

## Session No. 33

---

**Course Title: Social Dimensions of Disaster, 2<sup>nd</sup> edition**

**Session 33: Implementing Emergency Management Information Technology**

**1 hr.**

---

### **Objectives:**

- 33.1 Describe at least four major trends and developments in information technology applications in emergency management
- 33.2 Describe three barriers to the implementation of information technology into emergency management programs
- 33.3 Describe three difficulties encountered with information technology during disaster response and recovery
- 33.4 Discuss at least six impacts that implementation of information technology has had on emergency management agencies
- 33.5 Describe the range of information available from at least three Internet web sites relevant to emergency managers
- 33.6 Describe the role assignments and persuasive speech requirements for the disaster mitigation exercise (Sessions No. 34 and 35).

### **Scope:**

This session introduces students to the trends in information technology applications in emergency management, major barriers, difficulties, agency impacts and relevant Internet sites. Background for the disaster mitigation exercise is provided, including the case study scenario, individual role assignments, and persuasive speech requirements.

---

### **Readings:**

#### *Student Reading:*

Stephenson, Robin and Peter S. Anderson. 1997. "Disasters and the Information Technology Revolution." *Disasters: The Journal of Disaster Studies and Management* 21:305-334.

#### *Professor Readings:*

Quarantelli, E.L. 1997. "Problematical Aspects of the Information/Communication Revolution for Disaster Planning and Research: Ten Non-Technical Issues and Questions." *Disaster Prevention and Management* 6:94-106.

Drabek, Thomas E. 1991. *Microcomputers in Emergency Management*. Boulder, Colorado: Institute of Behavioral Science, University of Colorado.

*Background References:*

Cook, John Lee, Jr. 2004. *Santana Row Development Fire, San Jose, California*. Emmitsburg, Maryland: U.S. Fire Administration, Federal Emergency Management Agency.

Simpson, David M. and Paul Freibert. 2003. "Role of Advanced Technology in Disaster Response: Observations and Practitioner Issues." *Journal of the American Society of Professional Emergency Planners* 10:23-31.

Dash, Nicole. 2002. "The Use of Geographic Information Systems in Disaster Research." Pp. 320-333 in *Methods of Disaster Research*, edited by Robert A. Stallings. Philadelphia, Pennsylvania: Xlibris, Inc.

Butler, David L. 2002. "Selected Internet Resources on Natural Hazards and Disasters." Pp. 389-464 in *Methods of Disaster Research*, edited by Robert A. Stallings. Philadelphia, Pennsylvania: Xlibris, Inc.

Pine, John C. 1999. *Technology and Emergency Management: Instructor Guide*. Emmitsburg, Maryland: Emergency Management Institute, Federal Emergency Management Agency.

Fischer, Henry W. III. 1998. "The Role of New Information Technologies in Emergency Mitigation, Planning, Response, and Recovery." *Disaster Prevention and Management* 7:28-37.

Gruntfest, Eve and Marc Weber. 1998. "Internet and Emergency Management: Prospects for the Future." *International Journal of Mass Emergencies and Disasters* 16:55-72.

Sutphen, Sandra and William L. Waugh, Jr. 1998. "Organizational Reform and Technological Innovation in Emergency Management." *International Journal of Mass Emergencies and Disasters* 16:7-12.

Comfort, Louise. 1994. "Risk and Resilience: Inter-Organizational Learning Following the Northridge Earthquake of 17 January 1994." *Journal of Contingencies and Crisis Management* 2:157-170.

### **General Requirements:**

Use Overheads (33-1 through 33-6 appended).

Student Handouts (33-1 through 33-6).

See individual requirements for each objective.

---

### **Objective 33.1 Describe at least four major trends and developments in information technology applications in emergency management.**

#### **Requirements:**

Use Overhead 33-1.

Start this session with student exercise and proceed with lecture material specified below.

#### **Remarks:**

I. Introduction.

A. **Exercise.**

1. **Remind** students of exercise procedures.
2. **Divide** class into four groups and assign roles.
  - a. Chair.
  - b. Reporter.
  - c. Timer.
3. **Announce** time limit: 5 minutes.

B. **Display** Overhead 33-1; “Workshop Tasks.”

1. Group 1 – What are the four historical stages in information technology (IT) applications according to Stephenson and Anderson (1997)? (Identify two examples of major IT developments for each of the stages.)
2. Group 2 – According to Stephenson and Anderson (1997), what major trends and technologies define the current situation?

3. Group 3 – Select and illustrate two short-term and two long-term probable outcomes in IT development that will most impact emergency managers.
4. Group 4 – Select and illustrate five types of potential impacts on emergency management activities and programs that may be induced by the development of digital libraries.

C. **Start** discussion.

D. **Stop** discussion.

E. **Explain** that brief lecture and discussion will occur after each group report is presented.

II. Historical stages.

A. Group 1 report: 2 minutes.

B. **Supplement**, as required, with points like these (adapted from Stephenson and Anderson, 1997).

1. **1970s and prior.**

- a. Centralized computer that was time shared via terminals.
- b. Primary applications limited to calculations, scientific analysis and accounting.
- c. Limited emergency management applications.
- d. **Exception:** SPLASH and SLOSH models for storm surge forecasting and mitigation planning.

2. **Early 1980s** (pp. 306-307).

- a. Early conceptual work on decision-support systems (e.g., Belardo et al. 1984) and a geographic information system (GIS) for risk projection (e.g., Swawthorn 1984).
- b. Desktop PC's emerge.
- c. Initial efforts at on-line bibliographies.
- d. Initial computer based communications.

- e. “By the mid-1980s thousands of amateur radio operators had set up a wireless equivalent of the Internet long before most people had even heard the term, with e-mail, bulletin boards and chains of repeater stations.” (p. 308).

3. **Late 1980s** (pp. 309-311).

- a. Microcomputers shift focus from centralized systems.
- b. Greater autonomy at times “. . . overran the capacity of the equipment and software involved” (p. 309).
- c. Drabek (1991) compiled field studies of implementation and social history of evolving emergency management applications.
- d. Modem access provided networking capabilities.
- e. Specialized software for emergency management applications distributed by both government agencies and private firms.
  - 1) CAMEO, a product of the U.S. National Oceanic and Atmospheric Administration (NOAA), for flood forecasting.
  - 2) U.S. Forest Service researchers created early models of wildfire behavior.
- f. Emergency management bulletin boards.
  - 1) Emergency Preparedness Information Exchange (EPIX) (Vancouver, Canada).
  - 2) State and Local Emergency Management Data Users Group (SALEMDUG) (U.S.A.).

4. **1990s** (pp. 311-315).

- a. Real-time information management.
- b. EOC design and incident management systems were upgraded, e.g., Emergency Information System (EIS).
- c. Mitigation applications, e.g., GIS used by insurance companies for damage assessments following windstorms.

- d. Scientific information exchange, e.g., Natural Hazards Research and Applications Information Center (NHRAIC), University of Colorado.
- e. Gopher (University of Minnesota) software expanded by others that “. . . allowed software on one machine to reference and make links to information contained on another, regardless of physical locations.” (p. 314) This development became the “Worldwide Web.”

III. Major trends and technologies.

A. Group 2 report: 2 minutes.

B. **Supplement**, as required with points like these from Stephenson and Anderson (1987).

1. **Major trends** (p. 319).

- a. Continuing miniaturization of components.
- b. Increasing processing power.
- c. Increasing bandwidth.
- d. Increasing mobility.

2. **Technologies** (pp. 324-325).

- a. Ultra-broadband networks.
- b. Network commerce.
- c. Network agents.
- d. Digital libraries.
- e. High-capacity data storage.
- f. Cheap microprocessors.
- g. Others.

IV. The future: short and long-term.

A. Group 3 report: 2 minutes.

B. **Supplement**, as required with points like these from Stephenson and Anderson (1997).

1. **Short-term developments.**

- a. “Convergence of the various types of media used for information delivery will continue.” (p. 320).
- b. “Information overload is likely to become a crucial problem, and the range of software to cope with this can be expected.” (p. 320).
- c. “Emergency managers will increasingly be drawn into using information technology of all kinds.” (p. 321).

2. **Long-term developments.**

- a. “Many surprises can also be expected . . .” (p. 322).
- b. “Growing emphasis on emergency preparedness and IT in rapidly developing countries such as China and India could also alter the course of application of appropriate technologies in the Third World.” (p. 322).
- c. “The vulnerability of complex networked systems, together with potential ways of using data resources to speed up recovery almost certainly will increasingly preoccupy emergency planning staff in some areas.” (p. 323).

V. Impacts of digital libraries.

A. Group 4 report: 2 minutes.

B. **Supplement**, as required with points like these from Stephenson and Anderson (1997) (Refer students to Table 1, pp. 324-331).

1. **Staff training:** global access to training materials (p. 324k).
2. **Early warning – sudden emergencies:** monitoring databases and archives; mission reports; satellite images (p. 324).
3. **Emergency assessment:** more rapid access to baseline information (p. 324).

4. **Emergency decision-making:** manuals, emergency plans, humanitarian and emergency law (p. 326).
5. **Emergency settlements:** access to wider range of school and university educational media (p. 328).
6. **Community health and nutrition:** global access to scientific literature; travel and immunization information (p. 328).

### Supplemental Considerations:

The **key message** of this section is that the information technology revolution is **continuing**, has a **historical context**, and will **profoundly impact** both the expectations held for emergency managers and their actual work patterns. By working through the information summarized by Stephenson and Anderson (1997) in the manner suggested, **student understanding** of this **revolution** and its **relevance** to emergency management will be **enhanced**. Some professors may **expand** this section, and the entire session, by incorporating **exercises**, **examples**, and **applications** detailed in the course developed by Pine (1999). Additional **examples** of recent IT developments in **software** and **hardware**, e.g., GIS and hazard location initiatives, and major **constraints** on **adoption**, e.g., cost, training, etc. could be **added** by consulting Simpson and Freibert (2003). Others will choose to keep this section **brief**, using only portions of the material summarized above.

---

### Objective 33.2 Describe three barriers to the implementation of information technology into emergency management programs.

#### Requirements:

Use Overhead 33-2.

Use Student Handout 33-1.

#### Remarks:

- I. Drabek study of microcomputer implementation (1991).
  - A. **Explain:** Drabek conducted **field studies** in four state and 12 local emergency management offices during the late 1980s. One year later, he completed **post-disaster** field studies in three state and eight local emergency management agencies.
    1. **Review** briefly the study design, i.e., baseline (Phase I) vs. post-disaster (Phase II) field sites.
    2. **Review** briefly the study locations.

3. **Explain:** locations selected because of known (actual) implementation of microcomputers; not true in many agencies at that point in time.

## II. Implementation barriers.

### A. **Display** Overhead 33-2; “Implementation Barriers.”

### B. **Review** and **illustrate** the barriers listed on the overhead. (Adapted from Drabek 1991, pp. 60-62).

1. **Insufficient staff for data input. Example:** “Entering data from existing card files on community resources, shelters, notification lists, and the like required a great deal of staff time. Of course, additional time was required initially because of format decisions. . . . This barrier was stressed most frequently and in most detail. Local directors especially indicated that they had not realized just how much time this input process would require.” (p. 60).
2. **Machine incompatibility. Example:** “In the early 1980s when they started out, the purchasing units for their jurisdictions were issuing bulk purchase contracts. They had no control over the brand of machine selected . . . As various software programs with emergency management applications became available, they discovered that their machines were incompatible with those programs.” (p. 60).
3. **Obtaining software information. Example:** “. . . about one-third of the local directors indicated that they had encountered difficulty in learning about what was available. . . . many felt that their state agency or FEMA should review all of the software and at least make a rating or assessment available to local directors. As it was, they were working in the dark and felt unsure as to whether or not a better software package might be available.” (p. 60).
4. **Budget constraints and regulations. Example:** “About one-third emphasized this as the major barrier.” (p. 60). (Note: “this” referred to difficulties in software purchases).
5. **Constraints on system expansion. Example:** “When some emergency managers implemented micros in their agencies, they purchased machines that lacked a mapping graphics capability. . . . they viewed this as the prime requisite for their first upgrade.” (p. 61).
6. **Inadequate staff training. Example:** “While training was available, three core problems were perceived. First, some classes provided overviews, rather than specifics. . . . Second, when staff attended

classes, routine work piled up. . . . Finally, one-fourth of local directors felt the expenses required to send staff out of state for training classes was a barrier.” (pp. 61-62).

### **Supplemental Considerations:**

Given the rapid **pace of change** in information technology, even the students with minimal IT background, will sense the lack of relevance today for some of the barriers Drabek (1991) documented in his interviews during the late 1980s, e.g., machine incompatibility, and obtaining software information. Other matters remain relevant, depending on the degree of implementation and budget. **Ask students:** “Which of these six constraints are less relevant today and why?” Discussion could be directed toward the **upcoming field trips**. Students could be encouraged to **formulate questions** about the barriers that executives confront that are related to their implementation of information technology.

---

### **Objective 33.3 Describe three difficulties encountered with information technology during disaster response and recovery.**

#### **Requirements:**

Use Overheads 33-3 and 33-4.

Use Student Handout 33-1.

#### **Remarks:**

- I. IT difficulties during disaster responses: Drabek study (1991).
  - A. **Remind** students of the events Drabek (1991) selected for study (noted on Student Handout 33-1; “Microcomputers and Emergency Management”).
    1. Hurricane Hugo (1989).
    2. Flooding in Pinellas County (1989).
    3. Hurricane Gilbert (1989).
    4. Fire/toxic threat (1989).
    5. Nuclear power plant exercise (1989).
  - B. **Display** Overhead 33-3; “IT Difficulties During Disaster Responses.”

C. **Review** and illustrate the three difficulties documented (adapted from Drabek 1991, pp. 144-145).

1. **Software inadequacies. Example:** “The software package they (Florida State Emergency Management Office) used did not reflect the variability in the bands of wind and rain that accompany a massive storm like Hugo. Their oversimplified modeling program gave them faulty projections.” (p. 144).
2. **Staff shortages. Example:** “During the flooding in Pinellas County, Florida, for example, the person with the most computer experience was on vacation and their computers were consequently under-utilized.” (p. 145).
3. **Data base problems. Example:** “The Pinellas County, Florida, director learned the hard way that the automated EOC alert system, used to activate staff for emergency responses, needed to be revised. During the flood response, he quickly turned it off because it did not offer any selectivity. The system worked fine mechanically if one wished to activate the entire EOC staff, but this event did not require a full staff.” (p. 145).

II. Critical analysis: Quarantelli, 1997.

A. **Explain:** E.L. Quarantelli was a co-founder of the Disaster Research Center in 1963 at The Ohio State University.

1. **Reviewed** “five bodies of literature” on the difficulties in IT applications (p. 95).
  - a. Non-scientific writings on social effects of computers.
  - b. Writings by disaster-knowledgeable authors.
  - c. Sociological literature on diffusion of innovations.
  - d. Theoretical frameworks on societal change.
  - e. Social science literature on disasters and disaster planning.
2. **Identified** ten “problematical aspects of the currently accelerating cyberspace revolution . . . “ (p. 95).
3. “. . . there are no significant social phenomena that do not have some negative effects for someone, somewhere,.” (p. 95).

C. **Display** Overhead 33-4; “10 Problematical Issues: The IT Revolution and Disaster Management.”

D. **Review** and briefly illustrate each of the ten points listed (adapted from Quarantelli 1997, pp. 94-106).

1. **The “rich will become richer” in dealing with disasters. Example:** “. . . in 1995 only 12 of Africa’s 54 countries were linked to the Internet” (p. 96).
2. **Means-ends transition. Example:** There already is a “. . . tendency in disaster planning/management to apply technology to those problems that are addressed most easily by the technology, and to ignore or downplay those that cannot be handled so easily.” (p. 97).
3. **Information overload. Example:** “. . . unprecedented amounts of information can be brought to bear on issues of policy and action but the persons who must use the information to make the decisions become overloaded and everything gets muddled.” (Quotation by Quarantelli, p. 98 from Michael 1985, p. 34).
4. **Loss of, and/or use of outdated, information. Example:** “In pre-Revolutionary time, there is usually a ‘paper’ trail, . . . Such permanent ‘hard’ records are less likely to exist in the coming revolution . . . it has also been observed that in other cases, outdated and perhaps misleading information remains ‘cobwebbed’ at www sites.” (p. 98).
5. **Diffusion of inappropriate information. Example:** “Even now cases occur where the results of poor studies are disseminated directly, widely and publicly via electronic means instead of being screened out by peer review and other mechanisms devised to ensure the quality of scientific work.” (p. 99).
6. **Diminution of non-verbal communication. Example:** “Meaningful human communication is dependent in many ways on gestures, inflections, body language and affective tones, etc., over and beyond the cognitive symbols involved.” (p. 100).
7. **Increased difficulty in intra and inter-group communication. Example:** “The existence of better communication facilities does not necessarily lead in itself to a better exchange of knowledge and intelligence, and/or a greater understanding of what is occurring.” (p. 101).
8. **Acceleration of fads and fashions. Example:** “. . . individuals and organizations with particular agendas and superior access to the

Internet, can ‘flood’ the market with their views. In fact, not only can they, but they do.” (p. 102).

9. **Absence of necessary infrastructures and cultures. Example:** “In one very recent situation, the emergency management agency had bought many of the most up to date hard and software computer-related technologies that could be used for disaster preparedness, but turned to DRC to ask in what ways they could be used for such planning! The related culture itself could not be bought and therefore was absent.” (p. 102).
  
10. **Computer system-related disasters. Example:** A minor fire caused a large scale telephone outage in the Chicago area and temporarily the shutdown of the airport (O’Hare). This resulted in flight cancellations there and elsewhere but also “. . . affected the normal operations of dozens of banks, hundreds of restaurants dependent on reservations, three large catalogue sale companies headquartered in the Chicago area, about 150 travel agencies, most of the paging systems and cellular telephones in the affected area, and hundreds of businesses located in the area or others not located in the affected area but conducting business with those that were.” (Quotation by Quarantelli 1997, p. 103 from Pauchant et al. 1990, p. 244).

### **Supplemental Considerations:**

The **key message** of this section is to **enhance** student understanding of the range of **issues** and **difficulties** in using microcomputers and other information technologies in disaster response and recovery. Some professors will keep this section **brief** and perhaps **limited** to the material listed on Overhead 33-3 pertaining to the Drabek (1991) study. Others will **expand** the section by any of several elaborations. **For example**, following the Drabek findings, **students**, might be **challenged** through a **question** like this: “Given the advances in IT since the Drabek field studies, what types of technology difficulties have you encountered in your reading about more recent disaster responses?” Other professors may review a case study like Dash’s (2002) review of the difficulties she observed during the response to Hurricane Andrew and lessons learned regarding the potentials of geographic information systems (GIS) for managing disaster responses. Alternatively, some professors will select the points raised by **Quarantelli** (1997) and **expand** student understanding through discussions of these.

Finally, the issue of **public expectations** could be explored. Clearly, the general public, through news articles and television ads, learns of new IT applications. The credibility of emergency management programs in part depends on the **continuing implementation** of the newest IT developments **and** making the **public aware** of their inclusion in the emergency management program. To initiate such class discussions a news report like the following could “set the stage.” A Tokyo resident checked the traffic report on his in-car navigation system while en route to a dinner meeting. “When a map appeared on his

monitor, red arrows showed that a traffic jam was blocking one of the main roads into the city. The voice came back to warn him that there had been a car accident 500 yards ahead; Tokyo-bound traffic was slowing to a crawl. But there was good news too: the screen displayed five quick alternative routes into town, with estimates of how long each would take. . . . Berlin's system is likely to be the most advanced of all. . . . It gather's live data from 125 infrared sensors posted at major streets and 40 Webcams at key intersections. It combines these data with past patterns, including speed, flow, construction sites, road closings, temperature and precipitation, and feeds them into a battery of computers. The machines then tell city drivers the quickest way to get from point A to point B." (Kuchment 2003, p. E28). **Ask students:** "How can future disaster exercises be conducted so that the public can learn of the implementation of the newest IT developments into emergency management programs?" Through such discussion **student understanding** can be enhanced regarding the **symbolic consequences** of IT development and impacts on **public perceptions** of the program quality. Public **perceptions** and **concerns** about **privacy** could be noted as well following discussion of such "**big brother**" type technologies.

---

**Objective 33.4 Discuss at least six impacts that implementation of information technology has had on emergency management agencies.**

**Requirements:**

Use Overheads 33-5 and 33-6.

Use Student Handout 33-1.

**Remarks:**

- I. Internal impacts.
  - A. **Remind** students of Drabek (1991) study and locations specified on Student Handout 33-1; "Microcomputers and Emergency Management."
  - B. **Explain:** Drabek (1991) documented **seven types** of **internal** organizational **impacts** within the emergency management agencies that were attributed to implementation of microcomputer technology (pp. 106-112).
  - C. **Display** Overhead 33-5; "Impacts of Microcomputer Technology: Internal."
  - D. **Review** and illustrate the internal impacts listed on Overhead 33-5 (adapted from Drabek 1991, pp. 106-110).
    1. **New positions created. Example:** ". . . 35% specifically indicated that these positions were established to accommodate microcomputer

activities. (p. 107) . . . microcomputer use was the current ‘weapon’ for staff expansion.” (p. 108).

2. **Staff responsibilities redefined. Example:** “. . . a sizeable number (76%) of these directors indicated that the responsibilities of some staff members had been redefined. . . . In many cases, however, the creation and update of data bases, response utilization, and staff training were included in the redefinitions.” (p. 108).
3. **New policies developed. Example:** “More so than any other area of organizational change, policy development had been stimulated by the adoption of microcomputers. . . . 71% of these emergency managers indicated that new policies had been developed within their agencies that pertained to microcomputer use.” (p. 108).
4. **New understandings established. Example:** “. . . 94% reported that some type of informal understandings had developed among staff that pertained to microcomputer use. Most often these had to do with increased flexibility in work schedules.” (p. 108).
5. **Budget stability provided. Example:** “Several of the directors indicated that the acquisition of microcomputers and the requisite software, staff training, maintenance contracts, and such, had precipitated overall increases in agency budgets. . . . Relative budget stability reflected their successes in using microcomputer implementation to secure new positions and to redefine the responsibilities of others.” (p. 109).
6. **Staff upgrades. Example:** “Both professional and clerical staff positions had been upgraded in most of these agencies because of the implementation of microcomputers. Since many of the agencies had provided training to continuing staff members, this provided a mechanism for these individuals to receive salary increases that greatly exceeded those they might have received otherwise.” (p. 109).
7. **Improved morale. Example:** “Flexibility in work hours had been encouraged for a variety of reasons related to microcomputer use, for example, and this was viewed as ‘being in everyone’s best interest.’ Also, improvement in the quality of work produced—at least in physical appearance—was emphasized by several.” (p. 109).

## II. External impacts.

- A. **Explain:** Drabek (1991) documented **three types of external** organizational **impacts** within the emergency management agencies that were attributed to implementation of microcomputer technology (pp. 113-120).

B. **Display** Overhead 33-6; “Impacts of Microcomputer Technology: External.”

C. **Review** and illustrate the external impacts listed on Overhead 33-6 (adapted from Drabek 1991, pp. 113-120).

1. **Enhanced professional image. Example:** Quotation from interview with the Director of Emergency Management, Pinellas County, Florida: “The Council of Mayors, as well as a variety of other people, during our response to Hurricane Floyd (1987), were quite impressed with the way our computers could project the graphics on the screens. There definitely has been an enhancement of the image of this agency.” (p. 114).
2. **Increased network centrality. Example:** “Several of those interviewed were quite emphatic regarding the ways in which their microcomputer applications had reinforced the centrality of their agencies within the response network. . . . Several of the other directors emphasized that computer applications had permitted them to demonstrate the utility of data bases they had created.” (p. 115).
3. **New agency relationships. Example:** “Nearly all of those interviewed supplied examples of new agency relationships that stemmed from microcomputer implementation. Typically, these resulted from efforts to secure data bases that could assist them in some emergency management function.” (p. 116). Examples cited included tax assessors office, building and zoning departments, etc.

### **Supplemental Considerations:**

The **key message** of this section is that the implementation of microcomputers, like any other IT device, **impacted** the internal and external **structures** of emergency management agencies. While most professors may choose to limit presentation of this topic to the material specified on the overheads others will **expand** greatly. For example, the **analysis** presented above could be **revisited** within this context. Students could be **challenged** to specify various forms of organizational **impacts** that might be forthcoming given Quarantelli’s (1997) **observations** and the **newer technologies** described by Stephenson and Anderson (1997). Others will **extend** this section by **challenging** students to explore **alternative research designs** whereby the organizational impacts both internal and external, of these new IT developments might be **documented** empirically. Alternatively, the three trends (i.e., professionalization, cost reduction pressures, and IT implementation impacts) proposed by Sutphen and Waugh (1998) could be used as a basis for **expanded discussion** of potential research studies. **Ask students:** “What types of study designs can you propose whereby social processes like these might be investigated? How could such investigations improve the understanding emergency

managers could have of their own profession and the social constraints that are shaping it?”

Finally, some professors will **expand** this section through the use of **case study** material. For example, Comfort (1994) examined a wide variety of technologies that were used during the response to the Northridge earthquake (1994, California), e.g., “Emergency Digital Information System”—a satellite based communication system that permits simultaneous transmissions to multiple receivers. Subsequently, Grunfest and Weber (1998) explored “basic changes to emergency management as a result of internet access” (pp. 59-60). The **impacts** of the implementation of these devices on emergency management agencies and their network partners could be **discussed** to **enhance** student understanding of this topic.

---

**Objective 33.5 Describe the range of information available from at least three Internet web sites relevant to emergency management.**

**Requirements:**

Use Student Handout 33-2.

**Remarks:**

- I. Emergency management web sites.
  - A. **Explain:** there are hundreds, perhaps thousands, of web sites whereby information, in the broadest sense of that term, can be accessed that is relevant to emergency management.
  - B. **Distribute** Student handout 33-2; “Selected Emergency Management Internet Sites.”
  - C. **Review** the classification system used in this compilation and discuss one or two of the sites listed for each to illustrate the range of information available (adapted from Butler 2002).
    1. **General information: U.S.A.**
      - a. Department of Homeland Security.
      - b. International Association of Emergency Managers.
    2. **General information: international.**
      - a. U.N. Secretariat in Geneva, Switzerland, International Strategy for Disaster Reduction.

b. World Bank.

3. **Illustrative university centers.**

a. Natural Hazards Research and Applications Information Center, University of Colorado.

b. Disaster Research Center, University of Delaware.

4. **Hazard specific sites** (illustrative).

a. Climate change and drought.

1) National Climate Data Center, National Oceanic and Atmospheric Administration.

2) National Drought Information Center.

b. Floods.

1. Federal Emergency Management Agency.

2. National Flood Insurance Program.

c. Terrorism.

1. Office of the Coordination for Counterterrorism, U.S. Department of State.

2. Monterey Institute of International Studies' Center for Nonproliferation Studies.

d. Tornadoes and lightning.

1. National Severe Storms Laboratory.

2. National Lightning Safety Institute.

II. Student assignment.

A. **Assign** web site (use Student Handout 33-2 and assign each site to one student).

B. **Explain assignment:** prior to the next class session, each student will visit the web site assigned. They will prepare a one page paper comprised of two

paragraphs. The web site visited will be listed at the top of the page followed by a response to two questions.

1. **Question A:** What types of information are available at this site (range, content, etc.).
  2. **Question B:** What was the most interesting fact relevant to emergency management you discovered through your visit to this site?
- C. **Distribution:** all student papers will be reproduced by the professor so that in an upcoming class session each student will receive a compilation of the class work. This will complement Student Handout 33-2 (“Selected Emergency Management Internet Sites”) as a resource for future use.

### **Supplemental Consideration:**

The **key message** of this section is that there are **voluminous Internet** web sites whereby information can be obtained that is **relevant** to emergency management. Some professors may **complement** the distribution of the Student Handout with an **in-class exploration** of several sites. Other professors will **modify** the student assignment in scope, content or format, e.g., students could be given e-mail addresses for all class participants and be required to **send** their paper **electronically** rather than having the professor reproduce them. **Additional Internet sites** may be found in Grunfest and Weber (1998), Fischer (1998) and in every issue of *Natural Hazards Observer*.

---

**Objective 33.6 Describe the role assignments and persuasive speech requirements for the disaster mitigation exercise (Sessions. No. 34 and 35).**

### **Requirements:**

Use Student Handouts 33-3 through 33-6.

### **Remarks:**

- I. Disaster mitigation exercise.
  - A. Background.
    1. **Event:** Missionary Ridge Wildfire.
    2. **Date:** June 9, 2002.
    3. **Location:** Northeast of Durango, Colorado (La Plata County).
    4. **Population:** Durango – 13,922; La Plata County 32, 284.

## 5. Damages.

- a. Physical: 70,085 acres burned; 57 homes and cabins destroyed.
  - b. Economic: acute drop in tourism; long-term and continuing tourism impacts throughout 2003.
  - c. Remind students of tourism impacts of this wildfire that were highlighted in Session No. 28 (“Tourism and Disaster: preparedness, Responses, and Impacts”), i.e., Objective 28.6, II.A.2.b.
6. **Drought:** this area had experienced multi-year drought conditions which became acute during 2002. Such conditions exacerbate the wildfire risk.
7. **Policy issue:** What mitigation plans are required to reduce the risk of reoccurrence?

## B. Student assignments.

1. **Persuasive speech:** 3-5 minutes, must reflect role assignment.
2. **Explain:** assigned reading (Burby 2000) for next class session may be used for ideas; **requires creative extrapolation** since the focus of the assigned chapter is flood mitigation, not wildfire mitigation.
3. **Explain:** professor will evaluate each speech and provide a grade at the next class session. Refer students to the “Modes of Evaluation” that was included in the course syllabus (Session No. 1; “Course Orientation”).
4. **Review of maps:** all students will review maps of the Durango, Colorado area and note the location of the Lemon Reservoir which was the northwestern edge of the burn area which extended for approximately eight miles to the southwest. Use of the Internet web sites discussed above should be encouraged, e.g., <http://www.usgs.gov> (U.S. Geological Survey).

## II. Exercise handouts.

- A. **Distribute** Student Handout 33-3; “Wildfire Mitigation: Alternative Viewpoints.”

- B. **Explain:** Sample viewpoints help set the stage for the exercise. Students should study this handout in preparation for the exercise presentations and subsequent analysis.
- C. **Distribute** Student Handout 33-4; “Disaster Mitigation Exercise: Role Assignments.” It is recommended that the professor assign students to the various roles **prior to** distribution of this Handout. Some professors may prefer that students select a desired role although this can be time consuming.
- D. **Distribute** Student Handout 33-5; “Social Identity Worksheet.”
1. **Explain:** Each student should complete the worksheet prior to preparing their speech.
  2. **Explain:** During their speech, they should “role play” the constructed “social identity.”
  3. **Review** the list of items that comprise the social identity and **ask for questions**; clarify as required.
- E. **Distribute** Student Handout 33-6; “Sample Wildfire Mitigation Proposal.”
1. **Explain:** this is the proposal that they should oppose or favor in their speech.
  2. **Explain** exercise format.
    - a. Commission chair will be the first speaker.
    - b. Commission chair will then chair the simulated public meeting and recognize speakers in the order listed on the “Disaster Mitigation Exercise Role Assignments,” (Student Handout 33-4).
    - c. **Timers:** 5-6 students will rotate so that each speaker receives a signal from a timer at the 3 and 5 minute points in their speech.

### **Supplemental Considerations:**

The **key message** of this section is to “set the stage” for Session No. 34 (“Disaster Mitigation Exercise”). By preparing the recommended Student handouts, this can be done with **minimal time** expenditure and **thoroughness**. Some professors will **recast** the exercise by designing an **alternative** point of focus, e.g., hurricane, earthquake, terrorism, or some other type of hazard. The wildfire example was used herein to illustrate how a certain locale, e.g., Denver, reflected **student interest**. If wildfires are the focus, some professors may wish to review brief histories of **changing approaches**

and viewpoints, e.g., logging industry versus environmental groups. Maclean (2003) has an **exceptional chapter** (“A Short History of Wildland Fire,” pp. 193-213) that underscores the **controversy** and complexity.

In contrast to the small **tourist-based county** used in the sample scenario, i.e., La Plata County, Colorado, some professors may select an **urbanized location** like the Los Angeles region in California. The massive **wildfires** that occurred during October, 2003, for example, could serve as the **scenario context**. “Tens of thousands of residents were forced to flee the rapidly spreading blazes from Simi Valley in Ventura County in the north part of the fire-ravaged area to San Bernardino in the east and across the Mexican border in the south. . . . The state’s largest fire, in eastern San Diego County, caused at least nine deaths, including two who died inside their car as they apparently tried to escape the flames . . . (Carter 2003, p. 24A). “The area is vulnerable because drought and an infestation of bark beetles have left millions of dead trees.” (Carter 2003, p. 30A).

“The fires killed at least 20 people, burned 750,000 acres and destroyed 3,400 homes before rain, snow and cooler weather helped douse the flames. Fire fighters contained the biggest and deadliest of Southern California’s wildfires Tuesday—San Diego County’s 280,000 acre Cedar Fire—and turned their attention to mopping up other blazes and heading off mudslides when the rains come.” (Knight Ridder Newspapers, 2003, p. 4A). For an additional example, see Cook’s (2004) analysis of the Santana Row Development Fire, i.e., the worst fire in the history of the City of San Jose on August 19, 2002.

Alternatively, some professors might select the actions of “eco-terrorist” groups as a focal point. For example, “Earth Liberation Front” **claimed responsibility** for a fire that destroyed a lodge atop Vail Mountain, one of Colorado’s premier ski resorts (1998). This same domestic terrorist group has **claimed responsibility** for numerous fires, tree-spiking, and other such acts throughout the U.S.A., especially in the western states of California, New Mexico, Arizona, Oregon, Colorado, and Washington where the group may have originated (adapted from Hughes 2003, p. 1B). “With the accumulated toll of the attacks now estimated at more than \$100 million, environmental extremists have become the top priority for FBI domestic terrorism squads across the country.” (Hughes 2003, p. 1B). Finally, some professors might **encourage** students to **review** a couple of on-line newspapers via the Internet to locate a few news stories of the Missionary Ridge fire and its aftermath, e.g., *The Denver Post*, *Rocky Mountain News*, or *The Durango Herald*.

---

### Course Developer References:

- I. Arrowood, Janet C. 2003. *Living With Wildfires: Prevention, Preparation, and Recovery*. Denver, Colorado: Bradford Publishing Company.
- II. Barnard, Jeff. 2003. “Suit Seeks to Curb Federal Firefighting.” *The Pueblo Chieftain*, October 16, p. 10c.

- III. Belardo, Salvatore, Kirk R. Karwan and William A. Wallace. 1984. "Managing the Response to Disasters Using Microcomputers." *Interfaces* 14 (March-April):29-39.
- IV. Burby, Ray J. 2000. "Land-Use Planning For Flood hazard Reduction." Pp. 6-18 in *Floods* (Vol. 2) edited by Dennis J. Parker. New York: Routledge.
- V. Butler, David L. 2002. "Selected Internet Resources on Natural Hazards and Disasters." Pp. 389-464 in *Methods of Disaster Research*, edited by Robert A. Stallings. Philadelphia, Pennsylvania: Xlibris, Inc.
- VI. Carter, Chelsea J. 2003. "Fires Assault Southern Calif.: Hundreds of Homes Lost as Fierce Winds Frustrate Firefighters." *Rocky Mountain News*, October 27: 24A-25A, 30A.
- VII. Comfort, Louise. 1994. "Risk and Resilience: Inter-Organizational Learning Following the Northridge Earthquake of 17 January 1994." *Journal of Contingencies and Crisis Management* 2:157-170.
- VIII. Cook, John Lee, Jr. 2004. *Santana Row Development Fire, San Jose, California*. Emmitsburg, Maryland: U.S. Fire Administration, Federal Emergency Management Agency.
- IX. Dash, Nicole. 2002. "The Use of Geographic Information Systems in Disaster Research." Pp. 320-333 in *Methods of Disaster Research*, edited by Robert A. Stallings. Philadelphia, Pennsylvania: Xlibris, Inc.
- X. de Golia, Jack. 1999. *Fire: A Force of Nature: The Story Behind the Scenery*. Las Vegas, Nevada: KC Publications.
- XI. Drabek, Thomas E. 1991. *Microcomputers in Emergency Management*. Boulder, Colorado: Institute of Behavioral Science, University of Colorado.
- XII. Fischer, Henry W. III. 1998. "The Role of New Information Technologies in Emergency Mitigation, Planning, Response, and Recovery." *Disaster Prevention and Management* 7:28-37.
- XIII. Gruntfest, Eve and Marc Weber. 1998. "Internet and Emergency Management: Prospects for the Future." *International Journal of Mass Emergencies and Disasters* 16:55-72.
- XIV. Hughes, Jim. 2003. "Eco-terrorists Top FBI's List: Attacks Intensify Since Fires 5 Years Ago at Vail." *The Denver Post*, October 19, pp. 1B and 5B.
- XV. Knight Ridder Newspapers. 2003. "California Wildfires: Bush Tours Fire Remnants, Praises 'Best of Mankind'". *St. Petersburg Times* (November 5):4A.

- XVI. Kuchment, Anna. 2003. "Get a Move On: Led by Tokyo, Cities are Turning to Wireless Technology to Untangle Their Traffic Jams." *Newsweek* (October 20):E28.
- XVII. Maclean, John N. 2003. *Fire and Ashes: On the Front Lines of American Wildfire*. New York: Henry Holt and Company.
- XVIII. Michael, D.M. 1985. "Too Much of a Good Thing? Dilemmas of an Information Society." *Technological Forecasting and Social Change* 25:347-54 (as cited in Quarantelli 1997, p. 106).
- XIX. Morson, Berny and M.E. Sprengelmeyer. 2003 "Hayman Cost: \$237.8 Million." *Rocky Mountain News* September 26: 4A, 22A.
- XX. Pauchant, T., I. Mitroff, D. Weldon and G. Ventolo. 1990. "The Ever Expanding Scope of Industrial Crises: A Systematic Study of the Hinsdale Telecommunication Outage." *Industrial Crisis Quarterly* 4:243-261 (as cited in Quarantelli 1997, p. 106).
- XXI. Pine, John C. 1999. *Technology and Emergency Management: Instructor Guide*. Emmitsburg, Maryland: Emergency Management Institute, Federal Emergency Management Agency.
- XXII. Quarantelli, E.L. 1997. "Problematical Aspects of the Information/Communication Revolution for Disaster Planning and Research: Ten Non-Technical Issues and Questions." *Disaster Prevention and Management* 6:94-106.
- XXIII. Scawthorn, C. 1984. *The Locational Approach to Seismic Risk Mitigation: Applications to San Francisco*. Proceedings of the Eighth World Congress on Earthquake Engineering. Berkeley, California: Earthquake Engineers Research Institute (as cited in Stephenson and Anderson 1997, p. 333).
- XXIV. Sheridan, Samuel. 2003. "We Must Fight Fire with Fire—Literally." *Newsweek*, September 29, p. 12.
- XXV. Simpson, David M. and Paul Freibert. 2003. "Role of Advanced Technology in Disaster Response: Observations and Practitioner Issues." *Journal of the American Society of Professional Emergency Planners* 10:23-31.
- XXVI. Stephenson, Robin and Peter S. Anderson. 1997. "Disasters and the Information Technology Revolution." *Disasters: The Journal of Disaster Studies and Management* 21:305-334.

XXVII.Sutphen, Sandra and William L. Waugh, Jr. 1998. "Organizational Reform and Technological Innovatuion in Emergency Management." *International Journal of Mass Emergencies and Disasters* 16:7-12.