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Implications of the Dunning-Kruger Effect: Finding Balance between Subjective and Objective Assessment in Debriefing Professional Development

Cynthia Sherraden Bradley
University of Minnesota

Kristina Dreifuerst
Marquette University, kristina.dreifuerst@marquette.edu

Anne Loomis
Purdue University

Brandon Kyle Johnson
Texas Tech University Health Sciences Center

Aimee A. Woda
Marquette University, aimee.woda@marquette.edu

See next page for additional authors

Authors

Cynthia Sherraden Bradley, Kristina Dreifuerst, Anne Loomis, Brandon Kyle Johnson, Aimee A. Woda, and Jamie Hansen

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Cynthia Sherraden Bradley
University of Minnesota School of Nursing, Minneapolis, MN
Kristina Thomas Dreifuerst
Marquette University College of Nursing, Milwaukee, WI
Ann Loomis
Purdue University School of Nursing, IN
Brandon Kyle Johnson
Texas Technical University Health Sciences Center School of Nursing, Lubbock, TX
Aimee Woda
Marquette University, College of Nursing, Milwaukee, WI
Jamie Hansen

Department of Nursing, Carroll University, Waukesha, WI

Highlights

- Debriefing is an essential clinical and simulation teaching skill.
- The DMLES can be used for subjective and objective assessment.
- Dunning-Kruger Effect is the self-overestimation of skill performance when compared to skill assessed objectively
- Subjective and objective assessment using the same instrument can provide rich feedback opportunities.
- Subjective and objective assessment in tandem provide rich feedback opportunities.
- DKE was demonstrated through comparison of subjective and objective DMLES scores.

Abstract

Background

The ability to debrief is considered an essential clinical and simulation teaching skill because of the deep learning cultivated. Regulatory bodies identify the need for debriefing training and professional development followed by formative and summative assessment.

Method

The Debriefing for Meaningful Learning Evaluation Scale (DMLES) is a behaviorally anchored rating scale developed to assess 20 behaviors aligned with Debriefing for Meaningful Learning (DML). Participants from five baccalaureate pre–licensure nursing programs were recruited to receive DML training, then facilitate and record a debriefing for subjective and objective assessment using the DMLES.

Results

A total of 52 debriefers submitted 81 recorded debriefings. DMLES subjective ratings at two time points were higher than that of expert raters of the same debriefings demonstrating statistically significant differences between subjective and objective mean scores.

Conclusions

The difference between subjective and objective scores demonstrated the Dunning-Kruger Effect (DKE), a subjective overestimation of skill performance when compared to objective assessment. The potential for DKE is an important consideration for determining assessment methods.

Keywords

Measurement, assessment, self-report, Dunning-Kruger Effect, formative feedback

Key Points

- The DMLES can be used for subjective and objective assessment.
- The Dunning-Kruger Effect is the self-overestimation of skill performance when compared to skill assessed objectively.
- Subjective and objective assessment using the same instrument can provide rich feedback opportunities.

Self-assessment measures are frequently used in training programs and in research to evaluate the effectiveness of training. Although self-assessment is widely used in higher education, there is little evidence describing how well debriefers self-assess their specific debriefing skills, or how their self-assessed scores compare to objective assessment by an expert. This paper reports the findings from a study investigating the comparison of newly trained debriefers' subjective assessment with objective assessment by experts when using the same instrument, the Debriefing for Meaningful Learning Evaluation Scale (DMLES).

Background

Debriefing is the focused time of a simulation learning experience in which a debriefer engages learners in a collaborative, bidirectional discussion (Decker et al., 2021; Dreifuerst, 2009). Debriefing is a process that includes feedback and reflection to foster the transfer of learning into clinical practice (Decker et al., 2021). The debriefer is responsible for guiding learners in reflective thinking about their experience, helping them make meaning of their learning (Forneris & Fey, 2016; Kolb et al., 2014). Debriefing requires skill in using Socratic pedagogy to guide learners through this reflective thinking process, which encourages them to deeply examine their thinking, move beyond isolated facts, and explore relationships between concepts (Dinkins, 2015). However, the use of Socratic questioning to facilitate reflection may not be innate and takes time and practice to develop (Dinkins & Cangelosi, 2019). Faculty are often not trained in the use of Socratic pedagogy, nor is this commonly assessed (Fey & Jenkins, 2015; Dinkins, 2019). Despite the recommendations for debriefing training and competence assessment, many programs continue to facilitate simulation and debriefing without training because of the lack of evidence to guide nursing programs and regulatory bodies. Although it may seem intuitive that debriefing training would improve debriefing practice and subsequently improve student learning, this is unsubstantiated without supporting evidence.

Equipping the Debriefer

The ability to debrief in clinical and simulation learning is considered an essential skill for health care educators because of the deep learning that occurs during debriefing (Hull et al., 2017). The National Council of State Boards of Nursing (NCSBN; Alexander et al., 2015) and the National League for Nursing (NLN; Board of Governors, 2015) recommend that debriefers receive formal training in an evidence-based debriefing method. Although the NCSBN guidance for state Boards of Nursing also emphasizes the need for educators to have training in simulation and debriefing to ensure consistent learning outcomes (Alexander et al., 2015), the preparation required varies widely across state boards or is non–existent (Bradley et al., 2019). The Healthcare Simulation Standards of Best Practice™ The Debriefing Process also supports the recommendations for debriefing training, identifying that a simulation should be debriefed by someone capable and competent to facilitate a debriefing process, which should include feedback and reflection (Decker et al., 2021).

In addition, the Health Care Standards of Best Practice™ Professional Development outlines it is important to first self-determine learning needs, then participate in professional development that best address those needs, and finally reevaluate using formative and summative methods (Hallmark et al., 2021). In the context of debriefing skill development, this standard supports the need for educators and simulationists to identify debriefing skills that need improvement, then develop a specific plan to achieve this (Watts et al., 2020). This process is well supported by the literature, including Bandura's social-cognitive theory of self-efficacy, which explains the blending of knowledge and beliefs as a cognitive representation of what individuals believe about their ability to perform actions (Boz & Erdogan, 2019; Nuhfer et al., 2016; Wang et al., 2020). Because self-efficacy is based on self-perception of abilities, an individual's self-efficacy beliefs are considered the most influential determinant of human choices and behaviors, influencing motivation to improve and learn (Bandura et al., 1999; Boz & Erdogan, 2019; Mahmood, 2016; Nuhfer et al., 2016). Therefore, what an individual

believes about their ability to perform a task defines whether they believe they need to improve, and the extent of improvement needed.

Debriefing for Meaningful Learning

Debriefing for Meaningful Learning (DML) provides a systematic process for debriefers to foster reflective thinking using Socratic pedagogy and set the context for a rich feedback dialogue (Dreifuerst, 2015). DML has demonstrated improvements in clinical reasoning and judgment when used among pre–licensure nursing students (Dreifuerst, 2012; Forneris & Fey, 2016). With the use of Socratic questioning, a debriefer skillfully guides a conversation to uncover hidden cognitive processes, making the thinking of the learners visible to the debriefer and the learner. Following the DML process gives debriefers a tangible and achievable step-by-step method for facilitating reflection. If steps are skipped or taken out of order, this may impact how learners connect their thinking with actions, and debriefers may miss valuable learning opportunities. Although DML is used widely in nursing education, it is not known how newly trained debriefers self-assess their use of the method, or how their subjective scores compare to objective assessment by DML experts when using the same behavioral rating scale, the Debriefing for Meaningful Learning Evaluation Scale (DMLES). If teaching students to think reflectively is a primary goal of debriefing (Decker et al., 2021), it cannot be assumed that debriefers can achieve this effortlessly.

Assessing the Debriefer

The purpose of formatively assessing debriefing skills is to provide feedback and guide future growth. This may best be achieved using an instrument that describes specific debriefing behaviors, rather than using a scale intended for a broader approach. Meeting simulation accreditation criteria or other program quality improvement goals may be achieved by assessing the debriefing experience with global rating scales. A more specific behavioral scale, however, with clear, recognizable debriefing behaviors is supportive of providing detailed feedback that can improve skill in guiding learners through reflective thinking. An example of a behavioral rating scale to achieve this is the DMLES, which was developed to assess the presence of 20 debriefing behaviors that describe the DML process and sequence and can be used for both subjective and objective assessment (Bradley et al., 2021).

Although ongoing professional development for educators and simulationists has been a focus of increasing attention, assessment of its' impact is largely unreported and often involves self-reported competence or confidence. Self-assessment is widely used in higher education, yet there is little evidence describing how well debriefers self-assess their specific debriefing skills, whether their recollection of the quality of the debriefing is accurate, or how their subjective assessment compares to objective assessment by experts. The aim of this study was to capture this through subjective and objective assessment of debriefing using the DMLES.

Methods

Design

This multi-site descriptive study sought to test the impact of training on how a debriefer applies DML debriefing behaviors with learners. This study addressed the following research questions:

(a) Is a debriefer's subjective rating of DML debriefing using the DMLES when they recall their debriefing different than their subjective rating using the DMLES while reviewing a recording of their debriefing?

(b) Is a debriefer's subjective rating of DML debriefing using the DMLES when they recall their debriefing, different than an objective rating by an expert watching the same recording?

(c) Is a debriefer's subjective rating of DML debriefing using the DMLES while reviewing a recording of their debriefing, different than an objective rating by an expert watching the same recording?

Sample

A priori, the desired sample size was determined using G-Power Analysis 3.1 (Faul et al., 2009). The alpha was set at $p = .05$, and the beta was set at a power of 80%; 46 debriefer participants were needed for detecting a medium effect size of 0.50. After receiving Institutional Review Board approval, nurse educators who facilitate debriefing with pre–licensure baccalaureate students were recruited to participate in this study. Participants came from five baccalaureate nursing programs in the Midwest and southern United States.

Instrument

The DMLES, a 20-item rating scale anchored in the behaviors of DML, was used to assess the use of DML in newly trained debriefers as described in Bradley et al. (2021). Psychometric testing of the DMLES by a team of expert objective raters demonstrated evidence of content validity, construct validity, criterion-related validity, internal consistency reliability, interrater reliability, and interrater agreement (Bradley et al., 2021). The DMLES can be used subjectively or objectively to assess how well a debriefer follows the DML method.

Procedure

Participants attended a four-hour in person DML training led by the research team at each of the five sites two to five weeks before the simulation and debriefing with students. This training included an explanation of the importance of debriefing, theory that underpins a reflective debriefing, key concepts foundational to DML, and detailed instruction on the process and sequence of DML. Participants practiced what they learned and received individualized feedback, particularly in guiding reflective thinking by forming Socratic questions. Instructions were given for using the DMLES to rate a debriefing. After the training, they facilitated and recorded DML debriefing with their pre–licensure nursing students. Participants submitted their recorded debriefing for objective assessment by the research team, which consisted of six nurse educators who had each been trained in and used DML for greater than five years. Participants also subjectively assessed that debriefing immediately afterwards from recollection and approximately two weeks later while watching the recording using the DMLES. Subjective and objective scores were analyzed and compared.

Results

Descriptive and inferential statistics were calculated using SPSS version 27 (IBM Corp. 2016). After data were collected, analyses were performed to ensure there were no violations of assumptions of normality or linearity and that the debriefer participants at each site were similar enough to be combined into one sample (Fidell et al., 2013). Linearity was established through visual inspection of the Q-Q plot. Outliers were examined for impact and retained due to lack of impact on statistical conclusion validity. Significance was set at .05 for all statistical analyses and effect sizes were calculated with Cohen's d.

A total of 52 debriefers from five sites participated in the study, resulting in a sample that was pre–dominantly female (81%, n = 42), 88% Caucasian (n = 46), and held advanced degrees (59% Master's degree, n = 31; 27% doctorate, n = 14), as described in Table 1. Forty-two percent of the participants reported teaching in simulation for less than three years, while 27% reported 3-5 years, and 31% reported teaching in simulation for more than five years. Thirty-three percent reported having their debriefing evaluated three or fewer times, while 52% reported never having their debriefing evaluated.

Table 1. Debriefer Demographics

Demographic	*N*	Frequency
School		
School 1	10	(19%)
School 2	4	(8%)
School 3	7	(13.5%)

School 4	24	(46%)
School 5	7	(13.5%)
Gender		
Female	42	(81%)
Male	10	(19%)
Ethnicity		
African American	3	(6%)
Caucasian	46	(88%)
Hispanic	3	(6%)
Highest academic degree completed		
Bachelor's degree	7	(14%)
Master's degree	31	(59%)
Doctoral degree	14	(27%)
Years teaching in clinical environments		
Never	4	(8%)
1 year or less	8	(12%)
1-3 years	12	(23%)
3-5 years	12	(23%)
>5 years	18	(34%)
Years teaching in simulation environments		
Never	2	(4%)
1 year or less	8	(15%)
1-3 years	12	(23%)
3-5 years	14	(27%)
>5 years	16	(31%)
Times Debriefing has been Evaluation		
Never	27	(52%)
0-3 times	17	(33%)
3-6 times	1	(2%)
Not answered	7	(13%)

Participants were asked to submit a recording of one debriefing, however several participants facilitated and uploaded two debriefings resulting in a total of 82 individual recorded debriefings. The second debriefing was included because participants debriefed a different group of students, and because there was no additional training or feedback given to participants between their first and second debriefing. Most, but not all, participants used the DMLES to subjectively rate their debriefing from memory immediately after the debriefing (n = 79), and again after watching their recording approximately two weeks later (n = 61). One of the expert raters individually and randomly viewed and objectively rated each debriefing recording using the DMLES (n = 81). One video was deleted from the dataset due to technical difficulties that compromised the video quality.

The first research question was tested using a paired sample t test to determine whether a debriefer's subjective rating of their DML debriefing immediately after debriefing is different than their rating when watching their recorded debriefing two weeks later. Sixty debriefing recordings had matched pairs for the analysis since not all debriefers completed both ratings of their debriefing. There were no statistically significant differences between subjective ratings immediately after debriefing (M = 16.96, SD = 2.36) and after subjective rating of their video recording (M = 17.5, SD = 1.9), demonstrating a mean difference of .217 points, 95% CI [-0.73 – 0.3], t (59) = .84, p = .41 (Figure).
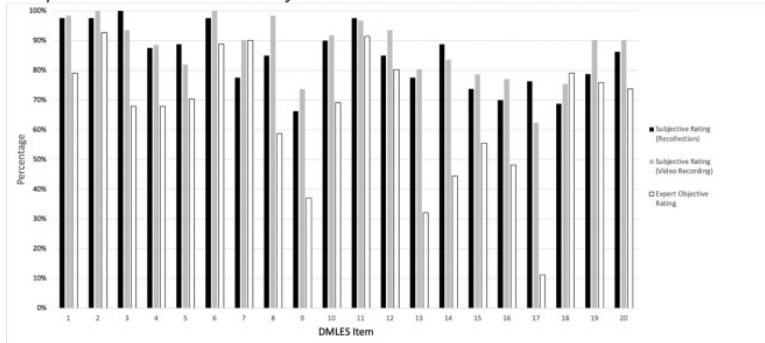
Figure 1. Comparison of DMLES Scores by Item.

The second and third research questions were tested using a paired sample t test to determine whether there were differences between the objective expert rating of the recorded debriefing and the debriefer's subjective rating of their recollection immediately after debriefing, and the objective expert rating and the debriefer's subjective rating of the recorded debriefing two weeks later. As depicted in Table 2, the DMLES subjective ratings of participants' recalled debriefing (M = 16.96, SD = 2.36) were higher than expert rater scores of the recorded debriefings (M = 13.2, SD = 3.8), demonstrating a statistically significant mean increase of 3.77 points, t (78) = 8.86 95% CI [2.93, 4.62], p < .001, d = .997. Subjective ratings of the debriefer's recording (M = 17.5, SD = 1.9) were also higher than expert ratings of the recording (M = 13.5, SD = 3.54), a statistically significant mean increase of 3.92 points, t (78) = 8.4 95% CI [2.99, 4.85], p < .001, d = .992.

Table 2. DMLES Scores

Element	M (SD)	Minimum	Maximum
DMLES Self-Evaluation	16.96 (*2.36*)	9	20
DMLES Self-Evaluation (Video)	17.47 (*1.85*)	13	20
DMLES Rater- Evaluation (Expert)	13.1 (*3.76*)	3	20

Discussion

The purpose of this study was to compare the subjective DMLES ratings of newly trained debriefers with objective ratings of DML experts to provide insight into how accurately debriefers perceive their debriefing, and to determine concordance with objective evaluation by expert debriefers using the same instrument. Debriefers who were newly trained in DML overestimated their debriefing by four points on a 20-point scale when compared with objective expert rating. This gap between subjective and objective skill assessment is a phenomenon known as the Dunning-Kruger Effect (DKE), first acknowledged by Kruger and Dunning (1999) in a series of studies of social ability, intellectual ability, and level of knowledge. The DKE has manifested in numerous studies comparing subjective and objective assessment in a variety of domains, presenting as overestimation of skill or competency by low performers, and underestimation by high performers (Authors). Kruger and Dunning (1999) noted that the skills needed to achieve competence are the same skills needed for accurate assessment of that competence. This raises questions regarding the reliability of a newly trained debriefer 's assessment of their debriefing competence and warrants the use of objective assessment. This also has implications for the new Health Care SOBP recommendation to conduct a needs self-assessment as the first step for determining a plan for professional development (Hallmark et al., 2021). While it is sometimes feasible for a novice to subjectively identify learning needs, there are also skills and concepts for which individuals are hypocognitive, lacking the context to determine their learning needs, accurately self-assess, or rely on self-confidence as an indicator of success (Authors).

The DMLES items with the widest gap between subjective and objective ratings were Item 3 (naming, framing, diagnosis), Item 8 (reflect on thinking), Item 9 (challenge thinking), Item 10 (reflecting on correct and incorrect actions), Item 13 (reflection-in-action), Item 14 (reflection-on-action), Item 15 (reflection-beyond-action), and Item 16 (reflection-beyond-action making connections). Facilitating reflective thinking is challenging for debriefers, therefore differences in scores for these items was not surprising. These DMLES items differentiate the multiple types of reflective thinking the debriefer guided learners through during a debriefing. Item 7, reflecting on knowledge, demonstrated the most agreement between subjective and objective scores, and even more so when participants watched their recordings versus relying on their recollection of what occurred. This may be explained by the more concrete nature of nursing knowledge and theory and might suggest that participants felt more comfortable fostering reflection on facts and knowledge, rather than thinking processes. This is also a more observable and less subjective behavior because it is pinned to concrete concepts, as opposed to the individualized thinking processes that requires the debriefer to guide learners to make these visible through their dialogue.

Item 17 also had significant differences between the subjective assessment from recall and then later while watching the video. The differences for this item, which assesses adherence to the process and sequence of DML, may be due to the initial recollection that they followed the DML process and sequence well, but then rated themselves lower after watching their recordings. However, they overestimated their adherence to the DML sequence compared to the expert rating. Correlating these data with learner knowledge outcomes is warranted to fully understand the impact of debriefing performance, a separate arm of the study not reported in this paper.

Implications for Professional Development in Debriefing

Approximately half of the participants reported teaching in simulation environments for either 3-5 years (n = 14) or greater than five years (n = 16). It cannot be assumed that these participants had received training (Bradley, 2019; Fey & Jenkins, 2015; Waznonis, 2015). These findings demonstrate that neither simulation experience nor a one-time formal training consistently results in accurate subjective assessment of debriefing skill. Further research exploring the impact of ongoing, repeated, or refresher training in debriefing skills is necessary.

The implications of the DKE findings demonstrated in this study are enlightening. First, subjective assessment is used extensively across academia in both faculty and student populations. Without awareness of a gap between how debriefers self-assess and how they are assessed by others, the debriefer may be left unaware of the need to improve, or which specific behaviors can be improved. Second, if debriefers lack the skill to recognize their lack of competence and expertise, the value of self-assessment as a sole measure is in doubt, particularly when the subjective assessment is from a novice. If debriefers are unable to identify debriefing deficiencies, there is no acknowledgement of the need to improve and seek further training (Hull et al., 2017). Individuals who over-estimate their skill or competence tend to believe that they are not in need of improving their skill level, which can lead to exaggerated self-efficacy, resulting in the absence of motivation to change or improve (Authors).

Community of Practice with a Feedback Culture

The findings of this study suggest the importance of developing a community of practice in which a culture of feedback is cultivated, combining objective assessment with feedback to inform progress and growth in debriefing skills, rather than a culture that is dependent solely on self-assessment (Cheng et al., 2015, Cheng et al., 2017; Doloresco et al., 2019; Peterson et al., 2017). The accuracy of self-assessment has been found to improve when an objective evaluation was completed at the same time (Doloresco et al., 2019). To successfully achieve this requires finding a balance between self-confidence in proficiency and a willingness to receive

constructive feedback (Walter, 2020). This willingness begins with intellectual humility and embracing the discomfort of not knowing what is still not known and yet to be learned (Grant, 2021).

It is important to note that more than half of the participants in this study indicated their debriefing had never been evaluated prior to the study. Ongoing competence assessment is necessary to continually improve debriefing skills and to calibrate subjective assessment with an objective assessment by someone who has more expertise. Rather than viewing this as a punitive process, this approach promotes a growth mindset which is well-supported by the requirements for ongoing professional development (Hallmark et al., 2021).

Limitations

This study had several limitations. Some participants debriefed more than once but did not receive feedback or their objective DMLES score before debriefing a second time. This may have perpetuated the continuation of incorrect debriefing behaviors in their second submitted debriefing. A second limitation was that not all participants rated their debriefing due to challenges precipitated by the onset of the COVID-19 pandemic.

Implications for Future Use of the DMLES

The DMLES can be used not only as a subjective and objective instrument but also as a guide for novice debriefers to identify best practices for DML debriefing. Making the DKE gap visible through comparing subjective and objective assessment presents an opportunity to receive feedback and re-training, which not only leads to improvement but is part of ongoing professional development. Ongoing competence assessment with the DMLES can provide context for feedback conversations in the continual growth of debriefing skills.

If debriefing is the most important part of simulation learning, it is important to clearly understand what happens in debriefing to better equip debriefers with the skills required to positively impact learner outcomes. As nursing education shifts to competency-based education, debriefing has been suggested as one way to help learners develop higher order reasoning and thinking skills, and to demonstrate achieving these required competencies over time. The debriefing skills required after simulation learning experiences are the same skills nurse educators can use across nursing curricula. DML provides one method for teaching faculty to foster reflective thinking; the DMLES provides a guide for adhering to this evidence-based process.

Conclusion

This study demonstrated there was a difference between subjective and objective scores when the DMLES was used to rate DML debriefing behaviors during a debriefing with pre–licensure nursing students. This difference demonstrates DKE, a mismatch between self-assessment and an expert's assessment after observing a DML debriefing. The greatest differences were demonstrated in the DMLES items that assess how a debriefer facilitates reflective thinking with students. This study contributes an initial description of how debriefers self-assess their debriefing skills, an important finding given the new recommendations for educators and simulationists to self-assess learning needs as the first step in developing a professional development plan (Hallmark et al., 2021).

Declarations of Competing Interest

None.

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References

M. Alexander, C.F. Durham, J.I. Hooper, P.R. Jeffries, N. Goldman, S.S. Kardong-Edgren, C. Tillman. **NCSBN simulation guidelines for prelicensure nursing programs.** Journal of Nursing Regulation, 6 (3) (2015), pp. 39-42, 10.1016/s2155-8256(15)30783-3

A. Bandura, W.H. Freeman, R. Lightsey. **Self-efficacy: The exercise of control.** Springer, New York (1999)

H. Boz, K. Erdogan. **Service quality, emotion recognition, emotional intelligence and Dunning Kruger syndrome**. Total Quality Management (2019), pp. 1-14, 10.1080/14783363.2019.1686971

C.S. Bradley. **Impact of training on use of debriefing for meaningful learning.** Clinical Simulation in Nursing, 32 (2019), pp. 13-19, 10.1016/j.ecns.2019.04.003

C.S. Bradley, B.K. Johnson, K.T. Dreifuerst. **Psychometric properties of the revised DML evaluation scale: A new instrument for assessing debriefers.** Clinical Simulation in Nursing, 56 (2021), pp. 99-107, 10.1016/j.ecns.2021.04.008

C.S. Bradley, B.K. Johnson, K.T. Dreifuerst, P. White, S.K. Conde, C.H. Meakim, K. Curry-Lourenco, R.M. Childress. **Regulation of simulation use in United States prelicensure nursing programs.** Clinical Simulation in Nursing, 33 (2019), pp. 17-25, 10.1016/j.ecns.2019.04.004

A. Cheng, V. Grant, P. Dieckmann, S. Arora, T. Robinson, W. Eppich. **Faculty development for simulation programs: Five issues for the future of debriefing training.** Simulation in Healthcare, 10 (4) (2015), pp. 217-222

A. Cheng, V. Grant, J. Huffman, G. Burgess, D. Szyld, T. Robinson, W. Eppich. **Coaching the debriefer: Peer coaching to improve debriefing quality in simulation programs.** Simulation in Healthcare, 12 (5) (2017), pp. 319-325.

S. Decker, G. Alinier, S.B. Crawford, R.M. Gordon, D. Jenkins, C. Wilson. **Healthcare simulation standards of best practice TM the debriefing process.** Clinical Simulation in Nursing, 58 (2021), pp. 27-32, 10.1016/j.ecns.2021.08.011

C.S. Dinkins. **Socratic pedagogy: Teaching students to think like nurses.** Expert Clinician to Novice Nurse Educator: Learning from First-Hand Narratives, 24 (2015), pp. 80-102.

C.S. Dinkins, P.R. Cangelosi. **Putting socrates back in socratic method: Theory-based debriefing in the nursing classroom.** Nursing Philosophy, 20 (2) (2019), p. e12240, 10.1111/nup.12240

F. Doloresco, J. Maerten-Rivera, Y. Zhao, K. Foltz-Ramos, N.M. Fusco. **Pharmacy students' standardized self-assessment of interprofessional skills during an objective structured clinical examination.** American Journal of Pharmaceutical Education, 83 (10) (2019), pp. 2142-2149.

K.T. Dreifuerst. **The essentials of debriefing in simulation learning: A concept analysis.** Nursing Education Perspectives, 30 (2) (2009), pp. 109-114.

K.T. Dreifuerst. **Using debriefing for meaningful learning to foster development of clinical reasoning in simulation.** Journal of Nursing Education, 51 (6) (2012), pp. 326-333, 10.3928/01484834-20120409-02

K.T. Dreifuerst. **Getting started with debriefing for meaningful learning.** Clinical Simulation in Nursing, 11 (5) (2015), pp. 268-275, 10.1016/j.ecns.2015.01.005

F. Faul, E. Erdfelder, A. Buchner, A.-G. Lang. **Statistical power analyses using G* Power 3.1: Tests for correlation and regression analyses.** Behavior Research Methods, 41 (4) (2009), pp. 1149-1160

M.K. Fey, L.S. Jenkins. **Debriefing practices in nursing education programs: Results from a national study.** Nursing Education Perspectives, 36 (6) (2015), pp. 361-366.

S. Fidell, B. Tabachnick, V. Mestre, L. Fidell. **Aircraft noise-induced awakenings are more reasonably predicted from relative than from absolute sound exposure levels.** The Journal of the Acoustical Society of America, 134 (5) (2013), pp. 3645-3653.

S.G. Forneris, M.K. Fey. **Critical conversations: The NLN guide for teaching thinking.** Nursing Education Perspectives, 37 (5) (2016), pp. 248-249.

A. Grant. **Think again: The power of knowing what you don't know.** Viking: New York (2021).

B. Hallmark, M. Brown, D.T. Peterson, M. Fey, S. Decker, E. Wells-Beede, C. Morse. **Health care simulation standards of best practice TM professional development.** Clinical Simulation in Nursing, 58 (2021), pp. 5-8, 10.1016/j.ecns.2021.08.007

L. Hull, S. Russ, M. Ahmed, N. Sevdalis, D.J. Birnbach. **Quality of interdisciplinary postsimulation debriefing: 360 evaluation.** BMJ Simulation and Technology Enhanced Learning, 3 (1) (2017), pp. 9-16.

IBM Corp. **IBM SPSS Statistics for Windows.** Version 24.0, New York (2016).

D.A. Kolb, R.E. Boyatzis, C. Mainemelis. **Experiential learning theory: Previous research and new directions.** Perspectives on thinking, learning, and cognitive styles, Routledge, United Kingdom (2014), pp. 227-248.

J. Kruger, D. Dunning. **Unskilled and unaware of it: how difficulties in recognizing one's own incompetence lead to inflated self-assessments.** Journal of Personality and Social Psychology, 77 (6) (1999), p. 1121.

K. Mahmood. **Do people overestimate their information literacy skills? A systematic review of empirical evidence on the dunning-kruger effect.** Comminfolit, 10 (2) (2016), 10.15760/comminfolit.2016.10.2.24

E. Nuhfer, C. Cogan, S. Fleisher, E. Gaze, K. Wirth. **Random number simulations reveal how random noise affects the measurements and graphical portrayals of self-assessed competency.** Numeracy: Advancing Education in Quantitative Literacy, 9 (1) (2016), pp. 1-24.

D.T. Peterson, P.I. Watts, C.A. Epps, M.L. White. **Simulation faculty development: A tiered approach.** Simulation in Healthcare, 12 (4) (2017), pp. 254-259, 10.1097/SIH.0000000000000225

Walter, D. (2020). *The power of discipline: How to use self-control and mental toughness to achieve your goals.*

P.Z.T. Wang, W.Y. Xie, S. Nair, S. Dave, J. Shatzer, S. Chahine. **A comparison of guided video reflection versus self-regulated learning to teach knot tying to medical students: A pilot randomized controlled trial.** Journal of Surgical Education, 77 (4) (2020), pp. 805-816, 10.1016/j.jsurg.2020.02.014

P.I. Watts, B.F. Hallmark, S. Beroz. **Professional development for simulation education.** Annual Review of Nursing Research, 39 (1) (2020), pp. 201-221.

A.R. Waznonis. **Simulation debriefing practices in traditional baccalaureate nursing programs: National survey results.** Clinical Simulation in Nursing, 11 (2) (2015), pp. 110-119, 10.1016/j.ecns.2014.10.002