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Addressing Ceiling Effects in IPE Assessments

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Statement of Problem

Interprofessional education (IPE) programs often employ ratings-based evaluations to gauge the level of interprofessional competency of students. Such evaluations are usually conducted through behavior-based systems of assessments (as opposed to self-reported attitudes and beliefs) designed to capture collaborative behavior both in educational settings and clinical settings (Committee on Measuring the Impact of Interprofessional Education on Collaborative Practice and Patient Outcomes, 2015). To aid proper development of interprofessional competencies, these assessment systems must provide reliable and valid feedback to students and professionals.

Background

The Jefferson Teamwork Observation Guide® (JTOG®) is a real-time, 360-degree competency-based assessment tool that measures how well teams and individuals collaborate in educational and practice settings. Available in both paper and mobile app form, the JTOG was initially designed in 2012 (Lyons, et al., 2016) and has since evolved both in content and scoring methods. Recently, the content of the JTOG items was updated to provide more succinct descriptions of competencies, and developmental language was added to the rating scale (e.g., 1 = needs improvement; 7 = exceeds expectations, Sicks, et al., 2021).

Despite positive movement toward app development, ceiling effects are evident in JTOG scores, an issue that seems to plague many IPE assessment tools (e.g., Hass, Collins, & Sicks, 2020). A ceiling effect is present when observations are bunched up at the high end of the measurement scale (Cramer & Howitt, 2004). Ceiling effects hamper research efforts partly due to their deleterious effects on most inferential statistical procedures (via restricted range and skew). Thus, in order to continue to explore the underpinnings of teamwork in IPE settings, and to properly evaluate interventions designed to enhance collaborative competencies, it is important to address ceiling effects on tools like JTOG.

In 2021 we developed a training video instruction process, which included a description of the JTOG, how to use it, and what it measures. We stressed in the video that when using the JTOG mobile app, ratings remain confidential—no other members of the team will know exactly what an individual team member gave for ratings. We hypothesized that training students explicitly on how to use the tool would reduce ceiling effects. Here, we report some preliminary findings from the use of this training video in a TeamSTEPPS®-based interprofessional teamwork and patient safety simulation.

Methodology

This intervention used TeamSAFE, an interprofessional simulation program adapted from the TeamSTEPPS curriculum in which students role-play in a scenario involving patient safety (King et al., 2021). The 2021 TeamSAFE sessions were administered virtually, and 584 students used the app to rate the performance of one of the role-playing teams following the simulation. Students used the Team JTOG, a 13-item version of the tool in which observers and

Figure 1 – Violin and box plots of student JTOG scores for sessions before the addition of the video (2020) and after (2021).

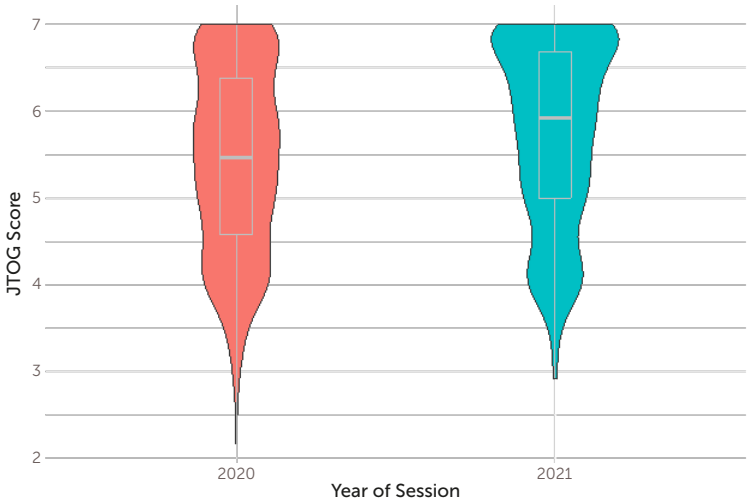
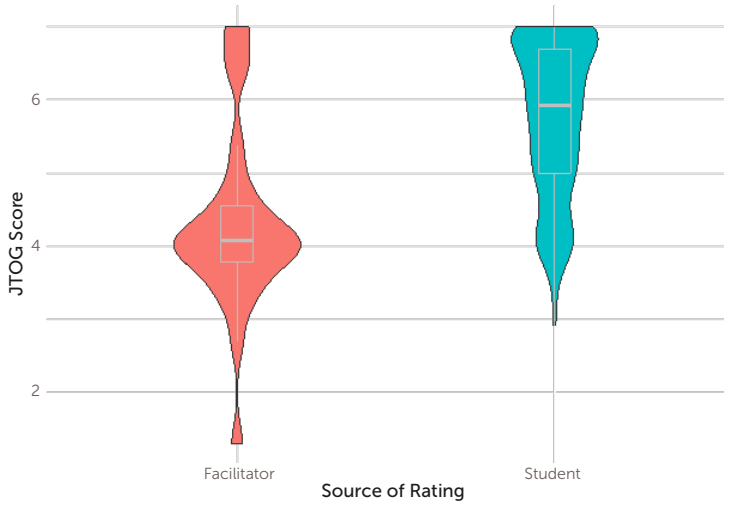


Figure 2 – Violin and box plots of facilitator and student scores for sessions in 2021.



team members rate the behaviors of an entire team.

The preparatory work for these 2021 TeamSAFE sessions included a module hosted in Canvas with a 3-minute training video created by the authors to emphasize the importance of accurate JTOG ratings. The video included narration describing the purpose of the JTOG (to measure IPEC competencies), the fact that JTOG scores are not grades, and that member ratings are confidential. The video also included a 1-minute exercise where students were instructed to think of a past experience with teamwork, either in a clinical or educational setting, and then rate that team on examples of four JTOG items. To examine potential impact of the training video on ratings, we used ratings from 403 students given during TeamSAFE sessions in Fall 2020 as a comparison. To further explore whether facilitators also exhibit ceiling effects, ratings given by facilitators of the Fall 2021 sessions (N = 28) were also analyzed.

Results

For each student, an average JTOG score was computed by taking the mean across the ratings of the 13 items. Multilevel reliability analysis (using composite reliability) showed that JTOG average scores were a highly reliable measure of overall IPEC competencies (omega = .98). Using multilevel modeling to model dependencies among ratings from the same session, we compared 2021 session-level average JTOG scores to those obtained in Fall 2020. As shown in Figure 1, the scores from 2021 fall sessions (M = 5.76, SD = 1.05) were estimated to be higher than those obtained in Fall 2020 (M = 5.44, SD = 1.08), b = 0.34, 95% CI: 0.15; 0.53. The confidence interval suggests the effect may be as little as a 1/10 of a point to about half a point difference in average scores from students in the two different years.

Figure 1 also illustrates ceiling effects in both years, though the 2021 ceiling effect appears more severe. As can be seen, scores bunch toward the top of the scale, with 75% of scores above 4.5 in 2020 and 75% of scores above 5.0 in 2021. Figure 2 illustrates the difference in the distribution of average JTOG scores between students and facilitators in the 2021 sessions. Facilitator scores are more evenly spread and appear to conform to a normal distribution. No inferential tests were performed due to the imbalance in sample sizes, but the figure clearly shows that the distribution of facilitator scores is not skewed, nor does it illustrate a ceiling effect. Due to issues with the app roll-out in 2020, comparable facilitator data were not available for that year. We suspect that the same trend would be evident in the 2020 data.

Discussion

The purpose of this analysis was to begin exploring interventions to assess interprofessional competencies while reducing the ceiling effect in JTOG scores, an issue relevant for all IPE assessments. Contrary to our intent, the introduction of a training video to TeamSAFE pre-work did not lead to a reduction of the ceiling effect, likely because there was no assignment linked to watching it. Since the video was hosted in Canvas, it was possible to check how many students navigated to the video, and unfortunately, less than 1% of students watched it. So simply offering a training video for JTOG is not enough to ameliorate the ceiling effect.

In the absence of an external, gold standard IPEC assessment tool, facilitator ratings served as our standard. All TeamSAFE facilitators are trained in both the IPEC competencies and TeamSTEPPS skills and can be considered experts in identifying levels of competency. Our comparison of the facilitator and student ratings suggests that the distribution of JTOG student scores may be inflated by lack of expertise in identifying levels of competencies, or by the students' use of a more lenient system of assessment than the facilitators. The latter may be linked to students' level of comfort in providing feedback to peers. Though individuals' ratings are not displayed to other users (i.e., aggregate ratings across only teams of five or more people are shown in the app), it is possible that students shy away from giving more critical feedback simply due to social pressures. This suggests that, in addition to training students to accurately identify levels of interprofessional competency in their peers, training efforts should focus on informing students on how to give constructive feedback to peers. Continued research in this area should be a priority in all educational and clinical settings.

Conclusion

Though our initial effort to reduce the ceiling effect in JTOG scores did not succeed in this study, we believe that the primary issue was that students did not take the time to watch the training video, despite reminders to do so as a part of pre-simulation work. The main takeaway for educators is that students likely need additional training both in identifying different levels of IPEC competencies, and more importantly, in how to provide critical yet constructive feedback to peers. The JTOG app was designed to provide confidential feedback to team members to facilitate such training, but pedagogical practices need to be developed to better equip students with skills for providing such feedback.

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