

INTERACTION WITH SIMULATION TOOLS: ANALYSIS OF USE CASES

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Abstract. This paper is meant to describe a study which is being carried out by a technology company (SME) developing web-based simulation tools together with a specialist in qualitative techniques of measuring the results of a complex (distant) training course.

The research starts with the definition of a methodology to work with; it continues with a series of observations and measurements on different groups of users both at university as well as in companies in order to understand how they interact with simulation tools and it will end with a comparison of the collected results between the academic and the business environment.

1 INTRODUCTION: THE CONTEXT

In an economical environment where competences have to change extremely rapidly and where there is no time any more to learn theoretical concepts before trying to convert them into usable skills, simulations are starting to be seen as an efficient means to offer a training exercise where the user can immediately try to apply the concepts he or she is learning.

In this context the competitive arena is becoming continuously rougher and everyone, especially young people, has to increase his or her productivity and specialization but traditional instruments are no longer effective. The rapid competence development causes continuous changes in the working processes that have necessarily to be supported by correspondent changes in the learning processes if the whole business wants to remain competitive.

With this analysis we try to support this optimization process through a set of case studies which are focussed on measuring how the main characteristics of these simulation tools should be designed in order to optimize the effectiveness of their application with respect to dynamic business processes.

2 THE METHODOLOGY

In the above described environment, empirical experiments have to be carried out in order to define how a “good” simulation has to look like, where “good” means that the simulation has to meet the defined training goal effectively making the user feel at ease and making him or her learn quickly some skills that can immediately be applied to his or her every-day-job.

Therefore a methodological framework is being defined and set up in order to:

- ✓ Be able to define and organize tests to observe behaviours and interactions during the use of simulation tools both in the academic as well as in the business environment (where business means not only companies but also different production contexts, like e.g. exhibitions,...) with particular focus on training applications
- ✓ Define and distribute a questionnaire
- ✓ Organize focus groups with people selected from those who participated to the usage tests in order to collect further information

2.1 Observation of behaviours/ User-based test

This kind of user-based test is a kind of observational assessment with users that begins already in the earliest phases of the user interaction design and continues throughout the entire life cycle of the designing process. Qualitative data are usually in form of critical incidents occurring while a user is performing task scenarios: these are events affecting user performance either in a positive or in a negative way. Main focus of the research is to integrate this method with specific tools (questionnaire & focus group) in order to use different methods to investigate the concept of usability in the real context of usage of the simulation tools.

2.2 The Questionnaire

Starting from a “classical” approach (we mean those studies integrating quantitative and qualitative tools) a questionnaire was built up in order to be able to measure the quality of simulation software. According to this approach five different aspects have to be evaluated:

- ✓ **Contents:** are they focussed 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 customized 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.

According to the above mentioned topics, the questionnaire 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....

The answers are given on a four-scores scale ("1-Much", "2-Enough", "3-A little", "4-Not at all") in order to avoid "average" answers.

2.2 Focus Groups

Although they are mostly used in market research, focus groups can be excellent for collecting usability data. The environment of a focus group, where participants bounce ideas to one another, is similar to the conversations and interactions in today's workplaces; focus groups produce real-life ideas and opinions in a social environment.

In a usability focus group session, people with similar characteristics discuss selected topics with the assistance of a moderator who is a usability specialist. Meanwhile another usability specialist takes detailed notes and videotapes of the sessions. Focus groups provide the richest data on what users like and dislike. Less controlled than usability tests, focus groups take advantage from group dynamics in which people interact and spark ideas as they do in real life. However, focus groups provide only "self-reported" opinions (users interpret their own behaviour) because this technique does not enable us to observe the behaviour of users performing actual tasks; therefore they should not be taken as the sole source of user data.

3 EMPIRICAL RESULTS: THE FIRST TEST

A first test was organized in May 2005 at the Università Cattolica di Milano with 18 students for Languages of the Media, Faculty of Literature and Philosophy.

The students were shown two different simulations: the first one was more oriented to a communication problem; they had the possibility to use the entertainment demo but were also shown a business example (in a sales' environment) which is the exact same in the logical structure. The second example is set in a behavioural context: a story is presented and it goes on according to the behaviour choices of the user until a final comment of his or her behaviour is reached (in the demo example three pa-

rameters are computed: reaching a pre-defined objective, time management and the ability of keeping a good relationship with a customer).

At the end of the usage test a group discussion was organized in order to be able to understand how users judge and feel about simulation tools with particular respect to the following elements:

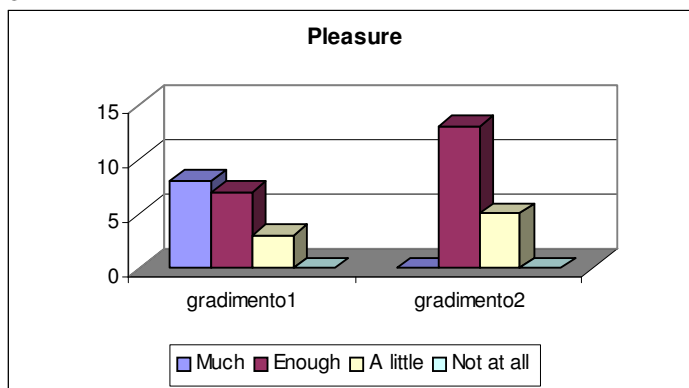
- ✓ What would be the ideal type of user who could profit from such a tool
- ✓ Who does a simulation tool address
- ✓ What kind of contents and topics could be treated in order to maximize the impact of using a simulation tool
- ✓ What could be the ideal application environments
- ✓ What kind of company could be addressed

The 18 users filled in a questionnaire that focussed on the following aspects: how much they liked the simulation tools, usability/ ergonomics, how well the tools fit with the goal (e.g. of a training), how free they feel while interacting with such tools and how far they get involved. (see 2.2).

After a statistical analysis of the collected data the first results of this questionnaire can be described as follows:

Pleasure

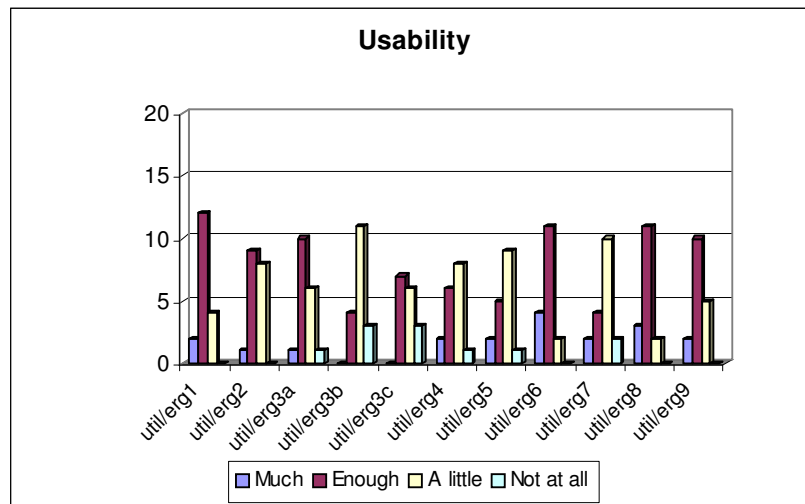
The tools were perceived as generally pleasant. In fact the descriptive statistic analysis of the questions correlated to the pleasure item shows high values for the answers “Much” (1) and “Enough” (2) which were given in more than 77% (average) of the answers.



Usability

The analysis of the answers given to the items dedicated to measure the usability of the systems shows a diversified typology of results which can be summarized as follows:

- the simulation is considered easy to use
- the subjects report not to be able to easily find what they are looking for
- the supporting descriptions at the beginning of the simulation do not clearly explain both the contents and the objectives of the simulation
- the instructions given at the beginning are not very clear
- the goal of the exercise as well as the final interpretation of the results are not considered clear enough

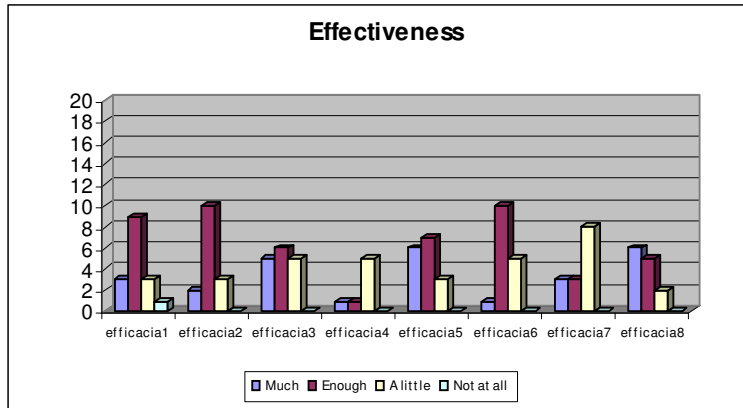


Effectiveness

The answers given to the items of this session almost always take the values "Much" or "enough."

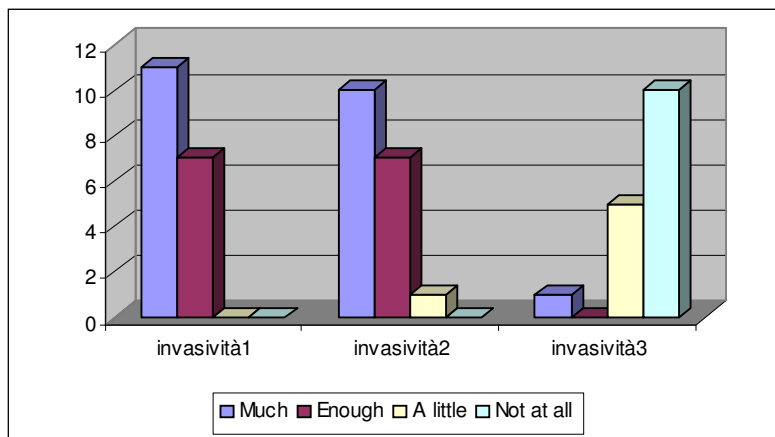
In particular the simulators are considered effective tools for:

- change
- reflection
- assumption of new behaviours
- transferability of the information treated in daily situations



Freedom of behaviour

The simulators are considered as non-invasive tools. In fact, the subjects declare to feel free during the deployment of the assignment and in the choice of the answers.



Involvement

In this further case the judgments given about the degree of involvement appear to be positive once more.

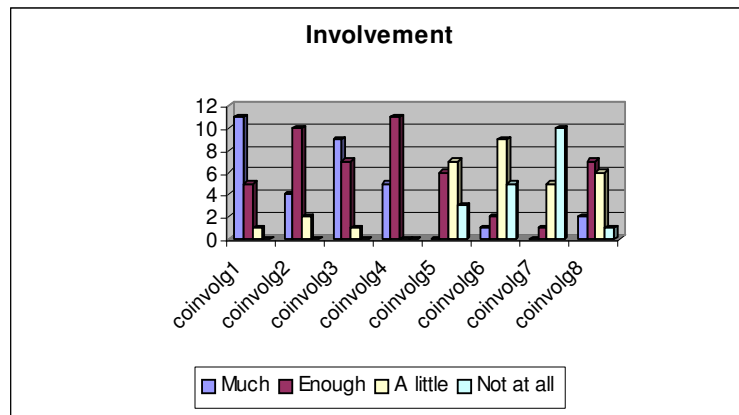
The users state

- to be prepared to repeat the experience
- to have succeeded in identifying themselves in the situation
- that they would prefer this training means if they were free to choose

- to have succeeded in maintaining a high degree of interest and attention towards the treated topic

The simulations are not considered as being boring and they are perceived as less tiresome than frontal lessons in a classroom.

The only negative element immediately appears to be the lack of a clear and exhaustive feedback after the conclusion of the simulation.



4 FURTHER STEPS

The presented data refer to the first step of the research (only one consistent group of university students) and are therefore incomplete. Also different groups of university students need to be interviewed.

In the next months the same tests will also be carried out with users belonging to the business environment with respect to different applications (e.g. a language versus a marketing training).

A first group is already planned for the beginning of July in the context of a pharmaceutical training.

Within a training of statistical market data analysis a simulation exercise will be presented. The simulation targets a communication strategy: salesmen will have to present their product to a doctor trying to increase the doctor's favourable perception of their product compared to their competitors' products. The presentation will not find place in a chemical context but a pure communication problem will be targeted.

Another group is being organized with a simulation exercise in a linguistic training: a group workers attending an English course will also be confronted with an interactive exercise based on a simulation and be interviewed.

The last step of the research will be a comparative qualitative analysis which will be carried out between the data sets collected within the two macro-groups (academy and business environment). This analysis will refer to a set of indicators which are particularly relevant for the evaluation of the processes of the interaction with simulation tools during a training course.

References

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