# Communication Skills Assessment Using Human Avatars: Piloting a Virtual World Objective Structured Clinical Examination

Bruce R. Kava,* Allen D. Andrade, Robert Marcovich, Thaer Idress and Jorge G. Ruiz

*From the Department of Urology, University of Miami Miller School of Medicine (BRK, RM) and Laboratory of E-learning and Multimedia Research, Geriatric Research Education and Clinical Centers, Bruce W. Carter Veterans Affairs Medical Center (TI, JGR), Miami, Florida, and Geriatric Research Education and Clinical Centers, James J. Peters Veterans Affairs Medical Center, Bronx and Brookdale Department of Geriatrics and Palliative Medicine, Icahn School of Medicine at Mount Sinai, New York, New York (ADA)*

## Abstract

**Introduction:** Proficiency in communication skills is a core competency of residency training. We evaluated the feasibility, acceptability and applicability of a virtual world objective structured clinical examination that enables practice based learning and assessment of resident communication skills.

**Methods:** A virtual clinical encounter situated in 2 practice settings was developed that uses a human avatar physician and a standardized patient. Following an online tutorial house staff participated in 4 communication tasks, including shared decision making, delivering bad news, obtaining informed consent and disclosing a medical error. Validated instruments and semi-structured interviews were done to assess house staff acceptability and applicability of the platform. Three faculty members used ACS (Affective Competency Scale) and communication specific assessment instruments to evaluate house staff performance.

**Results:** A total of 12 urology house staff completed the simulation. Direct costs were approximately \$1,000. The virtual world was easy to use and immersive. Applicability directly correlated with presence (Pearson r = 0.67, p = 0.01) and co-presence (Pearson r = 0.8, p = 0.002). House staff identified problems with 1) limited nonverbal cues, 2) too much information presented and 3) a lack of immediate feedback. The ICC (intraclass correlation) of faculty assessments was high for ACS at 0.53 (95% CI 0.36−0.69) for single measures, 0.77 (95% CI 0.63−0.86) for average measures and less for other assessment instruments.

**Conclusions:** A virtual world objective structured clinical examination is a feasible, acceptable and applicable method of communication skills assessment. Improving nonverbal cues, focusing on individual skill sets and providing immediate feedback are measures to be adopted in future iterations of this platform.

*Key Words:* urology, computer simulation, clinical competence, social skills, physicians

**Abbreviations and Acronyms**

4HCS = 4 Habits Coding Scheme

BAS = Bad News Assessment Scale

CSAS = Communication Skills Attitude Assessment Scale

KEECC-A = Kalamazoo Essential Elements Communication Checklist-A

OSCE = Objective Structured Clinical Encounter

PSA = prostate specific antigen

Communications skills are designated as a core competency for residency training by ACGME (Accreditation Council for Graduate Medical Education). These skills are extremely difficult to teach and evaluate.[1] Moreover, increasing time constraints and an expanding number of technical skills have drastically reduced the amount of time that can be committed toward fostering these humanistic aspects of medical care.[2−5] As a result, skills such as delivering bad news or medical error disclosure are often left up to urology residents to learn through trial and error.[2,5] The need for greater accountability to ensure patient safety requires urology program directors to find innovative ways for residents to improve these difficult communications skills.

OSCEs provide opportunities for practice based learning and assessment of communication skills in a safe and reproducible environment. This method has proved to be a reliable and valid assessment tool[6,7] but is expensive, requiring preparation, support staff, travel, equipment and location availability.[8]

Virtual worlds are computer generated platforms in which users interact via graphical character representatives called avatars. Individuals represented by specific avatars can communicate with each other via VoIP (Voice over Internet Protocol) communication. This portable, reusable, distance learning computer simulation can deploy multiple different avatar personas set in multiple practice settings. It allows for artificial advancement of time or disease progression in ways that are not possible in real life. Preliminary work incorporating immersive virtual world technology has demonstrated a positive impact on learning.[9−11]

Our objective was to evaluate the feasibility, acceptability and applicability of a virtual world OSCE in evaluating urology house staff proficiency with difficult communication skills. Feasibility was related to the technical challenge of creating an interactive platform in several practice settings and its attendant costs. For acceptability we characterized the participant sense of immersion in the virtual world using 2 parameters from the gaming and media industry, that is presence and co-presence.

There is a paucity of educational data describing the knowledge, attitudes and self-perceived proficiency of urology house staff with various communication skills. Establishing these metrics and determining how applicable the house staff believed the platform to be were additional criteria that were critical to the aims of the project.

## Methods

The study was institutional review board approved, participation was voluntary and all urology house staff at our institution were eligible to participate. It was performed in 2 offices in different buildings of the medical campus, each equipped with desktop computers capable of VoIP communication. The virtual world was developed using Second Life (Linden Lab®) and it consisted of 2 virtual world settings (see figure). After obtaining informed consent participants completed a demographic questionnaire and CSAS.[12] They watched a 40-minute communication skills tutorial online developed from the AUA (American Urological Association) core curriculum.[13]

Four scripted encounters were developed (see Appendix), each highlighting a specific communication skill. The "Wizard of Oz" technique was deployed.[14] In this technique an unseen associate (one of the faculty members) played the role of a standardized patient, processing participant responses in real time and responding quickly enough to support an acceptable interactive encounter. The de-identified audio recordings of each encounter were archived on MPEG files and later reviewed by the study team faculty.

After each encounter participants and the standardized patient completed ACS.[15] Following the final encounter house staff completed a post-encounter CSAS, and the Presence, Co-presence and Applicability questionnaires.[16−18] Participants were debriefed with a semistructured interview performed by a study team member.

The faculty consisted of 2 urologists and 1 geriatrics-palliative care physician who concomitantly served as the avatar standardized patient. They independently evaluated the archived audio files for each virtual OSCE using several validated instruments.

### Assessment Instruments

The Presence Questionnaire of Witmer et al evaluates the perception of presence, defined as the subjective experience of being in 1 place or environment even when one is physically situated in another place.[16] A 7-point Likert scale was used with higher scores indicating a greater sense of presence.

Co-presence is the subjective sensation of interacting with another person. A 10-point Likert scale was used[17] with higher scores indicating a greater sense of realism.

Applicability of the virtual world simulation was evaluated using several validated criteria.[18] A 10-point Likert scale was used with higher scores indicating greater applicability.

ACS[15] was the primary metric used to measure proficiency for each communication skill. Using a 5-point Likert scale 6 global elements of the physician-patient interaction were assessed. Scores above 3 for each component (total score greater than 18) are generally associated with competency.[15]