

Bringing Earth into the scene of a primary school: a science theatre experiment

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ABSTRACT:

Studies have shown that narrative is a valid tool to transmit science in a school context (Negrete&Lartigue 2010). We explored science theatre to promote earthquake knowledge and risk preparedness by readapting an old legend describing the 1908 Messina earthquake into a script, which was then performed in a primary school. We evaluated the experience by designing a questionnaire inspired by the Düss Fairy Tales method and a semi-structured questionnaire. Preliminary results strongly encourage science theatre as a mean to transfer knowledge and opens new opportunities to use this method as an agent of change in behaviour before and during an earthquake.

Keywords : narrative, risk communication, science theatre, education

INTRODUCTION

The use of narrative represents a reliable way to transmit science to people. An evaluation was conducted in a school context with encouraging results (Negrete&Lartigue, 2010).

Myths and legends serve as another type of narrative, structured in ways familiar to most people. They are currently a particularly important tool for educating people about Earth science. But they have a long history of being used as teaching tools: early human civilizations used myths to organize and convey information for transmitting the wisdom necessary to live in harmony with nature and sometimes even to conquer it. (Lanza&Negrete 2007).

If a section of narrative is captured by a play that is performed in the theatre of a primary school, will the acting reinforce the content of the narrative? Will the scientific content be better conveyed in this way? And, in particular, can this method represent a more efficacious way to convey seismic risk with the help of dramatisation, encouraging better seismic preparedness?

To answer these questions we conducted an experience using the old Sicilian legend of Colapesce from Messina (Sicily). In Italy, the project EDURISK already develops educational tools, keeping in mind

that knowledge and awareness are among the most important tools for surviving natural hazards (Camassi et al., 2005).

Within this context, the idea of investigating theatre as a further method to convey seismic and volcanic risk to people offers new opportunities. Unfortunately there is limited scientific literature about the use of theatre as a valid educating tool in the communication of science. This paper therefore represents a pioneering work in this field, especially in relation to the delicate issue of natural hazards.

Science theatre to promote behavioural change

Emergency preparedness and a culture of prevention are the key to successfully confronting natural hazards. In this sense, previous studies have provided evidence that death rates from natural catastrophes in Third World Countries are much higher than death rates in more developed countries (Meichenbaum, 1994).

As a recent example, the earthquake that struck Sumatra in 2004 showed how self-defeating it is to cut down mangrove forests, because they provide protection against tsunamis. Looting a petrol station during a dangerous volcanic eruption such as the one, which occurred in Goma (Camerun) in 2002 out of Mount Nyiragongo, is another example of counter-productive behaviour. On that occasion, the explosion of a petrol station ignited by the volcanic lava caused half of the fatalities. Such inappropriate behaviour during natural disasters is motivated by poverty, which, in the case of Sumatra, has induced people to cut back the forest along the shore so that they live next to the sea, which is their sole source of food. In the second case, people live in a country where just surviving everyday life is a struggle; in such environments, dangers from natural disasters can be underestimated. Instead, even if Italy is a developed country, the 2009 earthquake in Aquila killed a number of students residing in a building that violated anti-seismic construction codes.

Theatre has the potential to serve as vehicle for knowledge transfer and also to serve as an agent for change. In South Africa, for instance, it has already been successfully used in both senses as a novel tool for HIV intervention. A science theatre show named *The Alarming AIDS Adventure* was presented as a part of an educational program for secondary school groups visiting the University of Zululand Science

Centre. Provisional evidence of behavioural changes emerged within two to four weeks after viewing the production (Walker, 2010).

In dealing with natural hazards it would be complicated to measure changes in behaviour in such a short time span. Nevertheless, we can suppose that theatre could also serve as an agent for change in this case. We consider the present study as a first step in finding the right format for using science theatre to encourage appropriate behaviour during an earthquake. Furthermore we count on science theatre to produce a cultural change in countries where natural hazards are part of everyday life.

The Colapesce Legend

In Messina, a town in Sicily built in one of the sites with the highest seismic hazard, a legend tells about a hero, a fisherman, who decided to plunge into the deep sea of the Messina Strait becoming the protector of the town. The legend originated in 1230 under the reign of Ferdinand II, who is a historical figure. The fisherman, Colapesce, is a legendary figure. His name is the result of the nickname “Cola”, the diminutive of the Italian name “Nicola” plus “pesce” meaning actually “fish”. Colapesce loved the sea. He was a devoted fisherman and also a special one since he was able to explore the deep sea, while at the same time cognizant of the dangers involved. The story has been readapted several times during the centuries and is told also by the Italian writer Italo Calvino in *Italian Folktales* (Calvino, 1956).

People said that Colapesce was able to speak with the ocean nymphs, to swim with them reaching the unexplored realms of the deep sea. In search for a husband for his daughter and conquered by the fame of the fisherman, King Ferdinand II decided to submit the man to some trials to evaluate his skills. One of these consisted of plunging into the deep sea. In that occasion Colapesce made an unbelievable discovery. Sicily rested on three pillars and the fire of volcano Etna consumed one of these, so he decided to remain under water, holding up the column so the island would not collapse. Even today he rules the island.

Needless to say that the legend is a permanent warning of the seismic hazard in the Messina area. It is not by chance that the Sicilian painter Renato Guttuso depicted it on the vault of the Vittorio Emanuele II Theatre in Messina.

We have already explored the possibility of using myths and legends in a classroom. Instead of delegating them to the lowly status of superstition, science educators can introduce these important stories into the classroom in order to help children recognize the many facets of the representation of reality, each with an insight to contribute to human understanding (Lanza&Negrete, 2007).

From the myth to the theatrical performance: the script

Messina is the town in Italy that was struck in 1908 by the largest earthquake that ever occurred in the country. On the early morning of December 28, 1908, the deadliest earthquake in European history shook the Straits of Messina. Minutes later a tsunami struck the nearby coasts with waves up to 12 m-high, causing even more devastation (Platania, 1909).

To commemorate the 100th anniversary recurring on 26 December 2008, we readapted the legend of Colapesce for a theatrical script in a modern context. To involve pupils of different ages (from six to ten years old, the large age span due to the presence of disabled pupils) we divided the script into two levels of narration. In addition to portraying the legend itself with its legendary characters, the script also portrayed a modern story that was set in contemporary society. Together with the king, the princess, the king's guards, the counsellors and a ballad singer, a group of students played the role of the Istituto Nazionale di Geofisica e Vulcanologia (INGV) scientists. In the modern part of the script, the group of young seismologists (interpreted by the pupils of the IV class) with the help of the little fairies (interpreted by the pupils of the II class) succeed in going back in time to meet the legendary characters of the Colapesce legend one week before the tragic Messina earthquake (26 December 1908).

We conveyed the scientific content in the second level of narration, the modern one. The young seismologists showed the king a seismometer, which is an instrument to record earthquakes. The encounter between the past and the present produces a misunderstanding since the king believes that the instrument is a bomb and orders the guards to put the seismologists in jail. But Colapesce will rescue them. Brought once again before the king they should explain what a seismometer is and how it can help people prepare for the earthquake, because, coming from the future, they know it is imminent!

Even if its fundamental structure remained unchanged, the script has been readapted several times with the help of the teachers to meet the needs of the two classrooms. It was the teachers' idea to bring one to

the five seismologists to constitute a group. Together with a director, they also chose the pupils suitable for the different roles. They also suggested two jesters rather than one and a handmaid, Saruzza, for Princess Dorotea, the King's daughter. The number of characters grew to involve as many pupils as possible. Some important roles were also assigned to disabled pupils with good results.

Evaluation

The administration of questionnaires to evaluate the experience was conducted in the week after the theatrical performance. We evaluated the experience in accordance with the different roles assigned to the pupils. II class children (seven years old) did the chorus, while the IV class students (nine years old) were actually the characters of the play.

For the II class, we adopted a questionnaire inspired by the Düss Fairy Tales Method (Düss, 2003) to evaluate their knowledge about earthquakes, and risk reduction behaviour. We also wanted to explore the emotional aspects and the children's attitudes towards cooperating during a seismic event.

For the IV class, we prepared a semi-structured questionnaire aimed at investigating the knowledge of the Colapesce's legend, understanding of the message of the story and the grade of appreciation of the science theatre experience. In this case as well we wanted to evaluate their knowledge about earthquakes and risk reduction behaviour.

We administered also an open-ended questionnaire for teachers to verify if they considered science theatre to be an efficacious didactic tool. In particular the teachers were asked to provide a summary of the work done with the classes, the positive aspects of the theatrical experience, the difficulties faced, the negative aspects and those to be improved. Finally, we asked them for an evaluation of science theatre as an efficacious way to promote scientific culture.

Results

Unfortunately we don't have previous data to compare with this theatrical experience. However, the data collected after the experience shows the following.

II Class. The tales completed by children showed that 73% of them have a good knowledge about earthquakes. 70% have a good knowledge about risk preparedness, but 79% don't understand the

importance of group cohesion and cooperation during a seismic event. With respect to this last data it is important to note that this experience has been held in a multiethnic school with 55% of the students coming from abroad.

IV Class. 87% have familiarity with the Colapesce legend. From the replies to the question concerning the message transmitted by the story (*What do you learn by Colapesce's Story ?*) we found that 47% of the children understand the positive message in terms of behaviour and actions to be adopted to reduce seismic risk, but only 21% was able to use these input to transform the end of the story to reduce the earthquake effects.

80% of the children appreciate the experience of dramatisation. 93% have a good knowledge about earthquakes, but only 50% are aware of the actions to reduce seismic risk.

Teachers

In reference to the work done in their classroom during the project, all the teachers of the II Class have used INGV's didactic material about earthquakes. Among the positive aspects of the experience, they underlined that dramatization allowed the children to explore scientific content through unconventional narrative ways. Teachers of the II Class consider overall positively the whole experience.

The IV Class teachers have investigated with their classroom the story of the Colapesce's legend. In the open-ended questionnaire they also underlined educational effectiveness of dramatization method. They detected the experience has improved relations and cohesion in the school group and in particular with disabled children. They also think that the work done with the INGV expertise promoted the pupils' acting skills even with respect to previous theatrical experiences.

They didn't find shortcomings and believed that the emotional involvement reinforced the students' knowledge about earthquakes.

In brief, the teachers of both classes considered the experience of science theatre to be extremely positive, deeming it to be an efficacious educational tool. Finally, for similar future initiatives, they suggested involving the students in all the phases leading up to the performance: writing the script and setting the stage.

Conclusion

The experience of science theatre we shared with the children of the Federico di Donato primary school in Rome was definitely positive. Both the pupils and the teachers were satisfied in terms of participation and appreciation. Concerning our objectives, we can surely affirm that science theatre represents a valid tool to transmit a “conscious knowledge” involving both knowing-how-to-do and how-to-be. This knowledge is fundamental for every aware and participating citizen with respect to seismic risk preparedness. In particular, the experience allowed us to evaluate the children’s knowledge about earthquakes, their awareness about the behaviour to be adopted during an earthquake, and their ability to use this expertise and to cooperate. Preliminary results indicate that scientific theatre is a good way to convey contents and behaviours for seismic risk reduction. In a broader perspective we are aware that science theatre should be included in structured educational projects involving different methods and approaches. As a result of our being convinced that seismic risk education is the only way to prevent and curtail such risk, our goal is to propose educational projects that could be more efficacious in the reduction of seismic risk in the future.

REFERENCES

- Calvino, I. (1956) *Fiabe italiane*. Torino Einaudi
- Calvino I. (1992), *Italian Folktales*, Harcourt Brace Jovanovich Editor.
- Camassi, R., Azzaro, R., Castelli, V., La Longa, F., Pessina, V., & Peruzza, L. (2005) “*Knowledge and practice*”. *Educational activities for reduction of earthquake impact: the EDURISK project*. 250th Anniversary of the 1755 Lisbon Earthquake, 100-104.
- Düss L. (1947) *La méthode des fables en psychanalyse infantile*, in *Psyché - Revue Internationale de Psychanalyse et des Sciences de l'Homme*, n° 7 (1947) pp. 534-552
- Düss L. (2003) *Il mondo delle favole in psicoanalisi infantile*, Franco Angeli Editore.
- Lanza T. & Negrete A. (2007) *From myth to Earth education and science communication in Piccardi L. and Masse W.B. (eds) Myth and Geology*, London, Special Publication, 273. 61-63
- Meichenbaum, D. (1994) *A Clinical Handbook/Practical Therapist Manual For assessing and Treating Adults with PTSD*, Canada
- Negrete A. & Lartigue C. (2010) *The science of telling stories: Evaluating science communication via narratives (RIRC method)* *Journal Media and Communication Studies* 2(4), 98-110
- Platania G. 1909, *Il maremoto dello Stretto di Messina del 28 dicembre 1908*, *Bolletino della Società Sismologica Italiana*, 13 (1908-1909), 369-458.
- Walker, G.J. (2010) *Science Theatre: a novel tool for HIV intervention in South Africa*. Proceedings XI PCST Conference 6-10 New Delhi - India