

FACING NAIVE THEORIES ABOUT SAFETY AT SCHOOL: A STUDY WITH INFANT AND PRIMARY SCHOOL TEACHER TRAINING COURSE AT THE UNIVERSITY

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Abstract: *This paper focuses on the process of detect and overcoming student's and teacher's naïve theories about the topic of inclusive safety at school. This was the focus of the workshop "Safety at school", held by the University of Macerata and S.E.T.A. (Safety Education Training Agency) from November 2016 to March 2017, after the earthquakes that stroke in the central part of Italy. The course enrolled 26 students of the Infant and Primary School Teacher's Training Course. One of the purposes of the workshop was to deal with the knowledge and the possible naïve theories possessed by the participants on the topics of risk and danger. The course had also the aim to obtain a significant learning outcome, offering information and hands-on activities. The paper presents the theoretical framework, the design of the educational path, the adopted tools and some remarks about the reached goals.*

Keywords: *Safety; Inclusive safety; Scaffolding; Naïve theories; Peer's interaction;*

1. Problem statement

Emergency is a well-shaped term in the vocabulary of the Italian Civil protection and it refers to different situations in which the environment (which can be also nature itself) puts human life at risk. Moreover, emergency should deal with different human beings, their personal fears, kinds of reaction, attitude to pro-action and, of course, one's own physical or psychological boundaries.

Two terms are mainly connected with the concept of emergency: risk and danger. Both words have their scientific definition, that we can learn from the Italian national law UNI11230. According to that document, risk is the probability that a potential damage will occur. Even better said: risk is the probability that an event able to damage people will happen. Risk exists in relation to a source of danger. For example, an unsafe school is a source of danger. But if no one is there, than the risk is zero, because even if it falls down, no people will be involved and damaged. As a consequence, safety has to deal with risk more than with danger.

When working at school, teachers are often put face to face with these concepts at a very factual level. In Italian schools evacuation drill emulating a fire or an earthquake is a compulsory trial to be made at least once a year. Unfortunately, the rule is not always followed by a well-shaped practice, and probably even the meaning of such an exercitation is understood. As the Safety Education Training Agency (S.E.T.A.) association pointed out several times in public presentations, evacuation drill is often engaged by teachers and scholars as a leisure moment in their school routine, with no sense about the further benefit a well-performed simulation can bring them in a real emergency situation, not only because participants just memorize a safe path and how to behave, but moreover because they comprehend and interpret risks and potential damages.

The gap between laws and practice dramatically emerged in our territories in 2016 and 2017, when several strong earthquakes stroke caused massive damages and deaths in the

central part of Italy. Before even thinking about how to teach them properly the concepts related to safety, the main question – which is the one we try to answer in this paper – is how to proceed when dealing with such a subject. Safety is indeed something we experience in our everyday life at different levels and in different environments. Safety at home is different from safety at school or from safety while crossing the street. Moreover, safety is a concept that changes within the life cycle of an individual, according to age, physical and mental condition. Each person may have a different view on it, based on different reactions adopted in the past, divergent memories and educations. For this reason, we started from the assumption that our class already had a vision or a concept about what safety is and about the connected subjects of risk, danger and emergency. How to catch these visions and representations? How to connect the personal knowledge with the results of the scientific knowledge? And, when realizing that the personal knowledge is partially correct or incorrect if compared to the scientific conceptualization, how to convey them in a proper way in order to let students gain a significant learning? And also, how to manage to enlarge the conceptualization of safety at school in an inclusive way?

2. Theoretical framework

Scientific knowledge has often a winning counterpart when dealing with delicate still everyday life topics as emergency. We are talking about the naïve theories, a concept transposed from Vygotsky's "complex" thinking, that the author identifies as the evolutionary stage prior to "conceptual" thinking, which is what we call logic. The complex and the concept are hardly discernible when facing the so-called pseudo-concept. A liminal stage when certain facts or object are connected in order to gain a theory on a topic. Hence, naïve theory is by all means a real theory the subjects shaped in order to make sense of a phenomenon. But it isn't scientific because the nexus that forms the theory doesn't start from generalized and verified concepts, but from concrete and factual connections (Vygotsky, 1962).

The theoretical framework of the course "Safety at school" design is based on the conceptualization of Vygotsky's theory and drawn considering his idea of proximal development zone (1934). Furthermore, the scaffolding strategy (Bruner, Wood & Ross 1976) was adopted, in order to connect the personal knowledge to potentially new concepts and looking at the creation of a community of learners (Johnson, Johnson, Holubeck, 1994). As for the adoption of Multiple Intelligence Theory by Gardner (1983), it points out the need to address different kinds of intelligence, and the related tools and codes, in order to involve every participant.

These frames of work were connected in an integrated strategy (Fink, 2013) to offer participants a learning environment able to enhance experts and peer-to-peer scaffolding, exchanges of meaning and co-construction of knowledge within significant learning experiences (Hogan & Pressley, 1997).

3. Method

This work is about the results of the workshop about "Safety at school" held from November 2016 to March 2017 by the University of Macerata and the Safety Education Training Agency (S.E.T.A.). The course was designed to give students of the Infant and Primary School Teacher's Training Course a wide perspective on the topic of safety at school. The educational need arose from the fear and confusion caused by the ongoing earthquakes of that period. Indeed, after confronting with the students both in formal and informal occasions,

it came up that most of them did not have a clear view on the topics of safety at school, and how to deal with a class in case of emergency.

The training approach was chosen in order to deal with the representations and potential naïve theories surrounding the topics of risk, danger, and emergency because if they are conceived in an improper way, to adopt the right consequent behaviour can be difficult^{vi}. Our goal was not to train the participants to manage an emergency (as in an evacuation drill). We wanted to give them theoretical instruments both to teach about inclusive safety in class and to design didactic activities in order to spread a culture about prevention, once they will be working in schools.

In order to do that, we took into consideration also that an intervention on naïve theories must be customized according to the zone of proximal development of the class. Studies on this particular way of improving social and psychological impact on groups (which can be commonly found as “implicit theory interventions”) points out that the effect on the groups or class is possible because the messages are shaped to be effective to that students in a given context (Yeager & Walton, 2011). This does not mean the intervention is not replicable. Still, as Yeager and Dweck (2012) stated, these features must be taken into account when working on a scale larger than small groups as a class. In this sense, most of the initial work in the course was about to bring about these theories, share and deepen them if correct, put them on the right track if naïve, with the purpose of obtaining a significant learning by the students about safety, with a particular attention to inclusive safety. In fact, when facing an emergency, people with disabilities or people belonging to the weaker part of the society (as children, old people, foreign people, and so on) cannot have the same physical and psychological means to deal with the situation as it is expected for the majority of individuals (Hemingway & Priestley, 2014). In this way of setting up the teaching-learning process, professors, experts in different fields (such as geology, psychology, pedagogy), and participants themselves are included and motivated to interact, looking for a shared knowledge.

The course was composed of 6 meetings. Five experts in different fields related to the topic of emergency and safety at school were invited as guest to discuss with the participants.

4. Student’s knowledge about risk, danger, and emergency

4.1 Risk, danger and emergency: giving a definition

At the very beginning of the course, after presenting the general aim and organization, the students were asked to give and write their own definition of the words “risk”, “danger” and “emergency”. No previous explanations were given, in order to collect their representations and conceptualizations. This activity was thought to activate the participants’ motivation and reasoning, collecting their workout and sharing the ideas within the group.

The written definitions were collected. The results, part of which is presented below as significant examples (Tab. 1), pointed out that the concepts of risk and danger are often taken one for the other and there is not a clear definition of them. Also, the explanation of the word “emergency” was often the results of a very personal experience.

^{vi} This approach can mostly be found in medical student education (Borggreve et al., 2017) where simulation-based training is proven to give great benefits in the process of learning how to deal with trauma emergency. This is also the case of some non-profit organization approach, such as Action aid, that in order to teach about emergency put students together and let them simulate an emergency management.

Table 1. Examples of definitions at the beginning of the course

Definition/Student	1	2	3	4
Danger	danger is connected to something unsafe	danger is something that puts us on a trial, that obstacles our daily life and derives from risks. I feel in danger when my assurances are lost	danger is an occurrence that can bring up negative consequences	danger is a potentially damaging occurrence for things and/or people
Risk	risk is a potentially dangerous situation	risk is facing something that scares us and may put us in danger. To risk is to dive into a new and unknown situation	risk is a problematic situation where a danger may show up, bringing discomfort	risk is the possibility to step into a danger
Emergency	emergency is a situation that needs immediate intervention	emergency is a psychophysical stress condition in which complex dynamics take place. They are unexpected and difficult to figure out. Cooperation is fundamental	emergency is a case when you have to figure out the problem in the least time possible and with the best resources available	emergency is a situation that needs an intervention to be back to normality

Having a look at these definitions the first thing that come out is that, according to the scientific definitions of danger and risk, students had a clearer idea about the second concept. While, when asked to define danger, their knowledge appears more puzzled. Among the four definitions we choose to put out as relevant examples, only the first one barely meets the scientific concept of danger. The other three connect danger with a possible occurrence, without taking in consideration that danger is usually a permanent feature of a place or a situation.

In the emergency's definition we can find a recurrent concept: the timing and the action. "Immediate intervention", "figure out", "least time possible with the best resources available", "intervention to be back to normality". Hence, emergency as a situation and managing the situation, which are two different steps in dealing with emergencies, are shuffled in the same definition.

Moreover, these definitions - even the ones that tried to remain general - did not take into consideration people with illness, disabilities, or aged and the necessity to adjust things for them.

This is part of the naïf theory's or implicit theory's features (Yeager & Dweck, 2012): they develop starting from everyday experience and, if not worked through, they inform personal beliefs and, of course, they reinforce according to personal experience. Because no

one of the participants was dealing with disabilities at the time and they were young people, they did not think about physical or mental issues can change one’s own perspective in dealing with risk, danger and emergency.

4.2 Re-negotiating the definitions in an inclusive perspective

A group debate about the given definitions followed. The students read their definitions aloud so the other participants, including the professor and the experts attending the class, could note them. Through the discussion, the students could realize how personal views and feelings played a big role in their knowledge about the three concepts. Indeed, they all had their own personal theory about these concepts, especially because they had recently experienced the earthquakes. Such a fresh and thrilling experience reinforced their previous theory and support them even when not scientifically correct.

They started to move from these initial theories, which were not completely wrong but at the same time were not scientific and so not replicable, acquiring doubts and new aspects from the other’s declared perspectives. The further steps were indeed to ask students to divide the class in groups and write another set of definitions taking in consideration one kind of weakness or disabilities. In particular they were able to choose from weakness derived from age (child or old people), from an occasional featured (being an immigrant in a foreign place) or from a permanent or temporary disability.

In the following table (Table 2), we present some relevant definitions emerged from this group work. The definitions are about children at school, old people and auditory disability.

Table 2: Example of inclusive definitions

Definition/Category	Children (at school)	Old people	Auditory disability
Risk	Risks for children can be related to the food they eat, activities in the gym, wrong behaviour in class	Being scammed, being not able to avoid an imminent danger because of lack of readiness, get hurt as a consequence of ambulation’s problems	Being alone in a dangerous situation with no one that can warn you
Danger	Danger can result from slippery floor in the bathroom, crossing the street during school trip, electricity plugs	When the previous risks occur	Not being able to listen to the alarm signal as a bell ring or an alarm
Emergency	Bullying, inclusion, moral of psychological traumas, earthquake, fire	Sudden illness (as an heart attack), need for help or assistance	A person with an auditory disability can use other more developed skill as sight in order to deal with emergency

What is immediately clear, comparing these outputs with the previous definitions in the Table 1, is the attempt of the students to put themselves in the shoes of the category they were dealing with. So that what we are reading are hypothesis and possibilities, rather than definitions. This comes evident in the definition of emergency for people with auditory disabilities. The group skipped the definition and focused on the compensative abilities of the person who can't hear.

This first step (writing down the definitions and then thinking about a particular social group) was useful also to identify student's area of proximal development. At that point indeed, we had a clearer vision of what our students knew and didn't know, and from which starting point we had to lead them to a scientific vision of the topic. The final stage of this initial work was confronting the definition with the proper ones, which are given by the Italian national law UNI11230.

4.3 From the experts to the practice

For this reason, after students realized their previous ideas about the main topics of the course were partial or wrong, a variety of experts from different field of expertise were asked to discuss with the group of participants. These lectures were designed to empower the class understanding of safety in general and inclusive in particular. The experts were: a geologist, a psychologist, a pedagogist, a teacher, and an architect. Every meeting was a compendium of theory, personal experience from the experts and practical activities such as group work and simulations. The experts provided information in an interactive way, using narration, video, hands on activities, case analysis.

This was, in particular, the case of the architect, who was deaf and could tell students about real fact who occurred to her and other disabled people, to let them understand the importance of think about safety adopting an inclusive approach (Boon et al., 2011). She tackled the fact that, even if we have the technologies and the knowledge to make a building inclusive, architects and designers are not often used to project and plan buildings in an inclusive way.

In addition to the peer's debate, the practical aspects of inclusive safety have been considered too, in order to obtain a significant learning experience. The teacher, also vice-president of S.E.T.A. association, presented during one of the meeting the didactic subsidies that has been developed in recent years in order to make children and adolescents reflect and think about emergency (Midoro & Chiatti, 2009). The class had to use and then comment these subsidies, pointing out suggestions to improve them. This was auseful activity for two reasons: to present in a pro-active way to the participants what has been done during years in order to teach prevention; to give them the opportunity to make a comparison between previous didactic approaches and subsidies and the most recent technologies and didactic theories (in particular, the ones they have learned at the university).

During the last lesson students grouped together and designed their own games and activities to teach prevention in other classes. The projects had to point out: the target, the activities and a test to catch learning feedbacks. This phase was designed so that the class could put into practice what they have learned, in order to crystallize the notions in something practical. Moreover, the students, having previously learned about the Multiple intelligence theory by Gardner, already knew they could appeal to different way of learning, of catching attention and, of course, to different languages and activities in order to convey the topic to the selected target. Six projects were designed in this way, only one focused on high school students. It was about a "Safety manifesto" to write together with students, teachers, and experts after workshops and filmed evacuation drills.

The other projects were designed to meet younger educational needs. One game was focused on safety at home. Another game was about safety in the street using a role-playing game in which children were asked alternatively to be pedestrians, animals, cars and so on. Then, some students imagined a board game-like activities that involved answering questions about safety correctly in order to win the game, which should provide an immediate feedback on their learning outcomes. One project imagined the possibility to develop a virtual reality game. Another one was a team game to play in the school gym that reproduced a city-like scenario (in particular, the school’s surroundings) with simple objects. In this scenario, children have to pretend there is a fire or an earthquake. This, in student’s idea, would also help children to deal with fear, if properly guided during the game.

5. Finding and results

The purpose of the course was to identify participant’s entry knowledge and theories in order to catch possible naïve theories and then teach them about inclusive safety in a proactive approach. So, first of all, were the initial theories naïve? According to the initial definitions given in Table 1 and 2 and to the final reports of the students partly presented in the following table (Table 3), they mostly were.

In the final reports students had to take into account their possible cognitive change (Vosniadou, 1994) about the topic of inclusive safety at school and their role as teachers. Here some relevant comments the students made in their final reports about this process:

Table 3: Examples from the final report of the course

Student 1	<i>Thanks to these lessons we reflected on the fact that society is made by many different people and that these diversities must be taken into consideration. For this reason, didactic is to be customized in accordance with the target.</i>
Student 2	<i>We realized that changing the target may result in changing safety needs and every word took a very different meaning.</i>
Student 3	<i>We realized how important is to understand other people’s point of view. We gained a new awareness.</i>
Student 4	<i>Each category has a different vision about danger, risk an emergency. Being aware of this must lead to the customization of didactic at school. Children should be aware of what is risky and dangerous and be led into a path toward autonomy.</i>
Student 5	<i>The same situations, environment or events mean something different at different point of a person’s life. A simple step can be a danger to a child, an old person or a disabled person.</i>
Student 6	<i>All the definitions we wrote before were for normal people and differences were not taken into account. But as teachers, we must grow into children the awareness that what is not a danger to an adult, might be for a child.</i>

From these reports, it is clear that students gained new insights about inclusive safety. But also, about the teacher’s role, the variety of point of views and abilities. This also because students, by designing their own didactic activities about inclusive safety, were able to actively fill the gap between their initial theories and a more comprehensive view of inclusive safety. Letting the students giving their own definitions and letting them share their views on the topic without giving only one right answer at the beginning, made the learning process more effective, as well as the student’s attitude more open to learn from experts (Harland, 2003).

Moreover, the variety and care of the projects designed by groups pointed out that the core message on inclusive safety (which is to shape prevention without the blinding prejudice that human beings are all the same and that all react to an emergency in the same way), had been gained by the participants.

5. Conclusions and recommendations

This article starts a conversation about an educational gap in the courses addressed to future teachers. They usually deal with a variety of topics and situations, still the emergency framework remains somehow underestimate in their curriculum.

The main point of the course that has been presented, was to apply the scaffolding method in order to let the students reach a significant learning about the topic of inclusive safety. In order to do this their theories have been collected individually and in group works and then debated in the class in order to put them into a peer-to-peer conversation which raises doubts about the conceptions of singular participants, presents and enforces the scientific theories, then changing the naïve ones.

The students started from a set of definitions lacked of correctness and tend to confuse risk with danger. No one took into consideration the possibility of people aged differently from them or with disabilities.

They were then faced with this challenge: consider the three concepts according to the point of view of people with weakness or disabilities and to rewrite these definition thinking about a specific category. These definitions pointed out that students, while showing a certain degree of confidence in giving the previous general definitions (even when partials), this time faced more difficulties to generalize the concepts and tended to write down lists of possible scenarios. After this, they enriched their considerations with the help of the experts. Eventually, they were able to put their knowledge into practice by designing their own didactic activities about inclusive safety. Even in this step, transposing the theory into a real activity, they had to point out a specific target, environment, timing, instruments, and a method to detect if the didactic goals they had in mind had been reached.

To change the cognition about a topic as safety is not an easy process, especially in this context where students had recently experienced the trauma of an earthquake which had reinforced their theories on an emotional level about what is a safe behaviour and what's not. Enhancing class debate about the topic let them not only share their feelings and experiences, but also to let them correct their theories without a remarkable effort. Confronting their definitions was indeed a way to let them notice by themselves the gaps in their theories. This was pursued by promoting peer's debate and by facilitating this debate.

The method of detecting entry theories and to let the students reflect on their cognitive change after the course confirmed, as many literature and experiences has done in the past years, that holding a course as a "facilitator of learning" rather than as the "owner of knowledge", is a more complicated process while designing the course but its effectiveness can't be taken for granted (Trincherò, 2013). This also because both the experts and the students, if not trained or told previously, tend to expect a frontal lesson. Which is the main way Italian school and university work at the moment. Asking a class to debate, to produce original consideration, and to self-evaluate their products, considering that school and university work mainly by the system of products and grades, is not achieved from one day to another.

For these reasons the topic has been tackled from three different points of view (the personal one, the scientific one, and the one of a weak category of people). To gradually give the students the instruments to confront as a group was part of using the scaffolding approach to let students reach through their own learning process a more scientific and comprehensive

understanding of the subject. Also, the experts were asked to design interactive lectures with a practical part together with theoretical explanations. This initial effort was paid back with more effective and possibly long-lasting result. So, the first edition of the course was a satisfying pilot in order to overcome naïve theories about inclusive safety, and pursuing a significant learning in the class, as the final reports point out.

Some recommendations must be done in order to improve the course's design. First of all, a follow-up will be needed to test the efficacy and the long-lasting effect of the scaffolding action. The lack of follow-up resulted from the ongoing earthquakes that forced the University to reschedule some lessons at the time and there was no time left for a final discussion. Secondly, the practical part did not have the possibility to be tested with children or adolescents, leaving an open question on the efficacy of the activities designed by the participants. Thinking about future courses about safety, the activities designed by the students could be tested as pilot in real classes and improved by previous participants in the course.

We hope that sorting the process adopted during this course will help further educators in the field of inclusive safety to better face this kind of issues, which are common to all subjects that entail delicate aspects of human behaviour.

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