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Development and Psychometric Testing of the Debriefing for Meaningful Learning Inventory[®]

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Purpose

The purpose of this study was to determine if the Debriefing for Meaningful Learning Inventory[®] (DMLI) is a valid measure of the debriefing method Debriefing for Meaningful Learning[®] (DML).

Background

The evidence of improved learner outcomes through simulation debriefing has increased in the literature as the use of simulation has proliferated throughout nursing education (Hayden, Smiley, Alexander, Kardong-Edgren, & Jeffries, 2014). Because of the significance of the learning that occurs during debriefing (Shinnick, Woo, Horwich, & Steadman, 2011), the National Council of State Boards of Nursing (NCSBN) (Alexander et al., 2015) and the International Nursing Association for Clinical Simulation and Learning (INACSL Standards Committee, 2016) have recommended that debriefers receive formal training in a theory-based debriefing method to ensure consistent learning outcomes. However, it is unknown how debriefing training improves the ability to apply a debriefing method with learners. Indeed, because of the lack of valid instruments to measure the application of specific debriefing methods, it is not known how a debriefer enacts an evidence-based debriefing method during debriefing.

Instrument Development

DML is a theory-based debriefing method adopted widely across nursing education because of the improved clinical reasoning demonstrated with nursing students (Dreifuerst, 2012). DML facilitates guided reflective thinking using Socratic questioning through the phases of the six E's: engage, explore, explain, elaborate, evaluate, and extend. The Debriefing for Meaningful Learning Evaluation Scale[®] (DMLES) was developed as a behaviorally anchored rating scale. In psychometric testing, the DMLES demonstrated internal consistency (Cronbach's alpha = 0.88), face validity, and content validity (scale-level CVI 0.92) (Author & Dreifuerst, 2016). The DMLI was developed from the DMLES to explore how a debriefer describes their understanding of the central concepts of DML, and their application of the behaviors of DML during debriefing. While the DMLES assesses observed DML debriefing behaviors, the DMLI was developed to further understand how a debriefer understands DML and subsequently applies the method with learners. Therefore, the 31-item DMLES was modified into the 57-item DMLI to comprehensively explore a debriefer's understanding and application of DML. Five items of the DMLI assess the understanding of the DML central concepts with binary options of *yes* or *no*. Fifty-one DMLI items describe application of DML debriefing behaviors, scored with ordinal frequency options of *always*, *sometimes*, and *never*.

Methods

A confirmatory factor analysis was performed to determine if the 51 application items of the DMLI is a valid measure of DML. A latent class factor analysis (LCFA) was conducted since LCFA is the most common model-based clustering method used with discrete data (Dean & Rafferty, 2010). LCFA was used to identify latent case subtypes from the DMLI data set, and estimate parameter values for the model, thereby confirming the measurement theory of DML. The bootstrapping approach was used, requiring no assumptions of the DMLI data. To assess model fit, cross-classification frequencies were compared to the expected frequencies predicted by the model.

Sample

Known debriefers and members of INACSL were recruited for participation in this study. The DMLI was completed by 234 nurse educators who reported having received debriefing training, and facilitated simulation debriefing with baccalaureate prelicensure nursing students.

Results

The DFactor model within Latent GOLD[®] 5.1 (2015) was used to estimate cluster models within the DMLI data. The latent class approach to the DMLI data supported a six-class DFactor model, confirming the measurement theory of the six E's of DML. The six class DFactor model provided a good fit to the DMLI data, L-squared = 7.0803 with 85 degrees of freedom; $p = 0.298$. The Bayesian information criterion (BIC) also indicated the preferred model was the six-class DFactor model (BIC = 6630.79). The factor loadings and commonalities were evaluated, and the factors were ordered according to R-squared, indicating how well the model predicts the DFactor score. R-squared for the six DFactors ranged from 0.77 to 0.91, indicating the amount of variance explained in the items of each DFactor.

Conclusions

LCFA was used to confirm the item groupings of the 52 DMLI application items. Each of the six DFactors correlated with the six E's of DML; each of the 52 DMLI application items loaded onto one of the six DFactors. Findings from the LCFA demonstrated that the 52 DMLI application items did yield a model of good fit, indicating that the DMLI is a valid measure of the application of DML. This work is significant to the nursing profession by contributing a tested valid instrument for use in assessing the application of a debriefing method. Assessment of how evidence-based debriefing methods are translated into teaching practice is needed to advance the science of debriefing practice.

Title:

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Keywords:

Assessment, Debriefing and Instrument development

References:

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Abstract Summary:

Although use of theory-based debriefing methods is recommended for simulation debriefing, it is unknown how trained debriefers apply these methods with learners. The Debriefing for Meaningful Learning Inventory© was developed and tested through confirmatory factor analysis to assess the application of a debriefing method.

Content Outline:

I. Purpose

- A. To determine if Debriefing for Meaningful Learning Inventory© (DMLI) is a valid measure of DML

II. Background

- A. Significance of learning during debriefing
 - 1. Increased use of simulation
 - 2. Increased evidence of improved learning outcomes through debriefing
- B. Recommendations for training in theory-based debriefing method
 - 1. National Council of State Boards of Nursing (NCSBN) recommendations
 - 2. International Nursing Association for Clinical Simulation and Learning (INACSL)

recommendations

- C. Lack of valid instruments to measure application of a debriefing method
 - 1. Unknown how debriefing training improves application of a debriefing method
 - 2. Unknown how a debriefer applies a debriefing method

III. Instrument Development

- A. Debriefing for Meaningful Learning© (DML)
 - 1. Widely adopted in nursing education
 - 2. Theory-based debriefing method
- B. Debriefing for Meaningful Learning Evaluation Scale© (DMLES)
 - 1. Developed and tested as a behaviorally anchored rating scale
 - 2. Demonstrated through psychometric testing as a valid measure of DML
- C. Debriefing for Meaningful Learning Inventory© (DMLI)
 - 1. Developed from DMLES
 - 2. Developed to explore how a debriefer describes understanding application of DML

IV. Methods

- A. Confirmatory factor analysis
 - 1. Latent class factor analysis is most common model-based clustering method
 - 2. LCFA used to identify latent case subtypes from DMLI data set
 - 3. Bootstrapping approach was used
 - 4. Cross-classification frequencies were compared to expected frequencies for model prediction

V. Sample

- A. Nurse educators
 - 1. Reported having received debriefing training
 - 2. Facilitated simulation debriefing with baccalaureate prelicensure nursing students
- B. Sample size of 234

VI. Results

- A. DFactor model was used to estimate cluster models
- B. Six-class DFactor model
 - 1. Confirms DML measurement theory
 - 2. Model of good fit (L-squared = 7.0803 with 85 degrees of freedom; $p = 0.298$)
 - 3. Bayesian information criterion (BIC) = 6630.79
- C. Evaluation of factor loading and commonalities
 - 1. Factors ordered according to R-squared
 - 2. R-squared for the six DFactors ranged from 0.77 to 0.91
 - 3. R-squared indicates the amount of variance explained in the items of each DFactor

VII. Conclusions

- A. LCFA confirmed the item groupings of the 52 DMLI application items
 - 1. Each of the six DFactors correlated with the six E's of DML
 - 2. Each of the 52 DMLI application items loaded onto one of the six E's of DML
- B. The 52 DMLI application items did yield a model of good fit
- C. Contributes a tested valid instrument to nursing education
- D. Need continued assessment of how evidence-based debriefing methods are translated into teaching practice

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Professional Experience: As a nurse educator, Cynthia Sherraden Bradley has taught undergraduate and graduate nursing courses including research, theory, leadership and management, capstone, and nursing fundamentals. As a director of simulation, she has integrated simulation pedagogy across undergraduate and graduate curricula. She is certified as a Certified Nurse Educator by the National League for Nursing and as a Certified Simulation Health Educator by the Society of Simulation in Healthcare.

Author Summary: Cynthia Sherraden Bradley is an assistant professor of nursing at the University of Central Missouri. Her program of research is centered on faculty training in debriefing. She has served as a consultant for new simulation programs as well as integrating simulation pedagogy into curricula. She led a task force of educators resulting in a Midwest simulation collaboration, and currently serves on the interprofessional Kansas City Regional Simulation Alliance steering committee.