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TURNING CONSTRAINTS INTO OPPORTUNITIES: ONLINE DELIVERY OF COMMUNICATION SKILLS SIMULATION SESSIONS TO UNDERGRADUATE MEDICAL STUDENTS DURING THE COVID-19 PANDEMIC

ABSTRACT

The COVID-19 pandemic impacted higher-learning institutions. Communication skills training in medical education needed innovative solutions to adjust to the situation. In times of change, evaluation channels should be developed, and any problems raised by learners and educators should be responded to rapidly. A remotely facilitated communication skills simulation-based training programme was piloted by the clinical skills laboratory tutors using Zoom as the online platform. The goal of the pilot session was to establish a communication skills training strategy remotely, to test an online session using the defined online platform and to assess its effectiveness. Though locally facilitated face-to-face simulation-based training as the conventional format is easier to use and experience, training on virtual simulation-based communication skills enabled through the online portal has been described by participants as both feasible and effective. The results show that an efficient educational environment can be provided by remote simulation of communication skills. An important requirement for learner engagement with remotely facilitated simulation-based training is the development of contextual understanding, multiple exposures and a respectful learner-teacher relationship. Any negative impact of remotely facilitated simulation-based training may be concealed by an overarching high perceived value of simulation-based trainings in general. This pilot online simulation programme shows the value of using this modality and lays the foundation for communication skills teaching during future disasters. There is the need to consider how online simulation can be sustained after the pandemic and not just returning to the conventional face-to-face teaching and learning.

Keywords: *Communication skills training; COVID-19; medical education; online simulation; Zoom online platform.*

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1. INTRODUCTION

Effective communication during consultations with patients and their families is essential to instilling confidence in the medical practitioner (Jackson, 2005; Hagerty *et al.,* 2005). The ability to communicate effectively is a core competency needed by a healthcare professional (Kalafatis *et al.,* 2019). Studies have found that patient-centric communication tends to enhance health benefits, patient experience and perceived care quality (LaNoue & Roter, 2018). In medical education various methods are used to teach communication skills to medical students. One of the methodologies includes simulation-based training as an integral part of the undergraduate medical curriculum (Subramanian & Sathanandan, 2016). The training involves simulating a doctor-patient consultation using simulated patients and a written case scenario. In health care, a simulated patient is a person trained to behave as a real patient to replicate a series of symptoms or problems, also known as a standardised patient, sample patient or patient teacher (Kurtz *et al.,* 2003). Simulation helps students develop and enhance their communication skills in a controlled, environmentally safe setting where errors can be corrected based on simulated patient and trainer feedback (Maran & Glavin, 2003; Qureshi & Zehra, 2020).

In health professions' education both in-person face-to-face and web-based simulated practice has been known to allow for practice, feedback and refinement of communication skills (Liu *et al.,* 2016). Remotely mediated teaching based on simulation is a synchronous approach of distance learning where teachers promote real-time online or video conferencing and simulators. Christensen *et al.* (2018), in an interview study with newly graduated nurses and doctors, compared learners' perceptions of remotely/online facilitated simulation-based training to locally/in-person facilitated simulation-based training and concluded that virtually facilitated simulation-based training was judged less favourably despite being deemed an appropriate alternative to in-person face-to-face simulation-based training. The study participants however confirmed having little previous exposure to immersive simulation with most participants reporting they had participated in simulation-based training on fewer than two previous occasions. In previous studies participants have reported feeling uncomfortable, where remotely facilitated communication was a barrier to learning, and the quality of instruction was inferior and expressed unwillingness to participate in future training (Ahmed *et al.,* 2014; Christensen *et al.,* 2015). To illustrate learner experiences with remotely facilitated simulation-based training, theoretical models or conceptual constructs need to be explored to understand learners' engagement with remotely facilitated simulation-based training.

The principle of cognitive load theory (CLT) suggests that learning is most efficient when it decreases a task-related mental burden (intrinsic workload) and effort to control attention away from extraneous factors (extraneous workload) (Young *et al.,* 2014). The need for learners to communicate with a teacher through a monitor in remotely mediated simulation-based training, especially with limited previous exposure to immersive simulation, can theoretically increase the intrinsic mental workload during debriefing. Meanwhile, if the monitor serves to deter learners from the challenge of handling the clinical scenario especially with limited previous exposure to simulation, extrinsic mental workload will increase. Rudolph *et al.* (2014), taking on a different view through their conceptual model of psychological safety, acknowledged that the emotional activation of learners such as learners' anxiety with remote simulation training also affects their cognitive processing. Dieckmann *et al.* (2007) had also suggested in their theoretical discussion of realism that the cognitive and emotional reactions of learners to simulation are interdependent. As remotely facilitated simulation-based training

involves complex interactions, assessing important requirements for learner engagement with remotely facilitated communication skills simulation in medical education is necessary to provide educators with a better understanding of the processes for adapting technology to learning.

As the coronavirus (COVID-19) pandemic spreads, its impact on society is becoming more widespread and now threatens in-person face-to-face medical education. In March 2020 the University of KwaZulu-Natal (UKZN), like many universities around the world, closed all its campuses and transitioned to remote teaching and learning to reduce the spread of COVID-19 (RSA, 2020). Delivering high-quality in-person face-to-face clinical instruction to maximise medical student learning and performance was a challenge in the current environment. This required the clinical skills department at UKZN to adapt and develop a structure for delivering communication skills training using an online platform while retaining the key principles and structure of the in-person face-to-face communication skills teaching. The transition to online teaching platforms, gave us the opportunity to explore learner experience of adapting technology to modify an already existing in-person/locally facilitated communication skills simulation-based training. Furthermore, the need to evaluate the innovative potential of e-learning systems during a crisis was necessary.

The objective of this study was to adapt and develop a plan for face-to-face communication skills simulation-based training remotely, identify an online platform, pilot an online simulation-based training session using the identified platform and evaluate its effectiveness. The aim was to determine if remotely facilitated face-to-face communication skills training is an acceptable alternative to locally facilitated in-person face-to-face training. We explored medical students' perceptions of remotely facilitated communication skills simulation-based training with the aim to explore their perceptions of its value and to identify factors that might influence their attitudes to, and acceptance of, this methodology.

2. METHOD

2.1 Context and setting

This study was carried out at the Nelson R Mandela School of Medicine (NRMSM), UKZN. Prior to clinical placement undergraduate pre-clinical medical students at NRMSM, UKZN are taught communication skills in the first three years in the clinical skills laboratory. Communication skills are taught in an integrated fashion within the theme-based hybrid problem-based learning curriculum. The communication skill within each theme focuses on the history-taking related to a specific body system and follows the Calgary-Cambridge framework to a clinical consultation (Kurtz *et al.,* 2003). The communication skills teaching sessions are delivered by a group of clinical tutors in small group sessions through role-play with simulated patients. The clinical tutors are medical doctors from a wide range of specialist backgrounds and have had at least five years of clinical skills teaching experience.

3. STUDY DESIGN

3.1 Developing a plan for communication skills training remotely

With the urgent need to transition communication skills' training in the pre-clinical year remotely, a simulated face-to-face communication skills session was piloted using an online platform. To deliver teaching remotely UKZN opted to use Zoom™ (Zoom Video Communications Inc.,

San Jose, CA, USA) as the institutional online platform. Zoom is a portal that allows hosts and participants to conduct real-time online meetings and webinars. It allows participants to see and hear each other using webcams and microphones on computers and smart phones.

The participants for the project included the clinical skills laboratory tutors and 2nd year medical students. We tested various roles, including the roles of tutors as facilitators, tutors as simulated patients (SP), students involved in communication skills training as simulated students (SS) and students involved in scenario observation and the debriefing process.

During the preparation period different channels were used to share information between tutors, training of SPs and the online communication skills simulated teaching sessions. The tutors got together remotely on the Zoom platform before the actual online simulation teaching session to outline the communication skills scenario to be covered and to discuss the role of the tutors as either a facilitator or an SP. The Zoom platform also provided access for tutors as SPs and tutors as SP trainers where the SPs were trained for their role-play prior to the simulation session. The pilot online communication skills simulation teaching session was integrated into the timetable of the second year MBChB cardiovascular system theme. This allowed for online simulation teaching on the Zoom platform with two groups of students per week for four weeks to ensure the whole class had access to the teaching. Each group had one facilitator, one SP, four SSs and twelve students observing the session. Participants therefore worked in groups of fourteen to sixteen of whom four were allocated an active role in the scenario and the remaining participants observed.

Detailed scenario scripts were created for the SPs and a cardiovascular system history-taking protocol for the students based on the Calgary-Cambridge guide (Kurtz *et al.,* 2003). The relevant resources such as the cardiovascular disease-based scenario and debriefing guidance sheet to initiate the online simulation session were shared by email between facilitators and SPs. To ensure psychological safety, the scripts were developed specifically for the remotely facilitated simulation-based training to pre-empt some of the potential challenges of this technology, regarding interaction with the facilitator and other participants. We attempted to achieve consistency in the delivery of the debriefings by equipping facilitators with standardised debriefing prompts (Arafeh *et al.,* 2010). The objectives of the communication skills simulation session, schedule and time allotment and the history-taking protocol as pre-reading material were shared with the students on the university's learning management system (Moodle). An instruction on the expectation of students as either playing the role of SSs or observers during the online simulation session was also shared with the students. The actual choosing of the SSs was done during the online teaching session. Students were also informed of the need to turn on their video and unmute their microphone when requested to talk to the SP. During the online role-play session, the SSs were expected to establish rapport and gather information from the SP regarding their presenting problem based on the Calgary-Cambridge model as in a doctor-patient consultation (Kurtz *et al.,* 2003). The online/remotely facilitated scenarios were delivered in a similar manner as the locally/in-person facilitated simulation-based training except that the facilitators, SPs and students interacted with each other via a monitor and speakers from an off-site location. Figure 1 provides a structural representation of the whole process and the communication channels.

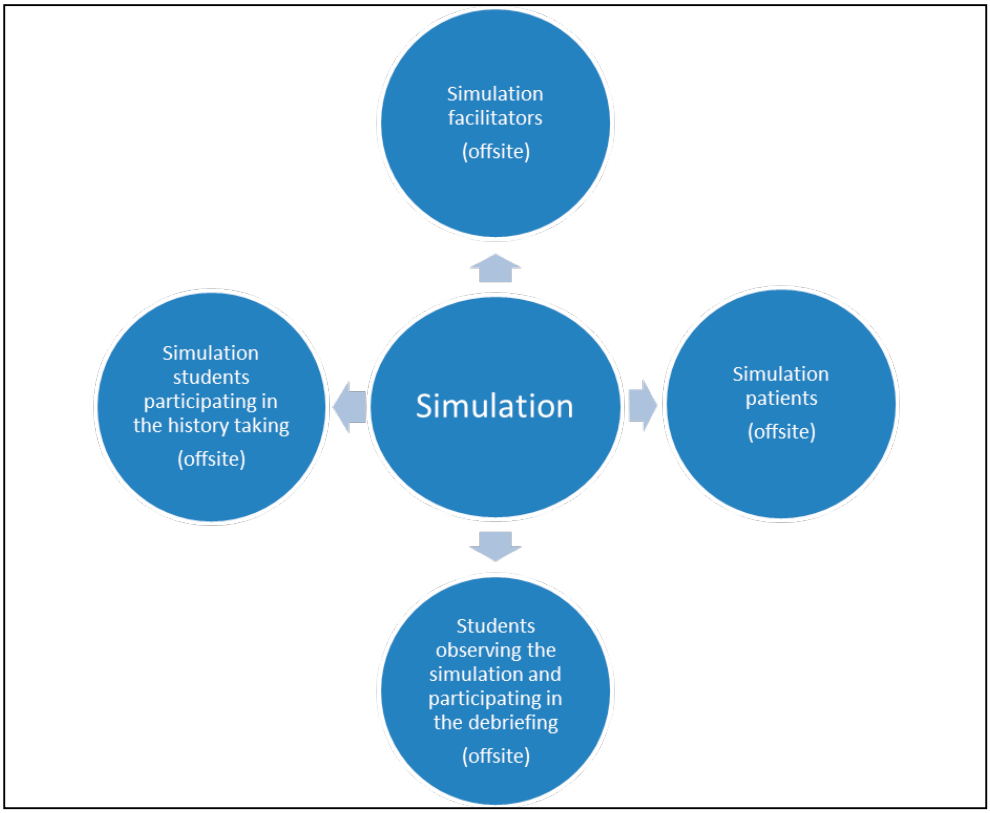

Figure 1: Representation of the communication skills training simulation process

Ground rules were set for all participants while using Zoom. This included sufficient lighting, camera adjustment for optimum visibility, the need for unrestricted high-speed internet access, when to turn the video on and unmute or mute the microphone to eliminate distractions, etc. The communication skills simulation session for each group was scheduled as below to ensure effective use of the 1 hour Zoom session:

10 minutes – Welcome and pre-briefing by the facilitators that included selecting SSs from the group.

20 minutes – Role-play using a stable angina scenario (SS with SP, while other students and facilitator observe).

20 minutes – facilitator debriefing that included interactive feedback to the students on their communication style, reasoning through the case, constructing differential diagnoses and a medical summary. All participants were actively included in the discussion during and after the scenario.

10 minutes – At the end of the session the link to the survey form was posted on Moodle for students to evaluate the pilot session.

3.2 Data collection

The data collection method was determined by the aim of the research (Creswell, 2014). This study surveyed second year medical students' perceptions on the effectiveness of

online simulation-based communication skills teaching. The survey questionnaire as the data collection instrument outlined the details of the study and possible implications. Respondents were informed that participation was strictly voluntary. Informed consent was obtained by requiring the respondents to tick acceptance to participate. Ethical approval for the study was sought and obtained from the Humanities and Social Sciences Research Ethics committee, UKZN (HSSREC /00001757/2020).

The survey form with rated questions gathered information on the students' perceptions relating to if online simulation met the learning objectives of communication skills teaching, how they perceived themselves as an SS on a virtual platform and what they felt about the SPs' responses. In addition, the students' feelings about the tutor's facilitation during the online session and their challenges with using technology were also assessed. The survey form was initially piloted with all the tutors to assess the adequacy and interpretation of the questions.

4. RESULTS

A dry run online teaching month gave us the opportunity to pilot remote face-to-face simulation-based communication skills training to the second year undergraduate MBChB class. Out of 248 medical students enrolled for the second-year cardiovascular system theme, an average of 100 students participated in the online learning. The simulation process was evaluated immediately after the session through online discussions between the facilitators and SPs and an online survey questionnaire for feedback from the participating students. In-depth interviews with students and facilitators would have sufficed but with the limited time to evaluate a pilot dry run online teaching month, the immediate purpose was to establish instant recall to identify gaps, both positives and negatives in terms of lessons learnt and then try to bridge the gaps for the formal online teaching. A disadvantage of a post hoc interview however is its inability to investigate real-time thought processes (Christensen *et al.,* 2018). Though there may be limitations of relying on self-reported student Google surveys, further studies on more long-term feedback on the effectiveness of the blended learning approach, triangulating students and facilitators' responses through in-depth interviews is considered.

4.1 Survey data

A total of 42 (42%) out of the 100 medical students that participated in the dry run pilot online learning consented to participate in the survey. Participants comprised 28 female and 14 males. In general, the participants had previous exposure to immersive simulation. All participants reported they had participated in communication skills simulation-based training on three occasions in their first year and on two previous occasions in their second year of medical school. They have also participated in communication skills simulation-based objective structured clinical examination (OSCE) assessment at the end of the first year. Of the participants that consented to the study 38.5% used a desktop or laptop and 78.4% had access to a smart phone to access the online sessions. Seventy-three per cent of students say they have mobile data, 17% have Wi-Fi and 15% have no internet access.

Open-ended response questions were also included in the questionnaire and the student responses are illustrated with quotations below. The open-ended questions were aimed at prompting the participants to recall how they reacted and responded in the moment to the remotely facilitated simulation experience and consequently reveal their acceptance of the methodologies and preferences, if these existed.

Of all the respondents, 79% perceived the ease of use of the online simulation teaching session indicating that it provided a user-friendly platform that allowed facilitators, SPs and students to navigate through easily and skilfully. Network connectivity issues were often reasons for those that had difficulty accessing the online Zoom skills sessions. Participants mentioned that Zoom session recordings made available has the advantage for re-watching or as catch-up, accommodating to network connectivity issues:

> Some people have connectivity problems and may repeatedly have to log in and out of zoom sessions. Sharing the recordings of the Zoom role-play sessions would benefit all as well as those that need to catch-up.

When asked if they found interacting with an SP on an online teleconference platform as effective as a face-to-face interaction, 65.5% of respondents agreed that it could be a good alternative to in-person face-to-face interaction but with certain challenges:

> Except for the bad internet connection that sometimes interrupts communication; I do think it could be effective as a face-to-face interaction. Though not ideal it is the best at this time and something we can look at its use as an additional learning platform.

Nearly all participants (93%) perceived the usefulness of technology in their learning and agreed that the online simulation session and case scenario met the objectives of communication skills training. They indicated that since they had done communication skills simulation sessions in-person before they had a better understanding of the situation, the purpose and outcomes of the activity and social relationships to ensure the consultation was patient-centred. They were therefore able to compare and perceived that the online platform allowed for appropriate greeting of the patient, obtaining patient details, addressing patient comfort, obtaining consent and reassuring the patient of confidentiality. They were able to identify the reasons for the consultation without disruptions. Ninety-five per cent of respondents mentioned that they found it easy to communicate with the simulated patient while gathering information i.e. obtaining the presenting problems, the sequence of events, analysing the symptoms and to review symptoms of other body systems. Just like any in-person face-to-face interaction they were able to use open questions initially, listen attentively to the patient and then narrow down to more closed questions.

> We did quite get the purpose of the video conferencing. It wasn't awkward as we have been exposed to communication skills history-taking role-play. We were at ease similar to when someone was really there in front instructing us.

However, picking up non-verbal cues from the patient on an online platform was still a challenge:

> It's not quite the same online for a patient to convey their feelings and show the medical student areas of their body where they were affected. But for communicating events verbally and to listen to their story without interrupting, online communication is still as good as in-person because the video was on.

In response to if they found it easy to use certain verbal and non-verbal skills to facilitate the SP's responses to their questions, 69% of participants indicated it was possible. However, a few respondents mentioned that it was possible to demonstrate empathy verbally but there were challenges to adequately use non-verbal process skills on an online platform:

> It was possible to say sorry and use words to reassure the patient… More difficult to use non-verbal methods as indicating with your hands isn't possible due to the camera only being on your face…also I tried to make eye contact with the patient by looking at my screen though I was not so sure if I should be looking at the screen or the camera.

Though 62% of respondents thought it was possible to pick up verbal cues, most respondents mentioned how difficult it was to pick up non-verbal cues from the simulated patients' video:

> It was easy to pick up verbal cues, but it was difficult to pick up non-verbal cues since I could only see the head of the patient and not the whole body, hands etc.

One participant however mentioned that adjusting the camera angle of the actors during the role-play could help:

> When the angle of the simulated patient's camera was right, I could see her hand gestures and facial expressions.

Even though all participants were doing this for the first time, 64.3% of respondents agreed that the facilitation of the pre-briefing, scenario role-play and debriefing on an online platform was intense with less distraction and effective. Learners further perceived that their engagement during the session was facilitated by their relationship with the tutors:

> I got feedback from the simulated patient to be careful of my judgemental thoughts of her being a heavy smoker. I know I have to be careful about next time. The tutor also gave me feedback on what I missed out and reminded me not to show certain judgemental expressions. I also felt like the tutor knows me and was just talking to me all the time. I am also able to privately message the tutor for real time feedback on my doubts."

However, 31% of participants did not find the online debriefing as effective as the traditional in-person face-to-face simulation in the skills lab:

> It is not easy for the facilitator to determine whether the students do understand or not by looking at our facial expressions on the video. The actual face-to-face communication in the skills lab allows for more engagement and questions.

Finally, most participants (88%) found that the online debriefing enhanced their understanding of how to clinically reason through a case and they felt confident to apply the clinical reasoning skills and diagnostic approach to other scenarios with more practise:

> The online debriefing was very informative. The facilitator gave me a good perspective on understanding how to think through the differential diagnosis and then work out a medical summary… I feel I can apply it to other cases but will still need more practise with clinical reasoning.

5. DISCUSSION

This study was a pilot investigation into the feasibility, perceived utility and effectiveness of a simulation-based communication skills online teaching strategy within a second year MBChB cardiovascular theme. Clinical teaching is most impactful during the clinical and pre-clinical years as this is the time where skills in taking a history, performing physical examination, clinical reasoning and making important decisions are taught and learnt (Spencer, 2003). According to the Miller's pyramid, medical students need to be able to show and demonstrate their knowledge and skills (Miller, 1990). Our remotely facilitated simulation-based approach

was designed to retain students' knowledge acquisition and competency attainment in communication skills.

All participants agreed that the remotely facilitated simulation session met the objectives of communication skills training. Participants believed the different online platforms enabled users to communicate effectively in preparation for the simulation sessions through audio, visual and textual methods and allowed for flexible and adaptive resource engagement. The Zoom platform was helpful as an online simulation tool as it did not require equipment beyond what participants already had such as a smartphone/computer/laptop with built-in speakers and microphone, camera and internet connection. Despite the fact that all participants were doing this for the first time, most agreed that the facilitation of the pre-briefing, scenario role-play and post scenario debriefing on an online platform is possible with less distraction and can be effective. In this study, the perceived usefulness of the technology was measured as the degree to which participants believe that the technology would contribute to increased performance, and its ease of use was measured as the degree to which participants expect the technology to be easy to use (Christensen *et al.,* 2018). Research in the information technology sector describes the technology adoption model (Davis *et al.,* 1989) which predicts that learner behavioural intent towards acceptance of remotely facilitated simulation-based teaching is most sensitive to perceived usefulness and that strongly perceived usefulness can outweigh and override the influence of negative attitudes on behavioural intent (Persico *et al.,* 2014; Tarhini *et al.,* 2015).

A key strength of the study was that the learners were exposed to locally facilitated/in-person communication skills simulation-based teaching format. Familiarity with immersive simulation methods through previous experience with simulation and expectations of learning allowed our learners to compare the two teaching formats. An important aspect of a good doctor-patient communication is active listening and demonstrating empathy. Students mentioned that listening attentively, demonstrating concern and caring for the patient can be expressed through computer mediated communication as in in-person communication. This introduces the concept of digital empathy which needs further exploration. Learner engagement with remotely facilitated simulation-based training requires contextual understanding and multiple exposures. We may consequently predict that learner perceptions reflecting cognitive workload with remotely facilitated simulation-based teaching will decrease compared to studies whose learners are unfamiliar with simulation methods (Eppich & Cheng, 2015).

A limitation that we noticed was some students unfortunately leaving the online session if chosen to interview the simulated patient because they were too shy, which was unusual during an in-person session. Also, while it was possible to have all participants at a time on the screen over video, apart from the simulated students switching on their videos, most students observing were not comfortable to keep their videos on. We could therefore not be sure of the level of engagement in the observing students. This comparison shows that while some perceptions correlated with negative experiences of teaching based on remotely mediated communication skills simulation, the same perceptions may also occur to a greater or lesser degree in either format. This confirms the need and should enable teachers to adapt, irrespective of format, to the psychosocial and cognitive reactions of learners to simulation-based instruction. To ensure active engagement with the remote simulation teachers in this study insisted on the need for students to have their communication skills protocol open during the session and to use it as a student-patient direct observation checklist to feedback on their peer's performance. The deliberate practice of providing peer feedback has the advantage to

motivate students learning while also developing competence in assessing and teaching their peers (Abraham & Singaram, 2019). This further develops student's self-regulatory learning response that can have a positive impact on both acquisition and transference of skills as well as improved clinical performance (Abraham & Singaram, 2019).

Zoom allows access to both university employees and students to communicate over the platform. There were however concerns with access to the clinical skills laboratory's bank of SPs as they do not have organisational email addresses as well as data concerns for internet access. This problem was tackled by using the clinical skills tutors as SPs who already had an organisational Microsoft Outlook account and Zoom licence for the pilot project. The study confirmed that facilitators as simulated patients worked well as students were not daunted by treating their tutors as simulated patients. However, using two tutors, one as facilitator and one as the simulated patient, can be a waste of academic labour. A suggestion that could work well would be to consider using one tutor to act as both facilitator and simulated patient.

There has been uncertainty with the formulation of best practice guidelines for facilitation of online face-to-face simulation debriefing compared to debriefing during in-person face-to-face simulation (Christensen *et al.,* 2018; Verkuyl *et al.,* 2020). Student's evaluation of the usability of the online platform confirmed receiving real-time feedback from tutors, SPs and colleagues. This included feedback on their skills of building rapport, gathering information, providing structure to the interview process and understanding the patient's needs. They also indicated receiving feedback on their non-verbal behaviour that included their facial expressions such as smiling, frowning, nodding and head shaking. Evaluation of the online simulation sessions hence concluded that the debriefing was as effective as in-person simulation and that the communication skills simulation-based training offered by virtual video conferences was both feasible and successful within an online curriculum. The Zoom online facility allowed for recording of the sessions for future reflection. Tutors recommended sharing the recordings with the selected student groups immediately after each online session to facilitate student reflection on the consultation towards refinement of skills. Reviewing the recordings has the advantage of helping students to be aware of their non-verbal behaviour and to identify skills that need improvement to positively influence the development of communication skills (Howley & Martindale, 2004). Hepplestone *et al.* (2011) mentioned that video recordings as feedback supports students' self-appraisal and motivation to engage with learning towards closing their learning gap. The recordings in this study were also used by the facilitators to discuss and feedback to each other.

Students perceived the online simulation as a platform to practise their communication and clinical reasoning skills and felt confident to transfer their learning to other scenarios. The tutors suggested that the online platforms can be extended for students to practise communication skills with their peers. To make simulation more effective for learning, students can be allowed to develop simulation scenarios based on their learning needs and to work on them with their peers (Babla *et al.,* 2020). According to the social cognitive theory, students acquire competence in clinical communication and reasoning skills through practise and feedback (Mann, 2011). The study participants' engagement with the simulation training was facilitated by their perceived relationship with their teachers and their conceptualised importance of events in the case scenarios. Rudolph *et al.* (2014) recognised that learners' emotional activation through their rapport with teachers influences their cognitive processing. The emotional and cognitive responses of learners to simulation are an essential prerequisite for learner interaction with remotely mediated simulation-based teaching and acceptance

of technology (Dieckmann *et al.,* 2007). The online communication skills simulation was perceived as an important educational tool that can provide an effective learning experience. There is therefore the need to look at using technology as an educational enabler. In addition, during the pandemic, it is also possible to adapt assessment of communication skills within an OSCE to a telemedicine-based platform in the form of a "virtual visit" telemedicine format, with learners and SPs communicating remotely through a simulation space built on a web-based platform. This becomes even more relevant especially as the medical fraternity looks at progressing towards adapting telemedicine platforms for virtual consultations (Waseh & Dicker, 2019).

As we are still in an early stage of rolling out such a programme, we will need to continue to evaluate this system with more long-term feedback. While students' feedback has been mostly encouraging, they have also pointed to certain challenges regarding interactive behaviours during communication skills training via tele-conferencing. Study participants frequently mentioned a reasonable frustration about the lack of in-person "face-to-face" opportunities to adequately pick up non-verbal cues while trying to interpret the SP's presenting problem. Though most participants mentioned the ability to see facial expressions on the video, others indicated missing out cues such as body language of SPs below the shoulder region which can be a limitation of this study. Some found it difficult to maintain eye contact with the SP as they could not physically look into their eyes. There was some confusion about whether they should look at the middle of the screen or directly at the camera during the consultation. Interestingly, the challenges identified by the students also revealed that they had experienced a deeper understanding of concepts related to the skill which meant that they appreciated the significance of non-verbal cues in communication skills. These skills are predicted to influence participants' sense of belonging and appreciation of social presence (Davies *et al.,* 2012; Cameron *et al.,* 2015). In addition to a doctor's verbal and non-verbal communication skills, responding to a patient's verbal and non-verbal cues using empathy has an impact on the patient's health outcomes (Ishikawa *et al.,* 2010). It is therefore important for medical students to pick up, respond to and develop these skills. Other challenges mentioned included accessibility issues such as internet data access and difficulties with internet connectivity as one of the main problems most of them faced. This might explain the low number of students that attended the dry run online sessions as well as the low survey response rate. A significant advantage of our adaptation was that recordings of the Zoom sessions can be disseminated and made available to students to re-watch later at their own pace for reflection or to catch-up whenever they are able to connect, accommodating to network connectivity issues. The University of KwaZulu-Natal has arranged for 20GB of data per student monthly via South Africa's three largest mobile network providers (MTN, Vodacom and Cell C) in response to the suspension of face-to-face teaching and learning and following the decision to move to remote online teaching and learning.

The best way of teaching is no doubt still through the conventional locally/in-person face-to-face facilitated simulation methods where tutors deliver teaching in 4-dimension utilising all the sensoria maximally to grasp and instil the knowledge and skill effectively. However, teaching medicine must be modified as social distancing is the cornerstone to combat the pandemic (Roger, 2020). Students have been reassured through announcements on the learning management platform (Moodle) that as soon as the existing social distancing restrictions are eliminated, time will be allocated to revisit in-person communication skills. Most study participants seem to understand that while replacing locally facilitated simulated

communication skills with video simulation is not perfect, they are the best possible option for reducing the health and safety risks in the current situation. Furthermore, we found that participants were able to ignore shortcomings of remotely enabled simulation-based teaching because they were outweighed by the potential advantages of being provided access to simulation-based teaching despite the current situation. While for many universities, COVID-19 will be disastrous, it also presents them a chance to transform how they operate. Medical schools will hence need to start planning for different epidemiological scenarios and be ready to adapt.

While online platforms may be sufficient for students in their pre-clinical year, senior medical students placed in the clinical environments may require patient contact. Though the delivery of live teaching via online platforms may not always be ideal to substitute actual patient contact, to avoid a substantial loss of student learning time, it may prove to be an appropriate solution to the cancellations that are currently taking place due to COVID-19. Researchers have suggested that the use of tele-health to deliver medical education and training has not received enough attention (Edirippulige & Armfield, 2016; Rienits *et al.,* 2016). This study's response on the behavioural preferences of learners to accept e-learning technology dictated by their positive or negative attitudes towards technology confirms that online teaching has the advantage of guiding student learning and places content within the overall context of their curriculum rather than leaving students to their own devices. Developing new teaching models lays the foundation for more resilient and efficient teaching in the future.

6. CONCLUSION

Though COVID-19 pandemic halted clinical teaching due to safety reasons, teaching still had to continue and clinical tutors had to quickly adapt to online teaching methods. This study demonstrates that remotely facilitated communication skills simulation-based teaching evokes a range of emotional, social and cognitive responses in learners that can influence their attitudes toward acceptance of technology in learning. Within the constraints of a remote set-up during the COVID-19 outbreak, the adapted approach retains the key principles and structure of the in-person face-to-face communication skills teaching and lays out an innovative solution for providing medical students with a means to practise and enhance their communication skills and clinical reasoning skills. This article forms a basis for further investigation and opens avenues to inform practice for higher education in the time of social (or physical) distancing. However, its potential influence is not limited to undergraduate medical education. With the increasing use of tele-health, especially during the current pandemic, online simulation could be incorporated into postgraduate medical training and nurse education programmes to help health professionals to reflect on and develop their communication skills. Studies to assess the application of online communication skills training in postgraduate medical and nurse education training are recommended. Also recommended are longitudinal studies monitoring the development of communication and clinical reasoning skills in medical students using online platforms. A further suggestion is that other online methods instead of only Zoom platforms be explored. Finally, within the context of the current situation a consideration that cannot be ignored is how online simulation-based teaching and learning can be sustained after this pandemic.

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