

Implementation science: Training community speech therapists to conduct evidence-based treatment for children with childhood apraxia of speech

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Community Rehabilitation Network 30th Anniversary cum The Hong Kong Society for Rehabilitation 65th Anniversary Conference

17-18 January 2025; Lee Shau Kei Lecture Hall, Centennial Campus, the University of Hong Kong

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This project is supported by Doctoral Student Clinical Research Grant provided by Apraxia Kids (US) and Faculty of Humanities, the Hong Kong Polytechnic University (HK).

Introduction

Childhood apraxia of speech (CAS)

- A neurological (motor-based) speech sound disorder
- Onset in childhood
- Acquired (known causes) or developmental (unknown causes)
- May be associated with neurodevelopmental disorders (e.g., Galactosemia, ASD) or genetic mutations (e.g., FOXP2)

Childhood apraxia of speech (CAS)

- Impaired motor planning and/or programming of speech movements, especially spatiotemporal parameters.
- Errors in speech sound production and prosody
 - Inconsistent errors in consecutive productions
 - Disrupted or lengthened co-articulatory transitions between words and syllables
 - Prosodic errors (tone errors in Cantonese)
 - Groping behaviors (searching for movements)



Assessment and treatment of CAS

- **Highly specialized**: Addressing/targeting the underlying motor deficit in CAS
 - Dynamic assessment of child's abilities (e.g., **Dynamic Evaluation of Speech Motor Skills [DEMSS]**; Strand & McCauley, 2019)
 - **Dynamic Temporal and Tactile Cueing (DTTC)** treatment (Strand, 2020)

Clinical practice of CAS in Hong Kong

- Limited evidence regarding the assessment, diagnosis, and treatment of Cantonese speakers with CAS
 - Most of the SLPs have “little” or “fair” understanding of CAS
 - No standardized assessment
 - Diagnosis mainly based on perceptual judgment
 - SLPs treat CAS using approaches that have limited evidence

Aim

- Provide intensive training to local SLPs on research-based assessment and treatment
 - Assessment protocol
 - Diagnostic criteria
 - DTTC treatment

Methods

Overview (~50 hours training)

Pre-clinical training

- 5 modules of online self-paced learning (each with a quiz)
- One-day in-person workshop
- Final quiz
- Assignment:
 - Video demonstrating DTTC techniques and DEMSS assessment
 - Completed Fidelity Rating Form
 - Self-evaluation essay

Clinical training

- CAS assessment (Cantonese & English)
- DTTC treatment
 - 12 45-min English sessions in 6 weeks
 - 12 45-min Cantonese sessions in 6 weeks

Timeline



June 2024

July 2024

August 2024

Self-
paced
online
learning

In-person
workshop

Clinical training

Start

Approximately
21 weeks

End

Self-paced online learning

Module 1	General information about CAS	1 hour	Quiz 1
Module 2	Assessment and diagnosis of CAS in English speakers	1 hour	Quiz 2
Module 3	Current assessment and diagnostic evidence of CAS in Cantonese speakers	1 hour	Quiz 3
Module 4	Treatment of CAS and DTTC treatment	1.5 hours	Quiz 4
Module 5	Ongoing DTTC treatment study in HK	1.5 hours	Quiz 5

Self-paced online learning

	Question number	Question type	Passing criteria
Quiz 1	10	T/F, MC, Short Q	100%
Quiz 2	15	MC, Short Q, Case study	80%
Quiz 3	10	MC, Multiple-answer Q, Short Q	100%
Quiz 4	10	T/F, MC, Multiple-answer Q	100%
Quiz 5	10	T/F, MC, Multiple-answer Q, Short Q	100%

One-day in-person workshop (7 hours)

	Content
1	English assessment
2	Cantonese assessment
3	DTTC – theoretical issues
4	DTTC – practical issues
5	Target selection
6	Treatment
7	Therapy planning

Final quiz

	Question number	Question type	Passing criterion
Final	10	T/F, MC, Multiple-answer Q, Short Q	100%

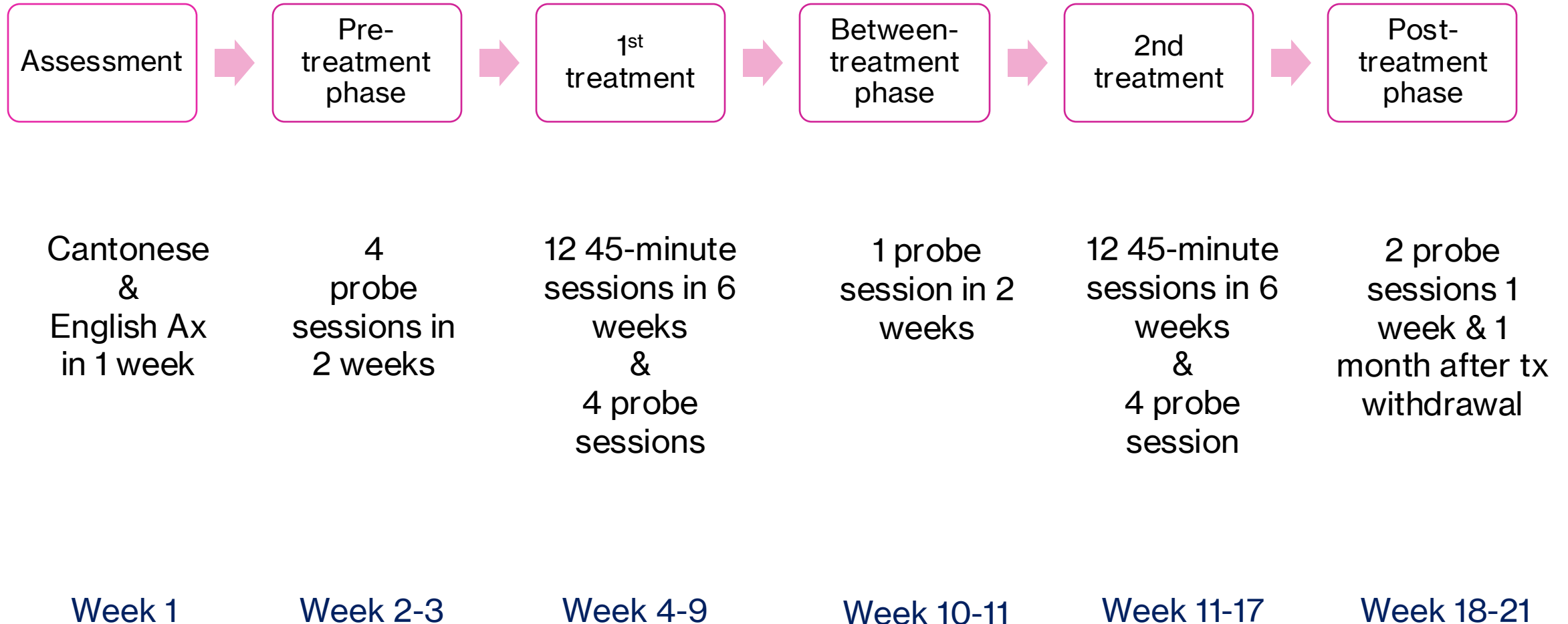
Assignments

1. A video demonstrating DTTC techniques and DEMSS assessment
2. A completed Fidelity Rating Form
3. A self-evaluation essay

PASS or FAIL (unlimited attempts are allowed)

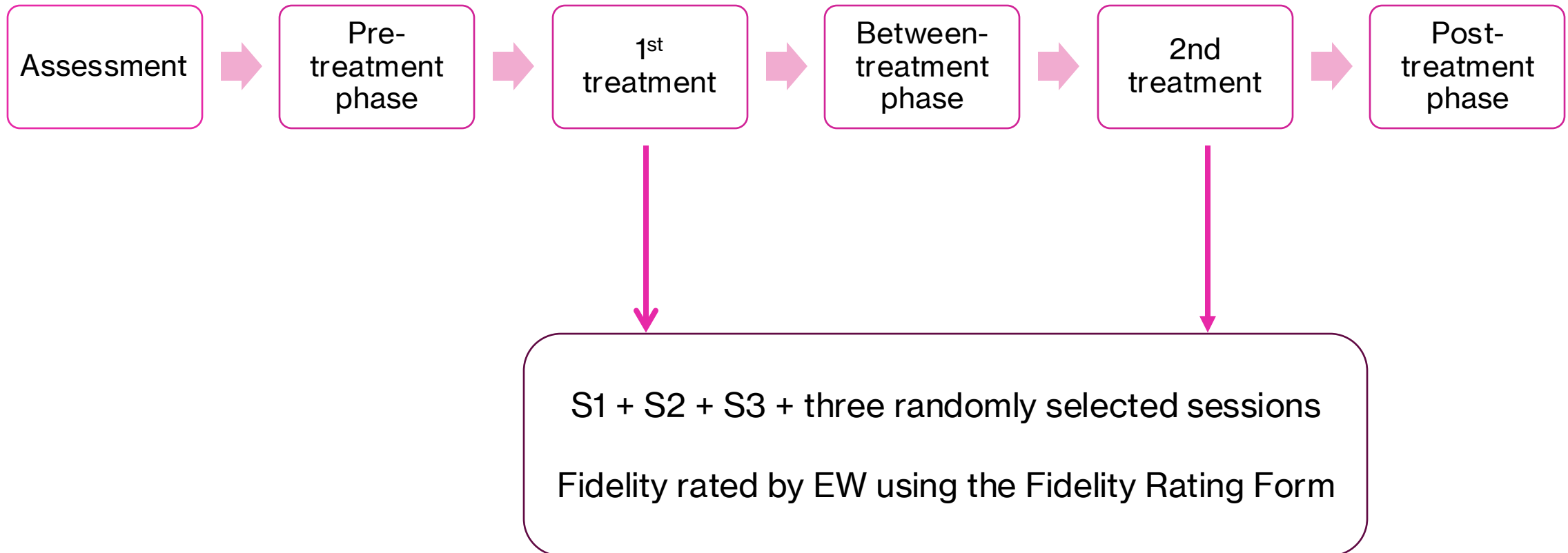
Clinicians on the research team (EW and SV) provide timely feedback to the participants

Clinical training (~30 hours clinical hours)

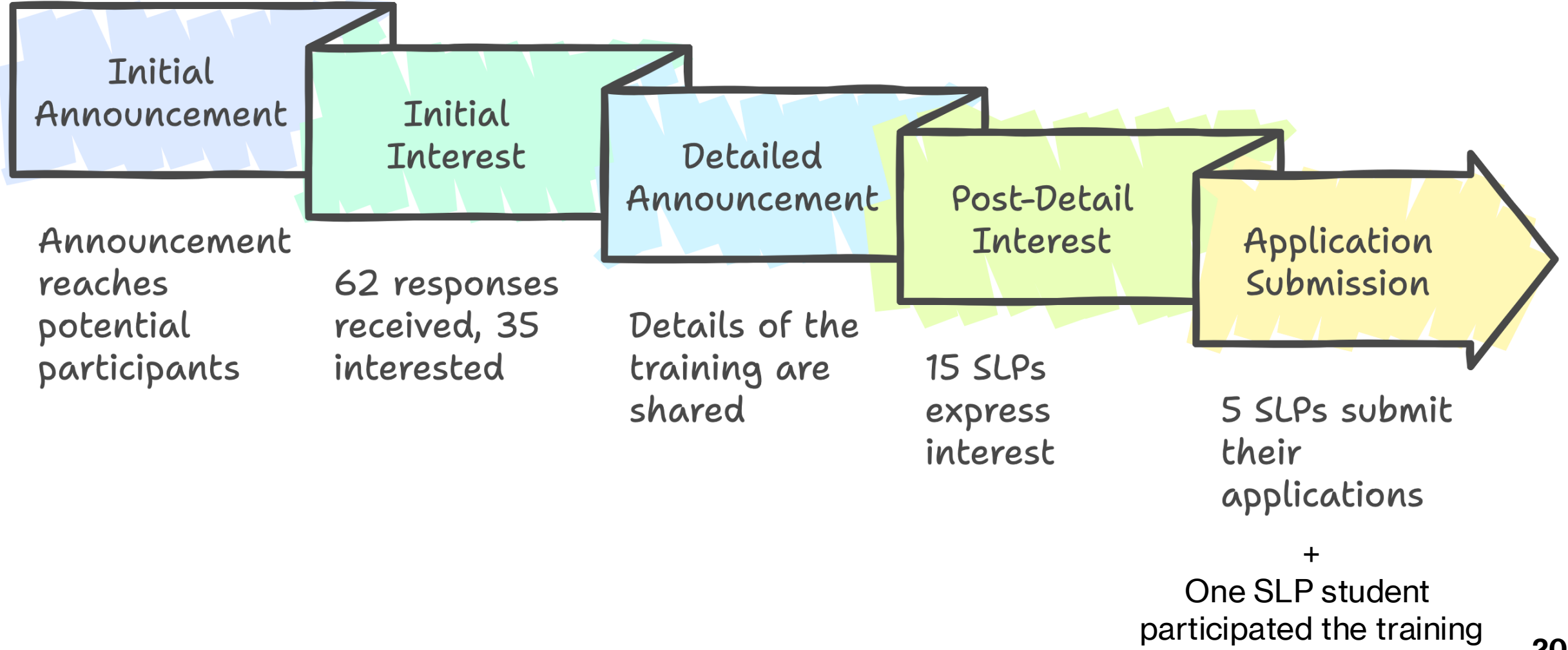


Clinical training was done in 1 master's SLP student previously

Fidelity measure



Results



+
One SLP student
participated the training

Participants

SLP	Years of clinical experience	SLP training	Previous training of CAS
SLP1	3	Master's degree	Self instruction
SLP2	3	Master's degree	CE programs
SLP3	4	Bachelor's degree	CE programs + self instruction
SLP4	2	Master's degree (overseas)	CE programs + training provided by a CAS expert in Australia
SLP5	5	Master's degree	CE programs + self instruction

Pre-clinical training

	5 Quizzes	Attempts	Final quiz	Attempts	Assignments	Attempts
SLP1	Completed	9	Pass	3	Pass	2
SLP2	Completed	10	Pass	3	Pass	1
SLP3	Completed	9	Pass	2	On-going	2
SLP4	Completed	11	Pass	3	On-going	1
SLP5	Completed	7	Pass	2	On-going	0
	Total	46	Total	13		
	Mean (SD)	9.20 (1.48)	Mean (SD)	2.60 (0.55)		

One-day workshop

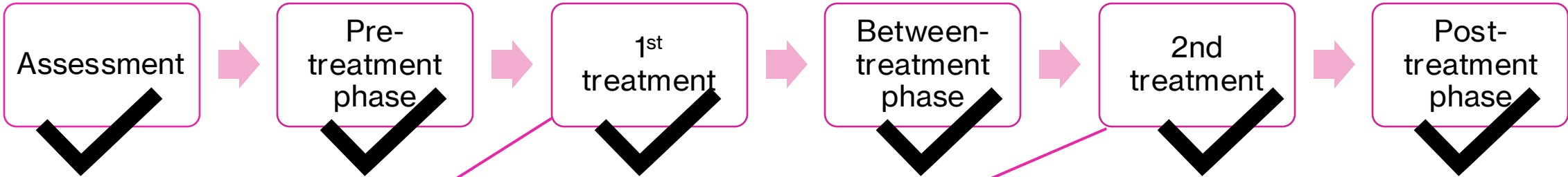
How do you rate your confidence in implementing DTTC treatment (4-point Likert Scale)?

Pre-workshop (n = 6): mean = 2.5 out of 4

Post-workshop (n = 6): mean = 3 out of 4

No statistically significant difference ($p = 0.131$)

Clinical training (SLP student)



1st treatment
General observation = 97.78%
Specific observation = 92.93%

Overall fidelity = 90.89%

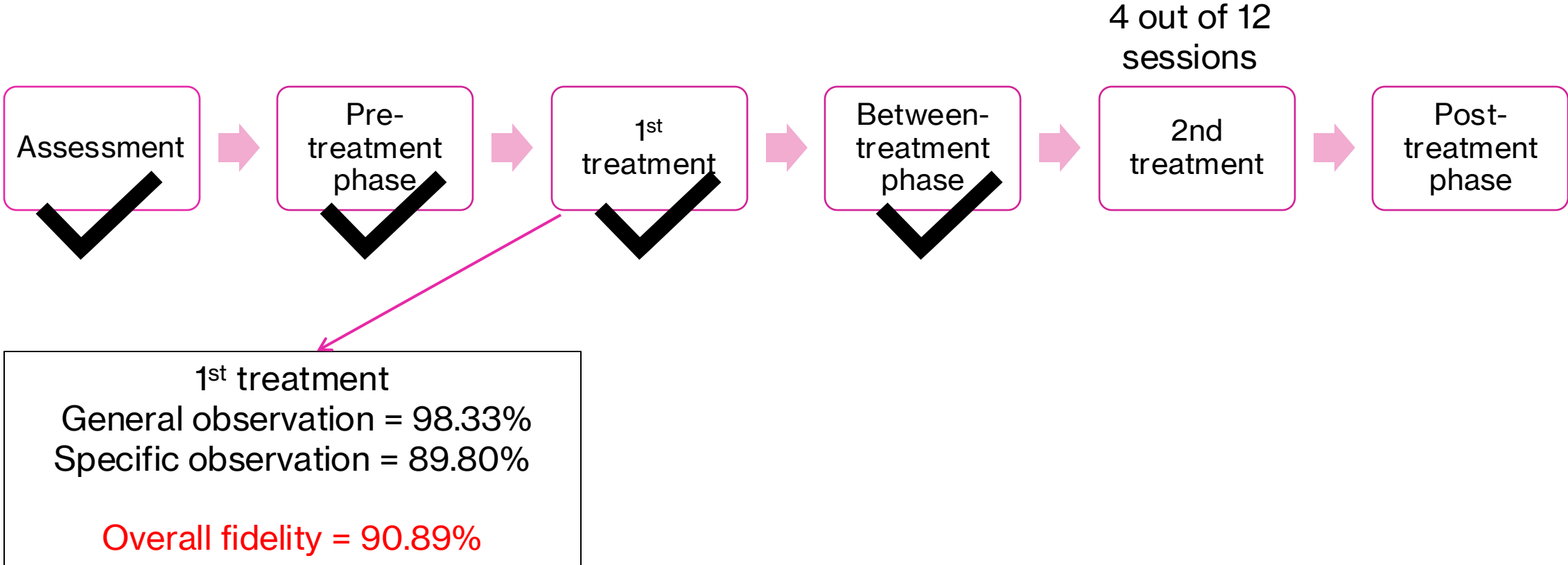
2nd treatment
General observation = 100%
Specific observation = 95.75%

Overall fidelity = 96.30%

Fidelity measures
General observation = 98.89%
Specific observation = 94.27%

Overall fidelity = 94.85%

Clinical training (SLP1)



Discussion

Discussion

- Preliminary fidelity measure (>90%) of the SLP and SLP student revealed that the training can ensure satisfactory treatment fidelity.
- Both SLP students and practicing SLPs can be trained using the same protocol.
- The training protocol (~50 hours) requires high commitment, which may be a burden to practicing SLPs.

Discussion

Pre- and post-workshop confidence ratings collected prior to the clinical training showed **no statistically significant differences**.

- A lack of confidence in implementing a highly specialized CAS treatment, even when lectures or workshops are conducted.
- Inform development of CE programs and professional-degree training.

What will happen?

- Clinical acceptability of DTTC from an SLP perspective
 - Confidence ratings after clinical training
 - Interview with the SLPs to discuss the facilitator and barrier using the Theoretical Framework of Acceptability (Sekhon et al., 2017)
 - Refine the training protocol

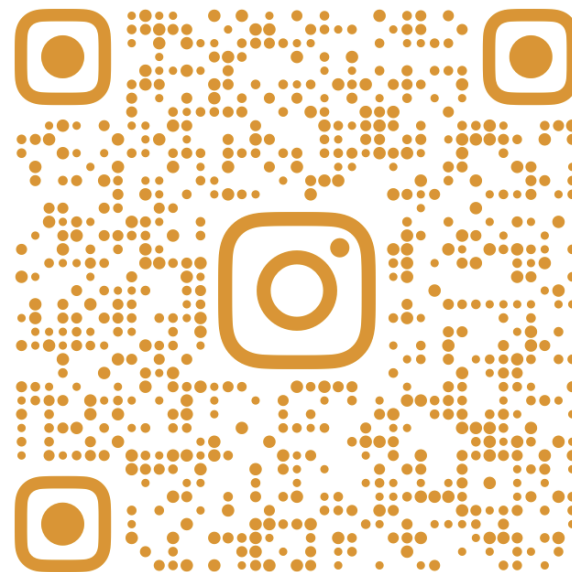
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Thank you

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IG/FB/YT: CantoneseCAS



CANTONESECAS