

## *Games and learning come together to maximise effectiveness: The challenge of bridging the gap*

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### **Abstract**

The authors are designing and carrying out some training sessions based on serious games with customers from different business environments and with some university student groups, both in northern Italy. Some business case studies are described in this article specifying the context, the training goal, the adopted training solution and the main characteristics of the designed game. Some screenshots are also shown. Furthermore, the authors are carrying out a survey both in the business and the university environment to analyse how the learners perceive these kinds of games in terms of effectiveness, engagement, pleasure, usability and freedom of behaviour while playing. Some results are reported in this paper, and the comparison between students' and employees' perception is shown. The questionnaire used can be found in the Appendix.

### **Introduction**

We are all aware that, at present, companies need continuously to adapt to market changes and to constantly evolve the competencies of their staff, as the success of modern corporations increasingly depends on its intellectual assets (Karapidis, Pannese, Pappa, Santalmasi & Volz, 2006), but that there is no time for 'traditional' training anymore. Also, traditional instruments are no longer particularly effective (Pannese, Cassola & Grassi, 2005), and 'pure' e-learning, although presenting very undisputable advantages, has not really conquered the once expected enthusiasm. Furthermore, learners are fed up with learning 'content in terms of facts' (Aldrich, 2005). This scenario suggests that some new form of training, as close as possible to business situations and exploiting the huge potential that technology nowadays offers, needs to be organised in order to keep up with the speed of changes. Also, users need to

be engaged more (Quinn, 2005) and to be put at the centre of the learning experience, to change from 'passive vessel' to 'active participant' (Iverson, 2005). As a consequence also, the role of the trainer must change from protagonist on the stage to facilitator (Michael & Chen, 2006). His or her main objective becomes motivating trainees to interact with the content, tutoring them in case of difficulties and 'debriefing them afterwards to help them assess what they learned and put it in context' (Michael & Chen, 2006).

At the same time, on the company side, as learning emerges as a key enabler for organisations to support and enhance performance, business processes and learning processes need to be strongly intertwined to maximise training effectiveness and to shorten the time before employees can apply their new knowledge in working situations (Karapidis *et al.*, 2006).

This challenge can be faced by adopting serious games and game-based e-simulations, the new form of 'learning by doing' that strongly exploits the potential of web technologies enabling a modern version of experiential training (Pannese, 2006).

Serious games are demonstrating a lot of advantages that can be found in literature as well as directly experienced while experimenting with them in training sessions. They merge high engagement and powerful content (Prensky, 2000), they trigger profound reflections and permit a rapid understanding of complex business environments. They even avoid a sense of 'failure' (e-ducation.it, 2003) as they turn mistakes into precious learning elements (Kindley, 2002), avoiding giving the message that an error is something that cannot be recovered (Kelten, Sadowski & Sadowski, 1998). This method of 'trial and error' results in accumulation of knowledge because trainees have the possibility to actively weigh consequences and mull over decisions (Michael & Chen, 2006). Thus, representing a new form of experiential and situated learning, a learner is soon able to use the new competencies in his or her daily job.

These benefits are a result of the peculiar nature of game-based simulations, which profit from the match of simulation aspects, game aspects and pedagogical elements at the same time (Aldrich, 2005).

Serious games are actually e-simulations of working situations, where 'game' usually mainly means interactivity, in which the learner is asked to develop strategies (marketing, communication or behaviour strategies according to the context-based scenario) to reach a certain result. There are no right or wrong answers; they do not hide a test as it is a matter of managing difficult situations, taking contrasting elements into account and maybe trying several approaches to see how the context reacts to different inputs (Quinn, 2005).

The results are measured against an underlying marketing, communication or behaviour model that needs to be designed with a business expert.

If correctly designed, which means that the real working environment needs to be studied in detail in order to reproduce it in the protected simulation environment, this form of exercise offers another double potential: the exercises are repeatable (with the same or slightly different conditions, should something be worth being reconsidered) and at the same time, every simulation experience is unique, as every experience in life is unique! On the other hand, serious games are simultaneously very close to reality (if designed as such) and multisituational as different aspects of the same situation can be experienced.

As far as the training experience is concerned, it is also known that the comprehension of phenomena is part of 'learning' and that experience is the fundament and a trigger of learning. Each new experience is understood by comparison with our previous experience. Serious games offer its users exactly this way of living training experiences (Bocca, 2003).

Following these beliefs, the authors are experimenting with some blended learning sessions, where sometimes 'blended' can even mean that technology is brought into the classroom, and are tracking the perception of the learners. Both the scenarios, the approach and the results are described in the case studies presented in this paper.

### **Case studies**

The following examples are based on two different types of simulation: simulations based on algorithms (imaginary called its engine MaSCoT) and branching stories—or even non-branching stories for simpler exercises (imaginary called its engine Chameleon) (Pannese, Nitti & Santalmasi, 2005).

#### *Training of sales forces in the pharmaceutical sector: An interview with a specialist doctor*

A start-up pharmaceutical company producing derma-cosmetic products has to establish a new (actually the first) product line and has to launch the first product. The network of salesmen is mixed: a few have an experience in the job, while nearly 80% of the others are facing their first job. They are a specialised network that has to visit dermatologists.

The Marketing Department defined the 'communication stream' for the salesmen: the brand/company, the product line and finally the first product have to be presented in exactly this order. A visual with the correct sequence of the presentation steps was prepared.

The risk occurring is that the salesmen start presenting the product to the doctor, forgetting to position the company and to establish the brand before.

According to this aim, a 5-day 'classical' training was organised, starting from giving information about the product line, the scientific training and the specific communications training. The final stage was to be—as it is mostly the case—a role play of inevitable concern to the learners, especially the younger ones. The anxiety of having to

expose one's self in front of the others, mixed with the unsure feeling of junior resources, was worsened by the presence of the company's management.

In this context, a serious game reproducing the communication stream of the visual was designed; the game actually reproduced a possible interview with a dermatologist.

The game had to cover different objectives at the same time:

- Exercise how to inform doctors about the innovative characteristics of the new product line with particular attention to the communication stream in order to reinforce by a situated exercise what had already been transmitted by the communication training.
- Anticipate some objections that could be raised by the doctor.
- Lower tension and raise a sense of experience during the role play on the following day (at least one first interview had already been carried out).

The chosen form of serious game was a nonbranching story, the simplified version of a branching story that provides players with immediate feedback after each step. This decision was taken in order not to confuse learners with more sophisticated forms of games.

One has to keep in mind that pharmaceutical salesmen are not too acquainted with the use of a computer; also, this form of exercise was new to the learners, who had so many innovations to cope with at the same time (company, product line, technology-based training and for some, even the job!). The stress and anxiety had not to be risen also via a complicated tool (Carlesi & Mengoni, 2006).

A training specialist with an extensive knowledge of pharmaceutical communication studied the transposition of contents from the visual into the game and the result was a sequence of scenarios, which simulate the main phases of the interview with the doctor. In each step, the learner could decide which was the information he wanted to give the doctor next and got an immediate feedback of risks and opportunities of his or her choice (Figure 1). Independently from the fact, if he or she chose the best possible answer or not, he or she was brought again into the best case. This is the most 'protected' possible form of game. A final report summarised the whole development of the interview showing each triplet scenario, answer and feedback in a sequence.

The salesmen were given about half an hour to concentrate on the story, and each one of them had a PC to play on his or her own. When everybody had played and studied the final report, a detailed debriefing of about 2 hours took place, moderated by the communication trainer. Nobody was asked where they had 'failed' in order not to give the impression of a 'test'. The scenarios of the interview were analysed again to find risks and opportunities of each step and of each choice. The two senior salesmen also participated actively and brought their field experience with quite some useful examples that were analysed as well.



Figure 1: A screenshot of the game: a feedback

The questionnaires filled in by the salesmen of this company are part of the results shown in the statistics session.

#### *Training of product managers in the pharmaceutical sector: How to define a communication strategy*

One of the greatest difficulties in defining the communication for presenting a new product on the market is to foresee how the single topics of the communication will affect the position of the product. The pharmaceutical market does not represent an exception to this rule. In particular: very often, different medicaments are based on the same chemistry; a medicament is no longer chosen for its clinical efficiency and thus, a major differentiating factor becomes the way the product is presented. Therefore, it becomes 'strategic' to collect data about a doctor's perceptions (so-called 'soft' data) and use them to support the communication strategy definition process.

In this context, a very well known pharmaceutical multinational company organised training for its product managers to teach them how to read and interpret market data coming from surveys that were meant to measure the perception of doctors towards a class of comparable medicaments. The research had to find out what the factors are that bring doctors to prescribe or to favour one medicament over others when the molecule is the same. One of the products of the study was produced by this pharmaceutical company, the others were competitors' products. This insight had to be used to develop a successful communication strategy.

After the traditional lesson about data analysis (taking 1.5 days), a serious game was introduced. This game was meant to simulate a communication of a certain product, within a comparable class, to a doctor to measure if this communication could enhance

the product's position in the graph showing a doctor's perceptions about the whole class of products.

This is a classical example of a scenario where a simulation is also very useful in shortening the time factor: adding foresight to a simulation allows the connection of actions in the present with implications in the future. Without this kind of exercise, different communication strategies should be carried out on samples of the target population and focus groups should be organised to collect a feedback.

When starting to play, the user has to choose the product he or she is going to present to the doctor within a group of comparable medicaments. Soon afterwards, the user is given a picture showing the results of the survey in terms of the doctors' perception. A sort of 'hit parade' in the form of a histogram is offered to him or her to show what position the product he or she chose from the list is occupying. Each column of the histogram consists of segments with six different colours. The extension of each coloured segment shows how the corresponding characteristic (the six main characteristics chosen in this game are: Analgesic Effectiveness, Anti-inflammatory Effectiveness, Tolerability, Compliance, Cost Convenience, Trust towards the Producing Industry) is perceived in each product. Once the user studied the market situation, he or she can simulate the interview with the doctor in order to try to enhance the market position of the medicament he or she is playing with.

To simulate the interview with the doctor requires attribution of weights to communication items that are given to the user by pulling some bars. It is not always immediately clear to which of the six main characteristics the item is associated. In terms of the game, this happens with the user being given 10 minutes at his or her disposal to talk to the doctor and having to decide how many minutes he or she wants to dedicate to each item (by pulling some bars). There are 20 items, so some have to be left out! Up to three attempts may be done, with the objective of measuring how the product's position could improve according to the priority given to communication items (in terms of the game, the column changed place). Then one simulation has to be saved (Figure 2).

In the classroom, the product managers were playing in couples to encourage a discussion about an appropriate strategy: from two heads and brains, a single strategy had to be discussed, defined and developed!

After this had taken place, the groups were given about 1 hour for; each group to present its strategy and the results they had achieved. A constructive discussion followed with a far-reaching debriefing of about 2 hours moderated by the trainer. This phase permitted an understanding of what items doctors are most sensitive to and therefore to reason about correct communication strategies. A lot of personal experiences were discussed and used to confirm theories and impressions about doctors' reactions.

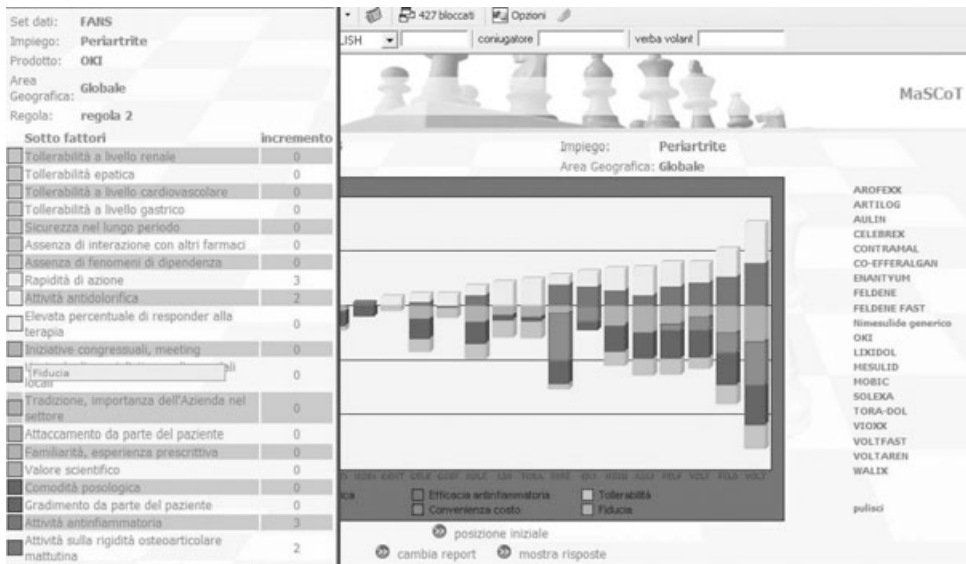


Figure 2: A screenshot of the game: the final 'hit-parade' of medicaments and the priorities given to the communication items in the simulation

The questionnaires filled in by the product managers of this company are part of the results shown in the statistics session.

#### *Training of the operators of a call centre: Objection management*

A company selling advertisement spaces on phone books with a specialised outbound call centre expressed the need to improve operators' capacity for answering/reacting to the objections of their customers or potential customers.

The company stressed the importance of developing a tool for both monitoring the improvements in the operators' abilities and recruiting new operators when needed.

A blended learning programme was defined with the help of a communication specialist; the first topic that had to be taken into consideration were phone calls to renew the subscription (new customers present a different set of problems and are even more difficult to talk to; therefore, a separate solution will be developed for this case and this problem will be investigated as a second training step).

Three classroom sessions were defined; between them, two serious-games sessions were to take place. The first classroom session was meant to train the operators about the types of objections and the easiest and most commonly used techniques of overcoming them, bearing in mind that call centre operators have only the caller's voice and tone to interpret—they cannot evaluate non-verbal communication. A lot of concrete examples of their specific environment were brought to bear.

The simplest solution was once again chosen for the beginning, and three nonbranching stories had been developed, simulating three phone calls with different levels of complexity. The player could thus face different customers raising different problems and objections during the dialogue. The scenarios were elaborated according to the real offers that the operators were selling over the phone daily (the communication expert had to study the template of the offer that is sent to the customers before they are called), and the list of objections that were collected by the operators while working was used to remain as close as possible to the real problems that the operators encounter daily. Once again, an immediate feedback was helping the user realise how good the spontaneous reaction was while the phone call continued in the best possible way (ie, considering the best possible answer).

A module was also developed to track results and monitor improvements of every player repeating the exercise several times during a 2-week period. After this time, the second classroom session took place with a detailed debriefing of the exercises to help the operators learn how to work with them. Actually, the operators just looked at the results in terms of score and penalties (Figure 3), and once they learned what the best answers were, they stopped playing. Therefore, 4 hours of debriefing were used to learn all such a game can offer: the interviews were analysed step by step to find out all risks and opportunities. All the objections were identified, contextualised and classified, and the overall trend of the phone call as a whole was identified: Is the tension increasing or decreasing? Is the speaker more interested than at the beginning or is he or she becoming irritated? ...

Thus, over another period of 2 weeks, the operators had to work again with the three nonbranching stories. They even spontaneously also introduced some group work!



Figure 3: A screenshot of the game: final report

The third classroom session was dedicated to comparing the gaming experience with real work, and this session also reinforced knowledge about possible techniques to overcome objections. The information about these techniques was structured and consolidated via some real examples and some cases brought by the operators themselves.

Thereafter, a branching story was designed, raising difficulties and introducing new elements (new objections and more subtle details to take into account). A period of about 3 weeks was given to the operators to work with the new context. They should play 'spontaneously' at first, then analyse different approaches to find out what spectrum of reactions they could expect from each possible attitude, and finally exchange impressions and insights via group work again.

To close this first training module, a last classroom session with another debriefing of about 4 hours was organised to consolidate what had been learned up to that point, to discuss some other real cases and to exchange impressions with the communication specialist.

The questionnaires filled in by the operators of this company are part of the results shown in the statistics section.

#### *Discover Pathologies: Serious games for children with chronic pathologies*

The latest project that the authors are working on at present are social games for children with chronic pathologies between 8 and 12 years approximately, that is studied jointly with the Master for Pharmaceutical Communication of the Italian university 'Università Statale di Milano'. The games address children with a specific disease, their friends, parents, and teachers and are meant to help the players familiarise themselves with the specific pathology and to live with it.

This cooperation between university and company guarantees both proficiency in content creation and in game technology development. The contents, as far as feedbacks and comments are concerned, are studied with paediatricians who are experts in the specific disease. A children's expert is also involved in order to respect all the characteristics that are necessary to engage children, to make them understand, not to frighten them and to make them work at an appropriate pace.

The games start with a short introduction illustrating the characteristics of the disease according to the type of user.

A slot of different quizzes of increasing difficulty will help to establish the basic knowledge required to enter the serious game: after having reached a certain score, players will become "superheroes" and will be able to access the game.

While playing, a child will be confronted with different situations. According to how much he or she is playing, the rate of increase/decrease in various levels is shown and

the player will learn what he or she has to take care of (eg, should the disease be diabetes, the insulin level would be measured).

After a while, the hero of the game gets hungry and he or she has to decide what to eat ... . The child will be able to learn what is healthy for him or her and why.

(Not too many details are given as the game is currently still under development).

This game is a valuable contribution to a broader social project of children's disease information that the Master for Pharmaceutical Communication is carrying out.

### **User perception of serious games: Statistics**

#### *The questionnaire*

In order to evaluate user perception of serious games, various games aimed at developing communication skills were proposed to two different target groups: one mixed group from the Italian business environment and one large university group of Italian students for new media. They were developed maintaining analogous characteristics and were based on similar technologies to assure homogeneity between games and consequent comparability between data.

After having played, users were requested to complete a questionnaire that was set up starting from a 'classical' approach (we mean those studies integrating quantitative and qualitative tools) in order to be able to measure the quality of the proposed simulations:

According to this approach, five different aspects have to be evaluated:

- *Contents*: Are they focused for the target user? Are they complete and comprehensible? Are they well structured?
- *Communication*: Is the interface user-friendly? Are different techniques used correctly? Is the software interactive?
- *Didactics*: Is there a critical vision of knowledge? Can different points of view be taken into account? Is there the possibility of customised learning paths? Does it match the learning goals?
- *Graphics*: How are the different symbols used (they have to correspond to functionalities and not to decorations)? Good image quality
- *Navigability*: Buttons and paths have to enhance information retrieval.

Following these topics, the questionnaire (which can be found in the Appendix) presents five sets of questions trying to investigate about how new, how easy to use and how clear are the simulations, how much users feel at ease and how spontaneous they managed to be, how well they liked the interface or could find what they were looking for, how effective they find it as an exercise inside their training, how close the presented situations are to reality, how much it stimulates thinking, how boring such an exercise is or how well they could identify themselves in what they were doing.

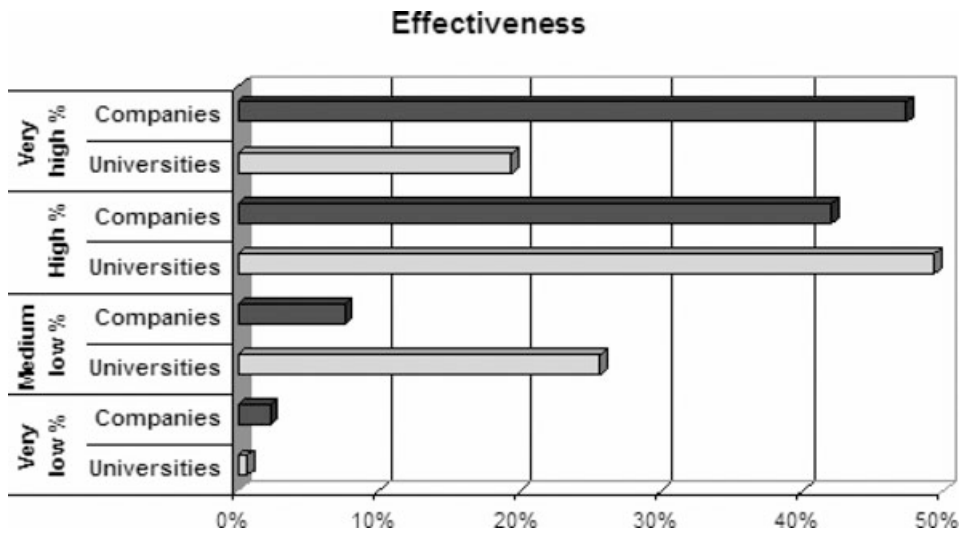


Figure 4: Perceived effectiveness of serious games

The answers are given on a 4-scores scale (1 = *much*, 2 = *enough*, 3 = *a little*, 4 = *not at all*) in order to avoid 'average' answers.

The results of the questionnaire are presented in the following, dividing users into two target groups:

- University: A consistent group of students who played the proposed serious games. Age: 20–22.
- Companies: Several groups of employees who played the proposed serious games. Age: 26–60.

#### *Effectiveness*

Game effectiveness is high or very high according to 89% of the employees, while the percentage decreases to 68% according to the students' opinion (Figure 4).

In particular, serious games are considered close to real situations and stimulate thought processes effectively.

#### *Pleasure*

Ninety-five per cent of employees evaluate the degree of pleasure of playing as high or very high, while according to students' opinion, the percentage slightly decreases to 78% (Figure 5).

However, according to both target groups, the most appreciated aspect is the originality of the tool.

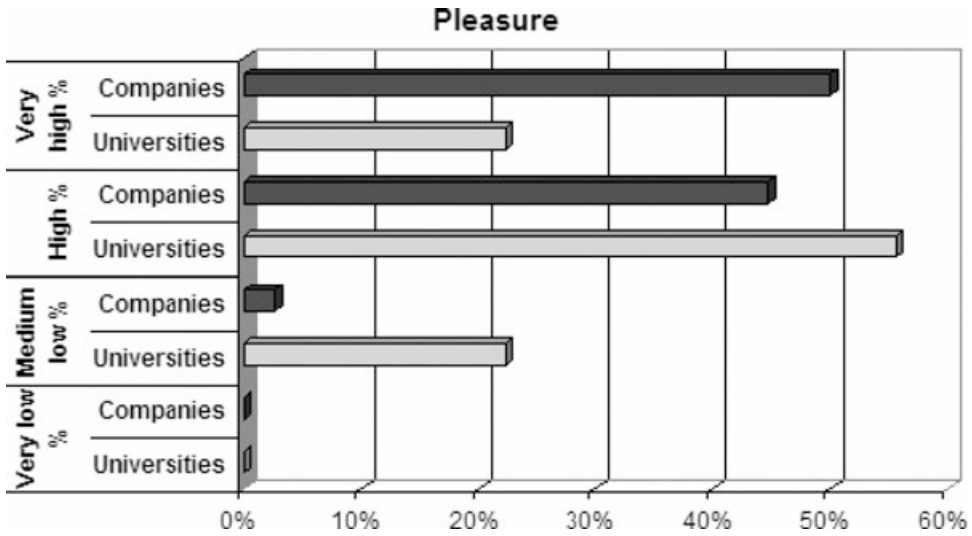


Figure 5: Perceived pleasure of serious games

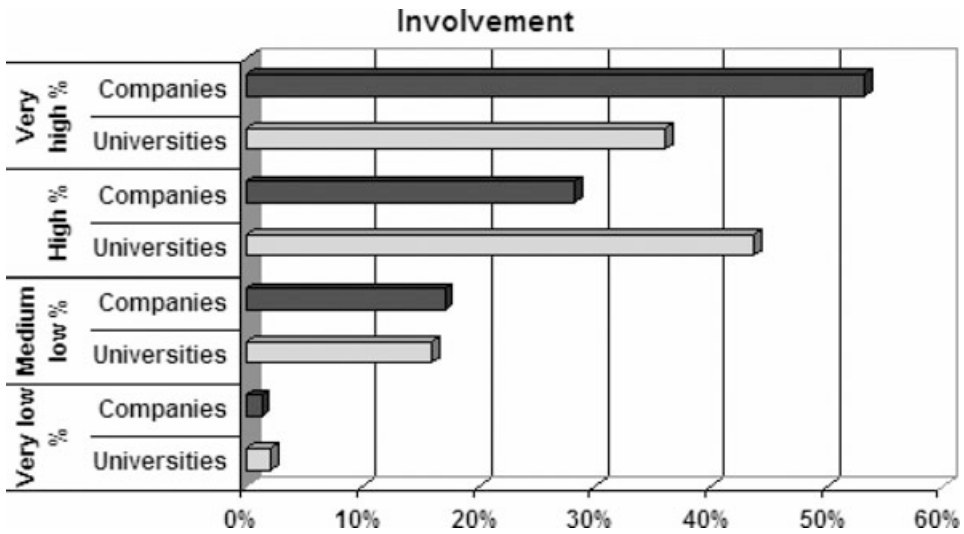


Figure 6: Perceived involvement of serious games

*Involvement*

More than 80% of employees (80% of students) feel involved while interacting with the proposed game, which is preferred to other ‘traditional’ training methodologies (Figure 6).

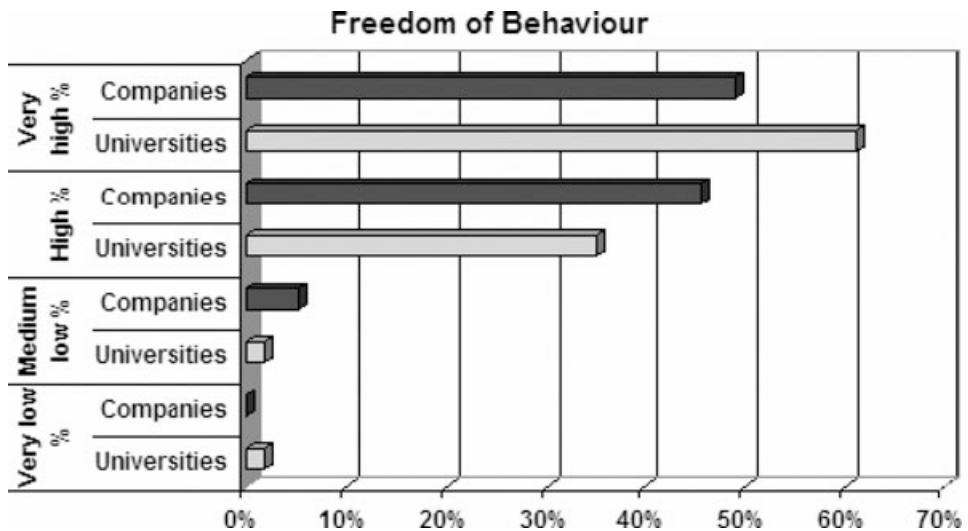


Figure 7: Perceived freedom of behaviour of serious games

The aspects more emphasised by the trainees are:

- their disposition to play the game in the framework of distance learning
- they are prepared to repeat the experience
- simulations are not considered boring tools
- games convey learning contents in an interesting way
- they would prefer using games than carrying out other types of exercises.

#### *Freedom of behaviour*

More than 95% of both groups of trainees consider games not to be intrusive and feel free in their choice of the answers. The gaming element allows human resources to act spontaneously, without feeling judged; moreover, this characteristic increases players' willingness to try different approaches, and as a consequence, increases their confidence in facing the real context afterwards (Figure 7).

#### *Usability*

Usability of the games seems to be very high according to the evaluation of 60% of the employees, while most of the students evaluated it high (44%) or medium low (37%) (Figure 8). In particular, students underline a lack of clear information and instructions before starting the game (no explanation of what to do with the game was given to the students deliberately to see what they could make out on their own, as they were studying new media), while both target groups stress that:

- The output is suitable for this kind of exercise.
- The game enhances knowledge and understanding of general information.
- The learning contents are easy to apply in everyday activities.

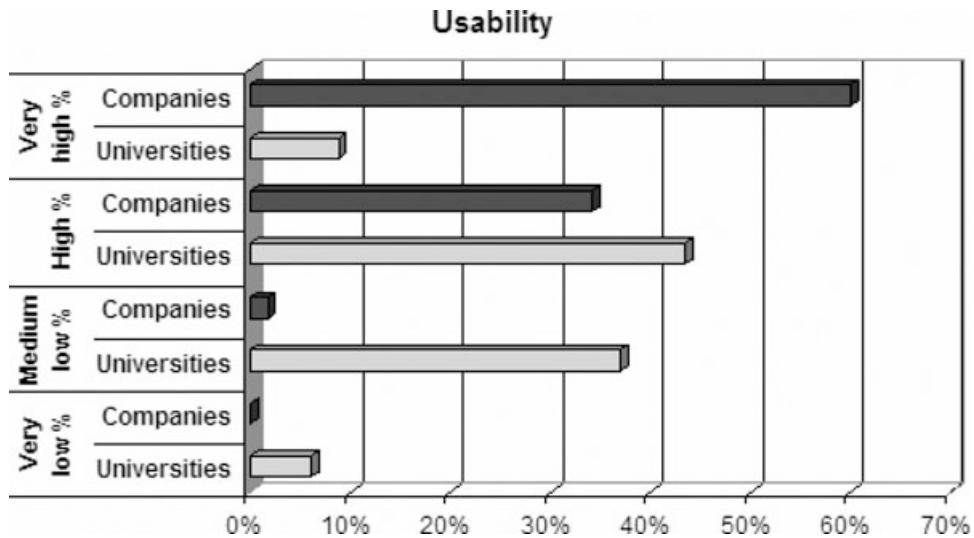


Figure 8: Perceived usability of serious games

## Conclusions

In conclusion, the perception of games as valuable training and educational instruments is generally very high; people seem to appreciate this innovative and unconventional training tool more than traditional exercises. In a company, training activities are normally implemented using traditional courses, and the involved human resources are probably very sensitive to changes in training methodologies.

Moreover, the typical high interactivity of the games assures a high degree of attention while playing the game and consequently increases the effectiveness of training and the involvement of players. In fact, human resources are not merely required to passively receive and assimilate learning contents but have the opportunity to experience situations and problems similar to those faced during working activities. People like having control of the scenario they are working with and to feel responsible for the success of their actions in understanding the dynamics of the environment.

Students, who are more used to playing games, seem to be slightly more critical about the proposed game. In fact, their average evaluation is positive but a bit lower than the one given by employees, except for the freedom of behaviour, although one should bear in mind that employees were prepared for the games during their classroom training, whereas students were faced with company games without detailed explanations of the context.

If suggested as an innovative, effective and more entertaining means meant to support classroom training, serious games often encounter not only the approval of the decision makers and the curiosity of the trainees but also the favour of trainers (who are often still afraid to be substituted by technology). In this sense, the new form of blended

learning, where blended means that technology is brought into the classroom, seems to be the best liked by the corporate sector. On the contrary, when the e-learning form of dealing with serious games is presented, quite a lot of difficulties arise. The main difficulty is often the lack of a quick internet connection and the fear of having to use a modem to interact with the solution. These considerations refer to the Italian market.

The conclusion can nonetheless be drawn that interest in trying out serious games for training seems to be rising slowly but steadily in the corporate sector in Italy and that closing the gap between gaming (something that most people enjoy) and learning (something that is often perceived as boring and that people feel forced to do) seems to raise effectiveness in training for the benefit of both companies and human resources (Pannese *et al.*, 2005).

The effectiveness of the simulation is meant on the one hand in terms of 'interactivity' and of 'performed actions' (Van Eck, 2006) because it is always much easier to remember and to understand the consequences of what one did than of what one heard or read; on the other hand, it is to be understood in terms of 'closeness' to the business situation (Karapidis *et al.*, 2006).

### **Outlook**

Brandon Hall states that by the end of the year 2006, 70% of e-learning solutions will include simulations: on the one hand, PC technology is largely diffused at present and on the other hand, the demand for really efficient and innovative products is growing continuously (e-ducation.it, 2003).

The authors do not believe that Italy is already that far, but the tendency is nonetheless encouraging.

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## Appendix: the questionnaire

### Introduction

For each comment the user should answer by checking the level of his or her agreement in the range 1–4, where 1 is very high and 4 is very low.

For brevity the answers with the checkboxes are shown only once:

Very high   high   medium low   Very low

Where the answer contains a negative statement, the scale was inverted (1 – very low, 4 – very high).

### Questionnaire

The present questionnaire is aimed to evaluate simulations.

We ask you to answer to all the following questions by checking the level of agreement.

You should choose the level of agreement with each assertion, between 1 (very high) and 4 (very low).

We thank you in advance for your kind cooperation and remember you that your contribution allows us to evaluate efficiency and effectiveness of serious games.

**Profession:** \_\_\_\_\_

**Degree:** \_\_\_\_\_

**Age:** \_\_\_\_\_

**Sex:**   M   F

1.

- 1.1. The application is original
- 1.2. I appreciate the look and feel

2.
  - 2.1. The application is easy to use
  - 2.2. When looking for something in the interface, i.e. a button, tips, etc., it can easily be found
  - 2.3. Information provided through the interface of the simulation clearly explains:
    - (a) content of the simulation
    - (b) objectives of the simulation
    - (c) proposed didactical approach
  - 2.4. The instructions given before starting the simulation are clear
  - 2.5. The aim of the exercise is clear
  - 2.6. It is easy to select the parameters of the simulation
  - 2.7. Final results and feedbacks are clear
  - 2.8. I like the instrument "simulation"
  - 2.9. The contents presented in the simulation are clearly and concisely explained
3.
  - 3.1. It was an effective tool within my training program
  - 3.2. The output is suitable appropriate for the exercise
  - 3.3. The proposed situations are close to reality
  - 3.4. It is a training instrument that stimulates to change
  - 3.5. It is a training instrument that allows a deep insight
  - 3.6. Contents of the simulation satisfied my expectations in terms of general knowledge
  - 3.7. Contents of the simulation satisfied my expectations in terms of skills, knowledge of new instruments and operating procedures
  - 3.8. Contents of the simulation satisfied my expectations in terms of ability to learn new behaviours and attitudes
  - 3.9. The topics approached during the simulation are easily transferable in real daily situations of my working activity
4.
  - 4.1. I felt at ease during the exercise
  - 4.2. I chose the answers spontaneously
  - 4.3. I felt judged during the exercise
5.
  - 5.1. If it were a free exercitation on an argument of your interest I would be interested in doing it
  - 5.2. I could identify myself in the situation
  - 5.3. After participating in this experiment I am willing to repeat the experience of using simulations
  - 5.4. The activities proposed in the simulation engaged me and made me interested
  - 5.5. It is difficult to pay attention while enjoying the contents of simulations
  - 5.6. I think simulations are boring
  - 5.7. Paying attention to contents in simulations is more tiring than in traditional courses
  - 5.8. An immediate feedback after the end of the simulation is missing