



## The Simulation Effectiveness Tool

### Overview

The Simulation Effectiveness Tool (SET) from the Program for Nursing Curriculum Integration (PNCI®) has recently undergone a multi-site research study under the leadership of Vicky Elfrink from Ohio State University College of Nursing (OSUCON).

OSUCON acted as the principal investigator of this study, which occurred from January-August, 2009. Due to the significant results of this study in identifying the SET as a highly reliable instrument for:

- 1) Total simulation effectiveness score
- 2) The reliability of two associated subscales (confidence and learning)

METI would like to make this tool available to all medical simulation users.

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### The Simulation Effectiveness Scale OSUCON Study

The Simulation Effectiveness Scale was crafted in partnership with METI and the nurse faculty experts involved in the initial development of the PCNI. This standardized simulation evaluation tool originally consisted of 20 items rated on a 5 point Likert-type scale. The tool had face validity, but had not been tested for reliability.

In 2007, The Ohio State University College of Nursing (OSUCON) tested the reliability of the tool with 160 pre-licensure nursing students. An original Cronbach's alpha reliability coefficient of 0.82 was calculated from evaluations by 160 junior and senior nursing students, however, the item-total correlations of some items showed little contribution to the total score, and some inter-item correlations indicated redundancy of items. Based on those findings, a revision of the scale and subsequent analysis using Cronbach's alpha and standard error of measurement (SEM) were performed.

The revised 13-item survey had a Cronbach's alpha for the overall survey of 0.92 with a SEM of 2.84. Additionally, principal components factor analysis indicated that two subscales are present that were labeled "learning" and "confidence". The learning subscale consists of 8 items and had a Cronbach's alpha of 0.87. The confidence subscale contains 5 items and had a Cronbach's alpha of 0.84. Additionally, in autumn, 2007, OSUCON revised the survey from a 5-point Likert-type scale to a 3-point ordinal scale. Changing the scale did not affect the reliability scores and anecdotally has provided the researchers with a clearer indication of the participant's opinions. Thus, the final revised survey contains 13 items that are evaluated using a 3 point scale, 0=Do not agree; 1=Agree and 2=Strongly agree.



In 2008, METI requested that the modified survey, now titled the “Simulation Effectiveness Tool” undergo further tests with multiple nursing programs (Brigham Young University (BYU), Provo Utah; Bryan LGH College, Lincoln, Nebraska; Texas Woman’s University (TWU), Dallas, Texas; Mt. Carmel College of Nursing (MCC), Columbus, Ohio; Daytona State College (DSC), Daytona Beach, Florida) along with the OSUCON acting as the principal investigator of the study. This multi-site study occurred from January-August, 2009. Subjects consisted of 645 volunteer nursing students from six nursing programs who were participating in one or more human-patient simulations during the 2009 winter, spring or summer terms.

The total Chronbach’s alpha reliability of the SET was **.929** a finding that was similar to the OSUCON pilot study (.92). The item with the highest “mean statistic” and the lowest standard deviation was “the instructors’ questions helped me to critically think”. However, the item analysis indicated that each of the items of the SET was relevant and that there was not much difference in the items’ contribution to the entire SET score.

The Confidence Subscale of the SET consists of five items. The calculated reliability of **.885** was similar to the findings of the OSUCON pilot study (.84). The item with the highest mean statistic “I feel better prepared to care for real patients” was not significantly different from other items in the subscale. Each item had a high correlation to the subscale; therefore there was not much difference in any individual items’ contribution to the confidence subscale.

The Learning Subscale of the SET consists of eight items. The calculated reliability was **.873**, a finding that was similar to the OSUCON pilot study (.87). The item with the highest mean statistic was “the instructors’ questions helped me to critically think” (the same question as for the total SET). Each item had a high correlation to the subscale; therefore there was not much difference in any individual items’ contribution to the learning subscale.

In summary, the SET is a highly reliable instrument for its total effectiveness score and for the “confidence” and “learning” subscale scores. Further, the item analysis indicates that there is a high total correlation among the 13 items. Finally, the findings also support earlier results which suggested that the 13 items may “load” on a single factor which we have determined as “simulation effectiveness”, however, the “learning” and “confidence” subscales are also highly correlated within the total SET.