

SISINE: Teaching Negotiation Through a Multiplayer Online Role Playing Game

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Abstract. Trainers have used role-playing games to teach negotiation skills for a long time. In traditional practice, learners in a small group “act out” the roles assigned by the trainer. The SISINE Project (www.SISINE.net) – funded by the EU Leonardo Program - has developed a teaching methodology making it possible to conduct this kind of role playing game at a distance. The teaching methodology exploits a specially-developed technology platform allowing a small community of players to communicate, interact and play online. The current beta version supports up to twenty simultaneous players, represented by avatars. Communication among players is based on short text messages displayed in bubble cartoons above the avatars’ heads. Special controls allow players to control the avatars’ movements, gestures and facial expressions. This way, the community can communicate, interact and play online. The platform provides the normal functionality expected by players of Multiplayer On-line Role-Playing Games (MORPG) as well as special functions allowing a trainer to set up games, intervene during game play, record specific phases of a game, annotate recordings and discuss them with the players. Since January 2007, the SISINE project has been testing its platform and methodology in Poland, Slovakia and Italy. In Poland the experimental group consists of company sales representatives; in Slovakia of managers in NGOs; In Italy of teachers. The testing is still in progress. In each case, the group uses a custom-designed virtual environment to practice specific forms of negotiation: commercial negotiation (in Poland), negotiation in human resources management (Slovakia) and intercultural negotiation (Italy). In all cases, SISINE helps learners to acquire basic notions and rules about negotiation and, more importantly, practical know-how on how to apply this knowledge.

Keywords: Role games, negotiation, vocational training, MORPG

1. Introduction

Finding a shared solution to a problem within a group requires *negotiation* – a potentially exhausting and time-consuming process. To negotiate successfully, members have to involve the whole group, explain their position clearly and do their best to understand those of others . There is a large literature showing that negotiation can reduce inter-individual conflict, and produce lasting solutions (Fox, 1987). However, in reality, groups often fail to negotiate, even when negotiation would be useful. Sometimes the problem lies in sheer size of the group, or in hierarchical organizational structures or in impediments to communication deriving from language, culture or history. In other cases, the main barriers lie in the individual psychology of specific group members. Typical problems include weak communications skills, lack of empathy with others, and poor control over the emotions arising during prolonged discussion.

Encouraging groups to negotiate more frequently requires education. In recent decades, this need has motivated psychologists, educationalists and trainers to develop techniques for group problem solving, and methodologies to teach them (Qin, 1995; Lewicki, 1997). One of the most important is *Psychodrama* (Moreno, 1958)– a technique originally developed for psychotherapy. In this technique, each session is a sort of play. The therapist/director sketches out a story, assigns roles to the patients/actors, watches as they act out the story, and intervenes where this can be useful. At the end of the “play”, the therapist leads a group discussion (debriefing).

When teachers use psychodrama for education, they talk about “role playing games”. Here it is the teacher who takes on the role of the therapist and the learners who play the part of the patients. The literature describes the use of role-playing games in many different settings, from companies and trade unions to schools and political parties (see Asherman e Asherman (2003)).

One of the biggest applications of “role playing games” has been commercial video-games, designed for entertainment. In these games, players act in a digital world, where they can play on their own or with other players. In recent years, the Internet explosion has led to the development of so-called **Massive Multiplayer On Line Games**, or MMORPG. Famous examples include Second Life (<http://secondlife.com/education/>) and Active Worlds (<http://www.activeworlds.com/edu/>). “Massive” games like these, allow enormous numbers of players to participate in a *virtual psychodrama*. Remote users control a digital actor (an avatar) as it explores a huge and hugely varied artificial universe, rendered in 3D graphics. Via their avatars, players take on specific roles, using the avatar as a mask in their interactions with other players. Players communicate using the possibilities provided by the avatars. For instance, avatars can adopt a posture, make gestures or show specific facial expressions. They can also communicate, via text or speech. In this way the remote user becomes a kind of “virtual” puppeteer. It has been suggested that players are less inhibited when playing electronic role playing games than they would be in real life (Fleming, Seay e Kraut, 2007). Divested of their social, psychological and corporeal identity, players find it easier to identify themselves in other lives (other roles). The effects can be both negative and positive. Excessive use can create disassociation and dependency; occasional, well-balanced use can stimulate players’ skills allowing them to freely explore multiple scenarios.

The positive effects of video-games, and their important role in the lives of adolescents and young adults have encouraged researchers to investigate their use in education (De Freits e Griffiths, 2007; Miglino et al. 2007). This paper describes one such application: a platform allowing simple development and deployment of educational role-playing games. We call the platform SISINE (*Sistema Integrato per la Simulazione e la Negoziazione*). The platform and the educational methodology on which it is based have been developed as part of the SISINE project, funded by the European Union “Leonardo” program¹

The SISINE software includes one version for teachers and another for learners. The teachers’ version includes tools allowing the teacher to a) define offline role-playing games for individual users; b) define online multiplayer games; c) intervene during multiplayer games; d) manage debriefing sessions. The learner version allows learners to participate in single-player and multiplayer games and in debriefing sessions. In what follows we will define this functionality in greater detail, together with the results of early trials in Poland, Slovakia and Italy.

2. SISINE functionality

SISINE is inspired by Role Playing Games. But on top of the functions normally present in any role playing game SISINE provides additional facilities specially designed to facilitate its use in distance learning. Below we analyze some of the most important of these functions, as they appear to teachers and to learners.

2.1 SISINE for teachers

SISINE provides a complete set of tools for teachers. Using these tools, they can organize their teaching in the way they see fit. SISINE tools allow teachers to write the scripts for online multiplayer games or for single player exercises (so-called “gyms”). When they design a multiplayer game they can choose the roles, goals and bodies of individual players. Once the game is in progress they can watch what is going on from any viewpoint they choose, intervening at any moment, writing messages to players, or activating special “events”. And when it is over they can become critics, leading a group discussion and analyzing the strategies adopted by the players.

¹ The coordinator of the SISINE project is the National Research Council - Institute of Cognitive Sciences and Technologies – (Italy). The other partners include the Intelligent Artificial Systems research group of Université de Paris XII (France), Entertainment Robotics (Denmark); ITTI - Institute of Communication and Information Technologies (Poland); Glaux, S.r.L. (Italy). TILS Spa (Italy); Mediazioni S.c.a.r.l. (Italy); PDCS – Partners for Democratic Chane Slovakia (Slovakia) and Xiwrite Srl (Italy)
For further information see <http://www.sisine.net>.

2.1.1 The multiplayer game editor

In an online training session, learners are less free to interact than they would be in a traditional chat session. The script is written by the teacher. Players have to take on specific roles and pursue specific objectives described in the script. As they do so they learn about the other “actors” in the story. Teachers can use SISINE tools to make it easier for learners to play their parts. For instance, if one of the actors is meant to be authoritarian and arrogant, teachers can use the tools to prevent him from using a soft voice or a conciliatory tone of voice. Alternatively they can force him to smile all the time (see below for more details).

To define scripts and the role of specific actors, teachers use the SISINE “Game Editor”. The editor allows them, among other things, to place constraints on the way players interact, giving a direction to the gameplay. Figure 1 shows what teachers see as they work with the editor to define the title of their script, a general description of the story, the graphics environment used in the story, and players’ “shared objectives”.

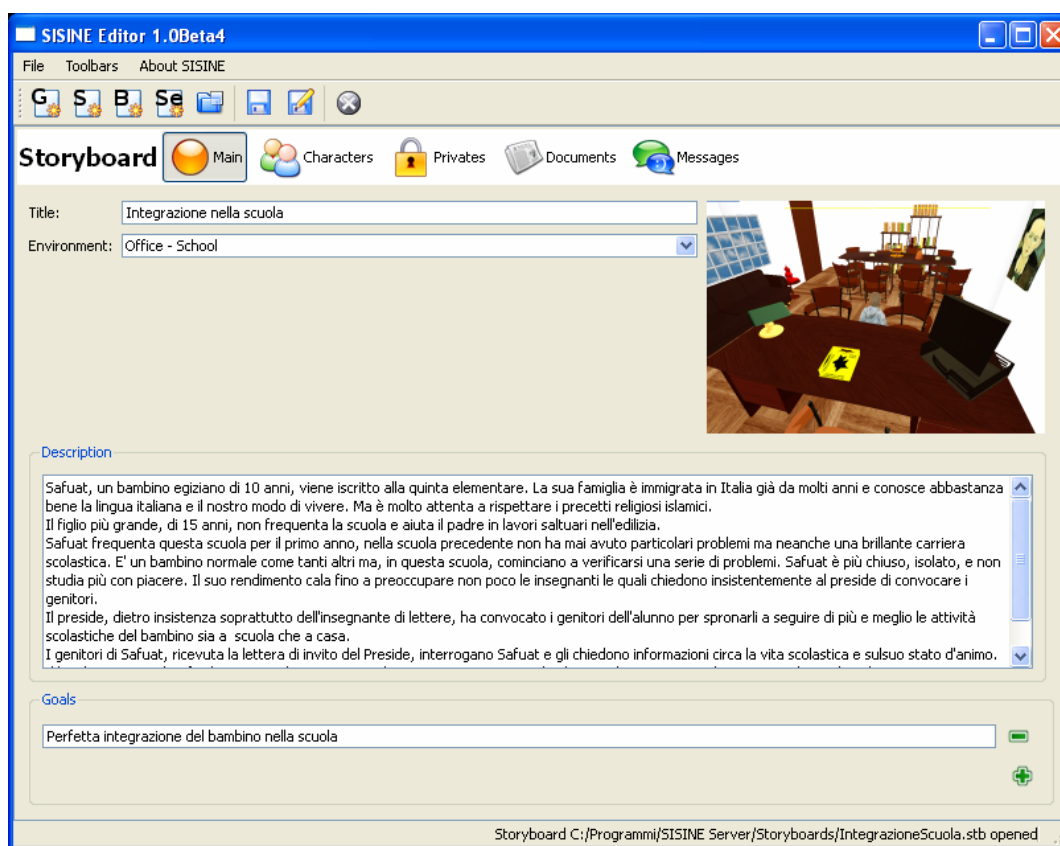


Figure 1: The main screen of the editor during script-writing. The teacher uses the editor to define the title of the session, the graphics environment, the background to the story told in the script and the players’ shared “objectives” .

Script writing takes place in five phases:

1. General description of the story
2. Definition of the “actors” (name, description, personal objectives, avatar)
3. Definition of “private actor characteristics” (i.e. characteristics visible only to the learner controlling the actor).
4. Definition of document events to be incorporated in the script (see below)
5. Definition of message events to be incorporated in the script (see below)

Once the script has been created, the teacher associates each “actor” with a specific learner. As soon as learners log on, they take on the role of the actor, chosen for them by the teacher.

2.1.2 The single player game editor

As well as interacting with other players in online multiplayer games, SISINE learners can interact with computer-controlled actors in offline games and exercises (so-called “gyms”). To control the actors, SISINE uses techniques from Artificial Intelligence. The gyms allows learners to practice strategies they can later apply to their interactions with human players. In multiplayer games, it is teachers who prepare the scripts for exercises. However, the scripts for the gyms are more detailed, specifying not only the basic story and the actors involved (one controlled by the learner, one by the computer) but the set of phrases the actors can use to communicate with each other the paraverbal signals (volume, tone of voice, facial expressions, gestures) associated with each phase and the effect of the phrase on the other actor (e.g. increased or decreased aggression).

The definition of a gym involves 3 phases:

1. General description of the story
2. Definition of the “actors” (name, description, personal objectives, avatar)
3. Definition of the dialog between the actors (number of steps, text of possible phrases available to the actors, para-verbal signals, effect of signals on the other actor etc.)

Figure 2 shows the editor screen used to define the dialog between the actors.

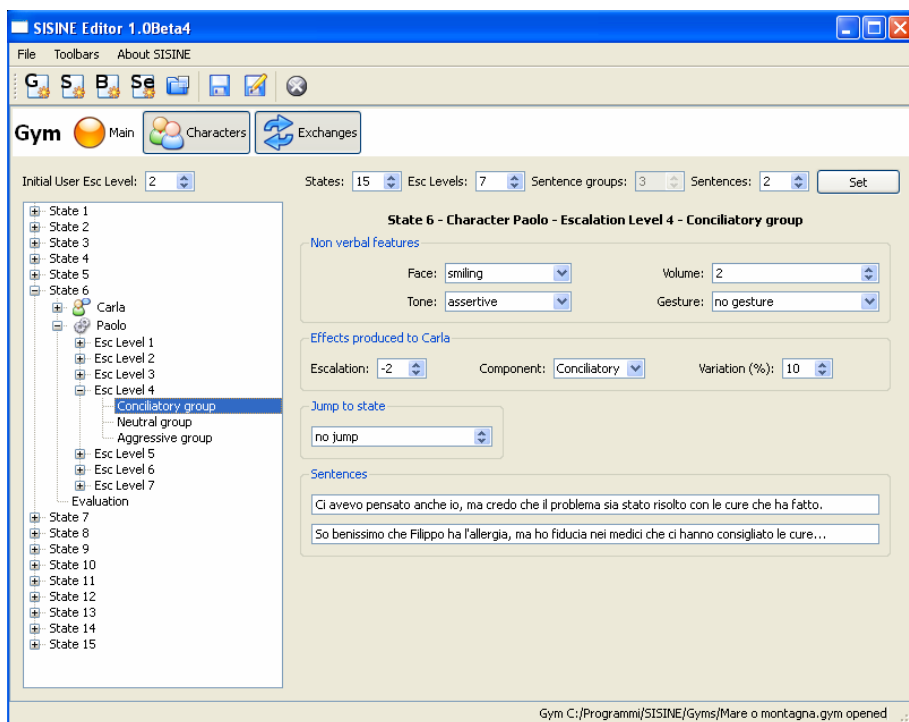


Figure 2: Definition of a dialog using the single player game editor.

The editor also allows the teacher to define the characteristics of the computer-controlled character (a so-called “bot”). These characteristics determine the way the bot replies to the human player. Each bot has an “internal state” and a “level of escalation” which depend, in part on the actions of the human player, in part on specific “personality traits”. For instance, an “irritable” bot might “lose its temper” very quickly, while another calmer actor might be more willing to look for an agreement or to accept the point of view of the other player.

2.1.3 The SISINE tutor

As well as preparing the scripts for online games and assigning actors to users, there are two other ways in which teachers can intervene in learners' interactions with SISINE. One is to take on the role of one of the actors in the simulation. The other is to act as an invisible stage director. In this second role, teachers can:

- invisibly observe the interactions among the players
- access the actors' "private characteristics"
- listen in to private messages ("whispers") between players
- "broadcast" messages visible to all players
- exchange private messages with a specific user
- activate events, changing the course of the simulation

To do all this, teachers use the tutor module.

Figure 3 shows how the teacher can use the software to activate an event.

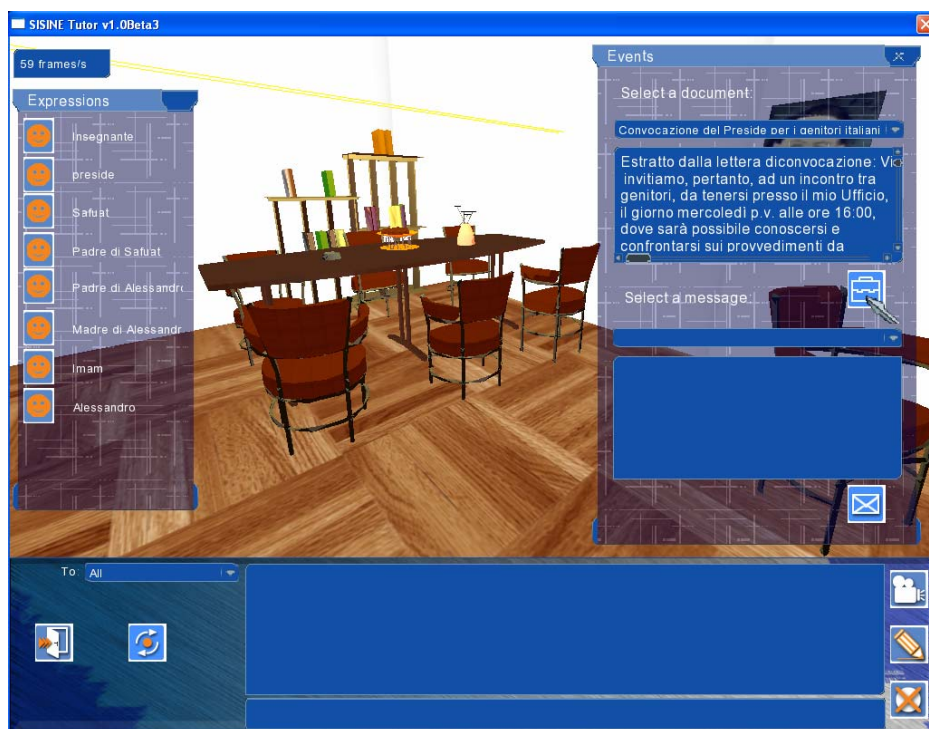


Figure 3: A screen from the SISINE Tutor. The teacher is about to activate an event.

SISINE events are pre-defined in the script written by the teacher. SISINE supports two classes of event: document events and message events. Document events are events which in some way involve a document: e.g. the arrival of a letter, the purchase of a newspaper. In message events, a new actor joins the scene, communicating important information to the actors already "on stage". For instance, a secretary might come into the headmaster's office to communicate that a pupil's parents want to talk to him.

2.1.4 Debriefing tools

SISINE allows teachers to record both multiplayer games and gyms. The recordings take the form of a 3D interactive video. SISINE provides teachers with a special player allowing them to interact with recordings in several different ways. In particular they can:

- view the recording from different points of view, shifting the virtual camera to the position they prefer

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- view the script for the session,
- insert comments,
- change the speed of the recording
- split the recording into chapters (as on a DVD)
- modify the recording in various way (e.g. cutting out less interesting parts)

Through these facilities, teachers can create a commented version of the recording for use during *debriefing*.

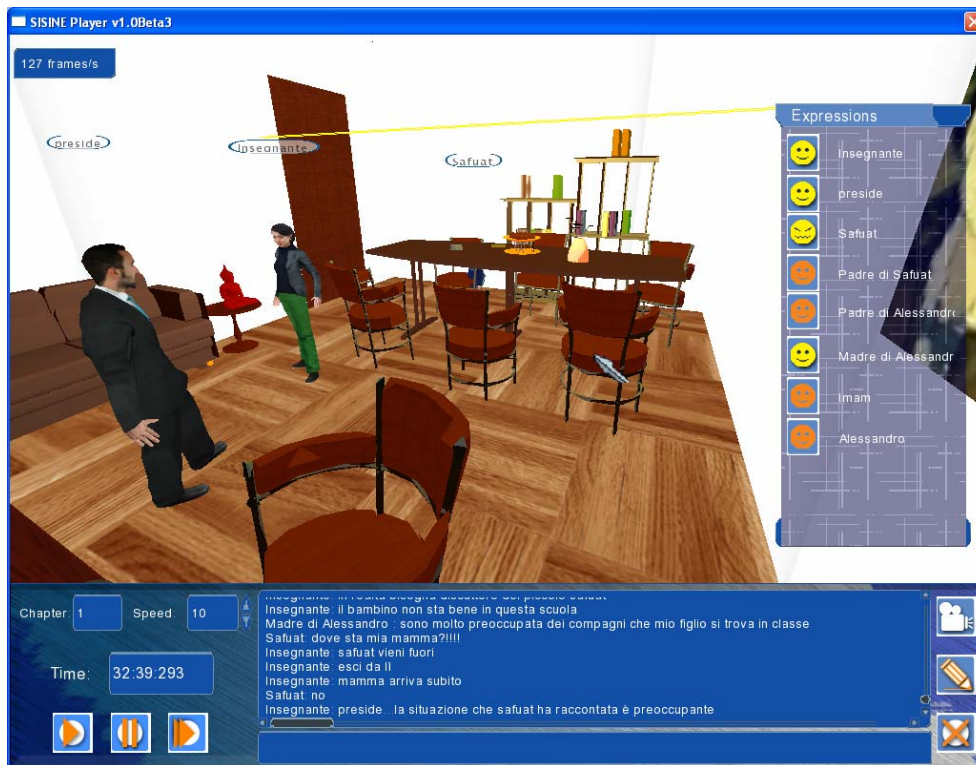


Figure 4: Using the player to review a previously recorded session

2.2 SISINE: student version

In the previous section we described the tools SISINE makes available to teachers. Here we discuss the way learners can use the system. .

2.2.1 Multiplayer on-Line role games

The first possibility SISINE offers to learners is that of participating in online role-playing games defined by teachers. To access the system, learners use a student version of the SISINE software . Once logged in learners join a 3D graphical environment in which they are represented by *avatars*. Learners can use their avatars to explore the environment and to communicate with other players. They can choose between a first person and a third person view of the scene. When they choose the third person view they also choose the position of the virtual camera.

Players communicate via short texts which appear in bubble cartoons, over their avatars' heads. They can also use various forms of paraverbal and non-verbal communication. For instance they can control how loud they want to speak (shown by the size of characters used in the bubble cartoons) and in what tone of voice (shown by the shape of the bubble). Another option is using avatars' facial expressions to show warmth, surprise, anger etc. Players can control avatars' gestures and body movements: e.g. by making the avatar wave goodbye, point at someone or hug someone. They can "whisper" messages to each other. These are audible only to the other partner

in the conversation, and to the tutor. Finally they can communicate with the tutor, to ask advice or clarification or to raise any other question that concerns them.



Figure 5: Avatar control as a way to explore an online session

2.2.2 Single player games

As mentioned earlier, SISINE learners can interact, not just with other players (during online role-playing games) but also with artificial “bots” controlled by Artificial Intelligence software.

Learner interactions with *bots* are not completely free: they follow a script defined by the teacher and communication is based on a fixed set of pre-defined phrases. Additional information specifies the emotional content of the phrase, that is, its effect on the other partner in the conversation. For example when an avatar says “Shut up and listen to me!” the message has a strong emotional content which is likely to increase aggression in the other partner. Just like the human player, the bot can choose between a set of different phrases. The phrase it actually chooses depends on its “internal state” and “level of escalation”.

Players can interact with different kinds of bot, each with its own personality, chosen by the teacher. Some are aggressive, some conciliatory, some are easily influenced by the other player, some less so.

Figure 6 shows an example of conversation between a learner (the “wife”) and a bot (the “husband”). In the dialog shown here the human and the bot are arguing about whether they should spend their holidays at the seaside or in the mountains. There are four ways in which such an argument can come to an end:

1. The two sides reach an agreement: this is usually a positive outcome – it means the player has managed to negotiate effectively with the bot. Sometimes, however, the system gives a less positive assessment, for example when the human player has given in to all the bot’s demands. This is not a negotiation but an unconditional surrender
2. Time runs out before the two sides have reached an agreement: this is nearly always a negative outcome. It shows that the human player has failed to fully use her negotiating skills.
3. The bot abandons the negotiations in a fit of anger: this too is a negative outcome: the human player has failed to achieve an agreements and has even managed to infuriate the bot.

Players can work with gyms independently without any need for help from the teacher. Later the teacher can watch recordings of the exercises, adding comments or suggestions to the recording.

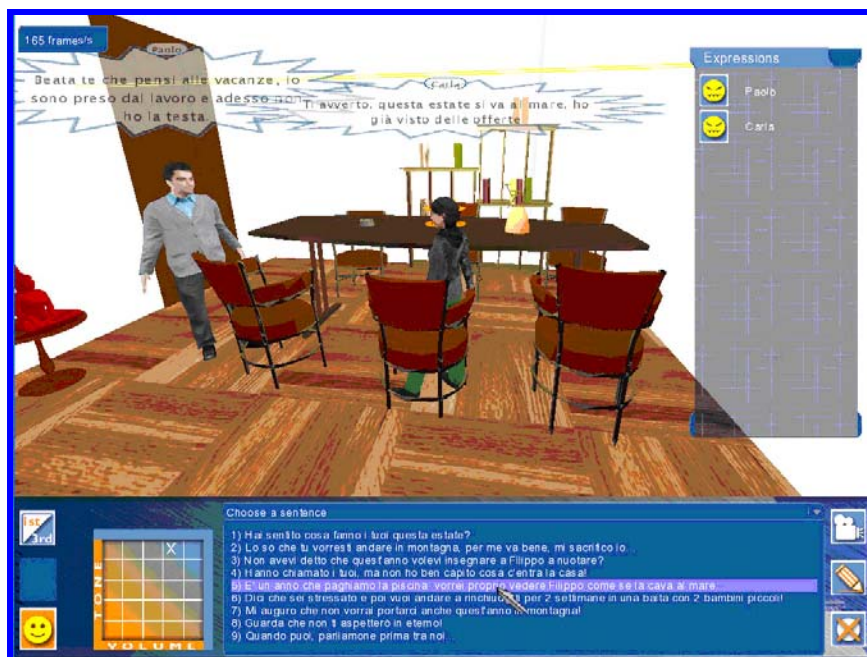


Figure 6: Wife (learner) and husband (bot) discuss their holiday plans in an offline role-playing session (gym)

2.2.3 Debriefing Tools

We have already seen how teachers and players can record and play back sessions using the SISINE player. Players too can record their online and offline sessions. The player allows players to review their behavior from different viewpoints, providing useful insights for subsequent debriefing sessions. Where useful the teacher can provide them with a complete version of the recording, including information which they could not see in the original session. Teachers also have various ways of editing and commenting on recordings. This allows them to provide useful suggestions to learners.

3. Early trials

SISINE tools and methodology is under testing in three early trials, in Italy, Poland and Slovakia. Each trial is the responsibility of a specific SISINE partner and focuses on one specific kind of negotiation:

1. Intercultural negotiation at school(TILS: Italy).
2. Commercial negotiation (ITTI: Poland)
3. Negotiation as a part of Human Resources Management in NGOs (PDCS, Slovakia);

Each of the trials involves roughly 20 learners. All learners satisfies the following inclusion criteria:

- Professional involvement in negotiation and/or mediation (though not necessarily as a main activity)
- A basic knowledge of computers and web-based services

All the pilot trials are applying the same methodology and the same technological tools. The courses are organized in the following stages

1. An initial classroom session to present the goals, content, methodology and tools used during the trial.
2. Remote Multiplayer sessions in which 4-5 learners simulate a negotiation under the supervision of a tutor

3. Four offline single player sessions with bots. .
4. A second classroom, follow-up session, including assessment.

4. Conclusions

SISINE's goal is to test the use of simulation as a way of teaching personal skills, which are hard to teach with traditional techniques of e-Learning. For those of us who believe in e-Learning's potential in high quality training, achieving SISINE's goal has been a major challenge, requiring the application of advanced techniques from Artificial Intelligence and from Interactive online environments. To build attractive, easily usable tools we have also had to pay great attention to the graphical interface and interaction design.

Today, the SISINE team is working to improve the "look and feel" of the system. In particular we are:

- Enhancing the repertoire of behaviors available, introducing new gestures, new facial expressions and new body postures
- Expanding the number and size of the environments teachers can use for simulation (in the early trials there is just one environment for each trial).
- Improving the graphical interface, using feedback from the early trials and making it easier for learners to control – and identify with – the avatars

Another direction in which we are moving is to improve the capabilities of the bots used in the gyms. In the early trials we are using "deterministic" bots whose reactions are directly determined by their teacher-defined personalities. In the future, SISINE bots will use adaptive artificial intelligence to learn from their interactions with human players. This will make the interaction with bots more realistic and offer new possibilities to learners. One option will be to train a bot to adopt a specific negotiation strategy of interest to the learner. In this way learners can swap roles, becoming tutors, and testing the effectiveness of their training strategies by pitting the bots they have trained against human players or other bots. All this will make SISINE's offline exercises much more interesting than in the current version of the platform.

We could also use Artificial Intelligence in online mode. SISINE is currently exploring two different techniques allowing online users to interact with artificial agents (Golems)

- When users are not connected to SISINE, they could delegate a pre-trained Golem to represent them: the human and the computer player would alternate in the same role. In this settings, learners have to be both good players and good trainers.
- Users could create a small community of Golems and observe how they play together, intervening at critical points in the game.

To summarize, SISINE represents a first attempt to exploit existing techniques from role-playing games and artificial intelligence for the purpose of teaching. Although the current system is designed primarily to teach negotiating skills it has strong potential for use in other domains – in particular in the teaching of strategic and soft skills.

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