Simulation-based training of communication and emotional competence for the improvement of physician-patient relationship

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Abstract: Recent research has determined that the training of health-care professionals in communication and emotional skills management is related to patients’ satisfaction and compliance towards medical treatments. Moreover, good communicative and emotional competence enhances the physician’s sensitivity to the psychosocial aspects conveyed by patients, and it may also help the physician to cope with his/her own emotions, thus reducing burn-out. Training in such capacities has traditionally been conducted via didactic learning. However, recent work in computer-based simulation offers a viable and promising alternative.

The present work, as part of the EU-funded project “MySelf: Multimodal e-learning System based on Simulations, Role-Playing, Automatic Coaching and Voice Recognition interaction for Affective Profiling” (www.myself-proj.it), aims to describe the potential of computer-based interactive simulations for enhancing communication and emotional competence training in the physician-patient relationship. In particular, this work is focused on the translation of typical interactive medical situations into 3D simulations with animated characters; this offers the possibility for physicians to train their communicative and emotional skills (e.g. empathy, emotional coping, non-verbal communication, etc.) in critical settings through interactive scenarios that improve the user’s identification and experience in a virtual context.

INTRODUCTION

Recent research has determined that the training of health-care professionals in communication and emotional skills management is related to patients’ satisfaction and compliance with medical treatments. Moreover, communicative and emotional competence enhances the physician’s sensitivity to the psychosocial aspects conveyed by patients (van Dulmen & van Weert, 2001) and it may also help the physician to cope with his/her own emotions, then subsequently reducing burnout (Fallowfield & Jenkis, 2004).

These capabilities are learned primarily through experience, since they require a number of cues that are managed hic et nunc, in the flow of the communicative exchange. Therefore communication competence has been traditionally considered as a typical face-to-face/ classroom learning topic. However, recent work on computer-based interactive simulations and autonomous agents (Aldrich, 2003; Marsella, 2000; Paiva et al., 2004) offers new opportunities for the training of communication and emotional competence in different professional contexts, including health care.

Simulation can be defined as a learning method designed to replicate a real-life situation as closely as possible, to give the user the opportunity to experience this situation in a realistic but non threatening context (Schank, 1997). The efficacy of simulation in soft skills training has been explored in several projects. For example, the IDEAS project (Marsella, 2000) aims to improve problem solving skills in mothers of paediatric cancer patients. Learning is based on interactive stories where two virtual agents, Carmen and Gina, play the role of the mother of a seriously ill child and of a clinical counsellor, respectively. Through identification with the characters, the user can improve his or her problem solving abilities. In addition, Aldrich’s
Virtual Leader (Aldrich, 2003) works to improve leadership skills with a training program based on simulations that show several different managerial and business scenarios.

The present work, as part of the EU-funded "MYSELF-project-Multimodal e-learning System based on Simulations, Role-Playing, Automatic Coaching and Voice Recognition interaction for Affective Profiling" (www.myself-proj.it), aims to investigate the potential benefits of computer-based interactive simulations for enhancing communication and emotional competence training in physician-patient relationship. After an introductory section describing the specific characteristics of communicative and emotional competence training in health-care, this contribution will focus on the rationale for the use of computer-based simulations for physicians' training in various relational skills. Some critical elements related to the design and development of interactive simulations will be presented and discussed, with particular reference to the goal of eliciting a sense of presence in the simulation's user/trainee in order to foster learning transfer to actual professional contexts.

**COMMUNICATIVE AND EMOTIONAL COMPETENCE TRAINING IN MEDICINE**

The medical encounter represents a complex communicative situation, deeply pervaded with emotional elements. Consequently, good management of communicative and emotional skills by the physician is a key element for an effective relationship with the patient (Fallowfield & Jenkis, 2004).

Even if the training of these abilities can be considered a basic element of medical education, some clinical scenarios invariably make the physician's emotional control particularly difficult. For example, in the oncologic field, the physician is repeatedly faced with serious diseases, and consequently with death. Other medical specialties, like paediatrics, gynaecology, obstetrics, cardiology and emergency medicine also are frequently confronted with stressful communicative situations. Giving bad news and facing possible therapeutic failures involves an emotional distress in medical professionals that may be particularly significant, as some physicians have reported (Orlander, Fincke, Hermanns & Johnson, 2002; Hammond, Franche, Black & Gaudette, 1999; Baile, Lenzi, Parker, Buckman & Cohen, 2002). Specific training focused on the communicative and emotional skills needed to cope with these circumstances can diminish their psychological impact on the physician, reducing the risk of burn-out (Libert et al., 2001; Farrell, Ryan & Langrick, 2001; Rosenbaum & Kreiter, 2002). A general survey on the communicative and emotional traits that characterize the medical encounter can help the comprehension of the role of relational skills training in this field.

The medical encounter can be defined as a non-symmetrical interaction, where the physician's position is higher than the patient's with respect to many variables, including professional competence, and often social status. It can be a non-voluntary relationship (for example in case of emergency) and always requires close cooperation between physician and patient. In this respect, many studies have underlined that good and effective communication by the physician plays a critical role in the patient's compliance with therapy and consequently in the achievement of a good therapeutic outcome (Siminoff & Fetting, 1991; Ley, 1988).

The communicative elements that characterize physician-patient interaction can be schematized as instrumental and affective behaviors. The instrumental communicative behaviors are task focused; that is, they are related to the physician's medical expertise and to the technical skills that enable him to analyze and solve the patient's problem (Hall, Roter, & Katz, 1987). These elements can be also defined as cure oriented (Ong, de Haes, Hoos, & Lammes, 1995) and are identifiable in the dialogue parts focused on the medical problem, both by the physician and the patient. On the other hand, affective communicative behaviors can be defined as care oriented (Ong, de Haes, Hoos, & Lammes, 1995), since they are related to the socio-emotional aspects of the disease. They include, among other elements, giving the patient reassurance and encouragement, showing empathy and approval, and asking information about the patient's social and family context (Roter, 1991).
In light of the emotional connotation of the medical encounter, the affective aspects should prevail over the instrumental ones, but the communicative scenario is quite different.

Experimental studies focused on the verbal aspects of the physician-patient interaction have revealed that the instrumental elements are quantitatively more frequent than the affective ones (Weston, Brown & Stuart, 1989). Moreover, other studies reported that the communicative exchange is mainly managed by the physician, as his contribution to the dialogue, in terms of speaking time, is higher than the patient's one (Roter, Hall, & Katz, 1988). These results seem to outline a communicative scenario in which the emotional aspects related to the situation are scarcely managed and encouraged.

In this respect, helping physicians to improve their communicative and emotional competence in their relationship with patients can be considered a primary learning objective.

In 1999, the American Council of Graduate Medical Education (ACGME) certified and approved some communicative skills that should be considered a fundamental aspect of medical education. In particular, the capability to recognize and respect the patient's emotional state and also the socio-demographic variables (patient's age, culture, gender, nationality) that can influence his relationship with the disease and the medical setting, are considered elements of basic competence for health workers.

In general, the learning of these abilities is usually rooted in real experience, since they require a number of cues that are managed *hic et nunc*, in the flow of the communicative exchange. In spite of the importance of such competence, communicative training in the medical field is fragmentary, and often accidental. One of the current modalities is the observation of a peer or a supervisor facing a difficult communicative situation, like a diagnosis of incurable cancer or the announcement of the patient's death to his relatives (Vaidya et al., 1999). This training can be useful, but not systematic and is necessarily limited to the colleague's communicative competence.

In medical training courses, one of the most frequently used learning devices in the classroom setting is role-playing (Petrusa, 2002). It is based on the simulation of real interactive situations that physicians often deal with in their daily relationships with patients. Traditional role-playing implies the presence of so-called *standardized patients*, individuals who are specifically trained to realistically interpret the patients' role, and consequently display the physical and psychological behaviors related to different pathological syndromes.

Though improvement of the physician's communicative competence through the use of role-playing has been acknowledged (Boehle, 2005; Barrows, 1993; Wallace, 1997; Fincher & Lewis, 2002), some critical aspects related to this traditional learning device have been recently highlighted (Olsen & Sticha, 2006).

First, role-playing demands a classroom setting and quite a long amount of time. Second, the learning efficacy depends to a great degree on the actors' competence: qualified role-players may be difficult to find and a small amount of subjectivity is always present, even in an expert standardized patient. Furthermore, even if role-play based simulations can be considered realistic, actors are usually healthy individuals who are trained to act "as if" they were patients; they are not actually patients. Finally another critical aspect can be identified in the lack of repetition: repeated practice of the same learning experiences is not possible. On the whole, such limitations can produce a decrease of the ecological validity of the role-playing based methodology. In order to overcome some of these drawbacks, interesting opportunities might be offered by the use of computer-based interactive simulations designed to improve the realism and the objectivity of the learning situation.

**COMPUTER-BASED SIMULATIONS FOR PHYSICIAN'S LEARNING OF COMMUNICATION SKILLS**

In medical education, Virtual Reality environments and interactive simulations have been increasingly used for the training of clinical and surgical skills. For example, the training of clinical competence has been endowed with virtual
reality based learning devices (Satava & Jones, 1997), in order to make the learning experience as objective as possible. In this perspective, the medical examination of a prototype based on augmented reality has been used to expand the range of potential physical abnormalities related to specific pathologies available for training (McKenzie et al., 2006). The prototype, a realistic human-like mannequin, allows the medical practitioner to listen to physiological or abnormal pre-recorded heartbeats and lung sounds. A preliminary experimental study of this device was carried out during the annual Observed Structure Clinical Examination (OSCE), and the results confirmed this tool’s validity for the clinical diagnosis of a circulatory pathology.

When moving from the training of surgical and clinical skills to the training of communicative and emotional ones, the learning objective shifts to the comprehension of the relational environment that characterizes the physician-patient interaction and a realistic representation of it through the simulation. Therefore, a computer-based simulation as a learning device for communicative and emotional skills should depict the social dynamics and the typical conversational patterns of such an interactive situation. This type of experiential training holds great potential in helping the physician to cope with difficult patients in relational contexts that require specific communicative strategies and emotional control (Schank, 1997; Olsen & Sticha, 2006).

In a computer-based simulation, the medical practitioner generally takes the physician’s role and manages the interaction with a virtual patient and/or with her relatives. Her character can be described by definite personality traits, which are depicted in the character’s profile at the beginning of the simulation. In this way, the user has to act according to these variables and to the relational process that is gradually displayed during the learning experience. Moreover, the physician could also play the patient’s role, experiencing the same situation from a different perspective. When compared with traditional role-play, a computer-based simulation provides the user with the possibility of potentially infinite standard replications of the learning process. In this way, the physician can think over her communicative choices and their related outcomes and can modify these outcomes through the repetition of the simulation experience. Furthermore, the simulation provides the user with an immediate feedback about her learning performance.

Within this framework, the development of computer-based simulations for physicians’ training of communicative and emotional skills is a main goal of the EU-funded MYSELF-project (www.myself-proj.it). These simulations are focused on specific communicative situations that emerged as particularly emotional involving, according to medical professionals’ evaluation. In order to maximize the realism of the learning experience, the simulations are experienced in 3D virtual environments with virtual characters playing the physician and patient role. Characters were modelled and animated with Poser 5 and particular attention was paid to their non-verbal modalities: characters’ appearance, gestures, posture, and tone of voice were studied to try to mirror the real physician-patient relationship within a coherent environmental setting. In this respect, the trainee has the opportunity to verify his communicative and emotional skills while managing the conversation with the virtual patient within the simulation’s path. The skills that have been identified as learning goals are multiple and include empathy, emotional coping, non verbal communication management, reassurance, focusing on the patient’s needs, personal commitment, etc.

The system is endowed with speech-recognition capabilities, so that conversational interaction in the simulation is mainly voice-based, as in a real physician-patient relationship. A screenshot from one of the simulations is represented in Figure 1.

The figure represents the character playing the physician role, which is animated according to the communicative options chosen by the user during the virtual interaction with the patient. A similar scenario is used for the character playing the patient role.

The process of developing training simulations necessitates the analysis of certain key features, in order to guarantee learning efficacy. These elements are strictly related to the elicitation of the user’s sense of presence, which is a fundamental element in virtual learning (Mantovani & Castelnuovo, 2003). Such key
features are represented by the simulation architecture and rationale definition, the dialogue scripting, and the simulation’s character animation. The simulation’s architecture building includes the identification of the learning targets, and consequently, of the communicative and emotional skills related to the physician-patient interaction.

To this end, the expertise of medical professionals is required in order to identify involving interactive situations with highly demanding patients whose management calls for communication strategies and emotional control by the medical practitioner. Such professional expertise has to be integrated with expertise in training communication skills. This expertise makes the identification of learning targets possible, beginning with the professionals’ evaluations, the operationalization of the communicative and emotional skills, and the building up of a coherent learning path, designed and structured to reach the predetermined learning objectives. In this way, the communication expert should integrate the information coming from the healthcare professional with the mental model of the targeted situation. This mental model can also be defined as a script (Schank, 1986), i.e. a cognitive representation of the structure and organization of an event. Scripts are socially and culturally influenced and acquired; they help individuals to give stability to the real world, as a contribution to the psychological process of meaning attribution.

The simulation’s architecture thus obtained generally follows a branching narrative approach, with which the complexity of the real situation can be preserved. At many points in the virtual conversation with the patient, the physician has to choose between different conversational strategies, and then experience different patient reactions as a consequence of their choice. Therefore, good dialogue scripting is essential for an effective simulation, since dialogues must be able to draw the trainee into the scenario and be emotionally and intellectually involving at the same time.

In the same way, character animation is a fundamental trait of the simulation’s visible output, and together with the previous elements, plays a critical role in the elicitation of the user’s sense of presence. The simulation’s animation demands technological and computer graphics expertise to reproduce the simulation rationale in actual implementation. In this respect, virtual patients have to be designed and animated to be believable: their personalities, appearance and clothing, general attitudes, nonverbal be-
haviors and conversational interventions must be compatible with the medical problems they represent. In medical e-learning, in particular, the characters’ nonverbal modalities should be carefully implemented, as they are strictly connected with the communication of emotion.

As seen in the analysis of these key elements, in a simulation’s building process it is necessary to consider the situation’s realism as a basic element to elicit the trainee’s sense of presence in the simulation.

CONCLUSIONS

The present contribution has illustrated the opportunities that computer-based simulations can offer in the improvement of the physician-patient relationship through the training of the specific communicative and emotional skills that characterize the medical encounter. As compared to typical classroom role-playing, interactive 3D simulations offer a training environment characterized by several potential benefits: in particular, training situations can be carefully scripted and standardized, there are advantages in terms of logistic constraints, and there is an opportunity for systematic repetition of the learning experience. Due to these aspects, computer simulations hold the potential both for enhancing the training and the assessment of communication and emotional competence in health-care professionals.

After a general illustration of the simulation’s constitutive elements, the key features for effective simulation building have been discussed. Particular importance has to be ascribed to the elicitation of the user’s sense of presence and identification with the simulation’s characters, in order to achieve a real transfer of knowledge through the learning experience. In particular, building effective simulations implies facing a number of issues: translating the real interactive situations into animated actions, scripting dialogues capable of eliciting trainees’ involvement in the simulation, providing multiple paths throughout the simulations, developing an adequate model of the complex real-world social dynamics with which the user interacts, as well as designing and animating believable and multimodal characters. Effective implementation of all these aspects can be considered a fundamental challenge that requires a user-centered design approach and a serious and systematic evaluation and validation process.

References


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