might exist except to advance knowledge systematically, although solutions to real-world concerns are often sought while operational research for both scientific and operational purposes has long been acceptable (e.g. Air Ministry 1963; Cummings 1997). An implicit value judgment may exist that any advance of knowledge is beneficial and should be accepted.

Technical rescue provides examples that this assumption might not always be valid due to ethical concerns. This section proposes research questions regarding the ethics of investigating technical rescue during a disaster event. The questions cover three general areas.

1. Could carrying out disaster research interfere with disaster and risk management activities?

During a disaster, priorities are naturally on managing the event. Conducting surveys of personnel involved in an operation would take their time and attention away from the immediate situation. In semi-structured interviews, asking a surveyee to explain or justify choices and actions could lead to different choices being made.

Simply observing could cause workers and managers to be more self-conscious, being aware that every action was being observed and critiqued for public publication. As well, good research is premised on repeatability. If the same civil defense manager, incident commander, or politician is observed or surveyed during several disaster events, could research fatigue occur where actions and decisions are influenced by the researcher's categories or the desire to score better on the researcher's survey?

2. Could publishing disaster research interfere with disaster and risk management activities?

Research outputs are frequently aimed at peer-reviewed publications, open to the public and subject to as much publicity as the author or journal could muster so that other researchers are inclined to read, use, and reference the publication. At times, bringing attention to a person, project, protocol, situation, or idea could cause problems and defeat the recommendations for improvement made by the research.

Another issue is exemplified by the terrorist attacks in the northeast USA on 11 September 2001. Hoetmer (2004) writes "We didn't foresee—could probably never have foreseen—the eventuality of airplanes being used as missiles to take out civilian targets". This statement is questionable since Hall (1992) wrote a novel about such

an eventuality and since Toronto's CN Tower and Paris' Eiffel Tower were both threatened by that possibility prior to 2001. Nonetheless, Hoetmer's (2004) statement leads to the question "What if a researcher discovers an opening for terrorists and publishes it only academically?" Prior to 2001, exposing airline security lapses, backed up by data detailing in-flight procedures, would have been strong research. Would publication be a public service to force security improvements or would that abet exploitation of the findings? Bringing a published paper to the attention of politicians and the media is no guarantee that identified problems would be rectified.

3. Should researchers take responsibility for the operational outcomes of their research?

Scientists frequently struggle with this question. Inventions which arose from pure scientific curiosity, which were made available to the world in order to improve quality of life, or which were developed to fight a specific battle have preyed on many scientists' consciences after the invention was applied for purposes deemed detrimental. Dynamite and the atomic fission bomb are traditional examples.

Disaster researchers should also be aware that their work could be misapplied. Research into how misapplication could occur, case studies where it has happened, and mechanisms for dealing with such situations would be needed. Examples of topics are:

- Following on from the 11 September 2001 example in question 2, much research now examines the vulnerability of high-profile targets. Should that research be published? A vulnerability index could be developed for buildings' ability to withstand different types of explosives, airline companies' in-flight security, the porosity of national borders regarding smuggled nuclear material, or cities' susceptibilities to different forms of biological and chemical attack.
- A vulnerability analysis might conclude that an upcoming drought would topple a dictatorial government if mitigation measures were not adopted. Would the researcher be responsible if, based on that paper, the government took mitigation measures and perpetuated the dictatorship?

- Structural engineers might publish papers developing a dam engineering technique which a decade later is discovered to be susceptible to internal microfracturing leading to apparently spontaneous failure. Would that group be responsible for subsequent disasters or for replacing the dams built with their technique? Should the same researchers receive research funds to pursue (a) internal microfracturing diagnosis methods and (b) remediation techniques?

Technical Rescue

1. Could carrying out disaster research interfere with disaster and risk management activities? On occasion, the presence of media cameras has influenced the protocols used by emergency responders and has raised ethical questions about the right to privacy of affected people (Rigg 2000). Could the presence of researchers create similar influences? Privacy might be less of an issue because data protection acts in many countries are increasingly stringent. As well, anonymity is often a guarantee of research surveys or interviews.

Gordon (2004) demonstrates the care which can be taken in avoiding the identification of individuals without loss of research material. The photographs accompanying his article, three of which are credited to a newspaper, show easily-identifiable individuals grieving. Could the choice of these images be questioned due to their intrusiveness into individual grief, particularly given Gordon's (2004) efforts to give anonymity to his research subjects?

Another possible mode of disaster researcher interference would be being on-site during a disaster to analyze the technical rescue protocols undertaken. Considering helicopter and boat rescues, important evidence could be collected by being on board which would entail undergoing appropriate training—a researcher "embedded" into the rescue team. The researcher's experience would be exceptional, likely leading to work with significant academic innovation and novel operational insights. The possible downsides are extra payload on the rescue craft, the researcher's training slots being unavailable for another rescuer, and being a burden in case of an emergency such as a helicopter's engine failing or a boat capsizing.

Would such potential interference be justified by the improved rescue responses resulting from the research? Gordon (2004) is a clinical psychologist for disaster survivors and publishes his work in academic journals. He has both operational and academic credibility. If someone could be similarly trained as both a technical rescuer and a researcher, would it be appropriate to try recording research observations while effecting a rescue? Or would it be more appropriate to compile material and to record memories soon after the operation has finished, despite the loss of real-time thoughts and information? Would thinking about the research and possible critiques of one's own rescue responsibilities and capabilities affect decisions made during the rescue operation?

2. Could publishing disaster research interfere with disaster and risk management activities? Good disaster research observes and critiques those observations, noting positive and negative aspects, and then suggesting improvements. In technical rescue, a mistake or the use of an improper procedure (even if recommended) could kill rescuers and rescuees. In such circumstances, a peer-reviewed journal paper could highlight mistakes made. Could that information provide a basis for legal action against the rescuers? If the published work does not identify the specific incident and people, could the researcher be subpoenaed to reveal that information?

Kelman (2005) discusses the legal right to technical rescue along with the potentially separate legal right to competent technical rescue. So far, despite cases of rescuers being sued, no cases have been found where either of those rights was upheld in court. Would it be feasible to sue a researcher, embedded or not, for having interfered with a rescue? Either a rescue team or people associated with the rescuee could feel that the researcher's presence influenced decisions being made. In cases where crowds can gather, such as trench rescues on construction sites or urban vehicle extrications, the researcher might be an additional onlooker. Where the public does not have access or did not appear, such as an open ocean rescue or an isolated wilderness rescue, the researcher's presence would be more obvious.

The final ethical area regarding this question relates to publishing advice in an academic setting which contravenes established guidelines or which is later shown to be inappropriate. Could moral

or legal repercussions result? An example of this debate is the use of the Heimlich maneuver on drowning victims (see Charlton 1996), generally accepted as being inappropriate, although the legal consequences of this debate are rarely mentioned. Exploring the ethics, legalities, and practicalities of such debates in other technical rescue protocols would be useful and innovative disaster research important for practitioners too.

3. Should researchers take responsibility for the operational outcomes of their research? Issues such as the Heimlich maneuver's applicability would be ideal for research projects: comparing rescue techniques and, based on data collected when each technique is applied, evaluating when certain techniques could be used or which technique would be most appropriate. Another example is the disagreements over treating cold water drowning victims (Harries 2003). These debates illustrate the balance and feedback between field experience and research which could be input into developing operational technical rescue guidelines, standards, and procedures. For water resuscitation, venues such as the World Congress on Drowning (WCD 2002) bring together researchers and practitioners to discuss technical issues.

Given this collaboration and the multiple reviews of techniques which occur, how much responsibility does a researcher bear if a technique adopted then proves to be harmful? Researchers' published work has normally been peer-reviewed and is open and available for others to read and to critique. The peer reviewers, though, must place inherent trust in the authors that experiments have been carried out as claimed and that the data reported are accurate. The peer reviewers' job is not to replicate the authors' work but to ensure that the research is appropriate in the manner and context in which it has been reported. The onus is correctly on the author to report the work accurately and honestly and on other researchers, not the peer reviewers, to verify the results' repeatability.

This attitude might be appropriate for theoretical or laboratory science, but is it adequate when research is applied directly for saving lives? Should researchers take additional responsibility for technical rescue research through a more intensive peer review process which demands a higher standard of proof? Or would practitioners have

the responsibility to verify for themselves that published research is appropriate for operations? If so, how would they verify other than making mistakes on rescuees or conducting their own research?

Research into these questions could bring researchers and practitioners closer together. This research could foster an improved understanding of how decisions pertaining to technical rescue protocols are made and the checks which have occurred before a proposal becomes standard operational practice.

Operational Ethics Applied: Field Volcanology

Field volcanology on active volcanoes is a disaster research area which has examined some operational ethics issues and which is relevant to technical rescue during a disaster (e.g. Bruce 2001 on the 1991 Galeras, Colombia eruption). Volcanologists working on active volcanoes have long struggled with ethical dilemmas regarding advice to give, as shown by two incidents on French Caribbean islands. In 1902, the volcano near St. Pierre, Martinique rumbled, but the civic leader opposed an evacuation, staying to demonstrate the safe situation. He was killed along with the 28,000 inhabitants when pyroclastic flows swept through the city. This disaster was recalled by volcanologists who were debating the danger to Basse-Terre, Guadeloupe when the nearby volcano's activity increased in 1975-1976. Some volcanologists believed that a catastrophic eruption was likely while others felt that the danger was minimal, with these differences well-publicized by the media. The decision was made to evacuate the more than 73,000 people at highest risk. After three and a half months with no major eruption and quietening volcanic activity, they were permitted to return (e.g. Sigvaldason 1978; Tazieff 1977).

These and other incidents did not galvanize volcanologists into comprehensively addressing operational ethics, despite suggestions that they should. For example, it took the deaths of twelve volcanologists in volcanic eruptions between 1991 and 1993—including six killed during the small 1991 Galeras eruption (Bruce 2001)—to start in-depth attempts at writing field work safety codes (e.g. Kerr 1993). One initial result was "Safety Recommendations for

Volcanologists and the Public" (IAVCEI 1994). During continuing discussion on further documents, eruptions on Montserrat, another Caribbean island, led to severe criticisms of the behavior of volcanologists, politicians, and the Montserratians regarding response to, behaviour in, and management of the situation (e.g. Clay 1999; Pattullo 2000).

One ethics-related result from all these experiences is the document "Professional Conduct of Scientists During Volcanic Crises" (IAVCEI 1999). The reaction of Geist and Garcia (2000) makes the same mistakes which had led to the volcanological community deciding that codes of conduct were necessary. Geist and Garcia (2000) focus on the importance of scientific enquiry while neglecting the scientists' responsibility to people affected by the volcano. For example, their comment "scientists must act civilly and responsibly and be aware of potential problems in communicating with other scientists, public officials, and the press" does not suggest that communication with the public has similar importance, although communication with the public is mentioned later in the article. Conversely, IAVCEI's (2000) reply recognizes operational ethics as an integral and essential part of scientific enquiry. For instance, they mention that the "need for suggested protocols is not obvious" indicating that not all scientists consider the ethics of their actions or their responsibilities to non-scientists.

Interestingly, neither IAVCEI (1994) nor IAVCEI (1999) have a social scientist named on the committee. Thus, operational ethics for field volcanology perhaps has not yet fully embraced all difficulties which could arise in research and has not yet recognized all forms of research which are conducted on active volcanoes.

Montserrat presents a useful example. The issues which manifested regarding operational ethics for disaster research involved principally volcanologists from the physical sciences, unsurprising since they dominated the scientific input into managing the situation. The focal point was MVO, the Montserrat Volcano Observatory. From an ethical point of view, was it appropriate to put the scientific focus on observing the volcano, which was only one component of the overall social process of building and maintaining a sustainable society on Montserrat? While Montserrat's volcano was the paramount environmental phenomenon being addressed

during the crisis mode, Montserrat is also vulnerable to hurricanes, earthquakes, and tsunamis along with social vulnerabilities.

Since "during volcanic crises, volcanologists' highest duty is to public safety and welfare" (IAVCEI 1999 p. 324), do ethical concerns demand that volcanic crises be viewed as social problems requiring volcanological input, not volcanological problems? Rather than a "Montserrat Volcano Observatory" being set up, the consequence would be that a "Montserrat Sustainability Observatory" or, better, a "Montserrat Sustainability Implementing Agency" should have been created. Volcano monitoring, modeling, analysis, and prediction would necessarily be an essential section, yet volcanology would be placed within the wider context of the sustainability process, in both name and appearance.

Investigating these suggestions might conclude that they are impractical or would yield other difficulties. Such work would nevertheless assist in developing research and practical contributions to operational ethics for field volcanology research.

Conclusions: Researcher Good Governance?

This paper uses technical rescue to illustrate questions which could be researched related to the operational ethics of disaster research. Experiences from field work on active volcanoes demonstrate the efforts of one research area to address operational ethics. In field volcanology, the main three questions asked in this paper have not been fully answered and are asked infrequently, indicating that improvements could be made.

In attempting to consolidate the material and issues explored, the questions raised perhaps point to a common theme of enquiring about who is monitoring the actions of disaster researchers. To whom are researchers responsible if detrimental effects occur due to their work? Academics are generally self-policing, most notably through the peer-review process. The system, overall, has arguably worked well in many circumstances. Could improvements be made?

Possible questions to investigate are:

- Do disaster researchers need codes of ethics? IAVCEI (1999) lists several existing scientific codes of ethics on which a disaster

research code could be based. Documents such as COSEPUP (1995) and the references in its bibliography, along with other fields' initiatives such as medical research's Committee on Publication Ethics (see http://www.publicationethics.org.uk), articulate important issues which could be formalized into codes for disaster research.

- Should all disaster research methods, not just those involving human subjects, be peer reviewed for approval or rejection before research is started with the same formality as academic papers are peer reviewed after research has been completed?
- Should some disaster research be banned in the same way that not all animal testing or experimentation on human subjects is approved in some countries? Kelman (2003 p. 121) asks "Should 'political testing'—real-time research on tinkering with human societies—undergo as stringent requirements as animal testing…or experimentation on human subjects?", a question which pertains to some disaster research.

Returning to the definition of research, the assumption that the systematic advancement of knowledge is acceptable, beneficial, and positive should be queried because methods, knowledge, and use of knowledge could yield ethical concerns.

This overarching question with respect to operational ethics for disaster research is possibly helpfully expressed through international development vocabulary. Should the principles of good governance—participation, transparency, accountability, rule of law, effectiveness, and equity (UNDP 1997)—be actively implemented for disaster research? This reference to how political and decision-making structures and systems govern themselves might be applicable to other sectors of society, such as how a research field governs itself. Or would formal attempts at governance and control inhibit the most creative and agenda-setting research, irreparably interfering with knowledge advancement?

Some of the good governance principles are relatively straightforward. Researchers should obey the rule of law at all times, particularly international law and the laws in the countries of their research. Aspects of accountability and transparency are potentially covered through the peer review and grant application processes,

although these processes suffer from prejudices (Mainguy et al. 2005; Wennerås and Wold 1997; and see discussion of Galeras' research in Bruce 2001). Additionally, self-funded or otherwise privately-funded research might not have these checks while some journal editors refuse to be accountable for their comments and decisions. Finally, these processes provide accountability to and transparency for only a certain sector, dominantly other researchers. How would accountability to and transparency for the research be attained for non-researchers, particularly if achieving that might influence the research results?

Answering the latter question and fully achieving the other good governance characteristics could yield the following responses:

- There is no need to meet these principles in disaster research, mainly because they would hamper innovative work.
- Minimum standards, universal research guidelines, and behavioral charters are needed for disaster research.
- The documents in the previous point could never be specific enough to be useful across all disaster research. Meanwhile, monitoring and enforcement would be too challenging. Researchers must self-police by accepting the doctrine of the good governance principles, by having a required examination on them for all research degrees, and by insisting that peers within a specific research area prove to each other that they have adopted and met these principles.

At minimum, these questions should be asked and debated. Researchers should understand what is and is not acceptable by thinking ahead to set appropriate limits in their field of operations. During a disaster and during research, it is too late. Before starting work, researchers should be aware of their potential influence and potential responsibilities by recognizing that "participant-observer" is, in some ways, an ideal. In most circumstances, a disaster researcher is almost inevitably a participant, even if an inadvertent one.

Rewards in research are primarily gained from investigating a topic, case study, or method which has not previously been examined. At times, perhaps no one has done it before due to possible detrimental consequences. Researchers are in a strong position to recognize, anticipate, and avoid mistakes. We have a responsibility to do so.

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