Teaching Earthquake Awareness to Persons Labeled Mentally Retarded

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Introduction

Earthquakes have caused, and can cause in the future, enormous loss of life, injury, destruction of property, and economic and social disruption. Because no accurate method for predicting earthquakes has yet been developed, there is usually no immediate warning and the area cannot be evacuated prior to an event. Therefore, the safety of individuals is more difficult to deal with in an earthquake than with other natural hazards such as hurricanes or floods (FEMA 149, 1988). However, knowing what to expect, how to prepare, and how to respond to an earthquake is a proven method of mitigating the loss of life and property (Buckle, 1989).

A survey of state education departments revealed that only a few states required earthquake awareness and safety education as part of the state education guidelines (Ross, 1990). A survey of earthquake education materials in the United States disclosed that there were no specific curricula for individuals who are mentally retarded or learning disabled.

Children do not automatically know what to do in an earthquake. In a preliminary study (Ross & Shuell, 1989), 9% of those K-6 students interviewed gave clearly correct answers to questions about what to do in an earthquake. Students also showed confusion in differentiating earthquakes from other natural hazards and weather. It can be assumed that persons who are developmentally delayed might also be unfamiliar with self-protective action in an earthquake and might confuse earthquakes with other natural hazards. In addition, persons with mental disabilities may be limited in their ability to understand information, recognize danger, and self-protect.

Although a literature search revealed no article specifically related to teaching earthquake awareness and/or safety to persons classified as mentally retarded (there were guidelines for teaching earthquake preparedness to those with other disabilities, i.e., blindness, deafness), there were articles related to the ability of those individuals to learn fire safety and other designated survival skills such as calling for assistance in an emergency or crossing a street. This literature is particularly relevant to those deciding whether and how to develop an earthquake education program for this population because it contains information about the ability of some individuals to learn survival skills. In addition, fires and earthquakes can produce some of the same circumstances, such as blocked exits and the inability to use the elevator; moreover, fire can occur as a result of a major earthquake. This makes fire education literature a logical element to consider when developing an earthquake education program (Tierney, Petak, & Hahn, 1988).

However, an important distinction between fire and earthquakes should not be overlooked. Fires usually consume single buildings, while earthquakes can affect large geographic areas. Information learned from fire safety articles is useful for justifying earthquake education for persons who are mentally retarded and provides some considerations that would need to be addressed in planning for an earthquake. Nevertheless, such articles are incomplete guides for the development of earthquake education programs for this population and should be used only as resources.

There is an additional consideration when planning earthquake education programs, evacuation behavior. Sime (1984), as cited in Tierney, Petak, and Hahn (1988), discusses evacuation behavior in a fire in terms of "movement toward the familiar." Sime argues that in crises, people receive more sensory input and have more cognitive

ambiguity than can be comfortably handled. As a result, they seek settings and exits that are familiar, showing little inclination to find alternate exit and escape routes. Those who have physical disabilities may be even more limited in the number and types of exit routes they use (Tierney, Petak, & Hahn, 1988).

Background Research

Previous investigations have shown that persons diagnosed as mentally retarded have the ability to protect themselves (MacEachron & Janicki, 1983; MacEachron & Kraus, 1985). MacEachron and Janicki looked at Perske's concept of risk from the perspective of fire safety, and found that about two-thirds of the developmentally disabled population receiving services in New York were capable of self-preservation.

Different teaching methods have been used effectively to instruct individuals in safety and survival skills. Instruction has been directed toward both those with mental handicaps (Horner, Jones, & Williams, 1985; Rae & Roll, 1985; Risley & Cuvo, 1980) and those without mental handicaps (Jones, Kazdin, & Haney, 1981; Miltenberger & Thiesse-Duffy, 1988).

Matson (1980) reported on a training program to teach persons with developmental disabilities how to escape from fires. Modeling and active rehearsal were used to train individuals to evacuate their homes in case of fire. Rae and Roll (1985) used daily practice, graduated guidance, and social praise to reduce evacuation times and the amount of assistance needed during fire drills for ten clients considered profoundly mentally retarded.

Jones, Kazdin, and Haney (1981) used instruction, shaping, modeling, rehearsal, feedback, and external and internal reinforcement to teach third graders how to exit in several simulated fire emergency situations.

Tymchuk, Hamada, Andron, and Anderson (1989) trained three mothers diagnosed as mentally retarded how to respond to household emergencies, including what to do and what not to do in dealing with a grease fire. There were two facets of the training. participants had to verbalize correct information about what would be done in a particular emergency and then had to role play each action. Training occurred weekly in both a community facility as a group and individually in the mother's home. Steps for each emergency were listed on a poster, discussed and demonstrated Dolls and child mannequins were used in some of the demonstrations

Prior to training, participants had limited information about some of the designated emergencies. Several stated actions that would have placed them and their children in even more danger had they been followed. After training, it was found that each mother acquired some of the information and necessary skills. However, acquired responses varied and because actions were demonstrated in a role play situation, there was no way to see whether the taught actions would actually have been applied in a real emergency.

Horner, Jones, and Williams (1985) used general case instruction[4] to teach individuals with moderate and severe mental retardation to cross streets which had not been used during training sessions. Initial training involved daily practice with one-to-one instruction, physical assistance, feedback, prompts, praise, and tokens which were gradually faded.

Risley and Cuvo (1980) taught three workshop clients to call independently three different emergency parties in simulated situations. The researcher's teaching package consisted of modified telephone directories, disconnected table model telephones, pictorial representation of emergency situations, an 82 step task analysis, and response feedback.

Nochajski and Gordon (1987) adapted the game of Trivial Pursuit and used it with a group of adults, labeled as mentally retarded, to teach functional community skills. The questions used in the game, based partly on the

[4] The term "general case instruction" comes from Horner et al. (1982) who described specific procedures for selecting training examples that sample a range of relevant stimulus and response variations present in a student's environment.

McCarron-Dial Street Survival Skills Questionnaire (SSSQ) and its accompanying Curriculum Guide (Linkenhoker & McCarron, 1979), were grouped into six categories: functional signs, domestics/measurements, health and safety, time and money, social skills, and public services and occupations.

Miltenberger and Thiesse-Duffy (1988) worked with four-to-seven-year-old subjects to teach the prevention of abduction and sexual molestation. The researchers found that the use of behavioral skills training following parental instruction using a commercially available program produced criterion performance in all of the subjects for all assessment procedures.

The literature tells us that daily individualized instruction, shaping, modeling, rehearsal, and feedback can be used effectively to instruct persons classified as developmentally disabled to learn survival skills.

Generalization of safety and survival skills is a crucial issue (Horner, Jones, & Williams, 1985). Research on the generalization of some of these skills can provide relevant insights to those planning an earthquake awareness and safety program.

Research has shown that it is possible for students to generalize the safety and survival training they receive (Horner, Jones, & Williams, 1985; Miltenberger & Thiesse-Duffy, 1988; Neef, Iwata, & Page, 1978). Horner, Jones, and Williams investigated the generalization of street crossing after using general case instruction. One student correctly crossed 89% of the social validation probe streets after the initial general case instruction, while another student crossed 90% correctly.

Neef, Iwata, and Page (1978) examined a classroom training procedure used to teach independent bus riding skills to persons who were classified as mentally retarded. They found that the in-classroom procedure was equally effective when compared with a bus riding program using city buses. The students receiving in-class instruction were able to generalize the skill.

Planning Earthquake Education Programs for Those Labeled Mentally Retarded

In view of the above studies, it seems plausible that students diagnosed as mentally retarded can learn the correct safety response for an earthquake, and appropriately generalize that response to other settings. Techniques successfully used in other survival oriented programs should be incorporated into any such earthquake programs including individualized instruction, task analysis, shaping, modeling, rehearsal, and feedback. Nochajski and Gordon (1987) also demonstrated that the use of a game may be another way to work on safety and survival skills. Curriculum developers might want to consider the adaptation of some currently popular games. In addition, an instructional program that uses both visual and verbal materials might maximize learning.

A major consideration in the development of earthquake education programs for those labeled mentally retarded is the subject matter that should be taught. While it is advocated that earthquake education programs for students in regular school programs incorporate both the science of tectonic processes and the application of science to daily life, this may be too all encompassing for some of the individuals in this population. A better starting place might be with instruction in the correct response to an earthquake in a simulated situation (earthquake drill). Students could be taught a five part response in a daily, structured earthquake drill through the use of teacher modeling and verbalization of steps, individual physical assistance, verbal prompts, and reinforcement of appropriate behavior. The eventual use of an earthquake sound tape might give students a better idea of what to expect when there is an earthquake [5]

One procedure for an earthquake drill can be found in Earthquakes/FEMA 159 (Callister, Coplestone, Consuegra, Stroud, & Yasso, 1988). The following guidelines are adapted from this curriculum:

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[5] An earthquake sound cassette tape can be obtained from the Emergency Preparedness Committee, Utah State PTA, 1037 East South Temple, Salt Lake City, UT 84102 for $2.00.

The first part of the daily earthquake drill training involves teacher modeling and verbalization of the five part response. This is done by the teacher telling the student or students that when they hear the directive, "Earthquake! Take cover," they should do the following:

1. Get under the desk or table
2. Hold on to the legs of the desk/table
3. Keep the head down and protected
4. Remain quietly in this position until told it is safe
5. Get out from under the desk/table when told it is safe

The teacher would then model the appropriate procedure, verbalizing the necessary steps.

The second part of the daily training involves an actual drill. This would be held at least fifteen minutes after the teacher's demonstration. The drill should start with the teacher repeating the directive, "Earthquake! Take cover." At this time, the student/students would be expected to demonstrate quickly the appropriate behavior. If a student did not respond within 15 seconds, the command would be repeated and the student would be physically assisted to get under the desk. Physical assistance and verbal prompts would then be used to help the student successfully accomplish each part of the five step response. Such assistance would be faded over time. Verbal praise would initially be given for accomplishing each step, either with or without assistance. Once a student correctly performed each of the five steps during an earthquake drill, he/she would be praised for his/her response during that drill rather than for each step. The times for training and drills would vary from day to day and care would be taken that training was done when students were at different locations in the classroom and engaged in different activities.

It is also suggested that at least one other time during the day a poem, song, or chant, such as the one provided in Earthquakes/FEMA 159 (Callister, Coplestone, Consuegra, Stroud, & Yasso, 1988) be repeated by the teacher (and eventually by the entire group) while a picture of the correct response during an earthquake is shown. The advantage of using the chant from FEMA 159 is that it includes what to do outside as well as inside. This is important information that should be included if teacher-composed poems or songs are used.

The initial phase of training would conclude when what is considered a socially valid criterion is reached. Because this is a survival skill, it is reasonable to expect students to accomplish 100% of the steps in an earthquake drill and execute them within five seconds of the directive at one drill/day in the classroom for ten days in a row without physical assistance or verbal prompts. After students reach criterion, follow-up training would take place in other locations in the school: cafeteria, gym, auditorium, playground.

It is important in the development of any new program to study objectively whether a particular intervention is effective with a certain group of learners. Research is needed. A program such as the one outlined here lends itself to a multiple baseline design across students.[6] In such a study, students could be selected from different classrooms. Prior to the training phase, baseline information could be collected utilizing multiple probes with a minimum of three probe trials. The percent of the five identified steps completed by the student could be recorded along with the latency time between when the verbal directive is given and the first step is initiated. It is recommended that intermittent probes be taken in place of a continuous baseline because it is unlikely that students will acquire the new skills without training. During training, information can be averaged for the week and graphed in a continuous baseline format. In addition, a separate graph could be used to show the number of trials to criterion. Once the criterion-level response is demonstrated by a subject, the training phase could be initiated with a new subject. After a student has reached criterion, probes of the latency time and the percentage of the five steps correctly accomplished could be taken in other designated locations in the school. With such objective information, program designers and teachers will be better able to determine whether this is an effective training program.

[6] For more information about this design, see Single Subject Research in Special Education by J.W. Tawney and D.L. Gast, 1984, Charles E. Merrill Publishing Corporation

Conclusion

Persons with mental handicaps can learn appropriate safety actions if they are taught concise information in a structured, systematic manner that provides the repetition and consistency that is needed for them to acquire new skills. However, it should be remembered that the mentally retarded are not a homogeneous group taught by only one method. A review of previous research tells us that there is no curriculum or teaching model universally applicable to all students. Individual learning styles, strengths, and weaknesses need to be recognized and appropriate adaptations made to any earthquake education programs that are developed. In addition, those programs need to be systematically evaluated in order to objectively determine their effectiveness.

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Section 2

Curricular Issues

1. Public Perception of Seismic Risk: The Educational Implications
   by Herbert D. Thier, Associate Director, Lawrence Hall of Science, University of California at Berkeley, Berkeley, California

2. Integrating Earthquake Education Into the Elementary School Curriculum: A Whole Language Approach
   by Tori Zobel, Teacher, CleveHill Middle School, Buffalo, New York

3. Teaching About Earthquakes in an Elective Course
   by Steven Boyar, Teacher, Scarsdale Public Schools, Scarsdale, New York

There is a tendency to view earthquake education as a narrow, discrete topic; separate from the rest of the curriculum. When viewed in this manner, it is not surprising that some educators do not have time to add it to their already crowded schedule. A broader perspective provides more places for earthquake education to be integrated into the curriculum.

There are a number of global approaches for the incorporation of earthquake education into the curriculum:

- Earthquake education as a model for other hazard education programs.
- Earthquake education as a model for other Science, Technology and Society (STS) programs.
- Earthquakes as a cross-curricular theme.
- Earthquake education as a vehicle for encouraging critical thinking.
- Earthquake education as a catalyst for encouraging an interest in earth science and engineering.