



Short Communication

Validation of the SPICE-R instrument among a diverse interprofessional cohort: A cautionary tale

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Abstract

Objective: The Student Perceptions of Interprofessional Clinical Education-Revised (SPICE-R) instrument was developed to measure interprofessional teamwork in a clinical setting. This study investigated whether the SPICE-R could adequately measure teamwork in a classroom-based setting, while also evaluating function of the instrument's rating scale as used among these learners, and psychometric responsiveness to change.

Methods: The SPICE-R instrument was administered to students at start and end of an interprofessional education course for first-year students from eight health care professions. The SPICE-R's rating scale functionality was characterized using Rasch Measurement. Without statistical adjustment, pre/post data were analyzed for total score change. With adjustment, a complex multiple regression modeled pre-SPICE-R, professional program, and gender on post-SPICE-R.

Results: A total of 553 students completed the pre-SPICE-R while 185 students also completed the post-SPICE-R. The 5-point rating scale did not function while a 4-point scale did. Overall, both SPICE-Rs were reliable (Cronbach's-alpha: 0.83 and 0.87). On unadjusted paired analysis, there was no mean improvement with course [pre-SPICE-R = 32.4 ± 4.4 ; post-SPICE-R = 31.8 ± 4.6 ; $P = 0.10$; and Cohen's $d = -0.1$ (trivial-effect-size)]. Separately, pharmacy improved modestly [pre-SPICE-R = 31.7 ± 5.7 ; post-SPICE-R = 33.5 ± 4.1 ; $P = 0.12$; and Cohen's $d = 0.3$ (small-effect-size)]. Regression showed that medicine and physician assistant did not have as much improvement as pharmacy (both <0.01), though students from all other professions responded less favorably than pharmacy.

Implications: This classroom-based setting among first-year students appeared to be outside the SPICE-R instrument's utility. This investigation showed that a 4-point rating scale allowed the SPICE-R to better function instead of a 5-point rating scale. Ultimately, the SPICE-R was reliable though showed only modest responsiveness to change after statistical adjustment.

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Introduction

Interprofessional education (IPE) has a long history and has been revived most recently with a focus on quality in patient care.¹ By creating competencies for various health profession programs, organizations representing a variety of professions moved this health care quality improvement agenda forward.² Accreditation authorities for each health

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profession are currently working to include IPE in their educational program standards for institutions of higher learning. An example is the 2016 Doctor of Pharmacy (Pharm.D.) Standards by the Accreditation Council for Pharmacy Education (ACPE).³ At this time, the question is not whether an institution is to deliver IPE, but how to deliver it, and how to assess IPE within each profession's other coursework. Once again, the Institute of Medicine (IOM) has taken a leading role in facilitating IPE development toward a higher-quality health system, with safer standards for patient care.^{4,5}

The 2016 Pharm.D. Standards explicitly state that experiential and didactic IPE are required,³ and so pharmacy colleges/schools of pharmacy must have classroom-based IPE within their purview. One promising instrument to assess student perceptions of IPE in a broad range of health profession programs is the “Students Perceptions of Interprofessional Collaboration and Education-Revised” (SPICE-R).⁶ It is a revision of the original “Students Perception of physician–pharmacist Interprofessional Clinical Education” (SPICE) instrument.⁷ The SPICE was developed within a clinical, experiential setting; however, much of the introductory IPE across the country is taking place in classroom-based settings. The educational learning environment is a large component of education,⁸ and the SPICE-R's utility in a classroom-based setting is not yet known.

For any evaluative instrument that is to be used more than once by a participant, responsiveness to change is an additional psychometric characteristic that requires investigation.^{9–11} For example, a chronic disease quality-of-life measure needs to be valid, reliable, and responsive to change in health status to monitor a patient's change in chronic disease severity. Likewise, an educational measure should be responsive to a change following further applicable and helpful education. The original report provided psychometric evidence for validity (including reliability) by describing initial development and internal structure of the instrument.⁷ In a further study after the original SPICE

report, the SPICE instrument's responsiveness to change was documented following clinic-based interprofessional activities.¹²

The SPICE instrument was revised to the SPICE-R as a more inclusive interprofessional education instrument for health professions of nursing, optometry, pharmacy, and physical therapy. Once again, instrument psychometric evidence of validity, including reliability, was provided for first-year health professions students.⁶ This was achieved with an online questionnaire of first-year students and gave no specific mention of any associated IPE coursework, though many students reported prior clinical exposure before their health education program. Evidence of responsiveness to change with the SPICE-R has not yet been shown.

Thus, our objective was to evaluate whether the SPICE-R was able to adequately assess improvement (i.e., responsiveness to change) of first-year health professions students within a classroom-based IPE course.

Methods

Design

In the fall semester of 2014, an interprofessional education course was integrated into the first-year curricula of 553 students from eight health care professions. [Table 1](#) provides the demographics of students in this IPE course. All students were asked to complete the SPICE-R instrument at the beginning of the course and again after it ended, via a link posted to their online course management system (Blackboard[®] Learn; <http://www.blackboard.com/learning-management-system/blackboard-learn.aspx>).

Course description

The National Competency Framework created by the Interprofessional Education Collaborative guided the development of the student learning outcomes for this course.² Course

Table 1
Demographics of course and matched SPICE-R participants

	Students participating in course		Participants with matched pre- and post-SPICE-R responses	
Medicine	175	32%	60	33%
Nursing	112	20%	37	20%
Occupational therapy	20	4%	10	5%
Pharmacy	108	19%	43	23%
Physical therapy	28	5%	13	7%
Physician assistant	45	8%	21	11%
Respiratory therapy	17	3%	1	1%
Speech-language pathology	48	9%	0	0%
Total	553	100%	185	100%
Female	352	65%	121	65%
Male	196	35%	64	35%
Total	553	100%	185	100%

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