Virtual Standardized Patients for Assessing the Competencies of Psychologists

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INTRODUCTION

The development of clinical competence involves having the requisite knowledge and abilities to accomplish clinical tasks. Training of clinicians aims to progress the student from novice to at least the initial level of a competent clinician. Each skill has a developmental trajectory (Spruill et al., 2004). A challenging task is that of developing effective methods for assessing the training interview skills and differential diagnoses. One area of assessment has focused on multiple-choice question examinations. While such tests have been shown to have reliable results, multiple-choice question examinations are often poorly written and tend to favor recall-based knowledge, lack content validity, and include cueing effect of the options (Frederiksen, 1984). Another approach is to make use of essay-based examination, to measure clinical judgment. An obvious limitation of essay questions is the large amount of time involved and the potential for subjective interpretation. Perhaps the most widely used approach over the past couple decades has been the Objective Structured Clinical Examination (OSCE; Doig et al., 2000). The OSCE offers educators an objective and structured competency assessment (Harden, 1988). A limitation of the OSCE is that it involves multiple stations (Barrows, 1993). Current therapeutic training systems that employ the OSCE resort to using real persons (hired actors or students) acting as standardized patients to portray patients with given mental health problems. Training of psychiatrists, for example, has involved the use of standardized patients for decades. In the 1960s, Barrows and Abrahamson (1964) argued for the use of a "programmed" patient (standardized patient) for appraising student performance in the development of clinical skills. In the past decade, the American Association of Medical Colleges has increasingly endorsed the use of standardized patients in teaching and evaluating students' clinical skills (Yudkowsky, 2002). Further, the Accreditation Council for Graduate Medical Education and the National Board of Medical Examiners have encouraged training programs to incorporate standardized patients into assessments of clinical skill development.

BACKGROUND

Traditional approaches to training clinicians in the interpersonal communication skills needed for assessment, diagnosis, and interview performance rely upon a combination of classroom learning and role-playing with human standardized patients. The importance of interpersonal communication is reflected in recent requirements for communication evaluation in medical schools. The Accreditation Council for Graduate Medical Education (ACGME, 2007) has emphasized the importance of interpersonal and communication skills in training clinicians. Residents are expected to: (1) create and sustain a therapeutic and ethically sound relationship with the patient; (2) use effective listening skills, eliciting and providing information using effective nonverbal, explanatory, questioning, and writing skills; and (3) work in an efficient manner with others. However, evaluation studies have revealed methodological deficiencies in many cases (Chant et al., 2002) and limited positive training effects (Hulsman et al., 1999). In an effort to increase interpersonal communication assessment, standardized patients (paid human actors) have been recruited and trained to exhibit the characteristics of an actual patient, thereby affording novice clinicians a realistic opportunity to practice and to be evaluated in a mock clinical environment. Although a valuable training approach, there are limitations with the use of human standardized patients. For example, human standardized patients are expensive and cost several thousand dollars per student. Further, given the fact that there are

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only a handful of sites (for over 130 medical schools in the U.S.) providing standardized patient assessments of the clinician in training's communication ability as part of the U.S. Medical Licensing Examination (USMLE), the current model provides limited availability. Whilst training programs commonly make use of standardized patients to teach interview skills, the diversity of the scenarios standardized patients can characterize is limited by availability of human actors. Further, there is the economic concern related to the time and money needed to train standardized patients. The inclusion of a standardized patient in an OSCE tends to cost approximately $10 per hour and then there is the additional $34 per student for involvement in an OSCE Cusimano et al. (1994).

Another concern is the issue of standardization. Despite the expense of standardized patient programs, the standardized patients themselves are typically unskilled actors. As a result of common turnover, administrators face considerable challenges for offering psychometrically reliable and valid interactions with the training clinicians. A related issue is the limited scope that the actors are able to portray. As a result, there tends to be an inadequate array of developmentally, socially, and culturally appropriate scenarios. For example, when a clinician has a pediatric focus and needs access to children, it is difficult for the clinician to pretend that the actor is a child. Finally, many clinical cases (e.g., traumatic brain injury) have associated physical symptoms and behaviors (e.g., dilated pupils, spasms, and uncoordinated movements) that simply cannot be accurately portrayed by human actors. Perhaps most damaging is the "standardization" of standardized patients—will they in fact consistently proffer psychometrically reliable and valid interactions with the training clinicians. OSCE-based checklists may not offer a psychometrically valid measurement of clinical competencies because clinical reasoning is understood as pattern recognition (Regehr, Freeman, Robb, Missiha, & Heisey, 1999).

The plan of this article will be as follows: First, in Section 1 "From Virtual Humans to Virtual Standardized Patients," the author will describe past work in virtual humans and the ways in which the virtual human work has been used to develop virtual standardized patients. Next, in Section 2 "From Cognitive Appraisal to Affect Sensitive Virtual Standardized Patients," there will be a discussion of the need to move beyond the outmoded appraisal theories found in much virtual human work to an approach that more closely approximates affective and cognitive modeling found in psychophysiology and the human neurosciences. In Section 3 "Distributed end-user approach" an answer to the problem of time and resource limitations on current approaches to developing affect sensitive virtual standardized patients.

From Virtual Humans to Virtual Standardized Patients

One proposed answer to some of the difficulties inherent in training persons with standardized patients, hence human actors, is to use virtual humans as patients. Virtual humans (VH) are developing into powerful interfaces that can enable greatly increased intuitive human like interactions. These virtual human systems consist of characters that have realistic appearances, can think and act like humans, and can express themselves both verbally and non-verbally. Additionally, these virtual humans can listen and understand natural language and see or track limited user interactions with speech or vision systems. Advances in simulated virtual humans afford the possibility of virtual standardized patients that reduce cost, ensure standardization and faithfully model psychiatric symptoms.

Virtual humans are artificially intelligent (AI) agents that control computer generated bodies and can interact with users through speech and gesture in virtual environments (Gratch and Rickel, 2002). Advanced virtual humans are able to engage in rich conversations (Traum et al., 2008), recognize nonverbal cues (Morency et al., 2008), analyze social and emotional factors (Gratch & Marsella, 2004) and synthesize human communication and nonverbal expressions (Thiebaux et al., 2008). Building virtual humans requires fundamental advances in AI, speech recognition, natural language understanding and generation, dialog management, cognitive modeling and reasoning, virtual human architectures and computer graphics and animations. All of these technologies need to be integrated together into a single system that can work in unison, be expandable, flexible and plug-and-play with different components.

Virtual Human Agent (VHA) technology has evolved to a point where researchers may begin developing mental health applications that make use of virtual reality patients (Dickerson et al., 2005; Johnsen