Playful Techniques to Raise Awareness and Train Diverse Audiences in Occupational Risks Prevention

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Our hypothesis states that playing is a useful technique for training diverse audiences in occupational risks prevention.

The game developed by Provincia ART helps identifying the risks inherent to different activities as well as the causes of work related accidents. It also allows the participants to learn simple measures to improve occupational health and safety (OSH).

While playing a probabilistic simulation of real-life work related accidents, participants gain awareness of the importance of prevention. The simulation takes place on a board that represents incurred loses experienced by the participant’s organization.

Playing games has several didactic advantages over traditional training methods: it develops a higher level of emotional commitment with the issues at stake, increases knowledge retention, and improves knowledge management. It has also proven more effective in terms of inducing the quick adoption of prevention measures. The evaluation of several training sessions conducted by Provincia ART supports these statements.

Introduction

OSH specialists in Argentina are concerned about the difficulties of installing an effective workplace prevention culture. Cultural change has proven elusive at all levels - manual workers, supervisors, managers and businessmen - and risk identification and prevention is yet to be incorporated in managerial practices. Unless a change is achieved in the culture and practices of all actors involved in the production process, OSH specialists will hardly succeed in promoting a safer, healthier and more productive work environment.

“Awareness raising and training activities” have become common denominators in OSH specialists’ initiatives, advertisements of insurance companies, union claims, and legal framework issued by regulatory bodies. Nevertheless, one might wonder what lies behind these broad terms, what results have been achieved and what obstacles are yet to be overcome.
As of 1996, when the Work-Related Risks Bill (Nº24.557) was passed, employers, insurance companies, unions and the State became responsible for improving workers’ awareness and training in order to achieve better working conditions. However, their efforts have had a limited impact so far. On one hand, training contents tend to refer only to mandatory issues, such as rights and obligations. There is also an idiomatic barrier: specific technical contents and advises are not translated into everyday language, making them hard to understand by diverse audiences. This problem is especially acute among manual workers, agricultural workers, and public servants. On the other hand, employers have shown little commitment to carrying on worthy training activities or engaging in awareness raising campaigns.

A few companies and institutions have developed remarkable initiatives, but even these success stories have fallen short in communicational and educational aspects. The root of this common limitation can be traced back to the higher educational system and the OSH degrees’ curricula: OSH specialists lack specific training in communication, education and motivation in order to allow them to effectively convey knowledge and information that can be put into practice.

Taking into account the above described situation, and as abundant research developed in the field of managerial and educational sciences has demonstrated, playful techniques present a useful approach to overcome mentioned shortcomings. Playing games has several didactic advantages over traditional training methods: it develops a higher level of emotional commitment with the issue at stake, increases knowledge retention, and improves knowledge management. It has also proven more effective in terms of inducing the quick adoption of practical measures.

While traditional training methods show low rates of information retention, transformation of data into knowledge, and of knowledge applied to solve practical situations; playful techniques’ more positive outcomes open a window of opportunity to manage the cultural change necessary to foster a healthier, safer and more productive work environment.

If we believe that experiencing and learning go well together, there is nothing better than to learn and teach in an amusing way, enjoying the whole process and promoting active and committed participation on behalf of the audience. Playing games makes all this possible, since pupils in the audience become leading figures of their own learning process.

Unlike traditional training sessions perceived by many as dull and arid, playing games allows to learn more from the environment (learning mates, learning situation, knowledge shared by other attendants) than from the trainer or reading materials. Playful techniques generate positive group dynamics that make it easy to share previously acquired knowledge and to manage the construction of new ideas and practical advises.

Grownups tend to enjoy learning by playing, since they perceive it as an opportunity to escape from their structured routine and bond with others and with their inner-selves by getting in touch with their emotions. As the poet Pablo Neruda said “the kid who doesn’t play is not a kid, but the grown-up who doesn’t play has lost his inner child and will miss him very much”.
Simulations and on-line learning environments also strengthen these positive results. Virtual games on work-related issues, recreate an interactive and challenging virtual world in the computer. These games face trainees with real life occupational risks in a virtual fashion, allowing them to test different solutions and to learn by trial and error without being in danger at any time.

The above-mentioned arguments lead us to believe – and then to test and confirm - that learning by playing could prove extremely effective to manage a cultural change in OSH matters. Real and virtual playful techniques are appropriate for manual workers, supervisors, managers and businessmen as well; since they all need to incorporate occupational risks identification and prevention to their daily activities. “The information age requires autonomous players more than demoralized workers. To be a player means to embrace the future, to be a worker means to defend oneself against it” (Alfons Cornella, President of Infonomia, Spain).

This paper is structured in three main sections. The first one - named The Game of Prevention - explains in detail the logic and the mechanic of the game developed by Provincia ART. This game was conceived taking into account those theoretical principles developed in the Introduction. Section number two – Experiencing the Game - narrates the experience of playing the game for the first time. This happened during a training session for public servants of the Government of the Province of Buenos Aires. In the third section – Conclusions - we share the lessons learned from that initial experience and from discussing the game with OSH specialists working for Provincia ART. The paper ends with some thoughts on further applications of playful techniques for enhancing a preventive culture among different publics.

Content

The Game of Prevention

The basic idea behind the game of prevention is that every organization faces incurred losses related to occupational issues (work-related accidents and injuries, professional diseases, in itinere accidents, etc). These losses can affect any worker in any given moment and place. OSH specialist, after analyzing workplaces and processes, may suggest preventive measures that, if implemented, help reducing the probability of occurrence of accidents.

Usually, managers, supervisors, employees and manual workers are unaware of the risks they face in their workplaces. Awareness comes ex-post facto, once the accident has occurred and the damage is done. The game has multiple purposes, being the most relevant the informational one, since it shows workers to what kinds of risks they are exposed. It also aims at raising awareness at all levels of the organization about the fact that every worker (independently of their position) has a responsibility in improving OSH.

In order to simulate – both on and offline - the risk map of an organization, the design team that developed the game used the logic of Windows Minesweeper. While the structure of the game always remains the same, it can be adapted to different activities (Uniform Industrial International Classification - UIIC), work positions (Occupational Uniform International Classification - OUIC) or complexity levels.
The first version of the game was thought for an audience with little information on OSH: public servants of the Government of the Province of Buenos Aires (public organizations tend to pay little attention to OSH conditions and quality of work environment). Subsequent versions of the game present more complex and detailed situations. The use of a dynamic form, that alters the contents but not the structure and mechanic of the game, is what allows this adaptive feature.

Participants can either play individually or in teams, gathered in the same room or simply through the Web, and according to the organization’s technological resources they can either play with their PC’s or on carton boards. The digital version of the game will be explained in details in this paper. As for the other version, it is similar to a lottery or a bingo. Each participant gets a carton board with numbered cells representing different types of accidents or professional diseases randomly distributed. As numbered balls come out, those participants that happen to have the coincident numbered cell “suffer accidents” and players can suggest preventive measures to minimize future exposure. Proposed measures are discussed among all participants, and the one judged to be more effective turns out to be adopted.

In the following pages we will focus on the explanation of the digital version of the game.

On a 100-celled board different types of accidents and professional diseases are hidden behind gray squares (Figure 1). The number and type of accidents depends on the history of work related incurred losses of the organization for which the game is developed.

**Figure 1**
STEP 1: the player selects one cell by clicking on it with the left button of the mouse. The cell changes color and becomes either black (meaning a lucky choice since there was no accident behind the gray square) or colored (different categories of accidents and diseases are represented with orange, brown, violet, blue, among other colors).

STEP 2: if the cell happened to contain an accident, a specific color, design and legend appear. Simultaneously, on the right side of the board a number of preventive measures appropriate to that type of accident are shown. All these measures aim at minimizing the exposure to risks and reducing the probability that the same type of accident happens again (Figure 2).

Figure 2

![The Game of Prevention](image)

STEP 3: the player has to choose one of the preventive measures after reading them carefully. The measures’ text can be zoomed by placing the mouse on it (examples are zoomed in Figure 3). The player’s criteria should be to select the most effective measure, meaning that it will reduce the most the probability of that same accident happening again.

Figure 3

![Prevention measure # 1](image)

**Prevention measure # 1**
Pay attention when you walk on the street, especially if you are in or nearby a construction site.

![Prevention measure # 2](image)

**Prevention measure # 2**
Always respect traffic and construction signs.
STEP 4: once the preventive measure is selected, several cells on the board will uncover and become black, meaning that a number of accidents has been avoided (Figure 4). The number of cells uncovered depends on two factors. The first one is the ratio of that type of accident over the total number of accidents presented on the board (this depends on the organization’s UIIC), and the second is the effectiveness of the selected preventive measure. Specific calculations based on statistics and other studies were prepared by OSH specialist to support the mechanic of the game.

Figure 4

Figure 5 shows the effectiveness of the adopted prevention measure, which was Measure Nº 1. It’s effectiveness is 5%, which allows the player to uncover 4 cells and avoid 4 probable accidents. Should the player had chosen Measure Nº 2 with an effectiveness of 2%, he would only have uncovered 2 cells remaining exposed to more probable accidents.

Figure 5
STEP 5: players continue to select cells, suffer accidents and adopt those preventive measures deemed more effective, with the purpose of uncovering all cells quickly and employing as few moves as possible. Figure 6 shows another sequence of “accident, corresponding measures and their effectiveness”.

**Figure 6**

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Figure 7 presents the main suggested prevention measures for “Falls, stumbles, slips, slides and other ways to loose one’s foothold”. The first cell shows the original format, while the others display only the texts in order to make them more legible.

**Figure 7**

<table>
<thead>
<tr>
<th>Prevention measure #1</th>
<th>Do not rock your chair back and forth. You might lose your balance or your chair might break. If you fall on your back, you might end up seriously injured.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Floors should be slippery proven and equally leveled.</td>
<td>Do not leave loose telephone or power cables on halls or alleys. Install plugs next to all telephones, PC’s and other devices. Avoid the use of extensions.</td>
</tr>
</tbody>
</table>

| Floors should be slippery proven and equally leveled. | All steps should be equal and equipped with no-slipping tapes. | Avoid walking on slippery surfaces. | Keep your workplace ordered and clean. Throw away those things you don’t need anymore, arrange your papers by the end of the day, store your work tools, etc. |

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Figure 8 shows how the exposure to risks and the probability of suffering an accident continuously diminish as more and more preventive measures are implemented.
The more the players keep repeating the above mentioned sequence, more cells will turn black standing for a reduction in the organization’s incurred losses. The game’s ultimate goal is to turn all cells black with few moves and suffering as few accidents as possible.

One of the many advantages of this type of learning objects is their high adaptability. The support of the graphic interface is a dynamic form were actual work related incurred losses are entered. These can be classified by type, frequency of occurrence, type of prevention measure most likely to help avoiding it, and so on. Once all this information has been typed into a dynamic form (which can also be published and shared online), the program automatically generates a completely different and customized game. This design flexibility is what makes the game an extraordinary training tool for OSH specialists (both employees and external contractors). But the game is also flexible in another sense. The form can be filled in with information conveying different levels of detail and difficulty, thus allowing the trainer to customize it to the educational level of his audience.

**Experiencing the Game**

In August 2005, we in Provincia ART experienced the Game of Prevention for the first time. The Government’s General Secretary (GGS) of the Government of the Province of Buenos Aires is one of the main organizations insured by Provincia ART. Among other things, it controls personnel affairs (including OSH) for over half a million employees and it manages the infrastructure and maintenance of 33,000 buildings scattered over the province. Directors and other managers of the GGS – none of them specialized in OSH - were invited to a whole day training session in the company’s location.

The session’s goal was to raise awareness of their responsibilities for OSH matters by using interactive knowledge management techniques, including playing games.
In order to break the ice, an introductory game was played to help everybody introduce themselves and share some basic OSH knowledge. Each participant was to share his personal information (who he was, where he worked, what his responsibilities were), a movie scene of a catastrophe and a short story of a work related accident or professional disease that took place in their departments. They were instructed to discuss what prevention and contention measures were seen in the movie and in the story. The goal of this first stage was to identify what information and experience they already had and build further – and more sophisticated - risk evaluation and mitigation procedures on that.

Then, a video with accident scenes was played. The participants – arranged in teams - were to identify the causes of the accidents and suggest preventive measures. Afterwards, teams were faced with disaster situations in an office building similar to the one where they work (fire, earthquake, flooding, bomb alert) and they should come up with a 5-step contingency plan to face it.

After these introductory exercises, and once an appropriate climate was created, the Game of Prevention was played. The goal of this second stage was to present and explain prevention strategies that could be applied in each department according to the sort of work-related incurred losses they experienced. The game was played with carton boards as previously explained, since the targeted audience was not entirely computer literate.

As the kick-off, a series of statistics of incurred losses by department was presented. With this data the game was played. Participants experienced simulated accidents and were asked to select prevention measures and discuss their effectiveness. In doing so they became aware of their risk exposure and what could be done to mitigate it. The players understood the link between adopting prevention measures and investing in infrastructure, safety equipment and training on one hand, and improving OSH on the other.

The training session was closed by presenting a general model to manage work related risks.

Conclusions

As designers of the game and planners of the described training session, we are satisfied with the results obtained. Using playful techniques, specifically the Game of Prevention, allowed us to raise awareness on the importance of prevention and to commit participants to take action according to their responsibilities. We conducted tests and surveys immediately after the end of the training session, and we also did some fieldwork and research in the same public offices a couple of months later, in order to validate our successful perceptions.

When asking participants about their evaluation of the training session, the majority of the answers were:
- “The methodology, activities and contents were innovative and interesting, specially the Game of Prevention.”
- “Suggested prevention measures are simple and useful.”
- “It is the first time I attend such an innovative training session for public servants.”
The methodology used in order to raise awareness was very interesting. I also enjoyed the friendly environment that playing games allowed us to build.

The most innovative feature was the way data and advices were conveyed by playing the Game of Prevention.

The didactic methodology was highly innovative.

I found it very interesting to be able to share knowledge and concerns with my mates.

When asking participants their evaluation on how useful the training session was for their day-to-day job, the majority of the answers were:

- “Very useful since it clearly made me realize the scope of my responsibilities.”
- “Very useful in raising awareness and teaching us to be more cautious to avoid accidents and improve our workplace.”
- “Very useful in raising awareness and giving us tips to go on.”
- “Useful to motivate us to search for prevention measures.”
- “Proposed prevention measures are very useful and can be put into practice.”
- “I found it very useful to work on case studies.”
- “Very useful to raise awareness.”
- “Very useful to make us focus on prevention.”
- “Very useful and interesting to share with young people.”
- “ Useful to clarify what our work related risks are.”

Two months after the training session, a sample of the participants was contacted in order to measure their level of knowledge retention and how many lessons had been put into practice.

Every participant contacted remembered key issues discussed during the training session. Their level of awareness regarding work related risks had not diminished. They all planned to allocate a certain amount of money in the 2006-2007 budget to infrastructure improvement, safety equipment acquisition, and personnel training. Moreover, for the first time since the Work-Related Risks Bill was passed, in 2006 the provincial Government launched an Evacuation Plan for its main building, where approximately 8,000 people work.

These results reinforce our initial hypothesis on the usefulness of playful techniques to make heterogeneous audiences aware of work-related risks and their chances to control them. However, we believe that this initial sparkle of interest is not enough to achieve an entire cultural change. Follow-up activities (surveys, telephone calls, OSH specialists visits, delivery of brochures and other reading materials, organizing more training sessions, etc) are essential in order to incorporate prevention into every day’s work by turning an extraordinary one-time experience into a daily habit.

As for the technological aspects of this training method, the digital version of the game was employed for in-house training sessions. The company’s OSH specialists took a seminar on “Training and awareness raising techniques”. Among other training materials, the Game of Prevention (in its digital version) was shown and explained. Each specialist was given a copy of the software, so that they could adapt it to the different organizations they had on their portfolio. The company is still gathering information on the impact of this activity through quality and satisfaction surveys to clients and in-depth interviews with OSH specialist using the game.
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References