

APPLICABLE METHODS IN TEACHING EARTHQUAKES TO PRESCHOOL CHILDREN

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ABSTRACT

It has been demonstrated that earthquake education from the early ages of children in preschool levels can be a suitable vehicle for increasing their knowledge to deal with earthquakes. Also, the transfer of this knowledge to the family and to the wider community seems feasible and promising in the development of a future seismic safety culture in the country. Various methods and activities have been designed and used in different parts of the world for educating the preschool children for disasters. In this paper, few of the applicable methods as well as other appropriate activities proposed by teachers are chosen, compared and tested in 10 nursery schools in four various geographical areas of the capital city of Tehran with more than 200 children. Children of ages 5 and 6 have been tested and questioned and interviews have been undertaken with teachers, administrators and parents. The results of this study reveal the most applicable and feasible methods for teaching earthquakes to small children through evaluation and comparison of these methods.

Introduction

The unpredictable timing of earthquakes urges the need for considering the safety of the very young children who form the future of any community (Izadkhan 2006). Preschool children are one of the most vulnerable groups in any society and their protection merits enhanced protection. In kindergartens in Iran, children range from two to six years of age. The six year old children in the preschool stage are prepared to progress to primary schools. There are around 1043 private kindergartens in Tehran including: independent (those governmental organisations which have got their own kindergartens), private (non-governmental) and governmental. According to the Data Information of Welfare Organisation in 2006, around 60878 children were attending preschool level in Tehran with 6734 teachers teaching in these kindergartens (Behzisti Tehran Website 2007).

The preschool education is teacher-based and teachers use their own creative ways of teaching based on their experience and tastes considering the outlines and contents which is provided to them by the Behzisti Organisation. Besides, safety measures in other sectors are taught to children at preschool level. Issues such as

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“how to cross a street”; “how to avoid eating contaminated food”; “how to brush teeth”; and “how to use the dangerous utensils such as knives” is been taught by teachers using their discretion as to what is appropriate for the children. However, the scope of teaching earthquake issues has a higher priority and is more controlled than the above instructions concerning everyday threats. This is continuously supported by institutes such as International Institute of Earthquake Engineering and Seismology (IIEES) due to the frequent occurrence of earthquakes in the country.

Children’s Learning

The greatest legacy among the many contributions that Piaget (1969) has made to the understanding of children in educational terms is the respect his theory inspires for children’s capabilities as learners and architects of their own understanding. His theory also identifies other educational phenomena such as children’s capacity for self-correction and self-instruction. These perceptions lend credibility to a view of children as self-motivated and self-directing agents of their own development (Wood 1988, Izadkhah 2004). Vygotsky (1962) drew attention to the historical and cultural relativity of knowledge and the importance of social interaction, communication and instruction, (both formal and informal), in the transmission of that knowledge. Additionally, the relations between children and adults are important, as is the role of teachers. For subscribers to the Piaget theory, interactions between children play a major role in facilitating the course of development as children are thought to stimulate each other towards more objective and rational understanding. Vygotsky also emphasised on interactions between children as an important role in the transmission of knowledge. There are a number of studies which lend credibility to these views. For example, in a review of research, titled “Can Two Wrongs Make a Right?”, Glachin and Light (1982) discuss the results of previous experiments which demonstrate that when children work together, in some circumstances, they can effectively solve problems. Study of Brown et al (1984) also demonstrates peer interaction in learning.

Hart in (1992) noted that children’s participation requires adults who are interested in listening to them and helping them in developing their skills. In (1998), Hart states that over a number of decades, a sense of self-control by children over their environment has been known. He further notes that children are able to easily manage stressful experiences and can show initiative in new tasks and in forming relations with others. The social and communication skills of children up to 7 years old adapted from Hart are shown in Table 1.

Table 1. The social and communication skills of children up to 7 years old

Children (up to 7 years)	Social skills	Communication skills
3 Year old	Takes the perspective of others	Limited language abilities
Pre-school years or into the primary school	Recognises that different people have different views	Limited language abilities (preschoolers)

In addition, different types of activities for children such as learning through practice, team work, discussion, role-playing, and demonstrations are among methods that can facilitate the process of learning that are proposed by teachers in this study (Izadkhah 2006a). Kaul (1998) emphasises that children learn things from active participation in its best way. Therefore, playing should be part of the activities for children. This makes the children to experience the environment more and hence the learned definitions and practices become clearer in their mind. This also leads them to think more logically. An environment that can motivate a child has a great effect on the degree of his/her learning. This environment will:

- 1) Provide opportunities for child to confront various places, experiments and experience various things.
- 2) Provide situations where the child confronts the older people and various groups or peers and can exchange ideas.
- 3) Guarantees the emotional support and security for the child.

In the next section, various media used in Iran for educating children about earthquakes are presented.

Selected Media

Different types of learning for children have been identified from various sources such as learning through practice, working in groups, dialogues between children and teachers, role-playing, games, and practical demonstrations that may all be effective depending on the context they are used. Again, it is argued that still there might be some media that is more popular with different groups. Few of these media are employed in this study to be compared and to identify the most favorite ones.

Songs

Audio and visual tapes can be beneficially used in preschool level, in addition to which children can benefit from the messages conveyed by music, songs and films. In Iran, audio-tapes are used to disseminate safety messages to families including recommended preparatory measures such as sheltering during earthquakes, and recovery activities after an earthquake (Parsizadeh et al 2007). An audio-tape is produced by IIEES and is used in Iran in kindergartens. The tape presents safety recommendations to be applied during an earthquake in the form of a song, "*Earthquake and safety*", accompanied by a lively music. Children are very receptive to the song which is simple and easily understood. The tape also incorporates a simply worded conversational explanation of some scientific principles relating to earthquakes and appropriate safety measures to be taken in a manner which is appealing to children and welcoming to the parents. However, in this method, it seems that children mostly learn the theory side of the practice, unless the learning is accompanied with performance.

Maquettes

One of the other media used for teaching children about earthquakes is maquettes. The instructor can teach the safe and dangerous places by narrating a story. The children then are asked to have a look at the scale model house and identify the right and wrong places to shelter. Additionally, children can be asked to recognise if the positions of safe places to shelter were correctly chosen. Sometimes the children are asked to propose suggestions on how to locate the homes appliances or how the people in the house should shelter safely.

Board Games

Board games have been designed to help children gain a better understanding of disasters. The board game designed for teaching about earthquakes has 36 squares with a start and an end point. There are various activities shown in the board game. The correct and inappropriate safety measures and sheltering are illustrated in the board randomly and the children need to address what is asked from them by the teacher. Children have to recognise these measures after they learned the story.

Glove Puppets

Teaching through glove puppets not only arouses the interest of children in learning but also improves their understanding. However, not all teachers seem to be interested in taking the trouble of teaching through puppets, as it requires writing the script and practising voice modulation. Nevertheless, experience has demonstrated that children on their part seem to be thoroughly enjoying their lessons through the medium of glove puppets. They would follow the story narrated by the puppet in detail and would like to get involve in answering the puppet's questions. They narrate the story afterward for their parents or peers in detail.

Drawings

Drawing is another media for promoting awareness among children and young people. Every year during the 'Natural Disaster Week' in Iran, there are additional activities provided for children, such as "Earthquake Drawing Exhibitions and Competitions" to raise their awareness and knowledge of earthquakes. In this method, the correct sheltering in appropriate places is taught to the children and they are asked to draw it on the board or on a piece of paper afterward. By using this method, they can express their inner feelings through drawing which helps the teachers to grasp the amount of children's learning, the safety measures and correct

sheltering. Sometimes, after teaching about proper sheltering, a drawing will be shown to the children and they are asked to show the correct and incorrect places on that drawing.

Role-playing

Role-playing and drama have become increasingly popular in working with children. Role-playing is one of the effective means that usually attracts the attention of children. This provides them with the opportunity to express their feelings and interact with each other. In this way, children become actively involved in a realistic learning process and gain the opportunity to express their ideas and comments (Parsizadeh et al 2003). This approach is one the favorite medium for teaching disaster issues, used in most kindergartens and primary schools in Iran, mostly in latter, and has received a considerable attention from the children's part.

Methodology

10 kindergartens were taught by a team of two educational staff of IIEES. These kindergartens were chosen based on their location in four various geographical areas of East, West, North and South in the capital city of Tehran. They were: Fardaye Roshan, Iran Mehr, Melina, Molood, Narenji, Negin, Nina, Pooyandegan, Shaparak, and Vista alphabetically.

257 children (118 girls and 139 boys) were taught through six methods explained above in two weeks and were tested to evaluate their degree of knowledge and retention of the earthquake information and safety measures after two weeks. Each group was taught 30 minutes in six different methods, shown in Fig. 1. Due to the limited number of preschoolers in few of the kindergartens, a same method was taught in more than one kindergarten.



Figure 1. Various media used for teaching earthquakes to preschoolers

Various tools were used in this study, such as questionnaires, interviews and personal observations. In the questions designed for preschoolers, an attempt was made to provide open questions. As Peterson, et al (1999) have stated, the answer to a closed question is readily available. But in the case of an open question, the information is requested from the reader and the response will not be something generated by "guessing". Therefore, using yes and no questions was avoided in order to grasp the real understanding of the child on the issue. The materials designed as well as questions asked addressed few issues such as earthquake definition, correct actions during an earthquake, earthquake song, children's interest in learning about earthquakes and the transfer of learnt knowledge to the parents. There were also interviews with some of the children randomly. Forms were conducted and distributed to children's parents to see if the taught messages have been gone across to the parents. In addition, there were interviews with the instructors in half of the kindergartens.

One of administrators stated that ‘children are motivated to learn about earthquakes and to tell their families about this without feeling fear’. Teachers also indicated that repetition in teaching earthquake issues can decrease the possible fear in the children and will increase their interest in learning about disasters. A list of the findings was prepared after each class was observed. During these observations, a comprehensive written record was made of all verbal responses and comments plus any significant non-verbal actions observed during the class. Observations revealed the high interest of the children towards learning about disasters as shown in Fig. 2 respectively, (songs, board games, maquettes, puppet gloves, drawings and role-playing).



Figure 2. Children performing/ learning various methods

Additionally, it was revealed that a few methods were more popular with the children, such as puppet gloves and role-playing. The advantage of the former method is that children had learned all the details about the story and narrated it to their parents as illustrated in Fig. 3.

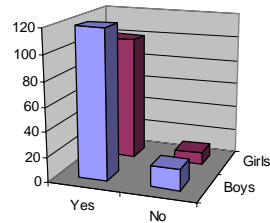


Figure 3. Number of children who have transferred the puppet story to their homes

As noted, children were also asked questions individually about what they have learned and most of the answers were correct. In addition, the teachers were also interviewed by the disaster expert, Fig. 4.



Figure 4. Interview with children and the teachers

It was also revealed that only few of the children were not listening or were disturbed by the distracting noises,

however, most of them were listening to the tutors carefully and with interest. The latter case did happen especially in classes where the puppet glove was taught by the instructors. In addition, the children who were taught through board games did have the knowledge of how and where to shelter, but did not perform well when they were asked. In addition, it seemed that girls were listening more to what the instructor was teaching than boys. Although in few classes, one or two boys were the source of distractions, but surprisingly sometimes some boys provided more appropriate and to the point answers in comparison to girls.

Further observations from this study revealed the most appropriate methods and media used for teaching children age 5 and 6 about disasters and few other issues such as:

- Teaching about earthquakes in the kindergartens play an important role in providing a base knowledge of disasters in children.
- Teaching by glove puppets proved to be the most effective method in this study, since the children explained the narrated story by the puppet in detail for their peers or families. They all seemed to have learned the simple definition of earthquake properly and retained it in their mind.
- Role-playing was also very popular. In this method, children could think of tangible situation and feel it naturally. This method stimulates their interest and makes them feel involved in the allocated roles and responsibilities and to provide correct reactions. Based on the observation in this paper, it seems that children could reach a certain level of self-confidence in confronting earthquakes through role-playing.
- In general, practical performance received more attraction from the children. Children were asked to demonstrate the correct sheltering in the time of an earthquake as shown in Fig. 5. They were all interested to imitate the teacher or their peers and demonstrate their learning.



Figure 5. Children performed the safety measures based on their knowledge and what they learnt

- Due to the rhythmic nature of the earthquake song, it remains in the children mind for a long time and with its repetition, the main message (safety against earthquakes) will be transferred to the families. The point to be mentioned is that if learning by songs is not accompanied with another method such as role-playing and appropriate postures, etc, it might not provide any correct clue to the child on how to shelter in an earthquake.
- There was no sign of fear in children on the earthquake issue if they were taught with amusing methods.
- A majority of children transferred what they have learned about earthquakes to their families.
- The number of children in a session made a difference on the way they performed in their classes, however teaching in small groups is more effective than individual learning.

- The degree of retention on taught earthquake issues was high among most of the children. It was interesting to see that a majority of the children still deeply remembered what they have learned about earthquakes after two weeks.
- The interest of teachers in using elective methods would make a difference in the way children learn about disasters. Teachers insisted in attending “Training of Trainers” courses that is conducted and taught by reliable experts who have knowledge and experience of disasters. They emphasised that teaching about earthquakes should be considered as a continuous process starting from preschool up to university levels.
- The role of parents to motivate children in learning about earthquake measures was important. Therefore, there is a need to strengthen the perception of the parents toward earthquakes and learning about them.
- Figure 6 illustrates the most favorite methods chosen by children stated in their interviews and revealed from observations.

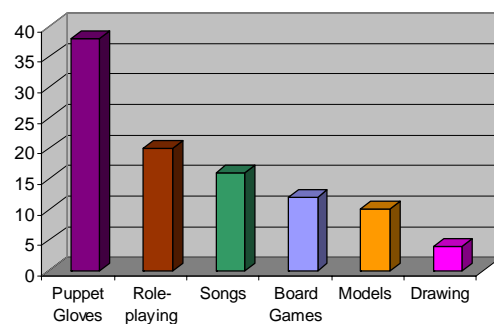


Figure 6. Favorite methods favored by the children

- The degree of motivation of the kindergarten’s administrators had a great effect on the way teachers would become interested in teaching these materials. It is important for a teacher to create a clear picture of earthquakes for the children in order for them to consider earthquakes as a natural and an unpredictable phenomenon.

Suggestions and Conclusions

To sum up, a few recommendations based on the authors’ observation is as follows:

- A simulated earthquake should be conducted for children to evaluate their reactions in a real situation. This method has been piloted before (Parsizadeh, et al 2003) and has had shown a great impact on children’s learning. This can be done with advanced permission from the parents.
- Teaching about earthquakes needs to be started from early ages. This helps in shaping the knowledge of children on the issue as they grow. It is worth mentioning that learning in this age and at this stage is very deep and sustainable and children easily transfer what they learn to their families.
- Teaching about earthquakes needs to be inserted in the preschool children formal and informal curriculum in order to be taught regularly. There is a section called “Earth” in the preschooler’s teaching syllabus that earthquake issues can be inserted.
- Using a mixture of various elective methods and tools is also suggested to prevent children from becoming bored. For example, the basic teaching can be done with a specific method such as using puppet gloves. Then at the stage of repetition and practice, other educational tools such as role-play can be used in order to stimulate the interest of children.
- Holding educational workshops for kindergarten teachers and administrators is needed. This helps in creating a positive perception on earthquakes as well as to familiarise children with various

educational methods effectively.

- Earthquake drills that are held annually for the kindergarten children in Tehran can be expanded across the country. This is a good opportunity for children to perform what they have learned on earthquakes in the form of various activities such as role-playing, songs, drawings, etc. Additionally, as noted earlier, this helps in transference of the learned knowledge to wider groups of the society.

It is proposed that children can act as a key factor in the promotion of a safety culture, leading to disaster prevention and risk reduction. Therefore, educating the children, as the future of any community at risk, can be regarded as an effective strategy to communicate safety messages to the entire community and serves to disseminate vital information to most of the population via the knowledge, skills and enthusiastic motivation of children. The children convey messages throughout society, starting with their parents. Therefore, using effective methods in teaching about disasters especially earthquakes can facilitate the process of learning and sharing the information and experience with others. Various existing methods for teaching preschoolers have been tested and compared in this study in order to come up with more effective methods in teaching disasters to preschoolers in the future.

References

- Brown, G., Anderson, A., Shillcock, R., and Yloe, G., 1984. "Teaching Talk. Strategies for Production and Assessment". Cambridge University Press, Cambridge.
- Glachin, M. and Light, P., 1982. "Peer Interaction and Learning: Can Two Wrongs Make a Right?" In "*Social Cognition*" (ed. G. Butterworth and P. Light). The Harvester Press, Brighton.
- Hart, R., 1992. "The Developing Capacities of Children to Participate", in *Stepping Forward*, by: Anderson, V., et al.
- _____, 1998. "Children's Participation: The Theory and Practice of Involving Young Citizens in Community Development and Environmental Care". *Earth Scan*, London.
- <http://www.behzistitehran.org.ir> [accessed Feb. 2007].
- Izadkhah, Y.O., 2004. "Bridging the Generations: A Critical Assessment of Disaster Education in the Development of a Seismic Safety Culture in Iran, PhD Dissertation, Cranfield University, 683 pages.
- Izadkhah, Y.O. and Davis, I., 2006. "Problems and Opportunities in the Integration of School Education Programmes Within Wider Seismic Risk Reduction Strategies", 8NCEE, San Francisco, USA.
- Izadkhah, Y.O. and Hosseini, M., 2006a. "Disaster Management Planning in Nursery Schools", 8NCEE, San Francisco, USA.
- Kaul, V., 1998. "*Earthquake Education in Preschool Level*". (Translated by F. Mofidi), Tehran, Samt Publication. 3rd Edition.
- Parsizadeh, F., Izadkhah, Y.O., and Heshmati, V., 2003. "The Necessity of Teaching Earthquake Preparedness in Iran's Kindergartens", *Fourth International Conf. on Seismology and Earthquake Engineering (SEE-4)*, Vol. 4, May, Iran.
- Parsizadeh, F., Izadkhah, Y.O., and Heshmati, V., 2007. "*Teaching Guidelines on "Earthquakes and Safety" for Kindergarten Teachers*", IIEES and UNESCO Publication.
- Peterson, C., Dowden, C., and Tobin, J., 1999. "Interviewing Preschoolers: Comparisons of Yes/No and Wh-Questions. *Law and Behaviour*, 23, 539-555.
- Piaget, J. and B. Inhelder, 1969. "*The Psychology of the Child*". Routledge and Kegan Paul. London.
- Vygotsky, L.S., 1962. "*Thought and Language*". Wiley, New York.
- Wood, D., 1988. "*How Children Think and Learn*". Hart Rolls Limited, Bodmin, Cornwall. First edition.