

Perishable Information, Enduring Insights? Understanding Quick Response Research

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Introduction

The hallmark of quick response research is collecting information that would be lost if it were not gathered in the immediate aftermath of a damaging event. The intent of quick response research is to understand circumstances that exist only fleetingly and/or to document evidence created as a result of a damaging event that will not survive clean-up operations. Disaster-induced damage, ephemeral situations, and people's attitudes and actions toward them quickly become overlaid with the next layer of the drive towards a more stable, sustainable situation. Consequently, investigators in a wide range of disciplines, as diverse as structural engineering and sociology, seek to investigate the temporary world of disaster incidents and what happens in their immediate aftermath. In the social and policy sciences, researchers are likely to describe their investigations during or immediately after a damaging event as "quick response" research, while those in science, engineering, and architecture may use other terms, such as "field reconnaissance" (Frost and Deaton, 2000), or simply "reconnaissance" (Singh, 1997; Rojahn, 1997; Arnold, 1997). Regardless of the terms used to describe their efforts, investigators undertake their research to advance both our ability to prepare, respond, and mitigate future damaging events and to further the creation of new knowledge within their disciplines and beyond them.

Quick response research has become widely thought of as a research method. Yet it is not a set of procedures or techniques for undertaking systematic inquiry. Erroneously considering quick response research as a research method leads to the misconception that it is somehow a subset of

social science research, particularly qualitative field work. As a result, it becomes more difficult to see that quick response research is practiced with great benefit across disciplines. Another danger of conceptualizing quick response research as a distinct methodology is that it becomes conceivable to justify lowering standards of rigor in executing all phases of an investigation. The inappropriate rationale would be that blanket exceptionalism is warranted by the phenomenon under investigation.

Consequently, rather than thinking about quick response research as research method, it is more constructive to understand quick response research as research distinguished by the time period during which the information collection phase is undertaken—during or immediately after a damaging event. The circumstances of data collection often require compromising or suspending established protocols for methods of data collection that are not inherently flexible. Methods of data collection that are flexible and do yield information in states of flux, such as interviews and observation, become the instruments of choice across disciplines in the disaster and post-disaster environment. Compromises in the non-data collecting phases of inquiry are justified only to the extent dictated by the compromises required in data collection.

The next two sections consider some of the motivations behind undertaking quick response research, including its applied utility, contribution to theory, and research objectives for undertaking it. This is followed by a discussion of selected research methods and data collection strategies and techniques useful to quick response researchers. Eleven trends shaping quick response research are then outlined, followed by a selective discussion of program support for quick response research. In conclusion, recommendations are made with the intent of stimulating discussion about developing a more systematic consideration of quick response research.

Applied Utility and Contribution to Theory

Quick response research can be important practically, often fulfilling researchers' desire that their investigations directly or indirectly bring about an improvement in a situation (Palys, 1997). Results may suggest how to minimize loss or enhance recovery (Cisin and Clark, 1962). Examples of the former are post-earthquake reconnaissance leading to improvements in the practice of structural engineering (Rojahn, 1997) or identifying the contribution architects can make to reducing structure vulnerability (Arnold, 1997). The work of Wallace et al. (2003) exemplify the latter. They focus their research on how to assist emergency managers in responding to service disruptions arising from events that affect infrastructure interdependencies.

When it comes to understanding policy research conducted in the quick response mode, it is helpful to distinguish between analysis *for* policy and

analysis *of* policy (Carley, 1980). Analysis *for* policy is applied policy research intended to be used by decision makers to improve policies or programs. It is requested by and provided for decision makers (Haas and Springer, 1998). The intent is not to make a general contribution to disaster-related knowledge; rather it is intended to enhance the capability of organizations who must plan for and/or cope with disasters. As such, it focuses on specific, practical concerns (Tierney, 2002). It is exemplified by the rapid assessments that the National Weather Service (NWS) has undertaken for the last 50 years. Teams are dispatched immediately after an extreme weather event to evaluate the performance of the NWS as it relates to the particular event being investigated. This includes assessing the utility of the weather forecasts to the media and individuals (Lerner, 2002). Likewise, the Federal Emergency Management Agency carries out its own research. Routinely it administers surveys on customer satisfaction focusing on questions that the agency wants answered. The City of Los Angeles exemplifies a jurisdiction that conducts its own post-disaster reconnaissance to learn first-hand from how other communities handle disaster (Tierney, 2002).

As analysis *for* policy expands, the concern is that organizations may decline involvement in analysis *of* policy. Assisting academic researchers may come to be seen as nothing more than a nuisance if organizations are able to support investigations that focus on their specific needs (Tierney, 2002).

Investigations into policy research conducted through the Natural Hazards Research and Applications Information Center's Quick Response Research Program, funded through the National Science Foundation, typically exemplify analysis *of* policy. They are usually academic investigations of policy problems concerned primarily with illuminating causes and effects of policies and programs. The Natural Hazards Center's program is not institutionalized in such a way that the research it funds has a direct conduit for affecting policy decisions.

While quick response research has practical importance, it also can contribute to purely theoretical work. Stallings (2002a) points out that an established way of better understanding how personality and social structures are created and recreated comes from understanding exceptions to rules, such as disruptions and threats of disruptions to routines. Aguirre et al. (1998) were able to extend emergent norm theory by demonstrating the ongoing importance of lasting social relationships in shaping collective behavior. This theory presumes that nontraditional collective behavior arises out of a normative crisis. The February 26, 1993, terrorist attack on the World Trade Center was the precipitating event that created the normative crisis that Aguirre et al. (1998) investigated using data collected from a survey of 415 people who worked at the World Trade Center in the first week of May 1993.

Research Objectives

Quick response research may be conducted for exploratory purposes, descriptive purposes, or explanatory purposes. A research project may have elements of more than one of these research objectives. The distinctions between purposes are not clear cut, although research can be categorized based on its primary emphasis (Selltiz, 1976).

Exploratory

Research is done to gain an understanding or to gain new insights into a particular phenomenon. It can be used to derive precise research questions or to develop hypotheses. Exploratory research requires a flexible and wide-sweeping strategy, open-ended techniques, and the use of atypical samples. It is undertaken for heuristic purposes, to get closer to an explanation (Palys, 1997; Selltiz et al., 1976).

Kendra and Wachtendorf (2003) describe their quick response research as an exploratory case study into the role of creativity in emergency response. By becoming familiar with the phenomenon being investigated, through exploratory research, the researcher can begin to identify important variables and questions of interest. During exploratory research, the researcher must avoid foreclosing what may prove to be worthwhile avenues of investigation and remain open to various perspectives. Exploratory research is a good source of ideas and helps ensure that when more systematic research questions and designs are formulated they will be meaningful. It is important to acknowledge that the results of exploratory research may be little more than anecdotal (Palys, 1997). They may also be wrong. At a minimum, users of information gathered through exploratory research must seek out subsequent work to find out whether preliminary results have been overturned or not.

“Preliminary” is an adjective frequently used to describe the results of quick response research (Bolin, 1990, p. vii). O’Brien (2003) emphasizes that his quick response research is the first phase of a larger project. In phase two, he will use quantitative methods to help achieve his long-term objective of understanding risk communication model dynamics in the context of terrorist attacks. O’Rourke et al. (2003) describe the lessons learned from their quick response research into critical utility systems after the September 11th terrorist attacks as preliminary. Work is proceeding on collecting additional information that will lead to refining the database and clarifying issues. As a follow up to his quick response research that generated an initial assessment, Sattler (2003) is conducting a longitudinal study to examine delayed mental health problems and growth and resiliency.

Quick response researchers are encouraged to use the initial findings they generate to lay the groundwork for larger and longer-term research projects.

Twice the Natural Hazards Center has surveyed researchers it funded to undertake quick response research to find out if they had applied for funding to pursue work begun as quick response research. The first survey, completed in 1993, was of 67 researchers who performed studies between 1986 and 1992. Of those, 53 responded for a response rate of 79%. In 1996, 33 researchers who completed quick response research between 1992 and 1995 were surveyed, and 22 responded. The first survey revealed that quick response researchers submitted 31 proposals for followup research, of which 29 were funded. At the time of the survey, three additional proposals were pending and four were in the process of development. The 1996 survey revealed that 13 longer-term proposals were submitted by respondents. (Myers, 2002; Natural Hazards Research and Applications Information Center, 1996).

Descriptive

Descriptive research attempts to accurately portray the characteristics of whatever entity is being studied, be it an individual or a population (Palys, 1997; Selltiz et al., 1976). Descriptive research is particularly important in disaster and immediate post-disaster settings because it is a critical means of preserving and interpreting perishable data. It may not be possible to revisit or replicate the situations that quick response researchers describe. Grant et al. (2003) provides a thorough account of intergovernmental cooperation in a multi-jurisdictional response to the United Flight 93 air crash in a small community, Shanksville, Pennsylvania. They discuss such specifics as mass feeding and technical communication. Simpson and Stehr (2003) explain the process of identifying individuals missing after the collapse of the World Trade Center. Kendra and Wachtendorf (2003) describe instances of creativity in the recovery from the September 11th terrorist attacks on the World Trade Center. Warn et al. (2003) depict the structural and non-structural damage to 130 Liberty Street, located immediately south of World Trade Center tower 2, which collapsed in the September 11th disaster.

Explanatory

Explanatory research attempts to study causal relationships (Palys, 1997). The purpose of such research is to test a hypothesis about a causal relationship between variables (Selltiz et al., 1976). For example, Holguín-Veras et al. (2003) set out to discover if there were linkages in behavioral changes in intercity travel and the impact of the terrorist attacks of September 11th. They did discover statistically significant linkages. However, they employed an unorthodox experimental design and data collection process because they were concerned that delaying any further the collection of stated preference data would result in further dissipating the transient behavioral effects

associated with the September 11th disaster. Consequently, they made pragmatic decisions about the scenarios to include in the experiment and about the people from whom they would collect stated preference data.

Research Methods

Quick response research employs approaches, methods, and data collection techniques familiar to social science researchers (Jacobsen, 1956; Cisin and Clark, 1962; Mileti, 1987; Stallings, 2002b) and by no means alien to investigators in policy, science, and engineering. They make possible analyses that have “grounded relevance,” essential for analysis to make its way into the decision-making process (Haas and Springer, 1998).

Collecting high quality, primary data during and immediately after a damaging event is a challenging enterprise (Stallings, 2002b). It is essential to be successful if the value of the information obtained in the immediate post-disaster phase is to be maximized (Frost and Deaton, 2000). The actuality of quick response research highlights the gap between the ideal and the practice of conducting research in the immediate aftermath of a disaster. It may be one reason why, as Stallings (2002b) notes, disaster research methods per se have not been discussed much.

This section begins with a brief discussion of the case study approach, a standby of quick response research. Next, field work, the most commonly used method of data collection in quick response research (Tierney, 2002), is discussed in connection with allied techniques such as observation, elite interviews, and document review. Then, sampling is discussed because it highlights the often opportunistic nature of quick response research.

Case Study Approach

When the primary task is to understand how action is taken to manage specific situations, a qualitative case study approach is helpful. A case study approach provides for a complete understanding of the complexity of a situation by examining the phenomenon within the context that it occurs (Yin, 1984). Kendra and Wachtendorf (2003) describe their quick response research as an exploratory case study into the role of creativity in emergency response. Holguín-Veras et al. (2003) treat the terrorist attacks on the World Trade Center as a case study of how extreme events affect intercity travel behavior.

Field Research

Field work remains the most commonly used method of collecting data during quick response research (Tierney, 2002). Field research is conducted in science, engineering, and the social sciences. For example, in science and engineering, expert field reconnaissance immediately after earthquakes is

valuable for determining the mechanisms responsible for poor performance of structures during an earthquake (Frost and Deaton, 2000) and to improve understanding of ground motion characteristics and the damage potential to different structural systems (Singh, 1997).

One example of social science field work undertaken immediately after the September 11th disaster terrorist attacks is Kendra and Wachtendorf's (2003) exploratory case study into the role of creativity in emergency response. They undertook 750 hours of systematic field observation over two months beginning on September 13, 2001. They observed key planning meetings at highly secured facilities, such as New York City's Emergency Operations Center, incident command posts, and the federal Disaster Field Office. They spent time observing operations at volunteer, supply and food staging areas, "Ground Zero," assistance centers for victims' families, and rescue workers' respite centers. They observed activities at major security checkpoints in lower Manhattan and at locations central to emergency response. They generated extensive notes, took over 500 photographs and sketches, and collected floor plans of various facilities. The primary interest of those gathering the data were the activities of formal and informal organizations and the emergence of multi-organizational networks. Systematic field observation facilitated informal interviews.

Field experience enables researchers to get a sense of initial reactions and attitudes, observe events as they unfold, access local news coverage, visit various response facilities, walk the streets, generate contacts for future research, demonstrate commitment to key informants, and suggest additional research (Simpson and Stehr, 2002). If in the social sciences "field research is the systematic study of ordinary events and activities in the settings in which they occur" (Bailey, 1996, p. 1), then what distinguishes disaster research is the circumstances in which it takes place (Jacobsen, 1956; Stallings, 2002b). If field research is typically about understanding "the meaning of daily events from the perspectives of those being studied" (Bailey, 1996, p. 3), quick response research is about understanding the meaning of exceptional events or daily events in exceptional circumstances from the perspectives of those being studied. Whereas Bailey (1996) classifies field research as a longitudinal design, because data collection usually takes months or years, quick response research employing field study is characterized by a shorter time in the field.

Field research is distinguished by the collection of data in the setting of the phenomenon of interest. In general, in field research researchers do not control events and interactions. Data collection is undertaken primarily through interactions and observations. Other techniques, such as semi-structured and structured interviews, may be used to supplement observation. In addition, the contents of documents may be analyzed or surveys distributed selectively. While field research is primarily classified as qualitative research, it may contain quantitative analysis as well. Whereas normally the

interactions and observations of the field researcher are systematic (Bailey, 1996), in quick response research settings, interactions in the field may be both systematic and serendipitous (Fitzpatrick and Mileti, 1990). O'Brien (2003) describes administering interviews with City of New York workers still on emergency alert after the terrorist attacks on an "as-available basis."

Field investigators may be challenged in gaining access to key informants (Bailey, 1996). This is true for quick response researchers who are interested in minimizing the loss of details respondents will be able to provide. The sooner a researcher can speak with informants, the less opportunity informants will have had to develop a canned response (Killian, 1956). It is not always possible for researchers, however, to gain access to key informants while the latter are still fully engaged in response and initial recovery activities (Killian, 1956; Grant et al., 2003; Simpson and Stehr, 2002). Arriving in Shanksville, Pennsylvania, three days after the crash of United Flight 93, Grant et al. (2003) recognized that it would not be possible to conduct interviews with key personnel engaged in emergency response. Two weeks after the World Trade Center collapsed, Simpson and Stehr (2002) were unable to access key informants in the New York City Office of Emergency Services, the Office of the Medical Examiner, the New York State Office of Emergency Services, and the Federal Emergency Management Agency, who were engaged in victim identification.

Ultimately, it is the field researcher's understanding and interpretation that determines what is learned from field research. Field research is highly flexible. It can be undertaken by an individual or by a team. It is well suited, but not limited to, exploratory and descriptive research. It is often used for generating theory and hypotheses. It rarely involves hypothesis testing, standardized questions, or manipulation and control of variables. The field work experience is rarely predictable prior to undertaking it (Bailey, 1996).

Quasi-experimental Field Studies

Guetzkow (1962) and Drabek (2002) both advocate quasi-experimental field studies. A quasi-experimental approach adapts the logic underlying traditional laboratory experimentation to a field setting. Since, unlike in the laboratory, a field researcher does not completely control all aspects of the situation, analytic rather than manipulative control is used to control rival, plausible explanations. This involves the researcher's taking an existing situation and using her or his analytical powers to make sense of the observed causal patterns (Palys, 1997). For Guetzkow (1962), a quasi-experimental approach would expand the traditional single-case post-disaster study. While there are exceptions, e.g., Morgan's (1990) investigation of the psychological impact of the Loma Prieta earthquake on law enforcement officers and health care providers, this approach has not been widely used in quick response research.

Observation

Since researchers generally do not control events and interactions in field research, observation becomes a critical means of collecting data (Bailey, 1996). Observation is important as the basis for careful analysis of disaster conditions (French, 1990). It can be used (1) when documentation is unavailable, (2) when key informants are unavailable, (3) when estimates and statistical data are spotty, (4) to verify information obtained through other means, (5) when it is the most appropriate means of obtaining the data, and (6) to generate ideas about future research.

Documentation is Unavailable

To collect information about the structural and nonstructural damage to a 39-story office building in lower Manhattan that was damaged in the collapse of the World Trade Center, one member of the Multidisciplinary Center for Earthquake Engineering (MCEER) research team accompanied a structural engineer from LZA/Thornton Tomasetti on a detailed inspection of the interior of the building on September 23, 2001 (Warn et al., 2003). The building is located immediately south of tower 2 of the World Trade Center. The reconnaissance of the interior followed an exterior inspection of the building from ground level two days previously. The interior inspection involved climbing from the entry level to the roof via a stairwell located in the building's core and then conducting a floor-by-floor inspection, paying particular attention on each floor to a particular northerly portion. The MCEER research team was motivated to analyze the building to understand why the building did not collapse, despite the observed loss of key structural elements and severe damage. Since the research team did not have access to detailed information on the structural framing system of the study building, they made do with the approximate sizes noted during the interior building reconnaissance (Warn et al., 2003).

Key Informants are not Available for Interviews

Upon arriving at the crash site of United Flight 93 in Shanksville, Pennsylvania, three days after the flight had been downed, Grant et al. (2003) recognized that it would not be possible to conduct interviews with key personnel engaged in emergency response as they had originally intended. Consequently, they amended their method to undertake, in the first instance, observation, supplemented with informal conversations.

Estimates and Statistical Data are Spotty

French (1990) and a team of four graduate students made a preliminary assessment of damage to urban infrastructure after the Loma Prieta earthquake, relying primarily on first-hand observation. To supplement their

observations they used available estimates of physical and financial damage provided by state or local officials.

To Verify Information

In her examination of the Muslim student experience after September 11th, Peek (2003) undertook participant observation to verify the experiences that students had discussed in interviews with her. For example, while walking through subway stations and sitting on trains with the young Muslim women she had interviewed, Peek (2003) confirmed that these young women received looks from passersby that they had reported in the interviews.

Most Appropriate Means of Obtaining the Data

Gillham and Edwards (2003) observed strategy meetings and protest events as one means to collect data for investigating changes in the organization field and changes in events by those who had been planning an “episode of contention” against the World Bank and the International Monetary Fund September 23–30, 2001. They observed three different decision-making meetings; an American Federation of Labor and Congress of Industrial Organizations (AFL–CIO) “disaster relief blitz;” two activist gatherings at the Anti-Capitalist Convergence Center; a number of protest events, such as a teach-in, a people’s summit, and an interfaith prayer gathering; two legally sanctioned sets of rallies and marches; and an illegal march.

To Suggest Future Research

Using informal observation, Wallace et al. (2003) found that visualization tools, such as geographic information systems, were widely employed during the response to the attacks on the World Trade Center. Consequently, they suggest conducting work that will contribute to the capabilities for visualizing assumptions and implications of models of infrastructure interdependence.

Elite Interviews

Elite or specialized interviewing involves collecting non-standardized information from selected individuals having specialized knowledge about an event or process (Patton and Sawicki, 1993). After the terrorist attacks of September 11th, a number of quick response researchers used variations of specialized interviewing, both in person and over the phone (for example, McEntire et al., 2003; Sutton, 2003; Gillham and Edwards, 2003; Grant et al., 2003; Thomas et al., 2003; O’Rourke et al., 2003; Wallace et al., 2003). Three examples illustrate the types of persons investigators approached to conduct specialized interviews. First, Thomas et al. (2003) spoke with providers and users involved in the geotechnological response efforts in New York City

after the September 11th disaster. Second, O'Rourke et al. (2003) interviewed deputy fire chiefs in command of the eastern and western sides of the World Trade Center complex to assess the amount of water drawn from the water distribution system. Third, Wallace et al. (2003) interviewed two public service providers to assist in choosing and developing cases featuring interorganizational aspects of disruptions in critical infrastructure systems.

Thomas et al. (2003) found that, in addition to face-to-face interviews, telephone interviews were also successful for gathering information to understand the broad use of geo-technologies. Michaels (2003) used telephone interviews to speak with representatives of information technology firms that had provided assistance in the immediate aftermath of the September 11th disaster. Using the telephone made it possible to conduct interactive interviews with individuals located throughout the United States and overseas.

Document Review

After the terrorist attacks of September 11th, quick response researchers used document analysis when access to key informants was not possible (Rubin and Renda-Tanali, 2003), as an investigative focus (Rodrigue, 2003), to identify specific events (Wallace et al., 2003; Zimmerman, 2003), and to complement interactive methods, such as interviews (O'Rourke, 2003; Gillham and Edwards, 2003; Thomas et al., 2003; Simpson and Stehr, 2003; Grant et al., 2003).

When access to key actors for personal interviews was not possible, Rubin and Renda-Tanali (2003) relied primarily on secondary sources in their investigation of the effects of the September 11th disaster on federal emergency management in the United States.

Rodrigue (2003) undertook a content analysis of *Los Angeles Times* front screen stories on the September 11th disaster. She began by recording the headline, lead sentences, date, key theme, and up to three modifiers of that key theme. The system she created yielded 17 key themes, 10 of which included more than five stories each.

Wallace et al. (2003) had independent coders identify and classify instances in the borough of Manhattan in which critical infrastructure was disrupted based on reports of such incidents in the *New York Times* Metro edition between September 12, 2001, and December 12, 2001. To identify events that relied heavily on infrastructure and to uncover how infrastructure was used in the immediate aftermath of the attacks on the World Trade Center, Zimmerman (2003) reviewed documents, reports, and media coverage supplemented by presentations from public and private owners, operators, and regulators of infrastructure in the New York City region.

O'Rourke et al. (2003) reviewed pumping records and examined high-resolution aerial photography in addition to interviewing Marine Division personnel from the New York City Fire Department. They did so to estimate how much water was supplied directly from the Hudson River to the World Trade Center complex and surrounding buildings for fire fighting after the September 11th attacks.

Gillham and Edwards (2003) gathered documents and examined the websites and e-mail list-servs of specific advocacy organizations that, immediately before the September 11th disaster, had been organizing a demonstration of support for global justice. To supplement the elite interviews they conducted, Thomas et al. (2003) tracked the use of maps in the *New York Times* since communicating to the public contributes to supporting the emergency management cycle. In their investigation of victim management and identification after the World Trade Center collapse, Simpson and Stehr (2003) collected additional data from reports in the *New York Times* and other publications.

Grant et al. (2003) supplemented observation and focused interviews with content analysis of the newspaper coverage of the response and recovery operation. While they utilized national news services, they focused on local coverage because it contained more details. Local coverage reflected that members of the local media were familiar with the local people engaged in the response effort. Grant et al. (2003) also utilized six different formal presentations made by responders about their experiences.

Kendra and Wachtendorf (2003) collected a wide range of documents produced by local, state, and federal agencies and individuals and organizations less formally tied to response efforts than government entities. Examples of documents they collected included internal and public reports, information or resource requests, information handouts, internal memos and directives, schedules, meeting minutes and agendas, and maps. They also took advantage of the extensive electronic database of articles and web-based information compiled by the Disaster Research Center. For six months after the attack, newspaper articles from major New York City papers were collected. The database also included articles from major periodicals, selected international newspaper articles, and information from government, charity, community-based, private sector, and individual internet sites that were created after and about the terrorist attacks of September 11th.

As illustrated in a number of examples above (Rodrigue, 2003; Wallace, 2003; Zimmerman, 2003; Thomas et al., 2003; Simpson and Stehr, 2003; Grant et al., 2003; and Kendra and Wachtendorf, 2003), newspapers were an important source of information. Quick response researchers used them to track specific incidents and to understand the broader context of events.

Sampling

In Bolin's (1990, p. vii) edited collection of quick response research into the 1989 Loma Prieta Earthquake, he comments how "research methods become opportunistic and flexible" in the emergency phase of the post-disaster environment where so much is in a state of flux. While this is evident in the choice of quick response researchers to use convenience, purposeful, and snowball sampling, Bourque et al. (2002) make the case that it is worth reconsidering the use of standardized, population-based surveys.

Convenience Sampling

While convenience sampling is normally discouraged, its value is recognized when it is the only feasible way to obtain information (Mason, 1996). In their investigation of what organizations and individuals did in response to aftershock and secondary hazard warnings after the Loma Prieta earthquake, Fitzpatrick and Mileti (1990, p. 76) describe how they employed a "convenience sampling technique" to gather data. Organizational respondents were selected based on their knowledge about warnings, while citizens were chosen based on "availability and convenience" (Fitzpatrick and Mileti, 1990, p. 77). Whenever possible, the researchers conducted group interviews in "affected areas where people were known to be gathering" to maximize information collected (Fitzpatrick and Mileti, 1990, p. 77).

O'Brien (2003) employed a comparable approach in New York City after the September 11th disaster. He interviewed individuals in the direct chain of responsibility for emergency response. Also, he interviewed people anywhere they congregated to discuss events; this included such venues as the street, restaurants, and subway stations.

The work of Holguín-Veras et al. (2003) provides an example of using convenience sampling in a survey conducted after September 11th. To gain insights into the effects that extreme events have upon intercity travel behavior, Holguín-Veras et al. (2003) used random utility models to provide a methodological framework for assessing behavioral changes. To generate the data to use in the model estimation process, they collected stated preference data about transportation options from volunteer research participants six months after September 11th. Between March 14, 2002, and April 4, 2002, 192 volunteers completed self-administered questionnaires. Initially the questionnaire was administered to a set of undergraduate and graduate students at the City College of New York. Undergraduate students were asked to respond to the questionnaire. To maximize the variability in the socioeconomic characteristics of the sample, the graduate students were each asked to administer the questionnaire to three other individuals. Holguín-Veras et al.'s (2003) findings are not generalizable to the population of

New York City's five boroughs because the researchers employed convenience sampling rather than representative sampling.

Purposeful Sampling

Purposeful sampling involves deliberately choosing particular people, events, or situations to obtain information that could not be obtained otherwise (Maxwell, 1996). In their qualitative investigation of volunteer behavior, Lowe and Fothergill (2003) employed a purposive sampling technique as they sought out people of diverse backgrounds. They succeeded in gaining a fairly diverse sample of 23 individuals to interview in-depth about their helping behaviors within 96 hours of the 2001 terrorist attacks on the World Trade Center.

Sattler (2003) employed purposeful sampling in conducting a study to examine if psychological distress, posttraumatic growth, resiliency, and coping varied as a function of spatial distance from the terrorist attacks of September 11th. Three weeks after the disaster, Sattler (2003) had 1283 students in four states complete a confidential and anonymous self-administered questionnaire. The response rate was 99%. He designed his sample of college students from the four regions of the country such that they had similar demographic characteristics. The rationale was that this would enable comparison across the regions.

LeDuc and Parker (2003) report on a survey designed to evaluate interagency communication and coordination in the post-disaster environment. The survey was distributed in October 2001 to the directors of the 22 member agencies of the Oregon Emergency Response System. All units in the population were targeted for study. An 87% response rate was achieved. In its capacity as state response coordinator, the Department of Oregon Emergency Management asked the Oregon Natural Hazards Workgroup, University of Oregon, to review the nature of state agency communication in light of the need to activate emergency response plans after the September 11th attacks.

Focus groups normally bring together a purposive sample of informants to discuss a phenomenon selected by the researcher (Palys, 1997). Participants value the interaction they have with their peers during focus group interviews (Michaels, 1993). Peek (2003) conducted 19 focus groups with self-selected participants as the primary means of collecting data during the initial phases of her study on Muslim student experiences after the terrorist attacks of September 11th. Such an approach enabled her to utilize effectively limited time and resources to gather a range of perspectives. She supplemented her focus group work by using one-on-one semi-structured interviews and participant observation.

Snowball Sampling

Snowball sampling starts with one or two people and then uses their connections and the connections of their connections to generate a sample (Palys, 1997). Its purpose is to identify cases of interest by using the expertise of people who know others who know which cases are rich in information (Miles and Huberman, 1994). Snowball sampling is a useful means of generating elite interviews where the actors know each other. McEntire et al. (2003), Thomas et al. (2003), Sutton (2003), and Lowe and Fothergill (2003) all describe using snowball sampling in their quick response research after the September 11th disaster.

Representative Sampling

Bourque et al. (2002) argue that in light of new, technologically sophisticated methods for conducting surveys, it is worth reconsidering the use of well-designed, standardized population-based surveys for certain quick response research topics. They use the term “survey research” to refer to a sample of respondents that represents an underlying population. They suggest that the representativeness of any random digit dialing sample after a disaster in the United States, particularly in an urban area, will be as good as if not better than any other method of collecting data, provided that the researcher is able to meet five conditions that they explain.

Selected Trends Shaping Quick Response Research

Quick response research is not a static enterprise in a constant world. Eleven trends demonstrate this.

- (1) Beginning with a deductive approach to research, quick response research has evolved to include both deductive and inductive approaches.
- (2) From its roots primarily in single disciplines, quick response research now is undertaken by researchers in a plethora of disciplines and has become multi-disciplinary and interdisciplinary.
- (3) After a significant disaster, there is a growing probability of researcher convergence at the impact site.
- (4) Those who conduct quick response research are an increasingly diverse group of individuals.
- (5) The oversight of institutional review boards has become pervasive when it comes to human subjects.
- (6) There is growing concern over litigation.

- (7) Increasing concern over security may limit access to decision makers and documentation.
- (8) The specter of biological and chemical attacks on their own or in conjunction with another disaster heightens potential health risks to quick response researchers.
- (9) Information technology is making possible new means of collecting perishable data.
- (10) The potential for conducting quick response research away from the immediate vicinity of a disaster site is expanding.
- (11) Quick response research now functions in a context where more people know more quickly about what has happened than in times past.

From a Deductive Approach to Deductive and Inductive Approaches

The implicit approach of the early social science quick response researchers was deductive. Deductive research is theory-guided. Research is focused by what a theory suggests should be looked at and where relevant information may be gathered (Palys, 1997). Killian (1956, p. 14) talks about the need “to insure that the subjects selected are adequate for testing the hypotheses of the study.” The early work emphasizes the mismatch between the rigors dictated by the hypothetico-deductive approach and the reality of disaster field work. The strategy employed to address this discord was to introduce as much discipline into data collection as is practicable.

The deductive tradition in quick response research continues. O’Brien’s (2003) work exemplifies theory-guided, deductive, exploratory quick response research. He undertook to test and extend a model of risk communication to understand the warnings disseminated immediately after the September 11th terrorist attacks. Sattler (2003) also employed a deductive approach to his qualitative research. He developed a questionnaire to test his speculation (based on research, theory, anecdotal evidence, and the nature of the threat) that citizens were experiencing fear and distress and were reassessing their own lives and showing resiliency. Those researchers who operate in a deductive mode use exploratory research as pilot studies (Palys, 1997).

Other contemporary quick response researchers operate in an inductive research mode, emphasizing the generation of theory that emerges from research. For example, Rodrigue (2003) conducted what she described as an inductive and iterative approach to classifying articles discussing the terrorist attacks of September 11th in the *Los Angeles Times* in the first 12 weeks after

the attacks. Sutton (2003) described how she examined the descriptive material she collected to identify themes she wished to consider in light of the Disaster Research Center's model of organizational adaptation. Exploratory research is an integral and focal part of research in theory-generating, inductive research. Initial exploration is essential as a source from which theory might emerge. The exploratory phase of research allows inductivists to gain new insights. Particularly important are the perceptions of those who inhabit the research site (Palys, 1997).

From Single Disciplines to All Comers

Speaking at a June 1952 conference on earthquake and blast effects on structures in Los Angeles, Engle posed the question, "Why is it that the practicing engineers on this [the West] coast find it impossible to collaborate on a clear, factual, complete and concise report following a major earthquake?" (Engle, 1952, p. 185). Less than a month later, earthquakes in Kern County became the foci of the first detailed analyses of the structural behavior of earthquake-resistant construction. While the emphasis on structural behavior in these initial investigations put structural aspects of building earthquake engineering ahead of other aspects, the Earthquake Engineering Research Institute (EERI) (1977) soon came to recognize that all engineering, scientific, and socio-economic effects needed to be considered in its field investigations of damaging earthquakes. In developing its multi-disciplinary approach to post-earthquake reconnaissance, EERI identified building engineering, lifeline earthquake engineering, geoscience, and social science as the concerned professions.

Likewise, while the field study of social relations after a disaster has become diversified, initially, quick response research into the immediate human response to a damaging event was almost exclusively the domain of sociologists (Quarantelli, 1994). This began with the pioneering field team that initiated disaster studies in the social sciences. The first was the National Opinion Research Center (NORC) that operated at the University of Chicago between 1950 and 1954 that studied natural and industrial disasters where circumstance might approximate a disaster in war. The Chemical Corps Medical Laboratories of the Army Chemical Center commissioned and supported its research (Quarantelli, 1987). The tradition of team field work by sociologists was continued at the Disaster Research Center, first at Ohio State University and then at the University of Delaware. Graduate sociology students received training in conducting field work during the crisis phase of disasters (Quarantelli, 1997).

The initial insistence on viewing disaster phenomena within disciplinary frameworks within the social sciences cast a long shadow throughout the late 20th century. Early efforts to launch multi-disciplinary or interdisciplinary

social science investigations into disasters failed. Recruitment of representatives from other disciplines, such as anthropology and psychology, into sociology-dominated teams proved disruptive of team work (Quarantelli, 1994).

In an effort to broaden participation in post-disaster research, the Quick Response Research Program at the Natural Hazards Center was initiated in 1982. About half a dozen efforts were funded the first year. The program was inspired by the Disaster Research Center's investigations into the immediate aftermath of disasters (Tubbesing, 2002).

The multi-disciplinary National Science Foundation/Natural Hazards Center program to support quick response research was structured to avoid the more typical and lengthy process of applying for research grants, which impeded capturing perishable information. The National Science Foundation explicitly funded the quick response research program portion of the Natural Hazards Center budget. The very limited funding that is available through this program is strictly for reimbursement of the most basic out-of-pocket expenses, such as travel and lodging. Consequently, scholars may not be able to take students with them, and professors cannot afford to buy out class time for data collection and analysis or travel to destinations where travel costs are expensive, such as remote or distant locations. Limited funding means that quick response research is undertaken more on an opportunistic than a systematic basis. Still, the Natural Hazards Center program has enabled researchers throughout the United States, regardless of discipline, who might not have done so otherwise, to undertake hazards research (Tubbesing, 2002).

Trickle to Flood of Quick Response Researchers

When Killian (1956) warned researchers to be mindful of coordinating their investigations, he was concerned that two teams working in the same locale would arouse resentment among their research subjects by overworking them. Now, dozens of researchers from around the world come to study the post-event impacts of high-profile disasters. Because communities and organizations affected by a disaster can easily become overtaxed responding to multiple research efforts, a coordinated strategy for managing the needs of researchers is beneficial to both those affected by a disaster and the investigators. For example, to manage researcher convergence after the 1994 Northridge, California, earthquake, a clearinghouse was established by EERI and the California Governor's Office of Emergency Services to enable researchers to get information, make contacts, and to be briefed daily (Tierney, 2002).

Increasing Diversity in Who Is Conducting Quick Response Research

For its first two decades, quick response research was dominated by researchers who looked a lot like those they were investigating—white males. The field is becoming more diverse. While there were a few women engaged as researchers in the first 20 years, their numbers began to increase noticeably in the mid 1970s. With notable exceptions, people of color have not been attracted to the field. It is now recognized that men and women experience disaster differently, that minority populations experience disasters differently from the majority, and that these differences are a legitimate subject of investigation (Tierney, 2002).

Emergence of Human Subject Issues and Institutional Review Boards

Quick response researchers have always been subject to the same ethical considerations as their contemporaries working in other fields. Human subject issues and institutional review boards were not a factor in the early days of field research in disaster settings (Tierney, 2002). Now, compliance with Institutional Review Board process common to most academic and other research settings needs to be addressed before a disaster (Dodds and Nuehring, 1996). For example, the Natural Hazards Center's Quick Response Research Program requires pre-approved human subjects protocol from a researcher's home institution. This was not a requirement when the program began in the early 1980s. Where the opportunity for quick response research has not been anticipated in advance, Institutional Review Boards or Human Subjects Committees may be able to act quickly, as exemplified by Simpson and Stehr's (2002) experience.

The appropriateness and necessity of the standard approach to consent, geared to experimental research and studies on at-risk populations, is questionable for many forms of quick response research. Highly formalized approaches to gaining consent are a mismatch with the fluid, informal data-collecting strategies and techniques often required in quick response research (Tierney, 2002).

Growing Fear of Litigation

The fear of litigation and appearing less than competent is increasingly acting as a deterrent to officials for participating in quick response research. The emergence of quick response research was predicated on the assumption that those caught up in a disaster would be willing to be candid in expressing their thoughts and describing their actions. No longer is it possible to provide blanket assurances of privacy and anonymity. Assurances must come with the

qualification that confidentiality can be provided “unless pursuant to a court order” (Tierney, 2002, p. 355).

Increasing Concern over Security

Considerably heightened concern over security in the United States and other countries is a legacy of the September 11th disaster. O’Rourke et al. (2003) describe the understandable cautiousness of infrastructure managers to provide information about critical facilities after September 11th. They describe how they collected detailed information that it is not appropriate for them to disseminate until review and clearance for it can be obtained. Taking data off-line, as occurred after the attacks of September 11th, has broad implications for the geographic information system and emergency management communities (Thomas et al., 2003), both for practice and research. Quick response researchers may face more limited access to key informants and information than they did before September 11th. Having pre-established relationships with organizations to be investigated in the aftermath of a specific event may prove decisive in enabling a researcher to access key decision makers immediately after a disaster.

Increase in Potential Health Risks to Quick Response Researchers

Since September 11th, there is the increasing specter of biological and chemical terrorist attacks either as independent occurrences or combined with other forms of disaster. In the past, quick response researchers were usually unconcerned about the immediate or long-term consequences to their health of investigating a disaster in the United States that had been triggered by a natural phenomenon, such as a tornado or flood.

Increasing Potential of Information Technology

O’Rourke et al. (2003) describe unparalleled opportunities to make use of advanced geographical information systems, remote sensing, condition monitoring, model-based simulation, and the capability to produce digital base maps that integrate the spatial characteristics of infrastructure. These tools make it possible to advance the state of the art and practice for characterizing and modeling complex infrastructure systems. A reliable system for rapidly recording querying and visualizing qualitative and quantitative information is being developed through integrating global positioning systems, geographic information systems, digital photography, and hand-held computers. Recent advances enhance the utility of data recorded during post-earthquake (Frost and Deaton, 2000) and other field reconnaissance.

Information technology makes it easier to manipulate electronic documents than paper copy. Rodrigue (2003) chose to analyze the on-line edition of the *Los Angeles Times* rather than the paper version for representation of the September 11th disaster because it made collecting data easier. She was able to copy and paste headlines and lead sentences into a spreadsheet, eliminating the need to manually retype what was being coded.

Information technology is making it possible to conduct quick response research away from the disaster impact site. First, it can expand the frame of impact and response to disaster. For example, the current state of information technology enables firms to deliver technical, communications-related disaster assistance without necessarily being in the vicinity of the physically affected area. Consequently, to understand how selected information technology firms contributed to recovery immediately after the attacks of September 11th did not require the investigator to be in the environs of the physically impacted site (Michaels, 2003). Second, information technology can provide a researcher with the same access to on-line information as someone directly affected by the disaster. For example, it would have been possible for a researcher to investigate the use of the World Wide Web in locating missing individuals after the September 11th disaster. A researcher located outside of the New York City area could use the Greater New York Hospital Association web page, "Patient Locator Service," put on-line 72 hours after the collapse of the World Trade Center, and find out—by entering a missing person's name—whether that person was being treated in an area hospital, and if so, which hospital (Simpson and Stehr, 2003). They could also explore the several websites that hosted "virtual" posters of missing people where those concerned about a particular individual could upload a scanned photograph and basic information about the missing individual (Simpson and Stehr, 2003).

On-scene to On-scene and Off-site

Where to conduct quick response research is a function of what phenomenon is being investigated. It is understandable that most quick response research has been conducted at or in the immediate vicinity of the disaster impact. Examples include Grant et al. (2003) investigating multijurisdictional response to the crash of United Flight 93 at the crash site in Shanksville, Pennsylvania, or Warn et al. (2003) investigating structural and nonstructural damage of a high-rise office building immediately south of the collapsed tower 2 at the World Trade Center.

Quick response research can also be conducted away from the site of impact. For example, three weeks after the terrorist attacks, Sattler (2003) conducted a study to examine psychological distress, posttraumatic growth, resiliency, and coping among college students in New York, South Carolina,

Colorado, and Washington State. The study was designed to examine if and how responses varied as a function of distance from the September 11th terrorist attacks. Rodrigue's (2003) examination of the representation of the September 11th attacks in the online edition of the *Los Angeles Times* provides another example of off-site quick response research. She chose the *Los Angeles Times* specifically because it was removed from where the terrorists struck and because its coverage could then be expected to focus on stories that had national appeal. Michaels (2003) investigated how information technology firms were able to deliver technical, communications-related disaster assistance without being at the sites impacted by the September 11th disaster.

More People Know More Quickly

One way in which the context for quick response research has become more complex is that there are more means than ever for the speedy dissemination of news as a disaster unfolds. One particularly striking facet of September 11th was that news of what was going on was reported instantaneously to friends or family members by people inside the World Trade Center and onboard the planes that were hijacked. The evolution of disaster-related memory is being shaped by many messages conveyed through disparate television and radio channels and through phones and the internet. Rodrigue (2003) describes how e-mail, list-servs, and news groups effectively reach audiences of a size and geographical scope previously the exclusive domain of national media conglomerates.

Program Support for Quick Response Research

The Quick Response Research Program at the Natural Hazards Center funded by the National Science Foundation is one of a number of programs that supports field investigations immediately after a disaster. Briefly noted here are examples of federal initiatives past, present, and future, and an initiative undertaken by a professional association. While the National Research Council has supported quick response research in the past, the National Science Foundation and the National Institute of Mental Health have ongoing programs. Federal legislation passed in 2002 authorizes the Director of the National Institute for Standards and Technology to establish and deploy a team within 48 hours of a major building failure. EERI has organized post-event investigations for over half a century (EERI, 1977).

A formal program existed at the National Research Council of the National Academy of Science to dispatch teams after disasters. Dozens of teams were dispatched, many of them interdisciplinary, before the formal program was disbanded (Gaus, 2002a).

In the 1960s, the National Science Foundation (NSF) made provisions to collect perishable information because its staff recognized that natural hazard events triggered full-scale tests of constructed and social systems that could not be replicated in the laboratory. The Small Grants for Exploratory Research (SGER) program of the NSF is probably the most significant source of quick response research support in the United States today (Wenger, 2002). The SGER program is well suited to quick response research because of the brevity of the proposal required (five pages) and because proposals can be approved quickly, within a day or so, at the discretion of the NSF Program Director. SGER grants can be for amounts up to \$100,000 per year.

The National Institute of Mental Health (NIMH) has issued program announcement PAR-02-133 in 2002 for Rapid Assessment Post-Impact of Disaster (RAPID). It replaces an earlier announcement issued in 1990 and revised in 1995. RAPID grants provide limited funding to enable investigators, who intend to follow up with a full research application, to undertake an early assessment to generate preliminary data that can be used as a basis for their longer, full application. The intent is to enable access to a disaster site immediately after an event has occurred by providing a rapid funding mechanism for research. NIMH's Traumatic Stress Research Program recognizes that for many types of mental health studies, such as those that consider service seeking, evaluate outreach or prevention initiatives, and identify high-risk individuals based on early response, it may be critical to undertake rapid assessment (NIMH, 2002).

The National Construction Safety Team Act, which became Public Law 107-231 on October 1, 2002, is an example of legislation designed to facilitate analysis for policy, applied policy research intended to be used by decision makers to make programmatic and policy improvements. The full title of the Act provides a succinct summary of it: An Act to Provide for the Establishment of Investigative Teams to Assess Building Performance and Emergency Response and Evacuation Procedures in the Wake of Any Building Failure that has Resulted in Substantial Loss of Life or that Posed Significant Potential of Substantial Loss of Life. The law has the potential to improve the quality of failure investigations, to establish clearly who is responsible for dispatching investigative teams, and to increase the number of failure investigations (Gaus, 2002b). As of spring 2003, the National Institute of Standards and Technology, which is authorized by the Act to establish the investigative teams, had not received an increase in its funding to carry out the Act's objectives (National Institute of Standards and Technology, 2003).

EERI's program to support post-earthquake investigations is noteworthy because its evolution reflects and advances the increasing sophistication and inclusivity of quick response research. Since its inception in 1949, EERI has undertaken post-earthquake investigations. The intent of these investigations

remains “to observe and document the effects of earthquakes on the built environment and the resulting social, economic, and policy impacts” (Earthquake Engineering Research Institute, 2003). The founders of EERI saw earthquakes as field laboratories—opportunities to investigate in ways that would not be feasible at test sites or true laboratories. Earthquakes allowed them to test theories and view performance under real conditions. The post-earthquake investigations have stimulated further research, changed practice in earthquake design and emergency management, and influenced building codes and standards (Tubbesing, 2002).

At the outset, EERI-affiliated engineers and earth scientists paid their own way to undertake post-event investigations. Then in the early 1970s, the National Science Foundation began funding the ongoing Learning from Earthquakes (LFE) program. Funding allowed the program to become more systematic and inclusive of a range of disciplinary expertise. It also enabled publication of results that could then be disseminated widely. The first published reconnaissance report was in 1972 on the Managua earthquake. The dissemination of observations is one of three main activities of the program. The other two are conducting investigations and developing guidelines for field data collection (Tubbesing, 2002).

The EERI program continues to evolve (Tubbesing, 2002). For example, in 1998 EERI initiated its Lessons Learned Over Time series. This series recognizes the need for a mechanism to capture lessons from earthquakes that may not become apparent until years after an event and to re-evaluate initial post-event findings in light of new understanding and knowledge (EERI, 2002). In terms of EERI’s immediate post-event investigations, there is an increasing emphasis on coordinating with other teams and individuals that converge on earthquake sites. New communication and data collection technologies are being employed for more systematic data collection. Training is being provided for field investigators and team leaders. Greater use is being made of the internet to disseminate information quickly from the field (Tubbesing, 2002).

Programs to enable quick response research are not confined to the United States (Koshida, 2002a). Emergency Management Australia has piloted a program adapted from the United States’ Natural Hazards Center model. The Institute for Catastrophic Loss Reduction is in the planning stages of a Canadian version of the Natural Hazards Center’s Quick Response Research Program (Falkiner, 2003). Environment Canada is exploring how to develop a protocol that would enable researchers within that government organization to investigate the immediate aftermath of extreme weather events (Koshida, 2002b).

Programs that enable quick response research play a significant role in shaping how quick response research is undertaken. Program managers are in a strong position to shepherd the development of quick response research.

They can encourage the development and deployment of multi-disciplinary teams. They can also promote bringing together researchers based in the vicinity of the disaster site and those from away. They can foster teams composed of researchers at different career stages.

Recommendations

The following seven recommendations stem from the consideration of quick response research provided in this paper. The primary purpose of this incomplete listing is to stimulate discussion about developing a more systematic consideration of quick response research.

(1) Assess quick response research undertaken since World War II as a basis for setting the agenda for future quick response research.

A large body of quick response research has been generated for over half a century. What types of quick response research have been influential in advancing disaster preparedness, response, and mitigation? What has advanced disciplinary and interdisciplinary theory building? It would be valuable to look at the legacy of specific programs, such as the National Science Foundation-sponsored, Natural Hazards Center-administered quick response program, as well as gaining an overview of all programs and quick response research supported fully or partially by U.S. government funding.

What is true about maximizing post-earthquake learning—that we need to be specific about “what we do not know” (EERI, 1977, p. 15)—is true generally for maximizing learning from quick response research. A research agenda for quick response research needs to be built on identifying the gaps in the existing quick response literature. Particular attention needs to be paid to that aspect of quick response research that distinguishes it from other research, namely the collection of perishable information generated during or immediately after a disaster.

(2) Undertake periodic disciplinary and interdisciplinary assessments of quick response research.

A key goal for undertaking quick response research is to advance knowledge within a discrete discipline or interdisciplinary domain that provides the conceptual framework for specific research projects. Therefore, it would be valuable for specialists in particular disciplines or in interdisciplinary studies to periodically assess the contribution of quick response research to enhance theory in that domain. This should be the basis for proposing a research agenda for quick response research that would advance conceptual thinking. At the same time, acknowledging that quick response research employs methods utilized by scientists and social scientists

outside the sphere of disasters should lead to engaging in methodological debate to advance the conduct of empirical research.

(3) Develop mechanisms that facilitate quick response research.

Given the unanticipated nature of many disasters, attention needs to be paid to how to facilitate timely and appropriate collection of perishable information. It would be worth exploring the potential of adapting the EERI model for post-earthquake reconnaissance to non-earthquake events.

(4) Designate and support one center to collect and catalog selected media coverage of major events.

Newspaper documentation, whether hard copy or on-line, has proven valuable to quick response researchers as a source of both background information and material for analysis. Having one center take the lead role in being the archival home for an event would facilitate quick response research and longitudinal research by capturing and processing popular sources of information.

(5) Establish a consortium of programs that support quick response research.

As quick response research programs proliferate, it becomes more important to establish a mechanism whereby these programs can exchange information, and as appropriate, pool resources.

(6) Provide fellowships for students to complete theses and dissertations that evolve out of quick response research.

The experience of participating in quick response research as a graduate student can stimulate a career-long research interest in disasters. The National Science Foundation/Center Quick Response Research Program encourages graduate students to apply for grants. A logical next step would be to create a program that provides financial support for graduate students to build on the quick response research they conduct.

(7) Develop quick response research capability internationally.

The impacts and responses to many disasters are not confined to one jurisdiction and there is potential to apply what is learned from one event to others. Consequently it would be valuable to think about how to support quick response researchers from different countries working together.

Conclusion

After half a century, quick response research continues to be a vibrant dimension of disaster inquiry. What is striking is how many of the issues that concerned the founders of the field continue to challenge present-day researchers. Calls for a systematic approach to field research after a disaster are not new (Killian, 1956 in general; EERI, 1977 specifically for earthquakes). Added to the historical concerns are ones that were not anticipated by the field's pioneers, such as increasing reticence of agencies to supply information. While the early "strike team" approach proved highly effective, there is growing interest in integrating quick response research into place-based research and developing the capacity of local researchers.

The term "quick response research" has been used in the past as if there were a clear conceptualization of what it is. We may have exhausted what can be accomplished, understood, and accepted from a field that has been understood intuitively rather than being defined transparently. One way forward is to explore the ramifications of appreciating quick response research as research defined by the information collection phase occurring during or immediately after a damaging event.

By recognizing that the common denominator in all quick response research is the collection of perishable data during or immediately after a disaster, it is possible to consider setting a research agenda for quick response research. This requires thinking about some fundamental questions. What are pressing quick response research needs? How should such needs be determined, prioritized, and then addressed? How can advances be made in the research methods used by quick response researchers? How can the use and functionality of multi-disciplinary reconnaissance teams be advanced in investigating a wide range of disasters? How should quick response research be evaluated? In earthquake engineering, post-earthquake reconnaissance studies collectively have had more impact on developing Applied Technology Council projects than any single investigation into specific earthquakes (Rojahn, 1997). We may find that developing a framework to understand quick response research will enable us to see that the sum of quick response research experience is greater than the parts.

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