Organizing to Intentionally Assess Medical Student Health Systems Citizenship Using Generalizability Theory

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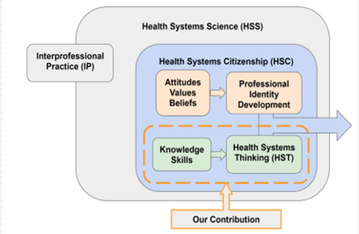
Background

- Systems thinking (ST) is at the heart of systems-based practice (SBP) and health systems science (HSS); it describes behaviors and ways of approaching problem solving and change that are open-minded, reflective, and founded on well-established strategies of critical analysis.

Figure 1. Health Systems Science and Project Contribution



- Existing assessment tools in this context are limited and often focus primarily on self-reported attitudes, and/or general improvement behaviors (e.g., the Systems Thinking Scale).
- Self-report measures alone are insufficient for assessing student learning of the systems-based knowledge and skill components of HSC which leaves UME without the needed tools to precisely measure and scaffold student expertise in this increasingly critical competency–a key gap our validated tool will directly address.

Key Project Features

- A focus on systems-thinking Knowledge and Skills within health systems citizenship
- Incorporation of a robust validation framework and psychometric paradigm
- A focus on observable knowledge and skills

Purpose

- Our primary goals are to create a framework for "health systems citizenship" (HSC) within undergraduate medical education and to use this framework to develop a generalizable, multi-scenario objective-structured clinical case-based exam (OSCE) of HSC for fourth-year medical students.
- A core foundation for our project is to identify the concrete, demonstrable, and measurable aspects of systems thinking as a core component of health systems citizenship.

Expected Outcomes

- A Framework for medical student HST within HSC
- A Generalizable 5-scenario OSCE
- Knowledge on relationships between hypothesized inter-related constructs that characterize HSC at the medical student level
- Multi-dimensional formative performance assessment with empirically established performance standards (see below)
- Rater Training Module

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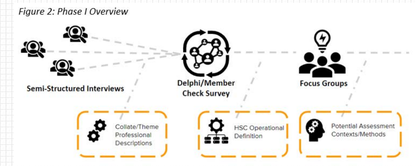
Methods

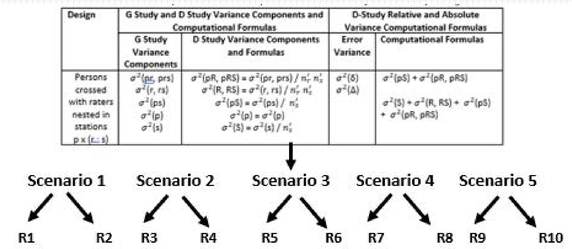
- We will utilize various qualitative methods to develop a framework.

Figure 2: Phase I Overview



- We will specify a random effects two-facet nested design with persons as the object of measurement. Persons will be crossed with two trained raters nested in each of the five different OSCE stations

Design	G Study and D Study Variance Components and Computational Formulas		D-Study Relative and Absolute Variance Computational Formulas	
	G Study Variance Components	D Study Variance Components and Formulas	Error Variance	Computational Formulas
Persons crossed with raters nested in stations p x (r : s)	$\sigma^2(p)$, $\sigma^2(pr, rs)$, $\sigma^2(ps)$, $\sigma^2(p)$, $\sigma^2(s)$	$\sigma^2(pR, pRS) = \sigma^2(pr, prs) / n'_r n'_s$ $\sigma^2(R, RS) = \sigma^2(r, rs) / n'_r n'_s$ $\sigma^2(pS) = \sigma^2(ps) / n'_s$ $\sigma^2(p) = \sigma^2(p)$ $\sigma^2(S) = \sigma^2(s) / n'_s$	$\sigma^2(\delta)$ $\sigma^2(\Delta)$	$\sigma^2(pS) + \sigma^2(pR, pRS)$ $\sigma^2(S) + \sigma^2(R, RS) + \sigma^2(pS) + \sigma^2(pR, pRS)$



(p x (r : s)).

- We will establish important relationships between embedded HSC-related constructs and their relationships with other traditional and novel measures of medical student academic performance

Preliminary Outcomes

- A Framework for ST as a metacognitive skill has been developed from literature and interviews with expert clinicians.
- Qualitative data are currently being analyzed to inform OSCE development and instrumentation.