Understanding empathy training with virtual patients

Andrea Kleinsmith [a,*], Diego Rivera-Gutierrez [a], Glen Finney [b], Juan Cendan [c], Benjamin Lok [a]

[a] Department of Computer and Information Science and Engineering, University of Florida, PO Box 116120, Gainesville, FL 32611-6120, United States
[b] Department of Neurology, University of Florida College of Medicine, HSC Box 100236, Gainesville, FL 32610-0236, United States
[c] Department of Medical Education, University of Central Florida College of Medicine, 6850 Lake Nona Blvd, Orlando, FL 32827, United States

A B S T R A C T

While the use of virtual characters in medical education is becoming more and more commonplace, an understanding of the role they can play in empathetic communication skills training is still lacking. This paper presents a study aimed at building this understanding by determining if students can respond to a virtual patient's statement of concern with an empathetic response. A user study was conducted at the University of Florida College of Medicine in which early stage medical students interacted with virtual patients in one session and real humans trained to portray real patients (i.e., standardized patients) in a separate session about a week apart. During the interactions, the virtual and 'real' patients presented the students with empathetic opportunities which were later rated by outside observers. The results of pairwise comparisons indicate that empathetic responses made to virtual patients were rated as significantly more empathetic than responses made to standardized patients. Even though virtual patients may be perceived as artificial, the educational benefit of employing them for training medical students' empathetic communications skills is that virtual patients offer a low pressure interaction which allows students to reflect on their responses.

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1. Introduction

Can virtual characters play a role in training empathetic communication skills of early stage medical students? The use of virtual characters in medical education is becoming more and more commonplace, and they are often provided as a tool for students to practice interviewing and clinical reasoning skills. While these are essential skills for every physician to possess, another essential skill that requires practice is empathy. Indeed, *"empathy is arguably the most important psychosocial characteristic of a physician engaged in patient care"* (Colliver, Conlee, Verhulst, & Dorsey, 2010).

There are a number of motivations for physicians to be skilled in empathetic communication. For example, empathy helps build patient trust (Deladisma et al., 2007), increases patient satisfaction and compliance, and may reduce medical malpractice lawsuits (Kim, Kaplowitz, & Johnston, 2004). Despite these motivations, empathy has been shown to decline during medical education (Diseker & Michielutte, 1981; Hojat et al., 2009). Thus, building an understanding of how empathy skills can be effectively practiced throughout medical training, and beyond, is important.

As highlighted by Hojat et al. (2009), empathy is a difficult concept to define and there are several schools of thought on the characteristics of empathy; either cognitive (Basch, 1983), affective (Hoffman, 1981) or both (Davis, 1983). Similar to Hojat et al. (2009), the view taken in this paper is that empathy in medical education is primarily cognitive, meaning that it involves understanding the concerns of another person, as opposed to feeling the suffering of another person. Put another way, physician empathy is considered a shared understanding as opposed to shared emotions, because the ability to maintain an 'emotional distance' is necessary for the clinical and personal durability of the physician (Jensen & The empathic physician (letter), 1994; Nightingale, Yarnold, & Greenberg, 1991).

Empathy in medical education is often practiced by role playing with other students and standardized patients. Standardized patients (SPs) are actors who are trained to act as patients and to assess medical students' performance during an interview (Onori & Fabien Pampaloni, 2011). Role playing situations allow medical students to practice empathy and communication skills in situations that will not have negative effects on real patients (Deladisma et al., 2007). While SPs provide students with valuable training experiences, SPs can be difficult to schedule and require significant resources to train and employ. A promising addition to interactions with SPs is the use of virtual patients (VPs).

* Corresponding author.
  E-mail address: alk@cise.ufl.edu (A. Kleinsmith).

While there are several forms that VPs can take, they usually contain the following: (1) a virtual character that represents a patient; (2) a set of actions that a user can take with the VP, such as asking health-related questions (e.g. "how long have you had the pain?"), conducting exams, and observing and documenting findings; and (3) the VP's response which often includes speech, gestures, and text but can also include other behaviors. Current research into VPs has evolved from constructing VPs and is now focused on evaluating where in the educational curriculum VPs can complement SPs.

VPs even offer some advantages over SPs. While VPs are constructed with the same symptoms and responses with which an SP is trained, VPs can be created to exhibit a wide range of clinical issues that are not possible for SPs, e.g., facial paralysis, ptosis (i.e., drooping of the upper eyelid), etc. Moreover, VPs can be used for repetitive practice, and offer a secure, low risk, low pressure environment that allows students to make mistakes without negative consequences to real patients. The prevalent thinking is that VPs can be a safe place to practice for the higher-stakes SP encounters.

However, while VPs may be useful for practicing interviewing and diagnostic skills, previous research has indicated that practicing empathy with VPs is perceived as less genuine, more difficult, and of a lower quality than practicing empathy with an SP (Deladisma et al., 2007; Raij et al., 2006). However, empathy in these studies included the students' nonverbal behaviors, not the responses alone. While nonverbal behaviors are clearly important in the overall empathetic 'message', practicing *what* to say verbally may be as important as *how* it is expressed nonverbally.

1.1. Empathy in medical education

Physician empathy and its importance during and after education has been studied extensively in the medical domain. As highlighted previously, physician empathy is positively linked to patient outcomes (Neumann et al., 2011). However, Tulsky (2005) notes that physicians feel that communication skills training on how to handle patients' emotional behaviors is missing. Moreover, there is little information on how empathy is actually taught (Shapiro, 2002). This is important given that every patient encounter is likely to contain at least one empathetic opportunity (Bylund & Makoul, 2005). Research has indicated that empathetic opportunities presented by patients are often missed (Levinson, Gorawara-Bhat, & Lamb, 2000). Indeed, Easter and Beach (2004) found that 70% of patients' empathetic opportunities are overlooked by residents in first-time oncology encounters.

To evaluate empathetic communication skills in the medical field, many studies focus on medical professionals' self-assessed empathetic communication skills. One such validated self-report measure is the Jefferson Scale of Physician Empathy (JSPE) (Hojat et al., 2002). A positive aspect of the JSPE is that it allows physicians to assess their own level of empathy, and ideally may lead them to reflect on their empathetic skills in general. However, the fact that the JSPE is a self-assessment measure means that the *patient's* perception of the physician's empathetic skills is not taken into account. It is quite possible for a medical professional to assess her/himself as being very empathetic, yet receive low empathy ratings from patients. Indeed, an unpublished study conducted by a research colleague found that a group of medical experts rated empathetic responses made in the context of a medical scenario as more empathetic than lay people (i.e., a group of Amazon Mechanical Turk workers who could be considered to represent a group of patients).

While it is clearly important to understand how medical professionals view their own empathetic communication skills, it is arguably more important to understand how *patients* perceive medical professionals' empathetic communication skills. To that end,

Bylund and Makoul (2005) developed the Empathic Communication Coding System (ECCS). The ECCS is a seven-point scale according to which outside coders (i.e., people other than a medical professional or an SP) rate the level of empathy in a healthcare provider's response. Therefore, the ECCS may provide a better indication of how empathy is perceived by patients. Using the ECCS, Bonvicini et al. (2009) found that physician empathy levels increased after a training exercise focused on physician empathetic communication skills. More recently, the ECCS was used in a study by Borish et al. (2014) to examine whether feedback provided to first-year psychology students after a VP interaction would cause empathy and rapport to increase during a subsequent SP interaction. Indeed, the results indicated that the students who received feedback about their empathy with the VP subsequently showed an increase in empathy and rapport with the SP.

1.2. Virtual humans

A large body of research has shown that virtual humans can be used to train individuals in a wide variety of contexts. For instance, virtual audiences have been used to treat people with a fear of public speaking; reducing anxiety and public speaking avoidance (Slater, Pertaub, Barker, & Clark, 2006). A study by Pan, Gillies, Barker, Clark, and Slater (2012) found that stress levels of men with social anxiety in relationships decreased over prolonged interaction with a female virtual human. Virtual humans have also been used in cultural training to teach social conversational verbal and nonverbal behavior rules of south Indian culture (Babu, Suma, Barnes, & Hodges, 2007). Participants who practiced with a virtual human performed significantly better during testing than those who learned from an illustrated instructions booklet.

Another area in which virtual humans are being used more and more is the medical field, in the form of VPs. VPs have been employed to investigate medical professionals' implicit biases. For instance, Kenny, Parsons, Gratch, Leuski, and Rizzo (2007) found biases due to ethnicity on the part of novice mental health clinicians when interacting with VPs. Haider et al. (2011) reported biases according to skin tone and social class. Hirsh, Hollingshead, Matthias, Bair, & Kroenke (2014) found gender differences in clinicians' pain assessment and management based on VPs' facial expressions that were manipulated to show different levels of pain. Another study found gender differences in correct diagnosis of VPs for a case that included a visual representation of a bruised forehead; the female VP was correctly diagnosed more often than the male VP (Rivera-Gutierrez et al., 2014).

1.3. The present research

The study presented in this paper aims to build an understanding of medical students' empathy expressed to VPs. The level of empathy in statements expressed to SPs in a separate session is used as a benchmark for evaluating the level of empathy expressed to VPs. Interviews with SPs are a standard part of medical education and are considered the gold standard to which interviews with VPs may be evaluated (Raij et al., 2006). The results of pairwise comparisons indicate that empathetic responses made to VPs were significantly more empathetic than responses made to SPs. Based on the ECCS (Bylund & Makoul, 2005), *more* empathetic can be defined as exhibiting a more explicit confirmation or understanding of a patient's concern, or emotional behaviors. The results also demonstrate that the length of an empathetic response is positively correlated with the empathy rating of the response.

While the technology behind VPs has come a long way in the last two decades, and VPs have improved, some may argue that VPs remain too artificial to be used for training on affective aspects