Innovative Assessment of Interprofessional Student Team Competency: The Development of the Creighton Interprofessional Collaboration Instrument (C-ICE)

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Learning Objective

Describe a method to quantitatively evaluate student **team** behaviors, skills, and performance using a valid and reliable instrument.

Interprofessional Education

When "students from two or more professions learn about, from and with each other to enable effective collaboration and improve health outcomes" (WHO, 2010, p. 7).

Have you taught in an interprofessional activity?

Have you been able to evaluate that interaction?

Background

Challenge: Prepare students for safe practice in a complex health care environment

Resource: Core Competencies for Interprofessional Collaborative Practice (CCICP)

Accreditation agencies: Incorporate IPE into existing curricula

Great! But Does it Work?

Academic institutions must focus on IPE learning outcomes through assessment (IOM, 2015).

Currently, assessment for IPE remains at a low level (attitudes and perceptions) rather than attributes or outcomes (Brandt & Schmitz, 2017).

GAP

Evaluation of IPE Benefits → Best Practice for IPCP

Level	Learner Outcome	Description
1	Reaction	Explores how the learner felt about the IPE experience
2	Attitudes/perceptions	Explores attitudes and/or perceptions of IPE experiences
3	Knowledge/skills	Identifies knowledge and/or skills acquired from IPE
4	Collaborative behavior	Assesses one's ability to engage in effective interprofessional team-based collaboration
5	Performance in practice	Assesses the ability of an individual and/or team to perform with or as an effective interprofessional team

Modified Kirkpatrick Evaluation Framework

Purpose

To describe the process of developing an instrument focused on the objective assessment of student team performance within the context of interprofessional collaboration.

Methods

Instrument Development

Modeled after the Creighton Competency Evaluation Instrument (C-CEI)

Valid and reliable instrument linking core competencies to student performance in the clinical and simulation environment

Modeling an instrument around the core competencies of IPE was logical next step

CCICP – 4 Core Competencies

1. Values/ethics for interprofessional practice

2. Roles/responsibilities

3. Interprofessional communication

4. Teams and teamwork

Instrument Description

26 items identified as essential to include

Each item assigned to 1 of 4 core competencies

Dichotomous scale
- 1 = demonstrates competency
- 0 = does not demonstrate competency
- Option for N/A

Final score calculated by adding the items that were scored as competent and dividing that number by the total items applicable to the scenario

Values/Ethics for Interprofessional Practice	0=Does not demonstrate competency 1=Demonstrates competency NA=Not applicable
Exemplifies patient-centered care (i.e., patient dignity, confidentiality, diversity, etc.)	
• Involves patient as a member of health care team (acknowledges, solicits information and listens to patient, NA if patient not present)	0 1 N/A
• Values patients' right to make their own health care decisions (references patient's perspective)	0 1 N/A
• Identifies factors influencing health status of the patient (verbalizes factors)	0 1 N/A
• Integrates patient-specific circumstances into care planning (considers factors in plan)	0 1 N/A

Validity Testing

Internal group of IPE experts and experts from 14 universities nationally

Reviewed for content validity rating items using Likert scale from 1 (strongly disagree) to 4 (strongly agree). A space for comments was available.

3 basic statements:
- The item is essential to be included in the instrument
- The item is reflective of the section under which it is included
- The item is easy to understand

Instrument was also rated as a whole, including usefulness, understandability, and effectiveness in evaluating student team performance, effectiveness in measuring the IPEC core competencies, and overall comprehensiveness of the instrument.

Validity Testing

Rate the appropriateness in a variety of scenarios

28 surveys sent out, 9 completed (32% response rate)

Item-Content Validity Index (ICVI)

Scale Content Validity Index (SCVI)

Gwet's agreement coefficient (gAC), ordinal absolute agreement, and consistency

Inter-rater Reliability

Faculty from 5 professions selected based on expertise in IPE teaching and scholarship.

Formal training in the use of the C-ICE prior to IRR testing

To establish IRR, the C-ICE was piloted with video recorded student team interactions
- 5 videos ranging from 20 – 38 minutes
- Faculty randomly assigned to view and evaluate 2 of the 5 videos
- After viewing, percent of agreement between faculty were calculated for each item
- Krippendorff's nominal alpha (nKALPHA) was used to assess the reliability of the instrument among the raters.

Results

Validity

Evaluated at the item, domain, scale, and aggregate scales

25 of 26 items on the C-ICE had I-CVI scores of ≥0.78

The S-CVI for the C-ICE is 0.93

Item-content validity index.

Item	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5	Expert 6	Expert 7	Expert 8	Expert 9	# in Agreement	I-CVI
1	4	4	4	3	4	3	4	4	4	9	1
2	4	4	4	3	4	3	4	4	4	9	1
3	4	4	4	4	3	2	3	4	4	8	.89
4	4	4	4	4	4	3	4	4	4	9	1
5	4	4	4	3	4	2	4	4	4	8	.89
6	4	4	4	4	4	3	4	3	4	9	1
7	4	4	4	4	4	3	4	4	4	9	1
8	2	4	4	3	3	2	4	4	4	7	.78
9	4	4	4	4	4	3	4	4	4	9	1
10	1	4	4	4	2	2	4	4	4	6	.67
11	3	3	4	4	4	3	4	4	4	9	1
12	4	4	4	4	4	3	4	4	4	9	1
13	4	4	4	4	4	2	4	4	4	8	.89
14	4	4	4	4	4	2	4	4	4	8	.89
15	4	4	4	3	4	2	3	4	4	8	.89
16	4	4	4	4	4	4	4	4	4	9	1
17	4	4	4	3	4	3	3	4	4	9	1
18	4	4	4	3	4	2	4	4	4	8	.89
19	4	4	4	3	4	2	4	4	4	8	.89
20	2	4	4	3	4	3	4	4	4	8	.89
21	4	4	4	4	4	2	4	4	4	8	.89
22	4	4	4	4	4	2	3	4	4	8	.89
23	4	4	4	4	4	4	4	4	4	9	1
24	4	4	4	4	4	3	4	4	4	9	1
25	4	4	4	4	4	3	4	4	4	9	1
26	4	4	4	4	4	4	4	4	4	9	1
					Mean I-CVI						.93
					S-CVI by mean expert proportion						.93

I-CVI – item-level content validity index

Validity

9 raters' measures of validity

Condition	gAC	Ordinal Absolute Agreement	Consistency
Essential	0.54	28%	92%
Reflective	0.62	44%	88%
Easy to Understand	0.63	44%	92%

Validity

Gwet's Agreement Coefficients for each combination of raters

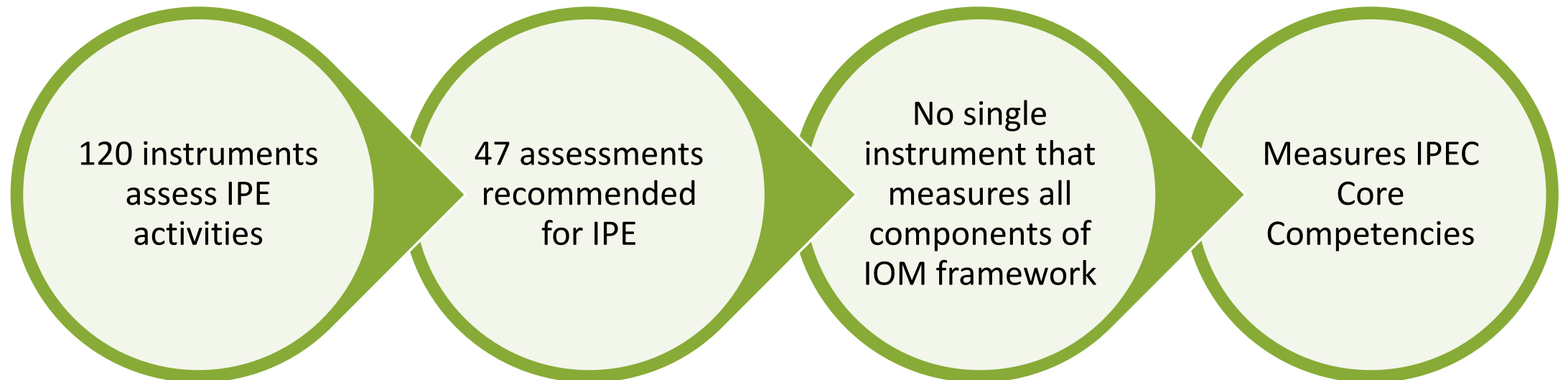. Gwet's agreement coefficients for each combination of raters.

Paire		Condition		
Rater A	Rater B	Essential	Relevance	Understanding
1	2	0.67	0.87	0.91
1	3	0.63	0.83	0.91
1	4	0.52	0.49	0.91
1	5	0.65	0.78	0.87
1	6	0.04	−0.02	−0.41
1	7	0.65	0.65	0.77
1	8	0.62	0.79	0.52
1	9	0.50	0.83	0.91
2	3	0.96	0.96	0.96
2	4	0.10	0.41	0.96
2	5	0.77	0.83	0.96
2	6	0.18	−0.20	−0.38
2	7	0.70	0.76	0.76
2	8	0.95	0.91	0.56
2	9	0.63	0.96	0.96
3	4	0.06	0.49	0.96
3	5	0.73	0.87	0.96
3	6	0.24	−0.25	−0.38
3	7	0.76	0.81	0.76
3	8	0.91	0.96	0.56
3	9	0.70	0.96	0.96
4	5	0.47	0.51	0.96
4	6	−0.18	−0.06	−0.38
4	7	0.17	0.41	0.76
4	8	0.01	0.41	0.56
4	9	0.23	0.49	0.96
5	6	0.15	−0.22	−0.33
5	7	0.66	0.77	0.70
5	8	0.72	0.83	0.49
5	9	0.56	0.87	0.96
6	7	0.21	−0.22	−0.10
6	8	0.18	−0.20	0.03
6	9	0.05	−0.25	−0.38
7	8	0.63	0.76	0.15
7	9	0.45	0.81	0.76
8	9	0.56	0.96	0.56

Video	Number of Raters	nKALPHA
1	5	0.833
2	5	0.887
3	5	0.558
4	5	0.796
5	5	0.827

Inter-rater Reliability

National Academy of Medicine Framework for Measuring IPE Impact (IOM, 2015)

◦ Student reaction

◦ Attitudes/perceptions

◦ Knowledge/skills

◦ Collaborative behavior

◦ Performance in practice

120 instruments assess IPE activities → 47 assessments recommended for IPE → No single instrument that measures all components of IOM framework → Measures IPEC Core Competencies

Filling the Gap

The C-ICE instrument provides educators a comprehensive, valid and reliable evaluation tool for assessing student team behaviors, skills, and performance.

Ability to now measure IPE educational outcomes at a higher level than previously available.
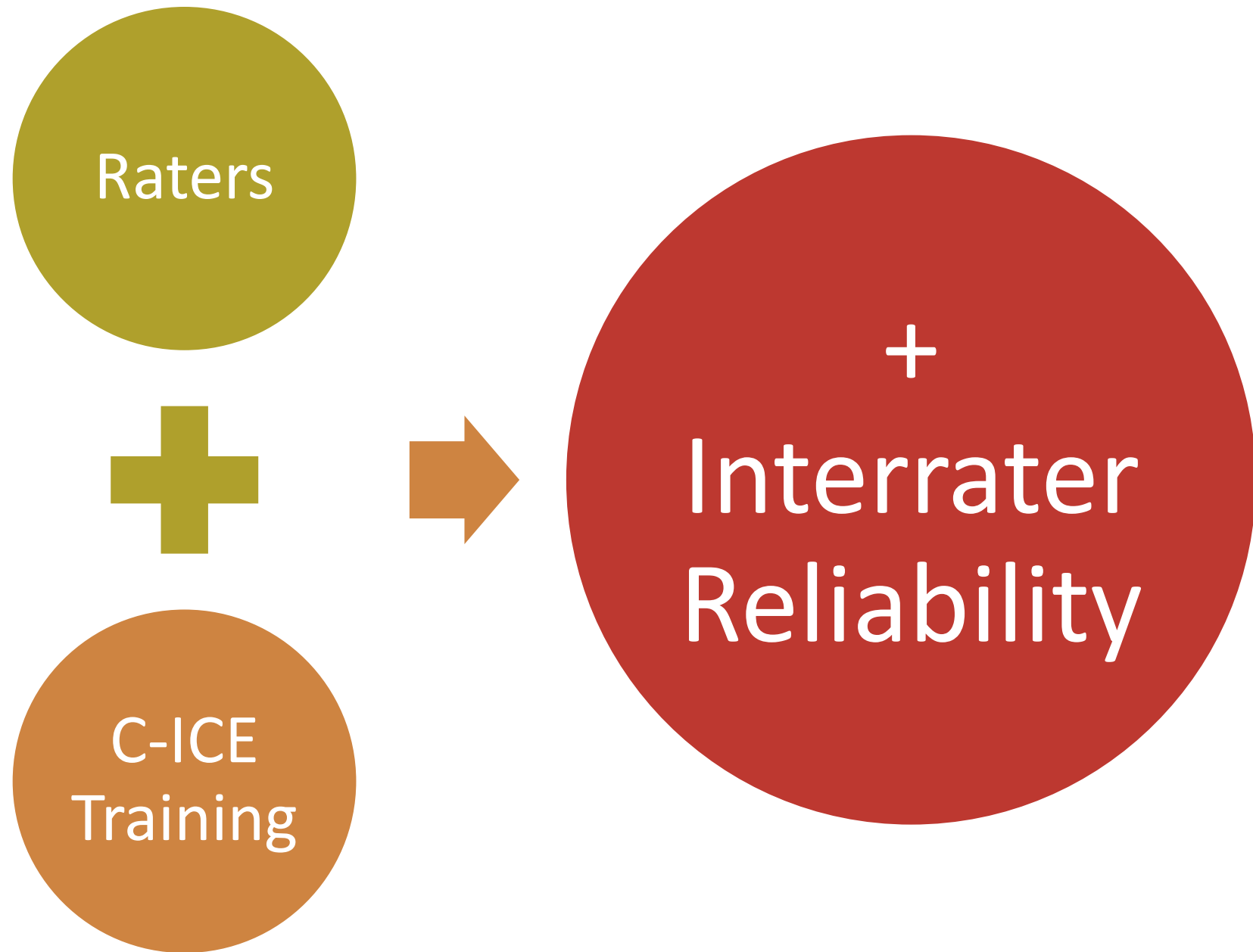
1 Explanation of the purpose of the instrument

2 Scoring procedures

3 Intent of each item

4 Agreement among raters on expected behaviors required to achieve competency on each item

Training

https://healthsciences.creighton.edu/interprofessional-education/center-interprofessional-practice-education-research-ciper/ipe-tools/c

Expert Panel

Item	Mean	SD
Useful	3.4	0.52
Comprehensive	3.4	0.52
Easy to Understand	3.6	0.5
Effectively evaluated team performance	3.4	0.72
Effectively measures IPEC Core competencies	3.5	0.52
Appropriate for assessment of the following interprofessional skills:		
Case study analysis	3.2	0.83
Clinical simulation	3.6	0.5
TOSCE	3.6	0.5
Practicum	3.4	0.52
Clinical Practice	3.4	0.72
Community Engagement (Service Learning)	3.1	0.78

Future Recommendations

Further testing of validity and reliability with students engaged in various teaching-learning strategies

Further testing in light of 2016 IPEC Core Competencies

Further testing at a variety of institutions and with a variety of students

CICE has been downloaded 148 times by 36 institutions in 9 different countries

The instrument provides a pivotal avenue for continued interprofessional education and research and aligns with the Kirkpatrick model, filling the gap of high-level assessment for collaborative behavior.

Acknowledgements

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