

**Heartland Innovations in Interprofessional Practice and Education Summit • July 17-18, 2025** **ONLINE**

# **Transforming Futures:** Innovation and Disruption in Interprofessional Health Care and Education

  
**DES MOINES UNIVERSITY**  
MEDICINE & HEALTH SCIENCES



# The C-ICE 2.0 Fully Loaded.....

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# Disclosure

Lindsay Iverson has a financial relationship with Laerdal Medical. However, Laerdal did not sponsor, influence, or contribute to the development of this project/presentation, and no Laerdal products or content will be discussed.

No other presenters have conflicts of interest or disclosures.

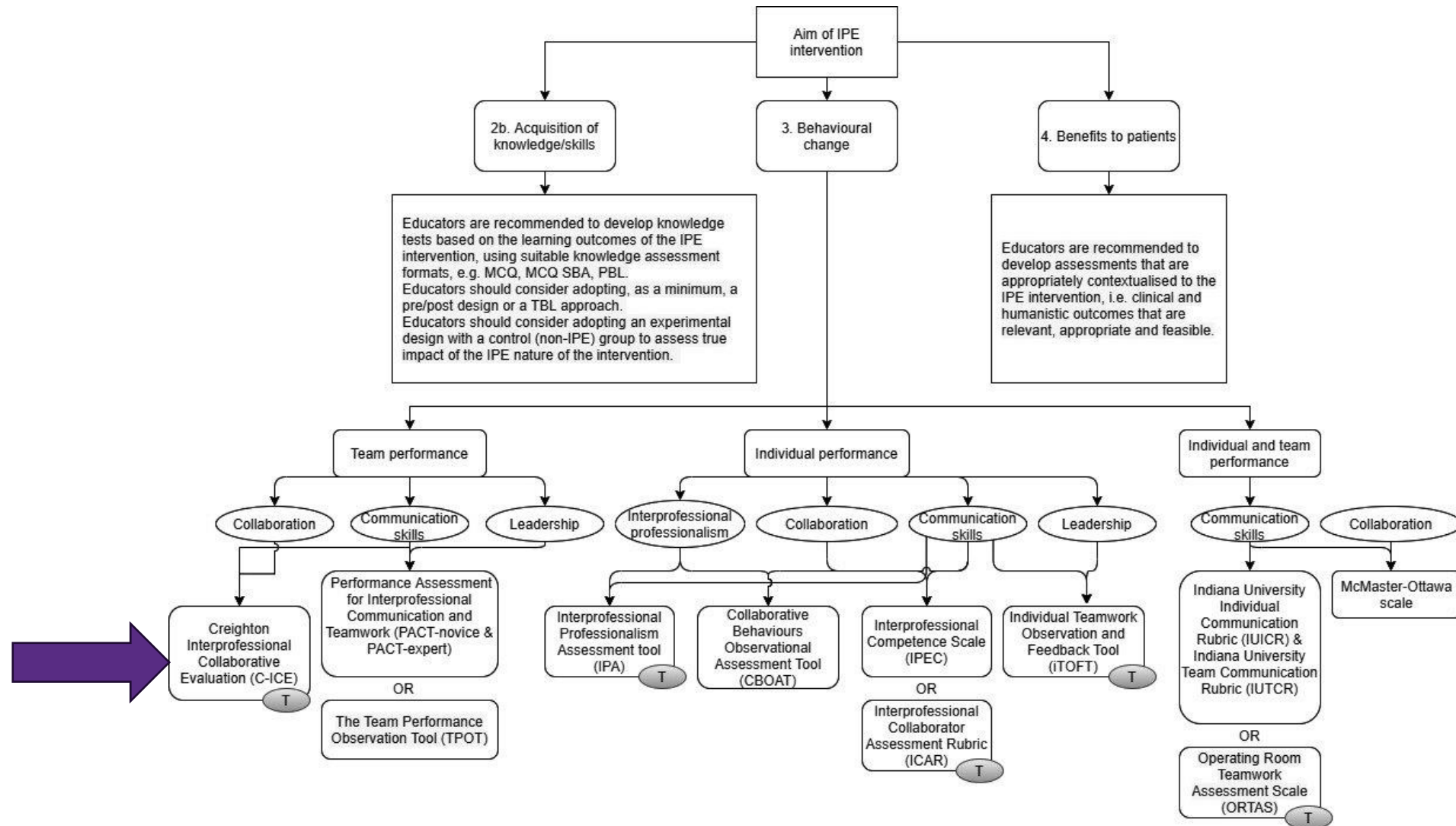
# Background



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

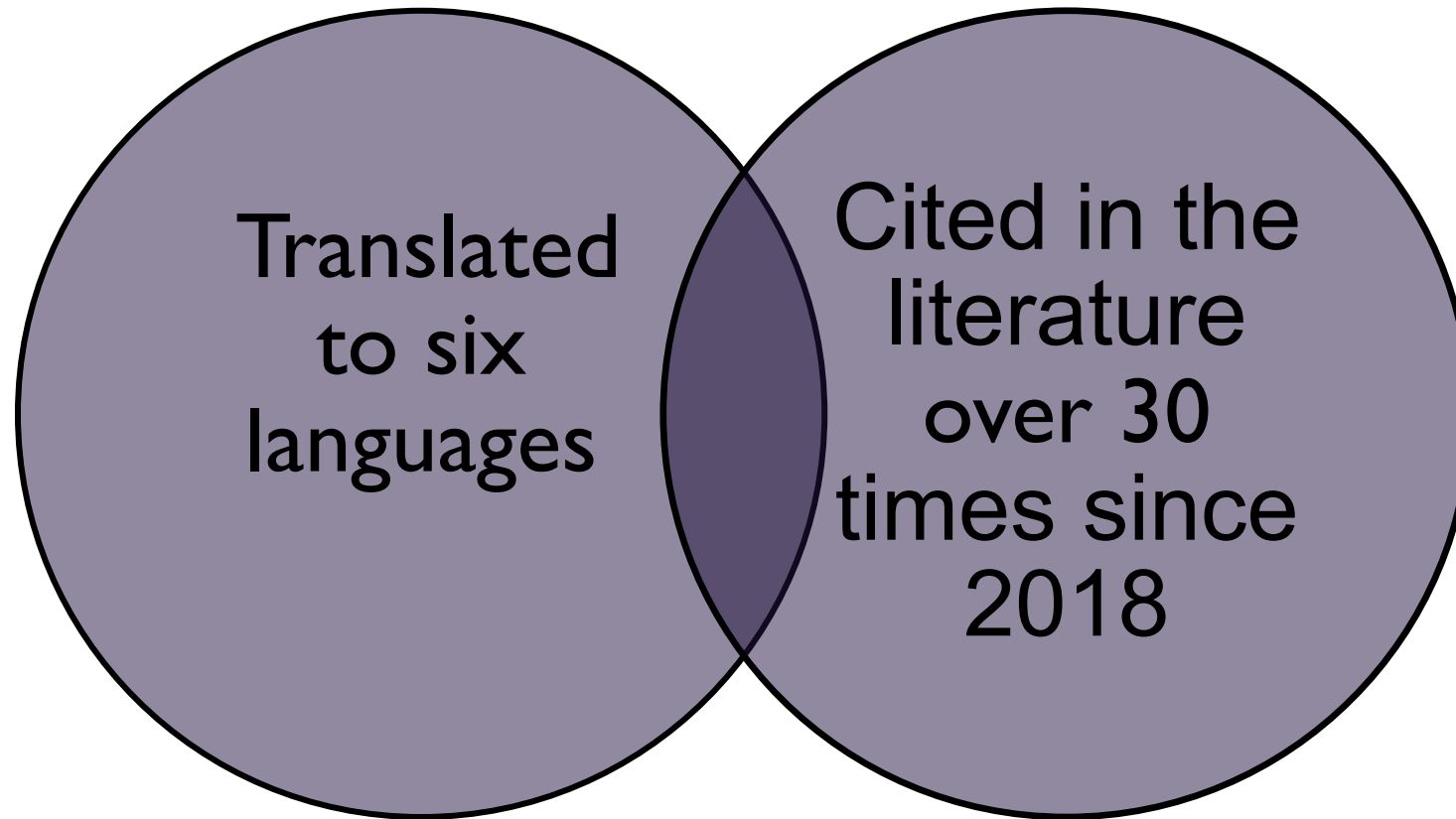
**Challenge:** Revision of IPEC Core Competencies in 2023

# IPE INSTRUMENTS





# C-ICE Usage



# Methods

Faculty had experience in assessment, interprofessional education and practice, and tool development.



Interprofessional faculty from Creighton University met every 2 weeks to map and align the C-ICE 2.0 instrument to the updated competencies.



Four core competencies were utilized as the framework for the instrument.



Twenty-two items were identified as essential to include in the C-ICE 2.0 instrument.

# Mapping to IPEC Competencies

Roles and Responsibilities	
<i>Respects and incorporates the roles, responsibilities, and expertise of team members to meet health outcomes.</i>	
7. Verbalizes discipline specific role to patient (introduces self/role)	RR4
8. Offers to seek guidance from colleague of the same discipline with uncertainty about own knowledge, skills, and/or abilities (NA if not necessary)	RR2, RR5
9. Communicates with team members about cost effective and/or timely care (i.e. generic medications, diagnostic utility)	RR1, RR3, RR5
10. Directs questions to other health professionals based on team member's expertise	RR1, RR2, RR3, RR4, RR5



# Instrument Description

- Each item assigned to 1 of 4 core competencies
- Dichotomous scale
  - 1 = Meets minimum acceptable threshold of competency
  - 0 = Below acceptable threshold of 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

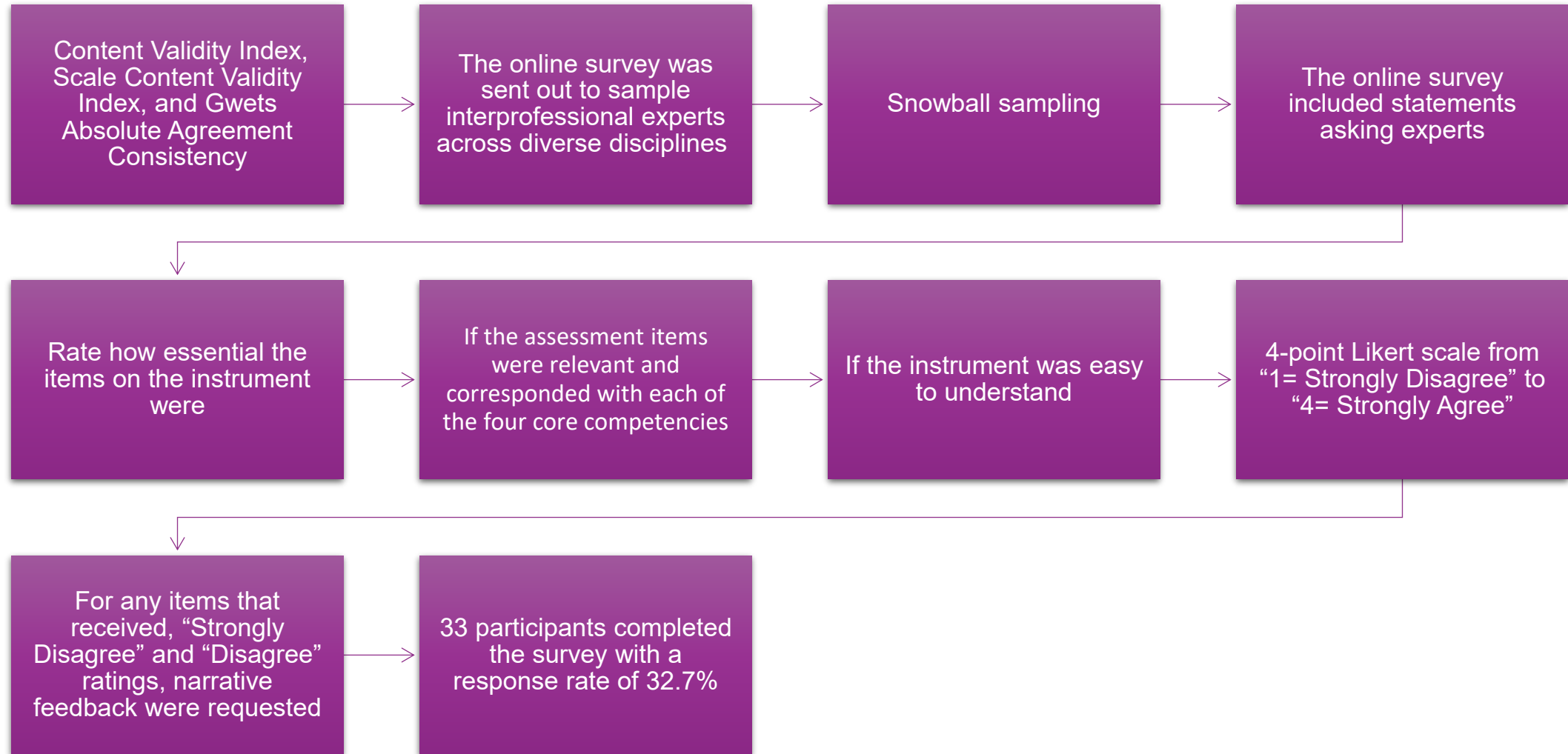
# C-ICE 2.0 Instrument

## Roles and Responsibilities

***Respects and incorporates the roles, responsibilities, and expertise of team members to meet health outcomes.***

7. Verbalizes discipline-specific role to team and/or patient (introduces self/role)	0	1	NA	
8. Offers to seek guidance from colleague of the same discipline when uncertain about own knowledge, skills, and/or abilities (NA if not necessary)	0	1	NA	
9. Communicates with team members about cost-effective and/or timely care (i.e., generic medications, diagnostic utility)	0	1	NA	
10. Directs questions to other health professionals based on team member's expertise	0	1	NA	
<b>TOTAL ROLES AND RESPONSIBILITIES SCORE:</b>				

# Validity Testing



# Validity Testing Results

## Content Validity Index (I-CVI):

- No item had an I-CVI lower than 0.788 and most ( $n = 17$ ) items had an I-CVI  $> 0.900$

## Scale Content Validity Index (S-CVI):

- (S-CVI = 0.958)

## Gwet's Absolute Agreement (AC) Consistency:

- Gwet's AC for each aspect, "Essential," "Easy to Understand," and "Relevance" were 0.83, 0.84, and 0.82, respectively
- Absolute agreement for "Essential," (0.54) "Easy to Understand," (0.56) and "Relevance" (0.52)
- Disagreement between raters was due to differences in ratings of 3 vs 4, because consistency was quite high for all three aspects ("Essential" = 0.93, "Easy to Understand" = 0.92, and "Relevance" = 0.93)

## Landis & Koch's Benchmark Scale (Wongpakaran et al., 2013)

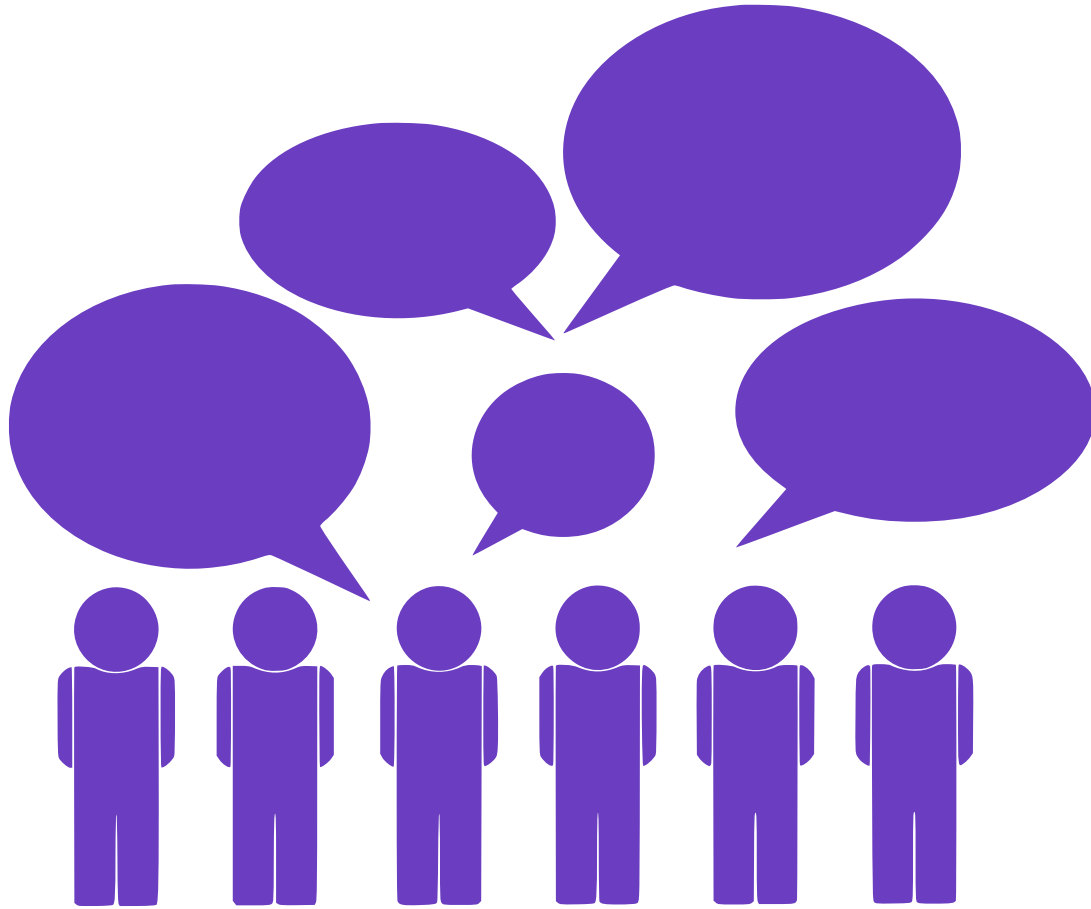
- 0.00-0.20: Slight agreement
- 0.21-0.40: Fair agreement
- 0.41-0.60: Moderate agreement
- 0.61-0.80: Substantial agreement
- 0.81-1.00: Almost perfect agreement

# Validity Testing Results

Overall  
opinions on the  
instrument  
were  
overwhelmingly  
positive

- “The C-ICE 2.0 is a useful measure of interprofessional team performance” and “The C-ICE 2.0 is easy to understand” as “3 – Agree” and “4 – Strongly Agree”
- 56% of respondents rated the statement “The C-ICE 2.0 effectively evaluates interprofessional team performance” as “3 – Agree” and 44% rated it as “4 – Strongly Agree”
- “The C-ICE 2.0 provides a comprehensive way to measure interprofessional team performance,” 56% rated it as “3 – Agree” and 41% rated it as “4 – Strongly Agree”; 3% (one expert) rated it as “2 – Disagree”

# Validity Testing



- 24 interprofessional educators were sampled and invited to participate in virtual focus groups
- The semi-structured focus group script included
  - a brief introduction of the facilitators
  - 3 demographic questions
  - 12 open-ended questions addressing the instrument's ease of use, comprehensiveness, and overall utility

Each focus group session lasted between 30 and 60 minutes, depending on the number of informants in attendance

- Across 4 focus groups completed, 9 informants participated with a response rate of 37.5%



# Validity Testing Results

7 professions

Average of 9.61 years of experience in interprofessional education

4 out of 9 participants (55%) reported prior experience with using the C-ICE

PARTICIPANT ID	PROFESSION	YEARS OF EXPERIENCE IN INTERPROFESSIONAL EDUCATION	PRIOR EXPERIENCE USING THE C-ICE
Participant A	Dentist	14	No
Participant B	Doctor of Medicine	20	No
Participant C	Nurse Practitioner	12	Yes
Participant D	Nurse Practitioner	4	Yes
Participant E	Occupational Therapist	1	No
Participant F	Pharmacist	4	Yes
Participant G	Physical Therapist	12	Yes
Participant H	Physician Assistant	16	No
Participant I	Physician Assistant	3.5	No

# Validity Testing Results

The themes that emerged from the focus group transcripts:

- Easy Implementation in IPE Contexts
- Valid Measure of an Interprofessional Team and Collaborative Practice
- Robust Utility in Educational and Clinical Contexts



Themes

# RELIABILITY TESTING

- Reliability was established through 1) Inter rater agreement and 2) Test/Retest
- Three videos of varying levels of competency were developed
- Videos were sent to over 100 interprofessional experts

# RELIABILITY TESTING - INSTRUMENTATION



To ensure that the three videos meaningfully captured varying levels of competency, we used one-way ANOVAs for the test and retest phases to compare scores.



There was a significant main effect for both the test ( $F(2,34) = 71.166$ ,  $p = 7.039e-13$ ) and retest phases ( $F(2,29) = 85.005$ ,  $p = 7.432e-13$ ).



For both phases, the mean score for video 1 was significantly higher than videos 2 and 3, and the mean score for video 3 was significantly higher than that of video 2.



It is worth noting that the mean scores for each video are not based on true independent replicates, but pseudoreplicates or technical replicates.



This analysis still demonstrates that the three videos represented different levels of student competence.

# RELIABILITY RESULTS

Gwet's AC for Video 1 (n=14), Video 2 (n=12), and Video 3 (n=13) were 0.82, 0.60, and 0.52 during measurement 1 and 0.90, 0.65, and 0.67 during measurement 2, respectively, indicating good interrater reliability.

Similarly, absolute agreement ranged between 0.71 to 0.92, exhibiting substantial to almost perfect agreement among the raters.

Test-retest reliability using the Intraclass Correlation Coefficient (ICC) for Video 1 (n=6), Video 2 (n=6), and Video 3 (n=8) were 0.69, 0.98, and 0.75, respectively, demonstrating moderate to excellent reliability.

Landis & Koch's Benchmark Scale  
(Wongpakaran et al., 2013)

0.00-0.20: Slight agreement

0.21-0.40: Fair agreement

0.41-0.60: Moderate agreement

0.61-0.80: Substantial agreement

0.81-1.00: Almost perfect agreement

# RELIABILITY RESULTS

Phase	Video	Gwet's AC	95% CI	Absolute Agreement	95% CI	Mean Score	95% CI	Mean Score CV (%)
Pre								
	Video 1 n=14	0.8187	0.703,0.934	0.8484673	0.777295594639946 - 0.919639049663119	17.28571	18.4844982570964 - 14.3159199518264	12.09856
	Video 2 n=12	0.59796	0.46,0.736	0.7204545	0.60119949555378 - 0.839709595355311	3.75	6.13563950374095 - 0.803427847611455	101.145
	Video 3 n=12	0.51781	0.292 - 0.744	0.7090909	0.619291224183795 - 0.798890593998024	12.36364	10.4113527754464 - 14.3159199518264	23.79446
Post								
	Video 1 n=11	0.90735	0.823,0.992	0.9157895	0.860256933383188 - 0.971322013985233	18.09091	19.0505049102828 - 14.3159199518264	7.992952
	Video 2 n=10	0.64843	0.496 - 0.801	0.7544444	0.60465712213887 - 0.904231766750019	3.7	6.51937592655537 - 14.3159199518264	108.1456
	Video 3 n=11	0.66804	0.432 - 0.904	0.7796791	0.720661900399599 - 0.838696388370455	13.36364	14.9135234309608 - 14.3159199518264	17.47651



# Current activities to further establish reliability



**Interprofessional patient team rounds in the clinical/hospital setting**



**Interprofessional ethical case studies**



**Interprofessional emergency simulation scenarios**

# BENEFITS FOR EVALUATORS



## Adaptability

- Can use in both didactic and clinical settings; virtual or in-person
- Evaluators can adapt C-ICE 2.0 based on activity



## Ease of Use

- Easy scoring: 0 – 1 or N/A; less risk of variability among evaluators
- Easy to follow and complete



## Time Commitment

- Training and resources available
- Evaluators can quickly score while continuing to monitor/observe

# Required Training

1

Explanation of the purpose of the instrument

2

Scoring procedures

3

Intent of each item

4

Agreement among evaluators on expected behaviors required to achieve competency on each item

5

Use worksheet to help guide agreement on items

# Worksheet Example

## Creighton Interprofessional Collaborative Evaluation (C-ICE) 2.0 Instrument Worksheet

\*For the key section, list how many behaviors/items the team must complete for each sub-competency to earn a “1” (i.e., must complete 2 out of 3 items to earn a 1, etc.)

\*\*Can put additional lines under each sub competency to add more behaviors/items

### Values and Ethics

Validate patients' right to make their own health care decisions (references patient's perspective and autonomy)

- 
- 

Key:

Identifies factors influencing the health status of the patient (verbalizes factors)

- 
-

# Worksheet Example

## Values and Ethics



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**Validate patients' right to make their own health care decisions (references patient's perspective and autonomy)**

- Team references that the patient wishes to go on palliative care and stop aggressive treatment

Key: 0=0; 1=1

---

**Identifies factors influencing the health status of the patient (verbalizes factors)**

- Team identifies that patient has multiple chronic illnesses (heart failure, osteoarthritis, depression)
- Team identifies that patient is exhausted physically and emotionally

Key: 0-1=0; 2=1

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**Addresses health equity of patient-specific circumstances into care planning**

- Addresses that daughter of patient has concerns about palliative care transitioning due to religious beliefs at the end of life

Key: 0=0; 1=1

---

**Identifies team goals for the patient**

- Team goal is to make patient comfortable and honor his wishes for care
- Have a family meeting so that all family members and healthcare team are on the same page\*

Key: 0-1=0; 2=1

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**Prioritizes goals focused on improving health outcomes**

- Team prioritizes patient's goal of transitioning to palliative care\*
- Team prioritizes altering medications to provide pain relief and anxiety relief
- Team prioritizes the goal that physical therapy will be for comfort, not rehabilitation

Key: 0-1=0; 2-3=1

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# C-ICE 2.0

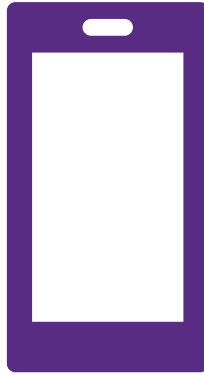
Creighton Interprofessional Collaborative Evaluation (C-ICE) 2.0				
Team Participants:	0= Below acceptable threshold of competency 1= Meets minimum acceptable threshold of competency N/A= Not applicable			Date:
Activity Title:	*After initial usage, patient/client can be used interchangeable as needed depending on the setting or population			
			Circle Appropriate Score for all Applicable Criteria	COMMENTS
<b>Values and Ethics</b>				
<i>Exemplifies person-centered care (i.e. patient dignity, confidentiality, diversity, etc.).</i>				
1. Involves patient/client* as a member of the health care team including goal development (acknowledges solicits information and listens to patient, NA if patient not present)	0	1	NA	
2. Validate patients' right to make their own health care decisions (references patient's perspective and autonomy)	0	1	NA	
3. Identifies factors influencing health status of the patient (verbalizes factors)	0	1	NA	
4. Integrates health equity of patient specific circumstances into care planning (i.e. transportation, medication costs, religious or cultural practices)	0	1	NA	
<i>Demonstrates the delivery of team-based care.</i>				
5. Identifies team goals for the patient	0	1	NA	
6. Prioritizes goals with team and patient focused on improving health outcomes. (NA if only one goal established)	0	1	NA	
<b>TOTAL VALUES AND ETHICS SCORE:</b>				
<b>Roles and Responsibilities</b>				
<i>Respects and incorporates the roles, responsibilities, and expertise of team members to meet health outcomes.</i>				
7. Verbalizes discipline specific role to patient (introduces self/role)	0	1	NA	
8. Offers to seek guidance from colleague of the same discipline with uncertainty about own knowledge, skills, and/or abilities (NA if not necessary)	0	1	NA	



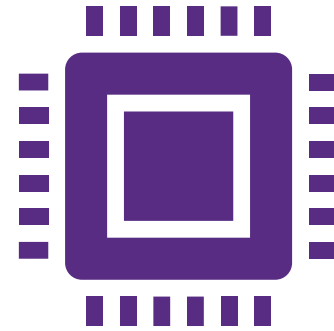
**QR code links  
to C-ICE 2.0  
Training and  
Resources**



# NEXT STEPS.....



User friendly mobile app development



AI chatbot integration into the mobile app that provides feedback to interprofessional teams based on the items on the C-ICE 2.0

# Conclusion

The C-ICE 2.0 provides a robust instrument for assessing interprofessional team behaviors, ensuring alignment with the 2023 IPEC competencies. Its application in clinical and simulated settings allows for the evaluation of critical skills such as communication and teamwork.

Initial findings suggest strong validity and reliability, highlighting its potential to advance IPE and practice by fostering effective teamwork and improving patient outcomes.

Future research will explore how the C-ICE 2.0 can be adapted for diverse healthcare disciplines and settings.

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BCB-PMD, FNAP

# References

- Almoghirah, Hailah & Nazar, Hamde & Illing, Jan. (2021). Assessment tools in pre-licensure interprofessional education: A systematic review, quality appraisal and narrative synthesis. *Medical Education*. 55. 10.1111/medu.14453 Interprofessional Education Collaborative.
- IPEC Core Competencies for Interprofessional Collaborative Practice: Version 3. Washington, DC (2023)
- Iverson, L., Todd, M., Ryan Haddad, A., Packard, K., Begley, K., Doll, J., Hawkins, K., Laughlin, A., Manz, J., & Wichman, C. (2018). The development of an instrument to evaluate interprofessional student team competency. *Journal of Interprofessional Care*, 32(5), 531–538. <https://doi.org/10.1080/13561820.2018.1447552>
- Kirkpatrick, D. L. (1996). Great ideas revisited: Revisiting Kirkpatrick's four-level model. *Training & Development*, 50, 54–59.
- Wongpakaran, N., Wongpakaran, T., Wedding, D., & Gwet, K. L. (2013). A comparison of Cohen's Kappa and Gwet's AC1 when calculating inter-rater reliability coefficients: a study conducted with personality disorder samples. *BMC medical research methodology*, 13, 61. <https://doi.org/10.1186/1471-2288-13-61>

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# Questions?

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