# Development and Refinement of a Health Science Education Innovation Culture Survey

**Nikki L.B. Zaidi, PhD, Jun Yang, MS, Paula T. Ross, PhD, Rajesh S. Mangrulkar, MD**

**Background:** The Research, Innovation, Scholarship, and Education (RISE) initiative first created and launched the Health Science Education Innovation (HSEI) Culture Survey via email to all members of the Michigan Medicine community in 2019. The survey items seek to better understand the degree to which our organization is cultivating a culture of health science education innovation through actions, behaviors and an environment that supports and drives innovation. We initially developed a 21-item innovation culture survey based on the innovation literature, then vetted by members of a core team responsible for leading an institutional innovation initiative. We established face validity through pilot testing and calibration with a small group of potential respondents to ensure a common understanding of the content. Feedback provided by this group of respondents resulted in further refinement of the survey. After two administrations of this biennial survey in 2019 and 2021, we sought to examine another important aspect of validity—the internal structure of the data from the survey responses.

**Actions, Methods, or Intervention:** We examined two years of survey data in an attempt to reduce data to a smaller set of summary variables and to explore the underlying theoretical structure of innovation culture. Using the statistical software, SPSS 28, we conducted an Exploratory Factor Analysis and Reliability Analysis on all 12 Likert scale items (the other nine survey items represented open-ended and/or demographic items).

**Results: The** 2019 and 2021 culture survey responses represent a combined sample size of n=708 (2019, n=308; 2021, n=400); however, our analysis included only complete responses (i.e., respondent answered all Likert scale items). Therefore, our sample size used in this analysis used only complete responses (n=447). The data still met the sample size requirement and all other assumptions for factor analysis. Factor loadings indicated a two-factor solution, suggesting that our Likert survey items represent two distinct constructs. Analysis suggests that five items did not load on either factor (using the criterion of >.500 factor loading) and could be eliminated without reducing the validity of these measured constructs. Therefore, the results of this analysis suggest that we can reduce our HSEI Culture Survey from 12 Likert scale items to 7.

**Lessons Learned:** We interpreted the two constructs based on Dobni's innovation culture framework (2008) that suggests innovation culture can be understood as the combination of behaviors and environmental factors. Innovation behaviors represent mindsets, characteristics, and competencies necessary to inspire, engage, and employ people to create and implement innovation ideas. By reducing the number of survey items, we can provide the most parsimonious tool and reduce the survey response load on our respondents.

**Future Application and Next Steps:** We will continue to evaluate this assessment tool, specifically examining how changes to the survey items impacts validity estimates. We will also continue to share our survey with others so that it can become a tool for other organizations who aim to better understand their own culture around innovation.

.