THEME ISSUE: SKILLS-BASED EDUCATION

Viability of Virtual Skills-based Assessments Focused on Communication

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Submitted August 28, 2020; accepted January 26, 2021; ePublished January 2021

Objective. To evaluate faculty and student perceptions and performance of virtual compared to in-person skills-based assessments focused on communication.

Methods. Providing sufficient formative and summative feedback is a challenge, particularly in the context of skills-based assessments. In spring 2020, two 12-item questionnaires, one each for students and faculty, were designed to assess perceptions of virtual skills-based assessments. The survey was distributed via QuestionPro® to second and third professional year pharmacy students and faculty who participated in a virtual skills-based assessment. Scores from the spring 2020 virtual skills-based assessment were compared to the in-person skills-based assessment that took place in spring 2019.

Results. Of the 19 faculty and 279 students invited to participate, 18 (94.7%) faculty and 241 (86.4%) students responded. The majority of faculty (88.9%) and students (63.5%) perceived the virtual skills-based assessments to be effective at simulating an interaction. However, only 33.3% of faculty and 28.6% of students preferred the virtual environment. There was not a significant difference in the percent of third year students scoring 80% or higher between in-person and virtual assessments for patient consultation and subjective, objective, assessment, and plan (SOAP) note skills.

Conclusion. Students and faculty reported the virtual assessment provided an opportunity for an appropriate assessment of student communication skills. However, despite feelings that the assessment was appropriate, a strong preference for future virtual skills-based assessments was not observed.

Keywords: assessment, skills-based assessment, virtual assessment, communication skills, skills lab

INTRODUCTION

Frequent practice of communication skills in healthcare professional education is essential to prepare trainees for real-world experiences.¹⁻³ Providing formative and summative feedback supports meaningful learning to the trainees but requires financial and personnel support to conduct these time-consuming activities.^{3,4} Traditionally, such assessments have been provided almost exclusively in person.

The coronavirus disease of 2019 (COVID-19) pandemic made in-person instruction impossible and Doctor of Pharmacy (PharmD) programs quickly transitioned to alternate methods of assessment, including skills-based assessments.^{5,6} While anecdotal evidence suggests that alternate assessment methods were effective during the pandemic, questions emerged related to continued utility of virtual skills-based assessments as an opportunity to improve quantity and quality of assessment throughout PharmD programs.⁷ Virtual skills-based assessments may offer opportunities to expand assessment to meet the Accreditation Council for Pharmacy Education accreditation expectations while managing evaluator travel logistics and general expense.^{8,9} Furthermore, virtual skills-based assessments may create additional assessment opportunities during the final professional year at our university when skills-based assessments would have not taken place due to student placement in off-campus advanced pharmacy practice experiences (APPEs).

Literature is limited in pharmacy education regarding the use of virtual skills-based assessments to evaluate patient care skills. Published literature describes using simulation-based software, virtual patients, and technology for distance learning.^{8,10-13} Other health professions have utilized online learning to a greater extent, but most information is related to simulation training or virtual reality.^{14,15} Limited data on faculty and student perceptions of skills-based assessments is found in medical and pharmacy literature and draws varying conclusions of satisfaction.^{4,16-18} The purpose of this project was to evaluate faculty and student perceptions and student performance of virtual skills-based assessments compared to in-person skills-based assessments focused on communication.

METHODS

A 12-item questionnaire was distributed via QuestionPro (QuestionPro Inc., Austin, TX) to second and third professional year (P2 and P3, respectively) pharmacy students that participated in a virtual skills-based assessment in March 2020. A parallel questionnaire was distributed to faculty who evaluated these assessments in March 2020. The questionnaire was open for two weeks; a reminder was sent after one week. Faculty and students who had not previously participated in an in-person skills-based assessment were excluded. The virtual environments were created in Blackboard Collaborate Ultra (Blackboard Inc., Reston, VA).

The virtual skills-based assessments were focused on verbal and written communication skills; physical assessment, compounding, or other hands-on skills were not assessed. P2 pharmacy students completed two activities on different days which included a patient case presentation and 10-minute in-service presentation. The P3 pharmacy students completed two activities within the same day which included a patient consultation focused on identifying and overcoming barriers and verbal recommendation to a provider. Additionally, the P3 pharmacy students completed a written one-problem SOAP (subjective, objective, assessment, plan) note. All skills had previously been assessed in an in-person environment. Respondents were asked to rate their perception of virtual skills-based assessments compared to in-person skills-based assessments using a five-point Likert-type scale to seven different statements. Respondents were also asked to report their professional year in school (students) or which assessment they participated in (faculty), participation in previous in-person assessments, how they connected during the assessment (video and computer audio, video and telephone, computer audio only, telephone only), and technology issues they experienced. The final item of the survey asked an open-ended question for respondents to provide reasoning for why they did or did not prefer a virtual compared to an in-person environment.

The primary objective was to examine faculty and student perceptions of virtual compared to in-person skills-based assessments focused on communication. The secondary objectives were to compare perceptions between the two student cohorts and virtual assessment scores to in-person assessment scores. To compare perceptions, strongly agree and agree were combined to reflect a positive response. Then, percent positive responses for each survey question were compared between groups using the chi-square test. To compare performance, the percentage of students achieving 80% or better was compared between the two groups using the chi-square test. This threshold was selected as it signifies expected performance of a P3 pharmacy student prior to beginning APPEs. Curricular revision precluded the same analysis among the P2 cohort as revised assessment practices resulted in no opportunities for direct comparison. P3 assessments were unchanged; therefore, spring 2019 in-person scores were compared with spring 2020 virtual scores. The same rubrics were used to assess both student cohorts; however, different cases were used to mitigate risk for academic dishonesty per standard course practices. Since the purpose of the case was to assess communication skills, adjusted case details were not expected to substantially confound findings. A detailed comparison of the resources used and assessment methods in each environment can be found in Table 1.

Analyses were performed using Stata/SE, version 13 (StataCorp LLC, College Station, TX). Results with p values less than .05 were considered statistically significant. Open-ended survey question responses were reviewed by study authors and grouped by common themes. The Ferris State University Institutional Review Board deemed this project exempt.

RESULTS

Nineteen faculty and 279 students were invited to complete the survey; 18 faculty (94.7%) and 241 students (86.4%) participated. A total of 110 P2 pharmacy students (80.3%) and 131 P3 pharmacy students (92.3%) responded to the survey.

The majority of faculty (72%) evaluated only one of three virtual skills-based assessments and 83% connected with students using video and audio through Blackboard Collaborate Ultra while the remaining 17% connected via audio only. Although significantly more faculty responded positively, the majority of faculty (88.9%) and students (63.5%) perceived the virtual skills-based assessments to be effective at simulating an interaction ($p=.03$). Most students (72.2%) perceived that the virtual skills-based assessment allowed them to demonstrate their communication skills; however, only 33.3% of faculty and 28.6% of students preferred the virtual compared to the in-person environment. These responses were not significantly different ($p=.67$). Students who connected using only audio reported similar preference of future virtual skills-based assessments compared to those who used video (18% vs. 30%, respectively, $p=.153$). Qualitative analysis of open-ended responses revealed 65.6% reported no technology issues, 17.4% reported connectivity issues, 13.3% reported audio issues, and 4.1% reported other issues related to usability of the technology. Table 2 compares positive responses of faculty and student perceptions for each questionnaire statement. Table 2 also compares P2 and P3 pharmacy student responses to each survey item. There were no significant differences between the groups. There was not a difference in the percentage of P3 pharmacy students scoring 80% or higher between in-person and virtual assessments

for patient consultation and SOAP note skills (Table 3), but there was a difference found for students scoring 80% or greater for the healthcare provider interaction (97.9% virtual vs. 84.9% in person, $p < .001$).

Qualitative feedback indicated that some faculty preferred that future skills-based assessments be conducted in a virtual environment primarily due to efficiency as a result of less travel. Most faculty who preferred in-person assessments stated that is how most interactions will be in practice and because it is easier to assess non-verbal communication skills. Students that strongly agreed or agreed with future assessments in a virtual environment noted a preference for the virtual environment due to flexibility, not needing to commute, and the importance of being exposed to telehealth environments. Students that preferred the in-person environment expressed similar comments to faculty indicating that in-person communication was taught in the classroom and much of their future practice will be conducted in person. The importance of being “forced to present in person” was also mentioned stating “uncomfortable situations are how you improve.” Students commented that the possibility for technology-related issues increased their anxiety.

DISCUSSION

This project describes a preliminary investigation of student and faculty perceptions of a series of virtual skills-based assessments focused on communication during the pivot to distance education at the beginning of the COVID-19 pandemic. Students did not overly prefer virtual skills-based assessments, though faculty were more supportive, and both groups felt the assessment was appropriate. These perceptions were similar to related work conducted before the pandemic.¹⁸ Since our study was conducted at the beginning of the pandemic, similarity would be expected. Perceptions may continue to shift as familiarity with video-based distance instruction improves.

Though nobody would have predicted the COVID-19 pandemic, nor would anyone voluntarily ask for such a disruptive force in educational delivery and assessment, there are serendipitous opportunities to learn from our experiences to optimize post-pandemic practices. While preliminary discussions of virtual engagement in skills-based assessments occurred in prior academic years, momentum favoring in-person skills-based assessments was difficult to overcome until the pandemic forced our hand. We now know that virtual skills-based assessments generally work, and students and faculty believe appropriate assessment occurred. Technology-related issues did not significantly alter student perceptions of virtual assessment and we anticipate that continued practice with distance education modalities will reduce frequency of technology issues over time. Students may have hesitation about the assessment of their performance, but there is opportunity to educate students that any isolated assessment of a skill has drawbacks, and there may still be strong value in constructive feedback for continued development. Familiarity with the virtual format for formative and summative assessments may also foster student acceptance over time. It should be noted that this study did not seek to compare perceptions of evaluation accuracy between virtual and in-person skill-based assessments, so it is possible that questions of accuracy may not be unique to virtual assessments.

Knowing that virtual skills-based assessments are generally viable, we see value in keeping virtual skills-based assessments given the significantly reduced travel and expenses. Our institution relies on a large cohort of faculty with significant APPE teaching responsibilities with corresponding off-campus placements. In an in-person format, faculty may require multiple hours of travel time to attend these assessments. The virtual format saves substantial time and better allows for APPE and clinic site responsibilities which may be why faculty expressed support for virtual assessments. We also see value to simulate telehealth encounters. There has been limited application of telehealth-focused simulations through an elective course in our program.¹⁹ Given that these initial experiences were well received and with the sizeable shift to telehealth during the pandemic, we believe it is advantageous to increase telehealth training in the pre-APPE curriculum.²⁰

Some institutions may have facilities that offer video recording capabilities in skills laboratories, which makes recording in-person assessments and subsequent reflection possible. In settings where such technology is unavailable, dated, cumbersome, or workload intensive, simply hitting “record” within a video conferencing tool may bring ease to recording and distributing files. Increased emphasis on self-assessment and goal setting has taken place in recent years at our institution. While a comprehensive self-assessment recommendation is beyond the scope of this work, relevant literature should be reviewed in development of a self-assessment plan and the use of technology during a skills-based assessment would create an opportunity for video capture to facilitate student reflections.²¹

As this study represents initial findings at a single institution, limitations should be noted, including that assessments were limited to communication and did not include physical assessment or pharmaceutical compounding, which are commonly included in other skills-based assessments across a PharmD curriculum. Our results may be confounded by prior experiences with in-person skills-based teaching and assessment that create baseline expectations from faculty and students. These results may have been different if students were exposed to more virtual skills-based instruction before the virtual assessment. Concern was raised related to the difference in scores between virtual and in-person assessments, and while this could be a between-class variation or a more structural difference (Table 1), our

assessments were not built to assess reasons for this variation. These differences could also be explained due to academic integrity concerns, which is generating discussion of how we can focus rubrics more pointedly to assess communication skills and less knowledge and clinical skills, given that information sharing about a case yields little advantage for communication skills-based assessments. Future research could be targeted at issues of inter-rater reliability and consistency of evaluation as well as methods to maintain case integrity. While these issues are not unique to virtual assessments, it may be possible to develop tools to assist with improving evaluator consistency in virtual environments.

CONCLUSION

Students and faculty reported the virtual skills-based assessment provided an opportunity for an appropriate assessment of student communication skills. However, despite feelings that the assessment was appropriate, a strong preference for future virtual skills-based assessments was not observed. Use of virtual skills-based assessments can be used to offset travel requirements, may better simulate modern telehealth activities, and may create opportunity for self-assessment.

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AJPE
Accepted Draft

Table 1. Comparison of In-Person vs. Virtual Skills-Based Assessment Environments

	In-Person Environment	Virtual Environment
Patient case presentation	Faculty served as evaluators while students verbally presented a patient case	Faculty served as evaluators while students verbally presented a patient case
In-service presentation	Faculty served as evaluators; students presented in groups while projecting slides	Faculty served as evaluators; students presented in groups using screen sharing features to project slides
Patient consultation station	Standardized patients were used and faculty served as evaluators	Standardized patients were not used; faculty served as the simulated patient and evaluator concurrently
Healthcare provider station	Faculty served as the simulated provider and the evaluator concurrently	Faculty served as the simulated provider and the evaluator concurrently
Grading	Faculty grading was completed in real-time using ExamSoft rubrics	Faculty grading was completed in real-time using ExamSoft rubrics
Sequestering	Students were sequestered prior to the start of the assessment and instructed to leave immediately upon completion to prevent academic dishonesty	Students were off-site and sequestering was not feasible
Timing	Students were in a controlled environment and were timed at each station; including the case review stations	Students were timed only when interacting with faculty Students were instructed to review cases for a specific amount of time; however, this was not monitored due to the virtual environment
Case information and resources	Students had access to only the resources provided by the proctors	Students may have used other resources not traditionally provided (i.e., guidelines, drug information resources, therapeutics notes, etc.)
Personnel resources	Faculty graders for all stations 2-3 staff for check-in and sequestered room observation 5-10 student assistants to move students to stations Assessment coordinator for logistics 1-2 additional faculty in case of emergency	Faculty graders for all stations 1 staff/student for technical support 1 additional faculty in case of emergency
Financial resources	Travel cost for faculty graders, food for those involved, staff salaries, and printed materials	Staff salaries, if needed
Technology requirements	Faculty laptops and on-site Wi-Fi	Faculty laptops and internet connection, student computers and internet connection, video conferencing accounts for all graders

Table 2. Comparison of student and faculty perceptions of virtual skills-based assessments compared to in-person skills-based assessments.

Survey Question	Student vs. Faculty ^a			P2 vs. P3 Students ^a		
	Student N=241 (%)	Faculty N=18 (%)	<i>p</i> value	P2 Student N=110 (%)	P3 Student N=131 (%)	<i>p</i> value
The virtual skills assessment was effective at simulating a patient-provider or provider-provider interaction.	63.5	88.9	.03	61.8	64.9	.62
The virtual skills assessment allowed students to demonstrate their communication skills.	72.2	94.4	.04	67.3	76.3	.12

The virtual skills assessment allowed the faculty evaluator to complete an appropriate assessment of students' communication skills.

60.2 88.9 .02 58.2 61.8 .56

The virtual skills assessment environment allowed the faculty evaluator to provide the students with quality verbal feedback.

76.8 94.4 .08 77.3 76.3 .86

The virtual skills assessment environment allowed the faculty evaluator to provide the students with quality written feedback.

58.9 66.7 .52 60.9 57.3 .57

In the future, communication skills assessments (e.g., patient case presentations, patient counseling, etc.) could be conducted in a virtual environment.

56.0 77.8 .07 56.4 55.7 .92

In the future, I would prefer a virtual environment for communication skills assessments (e.g., patient case presentations, patient counseling, etc.)

28.6 33.3 .67 27.3 29.8 .67

^aPositive response=strongly agree or agree as selected response

Table 3. Comparison of third professional year student performance on in-person (2019) vs. virtual (2020) skills-based assessments.

Skills-Based Assessment Station	2019, % scoring ≥80% (n=132)	2020, % scoring ≥80% (n=142)	<i>p</i> value
Patient Consultation	90.2	87.3	.46
SOAP Note	87.9	85.9	.63
Health Care Provider Recommendation	84.9	97.9	<.001