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Research Article

Fostering Service Orientation in Medical Students through a Virtual Community Health Center

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Abstract

Responding to the national need to prepare healthcare professionals motivated to work with medically underserved populations, our medical school developed a series of interactive, virtual patient training modules designed to provide simulated clinical practice in a community health center context. The purpose of this research is to determine the extent to which these training modules support practice with clinical reasoning, foster engagement, engender peer-collaborative discussion, and reinforce skills associated with community oriented primary care (COPC).

Methods: In 2014-15,109 first-year medical students worked in teams of 3-4 to complete eight simulated patient encounters within a new learning platform, the Virtual Community Health Center (VCHC). Small group faculty provided anonymous feedback after each session. Written student responses to case debrief were analyzed and coded using grounded theory.

Results: Over the course of completing eight electronic case modules, students achieved significant individual learning gains on pre-post quizzes for 7/8 cases. Student teams earned an average of 75/100 points on the cases. Small group clinical faculty affirmed the efficacy of these virtual cases in terms of clinical reasoning, engagement and student collaboration. Case debriefs suggest students increased awareness of patient-centered care and community health.

Conclusion: VCHC modules were valuable in terms of providing deliberate practice with clinical reasoning and learner engagement. They reinforced peer collaboration, and principles of Community-oriented Primary Care (COPC).

ABBREVIATIONS

CHC: Community Health Center; ATSU-SOMA: A.T. Still University; School of Osteopathic Medicine in Arizona; VCHC: Virtual Community Health Center; VPS: Virtual Patient Simulation; COPC: Community Oriented Primary Care; EMR: Electronic Medical Record; EHR: Electronic Health Record; OMT: Osteopathic Manipulative Therapy; OMM: Osteopathic Manipulative Medicine; ADL: Activities of the Living Day

INTRODUCTION

Community Health Centers (CHCs) are at the forefront of expanded care services under the Affordable Care Act. CHCs provide community-oriented primary care (COPC) [1,2] a continuous process where primary health care is provided to a community on the basis of defined needs. To prepare medical students bound for practice in patient-centered medical homes, community clinics, or primary care settings, A.T. Still University's School of Osteopathic Medicine in Arizona (ATSU-SOMA) embeds students at CHCs to foster their interest in "service learning" during years 2-4. Service-learning is a pedagogy of engagement wherein students address a genuine community need by engaging in volunteer service that is connected explicitly to the academic curriculum through structured ongoing reflections [3].

In an effort to orient the students to collaborative clinical decision-making and COPC for vulnerable populations, we designed and implemented a training platform, the Virtual Community Health Center (VCHC).

This paper reports results from a 2014-2015 study

investigating the feasibility of the VCHC. The VCHC (Figure 1) may be accessed through a website, as well as the school's learning management system. We sought to determine whether this training platform was engaging, provided clinical reasoning practice, fostered teamwork, and nourished reflection on COPC.

Several studies [4-6] have documented the effectiveness of interactive virtual patient simulations (VPS) in medical education. We selected Decision Sim™ as the case authoring system because of its ability to track student decisions and produce analytic reports useful for competency-based assessment, as well as its potential for use in distance training. The medical school received grants that supplemented the costs associated with student virtual simulation accounts, and Electronic Health Records (EHR).

First-year medical students are introduced to the VCHC during small group practice with clinical case studies. Over the course of the first two years of training, students complete approximately 22 virtual patient encounters. These interactive case scenarios invite students to solve patient cases in an authentic CHC context. Virtual patients present to the clinic with chronic or acute health care conditions and complex social determinants of health, such as little or no healthcare insurance, low income, low education, homelessness, or as new immigrants [7-9]. Consistent with CHC patient population statistics, the VCHC patient panel reflects a variety of age groups, ethnicities, and modern lifestyles, such as adoptive parents, single parents, same-gender parents, multi-ethnic families or extended families.

The VCHC is designed to enhance clinical reasoning, teamwork and COPC awareness through constructivist learning. Students are presented with an authentic clinical problem, and work together to co-construct theories for diagnosis and treatment [10]. Knowledge construction or 'knowledge building' refers to the process of creating new cognitive artifacts as a result of common goals, group discussions, and synthesis of ideas [11].

Clinical Reasoning

According to best practices, [12,13] providing novice medical students ample deliberate practice with decision-making and problem-solving expedites their ability to sort evidence in order to arrive at accurate diagnoses. Consistent with best-practice design principles suggested by VPS experts [14] students received immediate, pre-formulated feedback after each clinical decision, allowing them to self-assess and refine their reasoning as they progressed through a case. Additional guidance was provided from virtual preceptors and multi-media demonstrations. Enrichment information was included, such as anatomy tutorials and web links to clinical guidelines for medications.

Figure 1 [Scenes from the Virtual Community Health Center Cases].

Teamwork

In an effort to stimulate clinical reasoning and professionalism, students worked in teams during these exercises. Absorption in task while problem solving may be described as "situational cognitive engagement", a state supported by peer inquiry, in which a student's curiosity is piqued by the enigmatic nature of a problem as he or she searches for data to answer questions [10]. Collaboration during clinical casework is considered to be a sound approach to fostering the development of clinical decision making [10,15,16] Further, we hoped the opportunity for peer discussion would strengthen specific skills associated with interprofessional teamwork, such as respect and equal contribution [17].

Specific design features of the VCHC are intended to draw students into a story: an authentic community health clinic and continuing, connected dramatic episodes with a recurring cast of clinic support staff and attending physicians. Each patient presents with a full life story, and is depicted by professional-grade photos featuring actors as patients. Interactive media for heartbeats, lung sounds, etc. have been interspersed wherever possible.

COPC for At-Risk Populations

Although several VPS training projects have been developed for medical education [18,19] we found few specifically designed to train clinicians for the realities of community clinic healthcare. A 2015 study [20] affirmed VPS were successful in enhancing core knowledge, clinical reasoning, communication, and history taking by psychiatry residents caring for immigrant refugees with post-traumatic stress disorder. Another online training program, At Risk in Primary Care by Kognito™ [21] is a continuing medical education role play simulation VPS for primary care providers. This digital learning experience helps students develop skills related to screening, risk factor identification, interventions, collaborative treatment planning, and referrals for patients with mental health disorders. Other published projects reflect efforts to design virtual health scenarios for 3-D learning environments. A new Veteran's Administration Virtual Medical Clinic (VA/VMC) [22] was launched for patients, providers and staff. The VA/VMC provides training opportunities and links to VA services, education, and wellness information.

While all of these published training materials are exemplary, there is a gap in the medical education literature regarding virtual case scenarios specifically designed for community health settings. The goal of this pilot project was to design and test training modules to acculturate students toward humanistic care of medically underserved patient populations and social determinants of health.

Research Hypotheses

There are four research hypotheses associated with this study: 1) VCHC exercises support practice with clinical reasoning; 2) VCHC exercises foster engagement; 3) VCHC exercises engender peer-collaborative discussion; and 4) VCHC exercises nurture reflection on COPC issues.

MATERIALS AND METHODS

During the first semester of the 2014-2015 academic year, we implemented eight VCHC simulations at ATSU-SOMA within systems-based courses during required weekly clinical case study practice. Participants were 109 osteopathic medical students, year 1 (OMSI) and six of their faculty small group clinical tutors. The ATSU Institutional Review Board exempted this study from continuing review. We provided students and faculty with an explanation of the study prior to implementation.

Following a mixed-methods design, we triangulated both quantitative and qualitative data to increase the validity of the findings. The quantitative data consisted of individual student pre-post quiz results and team case scores. The qualitative data consisted of tutor feedback and de-identified, student case debrief notes. The research plan involved collecting the same package of data on eight separate implementation days, over the span of one semester. Consistent with a design-based methodology [23], we sought to improve the design of the intervention (the VCHC case studies) by reviewing the incoming data between each small group session involving virtual case practice.

This study collected data from pre-post, multiple choice quizzes, system-generated VPS case-learning analytics, tutor feedback, and a case "COPC" debrief notes.

1. **Pre-post Quizzes:** Prior to beginning each virtual case, each student completed a 5-item, online multiple-choice pre-test. After completing the case, each student again completed the same **Pre** completed the same pre-quiz as a post-quiz.

2. **Case learning analytics**: After each session, the case player software automatically generated a performance score report for each student team. The Curriculum Coordinator exported these case performance statistics from Decision Sim, de-identified and compiled them. Finally, these statistics were analyzed by a statistician using SPSS.

Tutor feedback

At the beginning of small group, tutors each met with a pod of 10 students. Next, students formed teams of 3-4. During the case session, tutors observed and circulated to answer questions. After each session, tutors were invited to provide anonymous feedback on paper-based observation forms. A third party transcribed the text documents, and the research team then sorted the tutor comments into themes using an open coding process [24] a method used by other VPS experts [5,18].

Case debrief

After each case, students logged into the learning management system and responded to four open-ended prompts related to COPC, usually on the themes of family-oriented care, social determinants of health, treatments, and osteopathic manipulative medicine. Tutors then guided a 10-minute discussion on these topics. Due to the high volume of narrative data received, random sampling was employed to select one of the eight case sessions occurring on any given day. Investigators analyzed individual, de-identified, student responses using a grounded theory process for each selected session [16] this entailed open coding responses into themes and tabulating the frequency of responses per theme category [24].

Over the first semester of the academic year, 109 first-year osteopathic medical students, working in teams of 3-4, met with eight virtual patients and their family members. During each patient encounter, students consulted the patient's EHR, took a history, selected and interpreted the appropriate diagnostic lab and imaging work, made a general diagnosis, obtained interprofessional consultations, and suggested a treatment plan. Cases included the following medical topics: limb pain (hand), sore shoulder, fall on outstretched hand, regional back pain, headache, seizure, acute neurological event, and dizziness. During each clinical encounter, student teams made a series of consequential clinical decisions based on available evidence. Decisions madeled student teams down different possible pathways, culminating in team scores, with 100 points possible.

Student teams completed cases 1-8 synchronously, yet independently, during small group sessions. Prior to engaging a virtual simulation, the lesson progression was:

1. Individually complete a 5-item electronic pre-test (6 minutes.)
2. Form teams of 3-4 and complete the virtual patient case study via laptop (30 minutes.)
3. Individually complete an electronic, 5-item post-test (6 minutes.)
4. Participate in a case debrief (reflection) activity (10 minutes.)

The reflection required answering four questions using an online survey and sharing responses orally with nine peers and one faculty clinician tutor. Debrief topics focused on patient-centered care (professionalism), family-oriented care, community-oriented care, osteopathic medicine, and identifying implications for improving community health.

RESULTS AND DISCUSSION

Findings reported in Table 1 suggest that the sequence of pre-quiz, virtual case practice, and post-quiz resulted in significant learning gains for seven of eight cases. For case 3, the gain score was positive, though not statistically significant. One reason for this variance may be that for cases 3 and 6, the mean pre-quiz scores were among the highest posted. This may account for relatively lower "gain". The reason students scored higher on case 3 and 6 pre-quizzes is not known.

Table 2 reports student team performance data from the virtual case activities. The highest team score for each case was assigned a value of 100, and the remaining scores calculated as a percentage of the highest score. These data suggest teams made clinical decisions and were in the process of completing cases within the 30-minute limit. The mean score over eight cases was

Table 1: Pre- and Post-Quiz Results.

	N	Min	Max	Mean	Mean Gain	Std. Deviation	p-value* p<.05
Case 1: Pre	107	0	20	6.82		6.67	
Case 1: Post	107	0	40	20.84		9.92	
					14.02		<.0001*
Case 2: Pre	109	0	50	21.65		9.58	
Case 2: Post	109	0	50	26.70		10.46	
					5.05		<.0001*
Case 3: Pre	109	0	50	28.90		10.39	
Case 3: Post	108	0	50	30.09		12.79	
					1.19		.913
Case 4: Pre	109	0	50	16.24		10.35	
Case 4: Post	98	10	50	27.86		8.88	
					11.62		<.0001*
Case 5: Pre	108	0	30	13.98		8.64	
Case 5: Post	108	0	50	23.80		10.39	
					9.82		<.0001*
Case 6: Pre	109	0	50	28.26		10.53	
Case 6: Post	108	0	50	30.83		10.78	
					2.23		.016*
Case 7: Pre	108	0	40	22.96		8.57	
Case 7: Post	109	0	50	30.92		10.59	
					7.96		<.0001*
Case 8: Pre	109	0	40	10.09		9.08	
Case 8: Post	109	0	50	25.50		11.18	
					15.41		<.001.*
Valid N	93						

*Wilcox Signed Ranks Test

Table 2: Virtual Simulation Learning Analytics.

Case	Virtual Patient	Presentation	# of Teams	Avg. Score	Std. Deviation	Time on Task	Std. Deviation
1	Shirley Yazzie	Hand and Joint Pain	36	74.30	15.87	- - -*	- - -*
2	Chris Williams	Fall on Outstretched Arm	40	77.15	12.64	25.00	7.05
3	Nancy Johnson	Shoulder Pain	38	81.42	9.27	34.03	8.82
4	Jesus Lopez-Gutierrez	Regional Lower Back Pain	40	88.33	7.31	24.94	4.51
5	Ashley McCaskill	Headache	38	74.62	10.50	26.79	5.35
6	Zelna Washington	Acute Neurological Event	39	74.30	14.46	19.89	4.95
7	Zachary Johnson	Seizure	39	77.15	10.21	26.40	5.23
8	Lisa Wong-Lucas	Dizziness	43	81.42	24.01	24.04	10.39
	Total			74.69	16.99	25.87	11.92

74.7. On average, student teams spent 25.87 minutes on each case. After the first case, some students forgot to log off, so an accurate estimate of time on task is not available for that case. Overall, time on task was significantly, positively correlated, r=.280 (p< .001), with overall score for the cases.

Over the course of eight cases, six clinical tutors were encouraged to offer anonymous feedback. These tutors returned 39 feedback forms. This feedback was divided into: "Tutor feedback on the quality of the learning experience" (Table 3) and "Tutor feedback on the VPS modality" (Table 4).

Detain (Table 3) summarize tutor comments regarding virtual community health center cases. Tutor comments were analyzed by sorting them into three a priori categories: clinical decision making, engagement, and collaboration, each divided into *ad-hoc* codes. Tutors made several positive comments about the quality of the learning experience in terms of clinical reasoning, including, "they liked this case-provided good information and feedback," "Good discussions." However, tutors also noted content areas that were challenging for students, such as "Confusion over use of specific tests of the shoulder in the physical exam."

Tutors described students being absorbed by the task, an indication of flow[25] and situational cognitive engagement[10].

Table 3: Tutor Feedback on the Quality of the Learning Experience.

A priori Category	*Post hoc* Theme	Code/ Frequency of Code	Example Tutor Feedback
Clinical Decision Making	Useful learning activity	Good learning activity (3)	"They liked this case--provided good information and feedback." "Great thinking students." "Good discussions."
		Case content (2)	"One group focused on trying to read/find scaphoid fracture so much that they almost missed the torus fracture." "Romberg test slide, students wanted an answer that was "vestibular… semicircular, canals."
		Muddy points (4)	"Confusion over use of specific tests of the shoulder in the physical exam". "A bit confounding for students. Case atypical." "It needs to be clear in case, that when a question is posed that doesn't directly relate to the patient in the case, and their specific symptoms, and is posed as a general question."
Engagement	Flow	Case study (13)	"Students really enjoyed the activity." "Students thought it was fun." "Group engaged, but easily distracted."
		Debrief (3)	"Engaging debrief." "Debrief was engaging and great points were brought out." "Students have great ideas during debrief but need guidance to discuss."
Collaboration	Partici-patory Discussion	Collaboration from the tutor's perspective (2)	"Student interaction positive. Willing to listen to other students reasoning and willing to change." "Respectful exchange of ideas."

Table 4:

Case/Tutor response *n*	Key Problem Identified by Tutors (Sample Statements)	Solution Implemented
Case 1 *Tutor response n* = 6	"Read tiny EMR type reports." "Didn't complete case. "Students mentioned some acronyms are not defined such as ADL's."	Added instructions for enlarging EMR graphics. Added 10 minutes of time per case. Spelled out acronyms.
Case 2 *n* = 6	"Students not always checking with team mates before going on to next page "My apologies for debriefing before the post-test."	Discussed these issues with tutors.
Case 3 *n* = 7	"Wondering if there is any way to get answers to pre- and post-tests."	Trained facilitators to share the answers to the pre-post questions during small group.
Case 4 *n*=3	"Over-past few weeks there is always one student who enters the post-test before I say. Since the system is timing them, I hope this will no longer be an issue."	Set auto time limit pre-post-test to 6 minutes.
Case 5 *n*=7	"Most buzz by the EMR."	Added specific directions on what to check on electronic medical record.
Case 6 *n= 5*	"Students not asking for additional info or going back to look at other answers for fear of losing points. Seems like they are more afraid of the grade than acquiring knowledge"	Added instructions on pages to encourage review of incorrect options.
Case 7 *n*=8	"Students often continue to select choices rapidly to find the correct answer and don't take time to read the explanation about why their selection was incorrect or correct due to time constraints."	Received permission from the Curriculum Committee to lengthen case practice. For the next year, time for each case will be 45 minutes. Held discussions with tutors about requesting students to read carefully.
Case 8 *n*=2	"It needs to be clear in the case when the question is posed that doesn't relate to the patient in the case."	The research team worked to improve the design of quiz questions.

Abbreviations: VPS: Virtual Patient Simulation, ADLs: Activities of the Living Day, EMR: Electronic Medical Record

Three tutors expressed positive comments about the COPC debrief: "Debrief was engaging and great points were brought out." Tutor comments were also positive regarding observed student collaboration (H3). For example, tutors described student interactions as respectful and positive.

Qualitative data from tutors about the VPS activity (Table 4) shed light on VPS mechanics in the following categories: EHR font size, time limit, speediness through the case, quizzes, EMR, and point deductions for incorrect answers.

Tutors indicated they felt students did not spend enough time reviewing pages of the electronic health record. Further, they believed acronyms and excessive text slowed comprehension, so we took additional care to streamline text and spell out acronyms. During the first case, with a 20-minute limit, students did not have time to finish, so upon approval, authors added 10 additional minutes for subsequent cases. Nonetheless, as noted by tutors, some students had the tendency to rush through the cases, so tutors encouraged students to slow their pace and be thorough. In general, there were not many technical glitches. Tutors provided valuable insight to specific elements that required fine-tuning, and these data were used to improve the design.

Case Debriefs

After completing each virtual case, first-year students completed an online survey. Students completed the online surveys during class, but they did not count toward a grade. This strategy garnered responses from most of the students during the eight sessions. A set of four writing prompts solicited short answer responses reflecting on topics such as patient-centered care, family-oriented care, social determinants of health, and community health. During debriefs, osteopathic considerations were frequently discussed, as they relate to "whole person healthcare".

The following section presents the analysis of student responses from four debrief questions for Case 2. Authors generated a series of post-hoc themes from the body of student responses. For each theme (or code) the number of student responses is provided in parentheses (in order of frequency). This was a case of an adolescent patient who fell off his skateboard onto his outstretched hand.

COPC Debrief Item 1, Case 2.

For this prompt, "List one thing you learned from this case about the care of patients", student responses aligned to nine post-hoc themes: patient autonomy (40), x-ray (15), fracture (11), professional collaboration (6), Patient (5) electronic medical record (EMR) (5), diagnosis (3), age-specific treatment (3), and scheme (flow chart) (1). Case studies incorporate "clinical presentation schemes" (e.g. decision trees) [11] to guide student clinical decision-making toward a general diagnosis. For example, one student reflected on protocols regarding patient autonomy.

"I learned that when dealing with a pediatric patient with recurrent injuries, it is important to ask whether the patient is comfortable with their guardian in the room, because abuse/family issues are possibilities."

COPC Case Debrief Item 2, Case 2

After coding responses from 89 students to the following prompt: "List one thing you learned from this case about family-oriented care", eight themes emerged: patient autonomy (25), the need to explain a diagnosis and treatments to all parties (16), communication (17), the importance of involving the parents of a patient in a discussion (10), emotional support (provided by family members) (8), how family members facilitate better care (6), family dynamic (4) and a need to treat both patient and family (3). In the quote that follows, one student discusses a need to explain prevention to accompanying family members.

"Care should be taken to ensure that the family of the patients understands what the cause of the problem was, the way the problem can be treated, and things they can do to prevent it from happening again. This is especially true with pediatric cases as the patients may not understand the ramifications of what they do."

Debrief Item 3, Case 2.

The third debrief prompt was, "List one thing you learned from this case about osteopathic medicine." Student written responses grouped into eight themes: treatment of fractures (31), the importance of Osteopathic Manipulative Therapy (OMT) (21), osteopathic structural exam (12), the healing process (11), Osteopathic Manipulative Medicine (OMM) techniques (8), safety gear (3), the need to explain osteopathic medicine (2), and no new knowledge (1). For example, one student reflected on the healing properties of osteopathic treatments:

"Osteopathic medicine can be used to help with the healing process of distal radial fractures that do not require a cast. These procedures can help with optimal lymphatic and circulation to the area for healing."

COPC Debrief Item 4, Case 2.

The final COPC debrief item was "Using this case for inspiration, describe one strategy for improving health for the whole community." Student responses (with the frequency in parentheses) matched 5_themes: safety education (35), protective equipment (32), patient care strategies (12), community health (8), and patient education about falls on outstretched hands (2). A sample student response is as follows:

"I would try hosting a community safety fair. Focus the activities on being for children (have them bring their bikes or skateboards) to ride through obstacle courses and do helmet give-aways along with education on safety while skateboarding and biking."

To summarize the results of the COPC debrief exercises, students participated actively, and their insights reflected a patient-centered focus about treatments and protocols.

"They should have given the child some pain relief earlier in the form of RICE and NSAID's."

"We need to have patience with patients as they try to understand medical concepts."

"You have to consider the patient's normal level activity when making treatment goals. The patient is going to want to return to their normal activities after healing."

"It is important to listen to patient's description of the problem including what area is affected and painful."

In their responses, students expressed a willingness to collaborate with the patient's family members, and to work closely with other providers. Their responses explored ways to improve community health and options for osteopathic care.

Discussion

This pilot study successfully tested eight interwoven, virtual clinical presentation-based case studies with first year medical students, and provided valuable feedback concerning student clinical reasoning, engagement, collaboration and attitudes as expressed through COPC debriefs. The project results support each hypothesis.

VCHC exercises supported practice with clinical reasoning. Triangulated results from three data sources, (pre-post quiz results, learning analytics, and tutor feedback) affirm Hypothesis 1. Although clinical tutors noted issues to clarify (Table 3), they were circulating around in the classroom to provide explanations as needed. The implementation of this VCHC supported the tutors' ability to provide explanations and to clarify issues as they arose for the students. Tutor observations and suggestions regarding elements such as EHR guided improvements in the design of the virtual case studies.

VCHC exercises fostered engagement. Tutor feedback and COPC debrief responses affirm Hypothesis 2, both in terms of flow (absorption in task) and participation. While tutors noted areas for improvement in terms of simulation mechanics such as too much text on the page, a process of continuous quality improvement is in place to refine the learning activity, as demonstrated by (Table 4).

VCHC exercises engendered collaboration. Tutor observations affirmed Hypothesis 3, indicating that students were working together well and collaborating to make decisions during the patient encounters. These communication skills are foundational to the learning how to contribute well in an inter professional team.

VCHC exercises nurture reflection of COPC issues. Student written responses to COPC debriefs allowed students the opportunity to discuss patient care, family-oriented care, and treatment options. According to the medical education literature, compassion and humanism should be more strongly emphasized:

What is most concerning is that the medical school training for the most part perpetuates the patient as "diagnosis" and thus, medical students are not often encouraged to discuss the psycho-social aspects of serious illness and the psychological or spiritual impact of illness because its relevancy is not acknowledged [26].

Student comments revealed an interest in listening to the patient's perspective, and an attitude of compassion.

LIMITATIONS

Time constraints limited the length and depth of quizzes. These will be refined through reliability, validity and item analysis in future iterations. A few teams did not log out after finishing their assignments, thus affecting the "time on task" log. The case scoring system requires refinement. Scores for cases 6 and 8 were somewhat lower than other cases. For case 6, student teams, on average, spent less time on the case. This case, concerning an acute neurological event, and a critical care situation, was designed as an "outcomes case" in which the team score was auto-reset to zero when student teams made a clinical error that resulted in an adverse, life-threatening event. Thus, many student teams lost points for making clinical decisions that drastically affected the patient's health outcome, which may have ended the case session early. For case 8, the scoring system (subsequently revised) deducted more points than in other cases.

The findings, supported by data triangulation, may be considered valid for the study site. There are many variables involved in implementing these virtual simulations in a different context, such as student pre-preparation, a school's educational culture, native educational technology, tutor involvement, and time limitations. These elements can affect learning outcomes.

CONCLUSION

Through this pilot, we tested a new method for training on topics such as clinical reasoning, humanistic medicine, and community-oriented primary care. Classroom experience thus far suggests the VCHC platform and lesson sequence engages students in active discussion, consensus decision-making, and reflection. Early indications suggest this training tool is useful for formative learning and assessment. It is hoped that by reinforcing concepts related to social determinants, compassion, and whole-person care, students will not lose their idealism and humanity, as often happens as they progress through medical school,[27] but instead develop compassion and motivation toward serving in medically underserved communities.

To date, the authors have developed 25 case studies. Our goal is to develop a large library of cases reflecting realistic social context, distribution of ethnicity, and the medical issues most prevalent in the community health center patient population [28]. Over the next few years, we intend to explore use of the VCHC for clinical assessment, case sharing among institutions, CHC staff orientation, and inter professional education [29]. We have already received requests to develop case studies for a wide range of content, including the training of community health center employees, healthcare delivery science, and continuing medical education.

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