Abstract

Communication Skills Assessment Using Human Avatars: Piloting a Virtual

World Objective Structured Clinical Examination

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**Introduction:** Proficiency in communication skills is a core competency of residency training. We 4HCS = 4 Habits Coding evaluated the feasibility, acceptability and applicability of a virtual world objective structured clinical Scheme BAS = Bad NewsMethods: A virtual clinical encounter situated in 2 practice settings was developed that uses a Assessment Scale human avatar physician and a standardized patient. Following an online tutorial house staff CSAS = Communication participated in 4 communication tasks, including shared decision making, delivering bad news, Skills Attitude Assessment obtaining informed consent and disclosing a medical error. Validated instruments and semi-Scale structured interviews were done to assess house staff acceptability and applicability of the platform. KEECC-A = Kalamazoo Three faculty members used ACS (Affective Competency Scale) and communication specific Essential Elements Communication Checklist-A OSCE = Objective Structured Clinical Encounter PSA = prostate specific antigen

Abbreviations

and Acronyms

assessment instruments to evaluate house staff performance. 27 **Results:** A total of 12 urology house staff completed the simulation. Direct costs were approxi-28 mately \$1,000. The virtual world was easy to use and immersive. Applicability directly correlated 29 with presence (Pearson r = 0.67, p = 0.01) and co-presence (Pearson r = 0.8, p = 0.002). House 30

examination that enables practice based learning and assessment of resident communication skills.

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

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## **ARTICLE IN PRESS**

#### Communication Skills Assessment Using Human Avatars

97 Communications skills are designated as a core compe-98 tency for residency training by ACGME (Accreditation 99 Council for Graduate Medical Education). These skills are extremely difficult to teach and evaluate.<sup>1</sup> Moreover, 100 101 increasing time constraints and an expanding number of 102 technical skills have drastically reduced the amount of time 103 that can be committed toward fostering these humanistic aspects of medical care.<sup>2-5</sup> As a result, skills such as deliv-104 ering bad news or medical error disclosure are often left up to 105 urology residents to learn through trial and error.<sup>2,5</sup> The need 106 for greater accountability to ensure patient safety requires 107 108 urology program directors to find innovative ways for resi-109 dents to improve these difficult communications skills.

110 OSCEs provide opportunities for practice based learning 111 and assessment of communication skills in a safe and reproducible environment. This method has proved to be a 112 reliable and valid assessment tool<sup>6,7</sup> but is expensive, 113 requiring preparation, support staff, travel, equipment and 114 location availability.8 115

116 Virtual worlds are computer generated platforms in which 117 users interact via graphical character representatives called 118 avatars. Individuals represented by specific avatars can communicate with each other via VoIP (Voice over Internet 119 120 Protocol) communication. This portable, reusable, distance 121 learning computer simulation can deploy multiple different 122 avatar personas set in multiple practice settings. It allows for 123 artificial advancement of time or disease progression in ways that are not possible in real life. Preliminary work incorpo-124 125 rating immersive virtual world technology has demonstrated a positive impact on learning.9-11 126

Our objective was to evaluate the feasibility, accept-127 128 ability and applicability of a virtual world OSCE in evalu-129 ating urology house staff proficiency with difficult 130 communication skills. Feasibility was related to the tech-131 nical challenge of creating an interactive platform in several 132 practice settings and its attendant costs. For acceptability we 133 characterized the participant sense of immersion in the 134 virtual world using 2 parameters from the gaming and 135 media industry, that is presence and co-presence.

136 There is a paucity of educational data describing the 137 knowledge, attitudes and self-perceived proficiency of 138 urology house staff with various communication skills. 139 Establishing these metrics and determining how applicable 140 the house staff believed the platform to be were additional 141 criteria that were critical to the aims of the project.

#### 144 Methods

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The study was institutional review board approved, partici-146 pation was voluntary and all urology house staff at our 147

institution were eligible to participate. It was performed in 2 148 offices in different buildings of the medical campus, each 149 equipped with desktop computers capable of VoIP 150 communication. The virtual world was developed using 151 Second Life (Linden Lab®) and it consisted of 2 virtual 152 world settings (see figure). After obtaining informed consent [F1]53 participants completed a demographic questionnaire and 154 CSAS.<sup>12</sup> They watched a 40-minute communication skills 155 tutorial online developed from the AUA (American Uro-156 logical Association) core curriculum.<sup>13</sup> 157

Four scripted encounters were developed (see Appendix), 158 each highlighting a specific communication skill. The "Wizard 159 of Oz" technique was deployed.<sup>14</sup> In this technique an unseen 160 associate (one of the faculty members) played the role of a 161 standardized patient, processing participant responses in real 162 time and responding quickly enough to support an acceptable 163 interactive encounter. The de-identified audio recordings of 164 each encounter were archived on MPEG files and later 165 reviewed by the study team faculty. 166

After each encounter participants and the standardized 167 patient completed ACS.<sup>15</sup> Following the final encounter 168 house staff completed a post-encounter CSAS, and the 169 Presence, Co-presence and Applicability questionnaires.<sup>16–18</sup> 170 Participants were debriefed with a semistructured interview performed by a study team member.

The faculty consisted of 2 urologists and 1 geriatricspalliative 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

181 The Presence Questionnaire of Witmer et al evaluates the 182 perception of presence, defined as the subjective experience 183 of being in 1 place or environment even when one is 184 physically situated in another place.<sup>16</sup> A 7-point Likert scale 185 was used with higher scores indicating a greater sense of 186 presence. 187

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

190 Applicability of the virtual world simulation was evalu-191 ated using several validated criteria.<sup>18</sup> A 10-point Likert scale 192 was used with higher scores indicating greater applicability.

193 ACS<sup>15</sup> was the primary metric used to measure proficiency 194 for each communication skill. Using a 5-point Likert scale 6 195 global elements of the physician-patient interaction were 196 assessed. Scores above 3 for each component (total score greater than 18) are generally associated with competency.<sup>15</sup>

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