

## Evaluating facilitator adherence to a newly adopted simulation debriefing framework

## Évaluation de l'adhésion du facilitateur à un cadre de débriefing de simulation nouvellement adopté

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### Abstract

**Background:** Post-simulation debriefing is a critical component of the learning process for simulation-based medical education, and multiple frameworks have been established in an attempt to maximize learning during debriefing through guided reflection. This study developed and applied a rubric to measure facilitator adherence to the newly adopted Promoting Excellence and Reflective Learning in Simulation (PEARLS) debriefing framework to evaluate the efficacy of current faculty development.

**Methods:** A retrospective review of 187 videos using a structured 13-behavior rubric based on the PEARLS debriefing model was conducted of facilitator-learner debriefings following a simulated clinical encounter for medical students. The aggregate results were used to describe common patterns of debriefing and focus future faculty development efforts.

**Results:** In total, 187 debriefings facilitated by 32 different facilitators were analyzed. Average scores for each of the 13 PEARLS framework behaviors ranged from 0.04 to 0.971. Seven items had an average of  $\geq 0.77$ , ten averaged  $> 0.60$  and two averaged  $< 0.20$ .

**Conclusions:** Faculty adhered to some behaviors elicited by the PEARLS model more consistently than others. These results suggest that faculty facilitators are more likely to adhere to frameworks that focus on educational behaviors and less likely to adhere to organizational or methodological frameworks.

### Résumé

**Contexte :** Le débriefing post-simulation est une composante essentielle du processus d'apprentissage dans le cadre de la formation médicale par simulation, et de nombreux cadres ont été établis pour tenter de maximiser l'apprentissage au cours du débriefing par le biais d'une réflexion guidée. Cette étude a développé et appliqué une grille afin de mesurer l'adhésion des facilitateurs au cadre de débriefing PEARLS (*Promoting Excellence and Reflective Learning in Simulation*), récemment adopté afin d'évaluer l'efficacité de la formation professorale actuelle.

**Méthodes :** Un examen rétrospectif de 187 vidéos utilisant une grille structurée contenant 13 comportements basée sur le modèle de débriefing PEARLS a été mené sur les débriefings facilitateur-apprenant après une rencontre clinique simulée pour des étudiants en médecine. Les résultats agrégés ont été utilisés pour décrire les schémas communs de débriefing et concentrer les futurs efforts de développement de la faculté.

**Résultats :** Au total, 187 débriefings animés par 32 facilitateurs différents ont été analysés. Les scores moyens pour chacun des 13 comportements du cadre PEARLS allaient de 0,04 à 0,971. Sept éléments avaient une moyenne  $\geq 0,77$ , dix avaient une moyenne  $> 0,60$  et deux avaient une moyenne  $< 0,20$ .

**Conclusions :** Le corps professoral a adhéré à certains comportements encouragés par le modèle PEARLS de manière plus systématique que d'autres. Ces résultats suggèrent que les facilitateurs issus du corps professoral sont plus susceptibles d'adhérer à des cadres qui se concentrent sur les comportements éducationnels et moins susceptibles d'adhérer à des cadres organisationnels ou méthodologiques.

## Introduction

Simulation-based medical education (SBME) allows learners to gain knowledge of and experience in clinical scenarios. It is an effective pedagogy that complements real patient encounters while minimizing risk to patients.<sup>1,2</sup> Although SBME can be an effective learning tool, educators face many challenges in utilizing it to its fullest potential.<sup>3</sup> One of the most important factors affecting productive SBME is the quality of the debriefing process.<sup>4-6</sup> Debriefing is a process of improving performance through active self-reflection, during which a facilitator guides the learner.<sup>7</sup> Debriefing gives the learner time to process the emotions associated with the experience and to evaluate the strengths and weaknesses in their knowledge and skills. Facilitators can also provide feedback on the observed performance, which is one of the most frequently cited factors of importance for SBME.<sup>8</sup>

While SBME has many positive aspects and benefits to its use, it can be a resource-intensive teaching modality. In addition to equipment, space, and time, these resources include faculty development for facilitators and debriefers. Many facilitators have diverse skills and teaching experiences, resulting in a high rate of variability in debriefing methods and effectiveness.<sup>9</sup> Simulation debriefing is a specific skill that focuses on learner reflection and feedback rather than content delivery, and many SBME facilitators need intentional development to change their existing teaching mind-set and approach to integrate best practice-debriefing methods.<sup>10</sup>

Medical educators have studied the importance of using a structured debriefing method in order to standardize the debriefing process.<sup>11</sup> The PEARLS framework increases the effectiveness of SBME by separating the debriefing into five phases with different areas of focus: setting the scene, reactions, description, analysis, and application/summary phases.<sup>12</sup> By standardizing the process through a framework such as PEARLS, we can maximize learning outcomes despite individual facilitators' styles. While debriefing is a robust area of study, there has been little research into the ways a simulation program might determine the extent to which facilitators adhere to a particular adopted framework. This study evaluated facilitator adherence to the newly adopted PEARLS debriefing model using a structured rubric developed to identify observed facilitator behaviors.

## Methods

### Study design

We conducted a retrospective video review of facilitator-learner debriefings following a simulated clinical encounter for medical students enrolled in the Medical College of Georgia (MCG) at Augusta University in December 2018. All debriefing videos analyzed were from the same simulation event with the same scenario, which was an individual, formative simulation and debriefing activity conducted during a required mid-clerkship intersession. The Augusta University Institutional Review Board (#1138500) approved this study.

### Sample size and sampling methods

During the intersession, 189 medical students participated in a simulation and debriefing activity at the end of the Fall semester, after students had completed their first of two six-month clerkship rotation blocks. The simulation case was an acute asthma exacerbation, was time-limited (15 minutes), and included a high-fidelity manikin as the patient and a standardized patient actor playing the role of the nurse. Each student participated in an individual simulation run by one of 32 faculty facilitators, who then facilitated the student's debriefing session immediately following the completion of the case.

### Setting

The MCG Educational Simulation program adopted the PEARLS debriefing model earlier in 2018 and all the facilitators participated in faculty development prior to the event. Instruction included asynchronous materials and in-person overview of the case, review of the technology, and peer-practice of the case for the faculty since the training was in groups. One or both of the senior authors (AJK and MT) were present at all in-person trainings. The online training materials included the case materials, the PEARLS model, an overview of debriefing, and two videos: one video of how the case was designed to run, and one in which the case didn't go as planned. Both videos of the case were followed by a video debriefing to demonstrate how to approach both scenarios using the PEARLS model. We offered facilitators the opportunity to come in and practice as many times as needed to feel comfortable. They were offered open practice times and/or individual sign-ups to practice with either AJK or MT. All facilitators received an additional orientation on the day of their simulations for last minute questions. AJK and MT checked in with each facilitator during their first simulations of the day. Facilitators were provided with a paper handout of the

PEARLS framework to use during their post-simulation student debriefing.

The facilitators were recruited as part of a network of faculty interested in teaching and simulation and represented multiple disciplines and specialties. Faculty were not paid nor reimbursed in any way for their participation. We informed the faculty facilitators that the data collected was for research purposes only and they consented to the study. Prior to the simulation event, all students participated in an in-person orientation session that explained the purpose and structure of the simulation experience. At that time a member of the research team who was not in a position to evaluate the students read a statement describing the study and answered any questions regarding the research. After the orientation, the students also received an in-room prebriefing to familiarize them to the simulation environment and to instruct them to collect any patient data, order any test or drugs, or call any consultant that they deemed appropriate in their care for their patient. Each student then participated individually in the 15-minute simulation. The simulation concluded either when they had successfully treated the patient's acute asthma exacerbation with a nebulized albuterol and reported on the patient's status to the patient's primary care physician via a phone call, or when the allotted 15 minutes had passed, regardless of progress in the simulation.

During the simulation, the assigned facilitator monitored the student from a discrete location, operating the manikin, voicing the patient, and documenting the order of the actions and decisions made by the students in a formative assessment instrument. They ended the simulation regardless of the student's progress at the 15-minute mark. Immediately after the simulation, students participated in an individual 15-minute debriefing session in a separate room led by the facilitator who ran the simulation. This one-to-one standardized 15-minute simulation debriefing time allowed for facilitators to observe student behavior directly and facilitate a focused debriefing of the short case, while keeping the event schedule on time for the large group of learners. In the event the debriefing ended because the scheduled time had elapsed, we recorded the data as observed. Facilitators used the student assessment instrument to assess the students' prioritization skills as a construct within the skill of clinical reasoning, and facilitators were able to use the completed instrument as a reference during their debriefing with the student.

## Study protocols

We analyzed the recordings of the debriefing sessions using a structured rubric we designed and developed to determine the adherence of the facilitators to the newly adopted PEARLS debriefing model (Table 1). We designed the rubric so that each behavior measured corresponded to one of the five PEARLS phases mentioned above. A pilot test of the instrument provided evidence of reliability and of content and construct validity. We established inter-rater reliability for the debriefing rubric using the three authors' ratings of the same four debriefing videos in a two-way mixed model, using an intra-class correlation coefficient (0.913). One member of the study team (LS) coded the remaining deidentified videos using the rubric. The author LS analyzed the aggregate results and then used them to identify common patterns of debriefing as well as areas that could be improved and incorporated into future training materials for simulation facilitators.

*Table 1. PEARLS Debriefing Behaviors*

Item	PEARLS Dimension	Debriefing Behaviors
Item 1	<i>Setting the Scene</i>	Stated purpose and goals of the debriefing
Item 2	<i>Setting the Scene</i>	Assured student of confidentiality (e.g. "Everything you say is off the record")
Item 3	<i>Reactions</i>	Asked the student about their emotions or initial reaction
Item 4	<i>Description</i>	Asked the student to summarize the case
Item 5	<i>Analysis</i>	Asked the student to identify strengths in their performance
Item 6	<i>Analysis</i>	Described positive aspects of the student's performance
Item 7	<i>Analysis</i>	Asked the student to identify areas for improvement in their performance
Item 8	<i>Analysis</i>	Provided directive feedback or redirection for behaviors that were incorrect or suboptimal that were not identified by the student
Item 9	<i>Analysis</i>	Asked student for thoughts or rationale during the case
Item 10	<i>Analysis</i>	Used preview statements to introduce new topics
Item 11	<i>Application/Summary</i>	Provided the student with an opportunity to reflect on their take-aways/lessons learned
Item 12	<i>Application/Summary</i>	Asked the student if they had any questions or other topics they would like to discuss
Item 13	<i>Application/Summary</i>	Clearly ended the debriefing

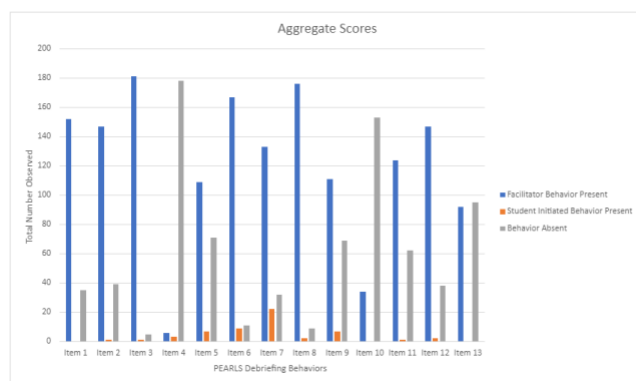
*Each item represents a behavior that facilitators were trained to exhibit during the debriefing sessions.*

## Outcome measures and data analysis

The rubric measured 13 observable behaviors identified in the PEARLS model and on which facilitators received instruction (Table 1). The author LS assigned each rubric item one of three-point values: absent (no score), initiated by the student (.5), or demonstrated by the facilitator (1). If a behavior was not observed during the debriefing the item was assigned no points. If the learner initiated a behavior without prompting from the facilitator, and the facilitator did not demonstrate the behavior themselves, that item was assigned a half-point (.5). If the facilitator exhibited the behavior, it was assigned one point (1) regardless of whether the learner initiated it first. The use of half-points allowed for the possibility that a facilitator did not exhibit a behavior because the learner preemptively addressed it while acknowledging that the facilitator created a learning environment in which the student initiated the behavior unprompted.

## Results

In total, 32 facilitators participated in 189 simulations and post-simulation debriefing sessions. Because two debriefings were not obtained due to a technical malfunction, LS analyzed 187 debriefing videos recordings in total. The intraclass correlation coefficient for establishing inter-rater reliability among the three authors was 0.913. Figure 1 displays the aggregate and means scores for each behavior. Of the 13 PEARLS adherence behaviors performed by facilitators, seven had a mean score from 0.77 to 0.971, 10 averaged from 0.60 to 0.971, and two averaged below 0.20.



**Figure 1. Aggregate Scores**

Items are grouped in their respective PEARLS dimensions in the order that they are addressed in the framework: Items 1 and 2 are "Setting the Scene," Item 3 is "Reactions," Item 4 is "Description," Items 5-10 are "Analysis," and Items 11-13 are "Application/Summary."

Facilitators included a summary of the clinical scenario only nine times, though the facilitator only prompted six of those nine (item 4, mean = 0.040). Facilitators used clear transitional language in only 34 of their debriefings, which

indicate transitions during the discussion (item 10, mean = 0.182). Approximately half of the debriefings ended in a clear manner (item 13, mean = 0.492). Item 7 (mean = 0.770) had the highest occurrence of learner-initiated behavior during the debriefing.

## Discussion

Facilitators demonstrated many of the behaviors in the rubric, reflecting general adherence to the PEARLS model. This indicates that the rubric was able to capture debriefers' behaviors fairly consistently, both for items seen frequently and those less utilized. Applying a structured framework is a best practice in simulation debriefing and is designed to provide consistency between facilitators and provide students with a more reproducible experience.<sup>11</sup> We feel that these results provide a clear picture of our facilitators' adherence to the PEARLS model and can be used to create improvements and areas of emphasis for further education of facilitators in the PEARLS debriefing model. Our goal was to evaluate adherence to the PEARLS debriefing model and we found that based on our results, we need to spend more time helping faculty adapt to the organizational and process nuances of debriefing to keep the debriefing learner-centered, including self-reflection and a balance between what was done well and what performance gap can be closed. We now have evidence of how we can use a debriefing rubric for training to ensure that best practices like preview and summary statements are emphasized in trainings and utilized in practice.

Our study may be applied to future faculty development programs to improve adherence to the PEARLS model. Many faculty development programs geared towards medical professionals are generally well-received and generate meaningful change in teaching behaviors.<sup>13</sup> Some of the programs shown to be effective for training debriefing skills include workshops, seminar series, short courses, and longitudinal programs.<sup>14</sup> Cheng and others propose a debriefing training model based on faculty development literature that includes longitudinal feedback combined with structured courses to address specific learning needs.<sup>15</sup> They also recommend a "tiered approach" that tailors the amount and type of development opportunities to varying "levels" of educators. The results gave us a current state of our facilitators adherence to our PEARLS checklist. Our analysis can direct how training programs are structured by prioritizing learning needs based on adherence rates to the

various behaviors described in the PEARLS debriefing model.

## Limitations

One limitation for this study is that it does not measure why there is variation in facilitator adherence to the debriefing model and focused on feasibility and performance of the model to be used across many facilitators. Further data specific to each facilitator such as teaching background, area of expertise, and prior educational training would offer insight into why certain behaviors have better adherence rates than others but was not collected as part of this study given that the focus was training all facilitators on the same model, regardless of their simulation background and practice. Further review of facilitator traits may also elucidate possible barriers to adherence that a structured training program could target. Further research is needed with facilitator data to maximize the usefulness of this rubric.

## Conclusions

These findings suggest that the new rubric reliably measured facilitator adherence to the PEARLS debriefing model, and that facilitators adhered more closely to the PEARLS model. However, faculty adhere to some components of the PEARLS model more consistently than others. The results of this analysis may be used in conjunction with existing studies on faculty development to instruct facilitators more effectively on best practices in debriefing.<sup>13-15</sup> Data obtained from the rubric in this study can be used help trainers target specific areas for improved adherence to the PEARLS model in order to maximize learning outcomes for learners in SBME.<sup>10-12</sup>

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