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KEY TERMINOLOGIES IN INTERDISCIPLINARY RESEARCH AS APPLIED THROUGH EMERGENCY MANAGEMENT

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Within interdisciplinary research as well as the emergency management community, it is important to distinguish between facts, theories, and opinions and the means by which these are created and tested; thesis, hypothesis, and experiments. This understanding is key because the knowledge base that decision makers and emergency manager's have will inevitably drive critical decisions. Sound or well-reasoned facts and theories should result in more effective

decisions on the part of leaders. The following sections provide an overview of key terminology used in interdisciplinary research as applied through the lens of emergency management. Each term is defined, explained, and then applied for contextual purposes.

Terminology

Fact: Merriam-Webster defines a fact as “something that truly exists or happens: something that has actual existence.”¹ A fact is a statement or observation of an event that can be proven to be true or to have occurred through repeated testing, observation, or data. For example, it is a fact that $1 + 1 = 2$; a fact provable with repeated testing. Or, the Hoover Dam exists; a fact provable via observation. Finally, rain measurements can be recorded by testing rainfall data; both an observable and measurable data set.

In emergency management, facts are helpful for understanding or making appropriate decisions in order to mitigate a threat or crisis. Facts pertinent to emergency management are often tangible data points that can be observed or measured. For example, understanding the facts concerning a disaster such as number of victims, the routes cut off, or the time that it will take to bring in resources, can influence the leadership decisions required to mitigate or recover from a particular event. The absence of facts often leads to misunderstanding or misinterpretation of a situation's context resulting in either inaction, hesitation, incorrect actions, or redundancy of efforts which lessens the impact or effectiveness of response. Such was the case during and after Hurricane Katrina, where “lacking an

¹ Merriam-Webster: Definition of Fact. (2015). Retrieved March 10, 2016, from <http://www.merriam-webster.com/dictionary/fact>.

assigned role, and in the absence of communication facilities and electrical power, many volunteers were unable to meet the actual needs of victims.”² In short, facts facilitate functional, effective, and accurate decision making during most situations.

Theory: The Cambridge Dictionary defines a theory as “something suggested as a reasonable explanation for facts, a condition, or an event, esp. a systematic or scientific explanation”³ Theories are well thought out ideas, supported by evidence and facts and tested with experimentation, research, and analysis that explain why or how certain things behave or exist. In the field of emergency management theory can apply to elements such as post disaster analysis or why an event occurred, as well as population or cultural studies and their application to emergency preparation which can indicate if a belief led to a certain type of preparedness.

Theory can also be looked at as a way of understanding concepts as well, such as a principle or school of thought. In this sense, theories are ways in which ideas are conceptualized. For instance, Freudian theory looks at basic, childhood relationships and their effects on the thought process of the mind as an adult. In terms of emergency management, theories can focus on how crisis and emergency managers prepare or if they prepare. One theory that continues to be debated is the utility of preparation vs. recovery focused emergency management efforts. Studies were conducted to evaluate effectiveness of preventative theories. As an example, a Multi-hazard Mitigation Council study concluded that: “a

² Jacob, B., Mawson, A. R., Payton, M., & Guignard, J. C. (2008). Disaster Mythology and Fact: Hurricane Katrina and Social Attachment. *Public Health Reports*, 123(5), 555–566.

³ Cambridge Dictionary: The definition of theory. (2016). Retrieved March 10, 2016, from <http://dictionary.cambridge.org/us/dictionary/english/theory>

dollar spent from the federal treasury on FEMA mitigation grants potentially saves about \$3.65.”⁴ Studies like this support preventative mitigation theories on emergency management.

Opinion: An opinion is defined by Merriam-Webster as “a belief, judgment, or way of thinking about something: what someone thinks about a particular thing.”⁵ Opinions are not facts but can lead to effective questioning of issues and helpful generation of ideas during a crisis. They are also good for challenging leaders and keeping thought processes from becoming too rigid or even too well aligned. For example, at the global oil field supply company this author works for, our supervisors were reluctant to the idea that the Ebola virus presented a risk to our African businesses operations. My opinion as an analyst was that the Ebola virus was a threat to not only the health of traveling workers, but the business climate as well. It was through discussion of competing opinions and challenges to aligned thought that a successful mitigation strategy was created.

Expert Opinion: Expert opinions are opinions of those that are considered by outside sources as well as their peers to be of higher value or better substantiated than others. For instance, the Director of Homeland Security might be considered to be an expert in homeland security issues as opposed to a community college professor or a threat analyst. Webster defines an expert opinion as “a belief or judgment

⁴ Natural Hazard Mitigation Saves: An Independent Study to Assess the Future Savings from Mitigation Activities. (2005). Retrieved March 10, 2016, from https://c.ymcdn.com/sites/www.nibs.org/resource/resmgr/MMC/hms_vol1.pdf

⁵ Merriam-Webster: Definition of Opinion. (2015). Retrieved March 10, 2016, from <http://www.merriam-webster.com/dictionary/opinion>.

about something given by an expert on the subject.”⁶ Expert opinions can be highly valuable, because they are informed from many years of experience and add perspective as well as first-hand knowledge to the theories they put forward.

Hypothesis: In order to develop a thesis statement, one must first form a hypothesis. The Cambridge Dictionary defines hypothesis as “an idea or explanation for something that is based on known facts but has not yet been proven”⁷ Basically, a hypothesis is an idea that explains why something might be. An example of a hypothesis addressing the failures in government response to Hurricane Katrina might read: “Hurricane Katrina response efforts failed due to a lack of application of lessons learned during the 2003 Hurricane Pam exercise.” A hypothesis provides a direction for research, study, experimentation, and fact finding in order to attempt to disprove the hypothesis. It is most frequently the goal of a scientist or researcher to disprove the hypothesis, for it is through the attempt to disprove the hypothesis that a theory can be established. According to Dr. Malachowski (2014), “A hypothesis that cannot be disproved becomes a theory.”⁸

In emergency management, it is important to develop hypotheses in order to determine the cause of certain events so that their effects might be mitigated in the future, in order to project possible future events, and in order

⁶ Merriam-Webster: Definition of Expert Opinion. (2015). Retrieved March 10, 2016, from <http://www.merriam-webster.com/dictionary/expertopinion>.

⁷ Cambridge Dictionary: Definition of Hypothesis. (2016). Retrieved March 10, 2016, from <http://dictionary.cambridge.org/us/dictionary/english/hypothesis>.

⁸ Malachowski, M. J., Ph.D. (2014, October 12). The Scientific Method. Retrieved March 11, 2016, from <http://fog.ccsf.cc.ca.us/~mmalacho/ScientificMethod.html>

to establish and evaluate training and mitigation measure effectiveness. For instance, one might hypothesize that a new fire drill will reduce potential fatalities by “X” percent. This hypothesis can then be tested and the effectiveness of the plan can be determined. The facts resulting from such testing could then help establish future use(s) of said plan.

Thesis: A thesis is an idea or concept, most often a statement, which must be tested in order to determine its value, accuracy, or merit. Webster defines thesis as “a statement that someone wants to discuss or prove.”⁹ It can also be writing on a subject that is done for collegiate or scientific merit. For instance, a master’s program “thesis” paper. An emergency management thesis will most likely focus on a particular aspect of emergency management planning or mitigation strategy. It could also be a crucial part of effective grant writing. For example, this author toured the emergency operations center (EOC) in Kansas City, MO and learned that many of the funds used by an EOC are often gathered through grant writing and that in order to earn those grants, EOC managers would often research and write thesis papers that focused on the needs for certain measures.

A thesis has to be testable. For instance, a thesis about Hurricane Katrina and the subsequent flooding could state that “the final outcome was a disastrous mismanagement of federal and state resources as evidenced by poor government regulation of emergency management practices prior to and during the event, as well as inadequate Army Corps of Engineers flood mitigation practices. This would then be tested by studies, research, and analysis

⁹ Merriam-Webster: Definition of Thesis. (2015). Retrieved March 10, 2016, from <http://www.merriam-webster.com/dictionary/thesis>.

to determine the factual validity of the thesis statement.

Experiment: Experiments are a method by which we can test hypotheses and are part of establishing theories and determining facts. According to Webster, an experiment is “a scientific test in which you perform a series of actions and carefully observe their effects in order to learn about something.”¹⁰ For example, an experiment could take the form of flow analysis of streams that are prone to flooding. Such an experiment could support or dismiss a hypothesis that a given stream will flood during certain times of the year. In this example, such fact finding could then lead to evidence supporting mitigation strategies to protect residence during periods of probable flooding. Experiments could also lead to understanding previously unexplained events as well, like why a bridge collapsed or the root cause of a fire. Such knowledge can greatly help in future mitigation efforts.

Subjective and Objective: Subjective refers to how a person perceives events based on their own experiences and is open to interpretation. Objective is the opposite and relies on suspending personal feelings and relying on looking at a situation from an external and often verifiable viewpoint. In an emergency management situation, objectivity can reduce the risks of jumping to conclusions about how event(s) will unfold or their cause. Objective views are typically more scientific and fact driven and less based on or influenced by emotion than subjective views. In emergency management it is important to be as objective as possible in fact finding, but one must also balance decisions with subjective knowledge from one’s experience.

¹⁰ Merriam-Webster: Definition of Experiment. (2015). Retrieved March 10, 2016, from <http://www.merriam-webster.com/dictionary/experiment>.

Conclusion

It is important to understand the terms fact, theory, opinion, expert opinion, hypothesis, thesis, experiment, and subjective vs. objective so that one can apply them properly to interdisciplinary research. Moreover, knowing the difference between opinions and expert opinions can help citizens, leaders, and policy makers prioritize information. In a world where everyone seems to have opinions, expert opinions remain key to intelligent analysis across nearly every industry and discipline. Knowing how to test a hypothesis via experimentation to incubate sound theory is critical. Businesses, government, and emergency management leaders’ alike need to be effective and decisive. Such requirements are supported by solid facts and a thorough base of knowledge (whatever the topic might be).

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