UTCC
**Research Institute for
Policy Evaluation & Design: RIPED**
สถาบันวิจัยเพื่อการประเมินและออกแบบนโยบาย

Heterogeneity in Technology Adoption of A Novel Early Childhood Teaching Practice

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What are we trying to do?

- This paper uses the RIECE Thailand project as a laboratory to study the adoption of a process technology, called HighScope.

- We would like to understand intangible process technology adoption decision.

- To improve the lives of the majority, more attention should also be paid to promote high-fidelity adoption of an effective existing technology.

What is RIECE Thailand?

- RIECE Thailand promotes an early childhood teaching method called HighScope in Maha Sarakham and Kalasin provinces.

- There were 25 Tambons and 51 Childcare Centers in 2015.
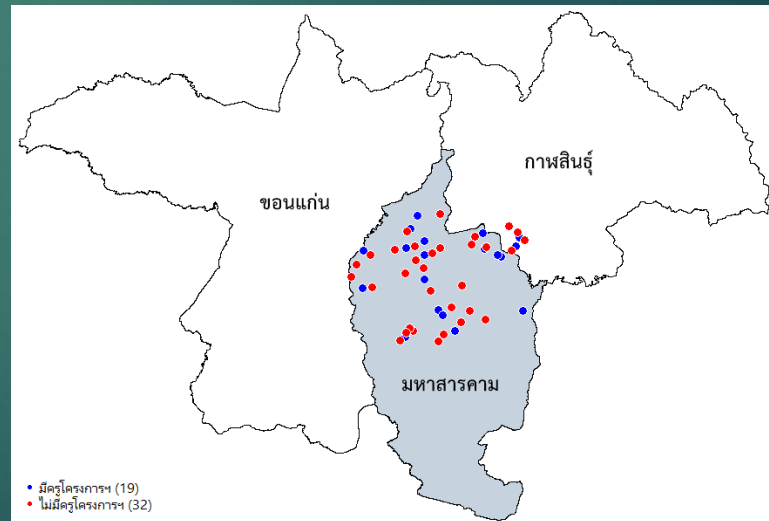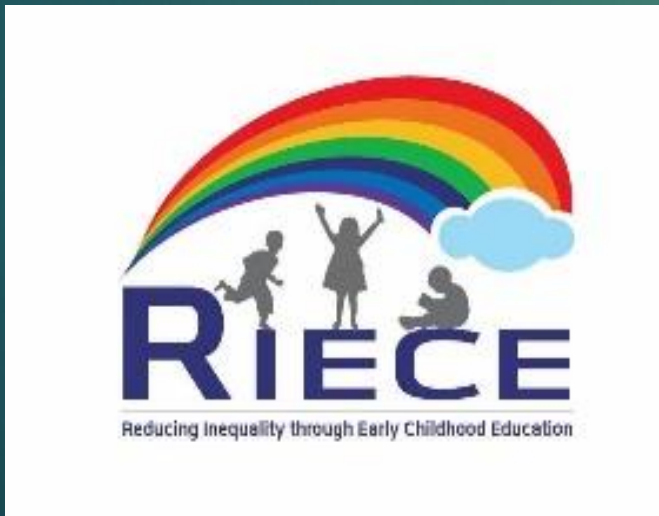
HighScope as a Process Technology

- HighScope is the curriculum for the Perry Preschool Project, whose benefit to cost ratio is more than 7:1 (Heckman, et. al. (2010)).
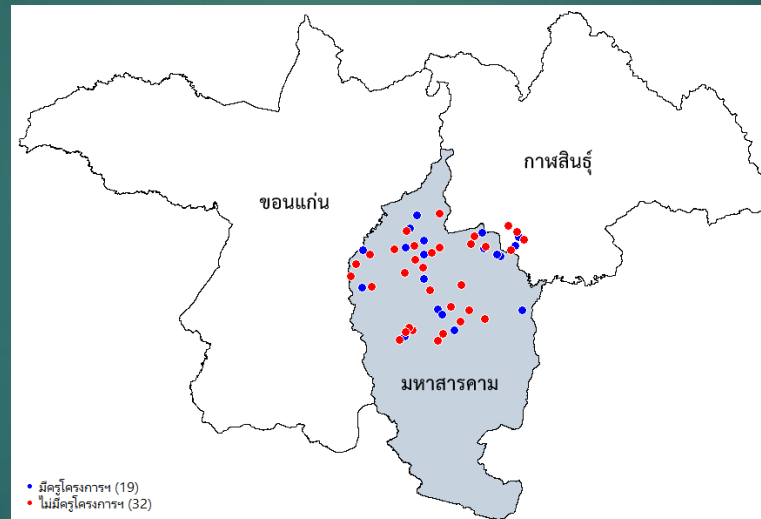- Core teaching process of HighScope is PLAN-DO-REVIEW (PDR).

PLAN   DO   REVIEW

RIECE Teachers as Technology Transfer

▶ In 2015, RIECE Thailand **randomly** assign 19 to **co-teach** in 19 out of 51 centers.

Heterogeneity in HighScope Adoption

- During the first year (2015), there are
    - 80% of local teachers claimed that they had adopted the PDR process.
    - 8% were high-fidelity adopters (with high quality teaching).
    - Question: why some adopted while the others did not?

An Economic Model of HighScope Adoption

- The main cost for teacher is **disutility of effort**.
- A teacher simultaneously chooses her effort and teaching technology to maximize her utility.
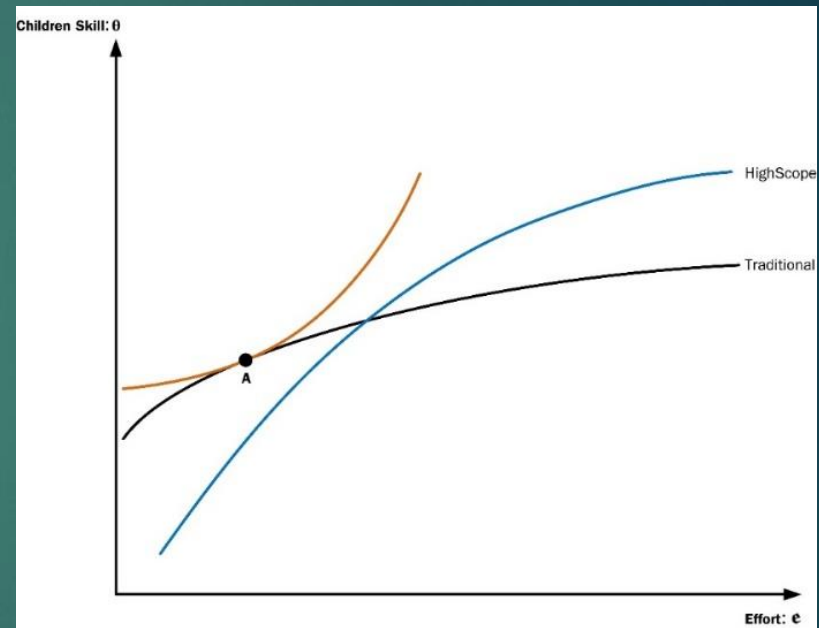
$$max_{f\ or\ h}\{max_e U(e, f(e, A, m), B), max_e U(e, h(e, A, m), B)\}$$

Data and Econometric Specification

- Adoption Measures:

  - **PDR adoption**: we simply asked each teacher if she has implemented the **Plan-Do-Review (PDR)** in her classroom. The answer here is yes or no.

  - **High-Quality or High-Fidelity adoption**: Two academic personnel evaluated each teacher based on the quality of the PDR and other key activities.

  - Econometric Specification:

  $$y_i = \beta X_i + \varepsilon_i$$

  - For PDR adoption which is a binary variable, we use Probit.

  - For the teaching quality, we use standard Ordinary Least Square (OLS).

Technology Transfers through RIECE Teachers

- **Technology transfers through regular and intensive interactions** between RIECE and local teachers increase the likelihood to have high-fidelity adoption.

	PDR Adoption		Teaching Quality	
	(1)	(2)	(3)	(4)
on-site training ratio	0.0340***	0.0572***	0.0144	0.0128
	(0.0118)	(0.0156)	(0.00974)	(0.0122)
Riece teacher dummy	**1.092****	**1.929*****	**0.870****	**1.038****
	(0.444)	(0.600)	(0.379)	(0.504)
earlychild degree	0.376	0.410	-0.0807	-0.149
	(0.370)	(0.515)	(0.340)	(0.403)
having bonus in 2014		-0.596		0.102
		(0.533)		(0.454)
teacher indebtedness		0.117		0.0250
		(0.184)		(0.184)
teacher attitude		-0.208		-0.112
		(0.291)		(0.218)
local tie		0.213		-0.536
		(0.514)		(0.517)
being civil-service		-0.408		-0.0327
		(0.423)		(0.402)
Observations	105	81	89	71

An Onsite Training as Technology Transfer

- But the on-site training **affects only PDR adoption not the high-quality.**
- Key problem is the quality control:
  - The training was organized in 14 centers.
  - Most of the trainees were left with the local teachers and our young RIECE teachers.
- Potential Solution: an on-site training program with an **intensive support from our academic personnel** and **more hands-on teaching experiences**.

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Many Common Beliefs Does Not Seem To Matter

- **Early Childhood Education Degree is not significant, at best is negative.**
  - **Effort and incentives are more important than qualification.**
  - Or part-time teacher training (most of them) is ineffective.

- Current **bonus system** is not effective.
  - **No good evaluation system.**

- **Teacher indebtedness** does not matter.

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Many Common Beliefs Does Not Seem To Matter

- **Teacher attitude** toward being an early childhood teacher is not significant:
  - at best is negative.
- **Local tie** to the community is not significant:
  - at best is negative.
- **Job security** of the teachers does not help:
  - at best is negative to the adoption.
  - Consistent with the literature on contract teachers (e.g., Atherton and Kingdon (2010), Duflo, Dupas, and Kremer (2015), and Muralidharan and Sundararaman (2013), suggesting that **effort and incentives are more important than qualification**.

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Qualitative Analysis

High-fidelity Adoption

Interaction

Objective implementation

Classroom environment

Low-fidelity Adoption

Interaction

*Objective implementation*

Classroom environment

RIECE Thailand (fieldwork observation, 2016-2017)

- **Heterogeneity** in adoption
- Some adopted wholly, while some adopted partially.
- Complemented with RIECE's evaluation (rating 'A' to 'D')
  - 3 main criteria:
    - ➢ Consistent and purposeful implementation of essential teaching practices e.g., Plan-Do-Review and children's book borrowing scheme
    - ➢ Classroom environment
   - ➢ Outcomes in children's skills

Bar chart — No. of schools:
- A: 1
- B+: 3
- B: 14
- C+: 7
- C: 10
- D: 11
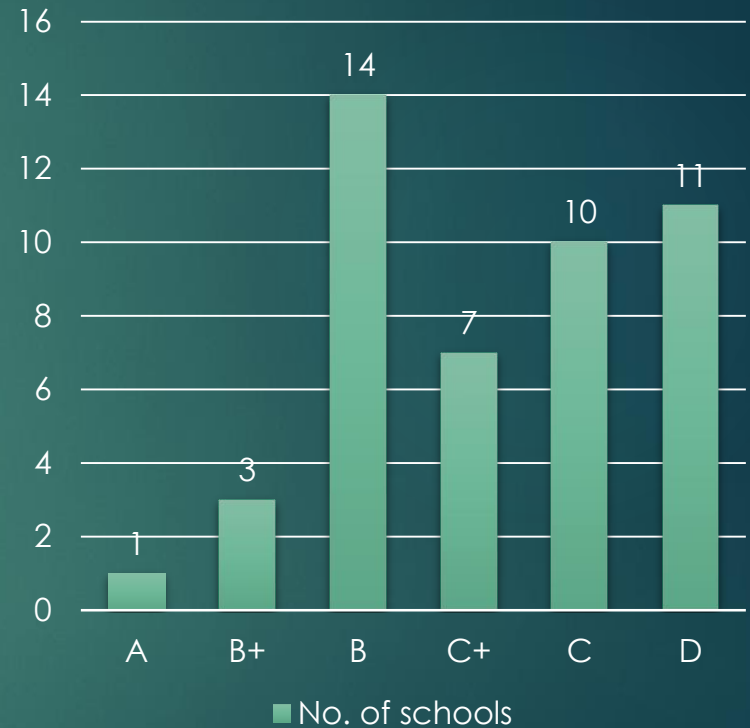
Data Collection (from 2016 to 2017)

Sources of data	Types of data
Interviews (with adopters and stakeholders)	1) **Teachers** 2) **RIECE teachers** 3) **SAOs**
Interviews (with the change agent)	1) **RIECE's Nited team** 2) **RIECE staff**
Interviews (with other stakeholders)	1) Parents 2) Experts in the field
Participant observation	1) **Preschools** 2) **In the head office, Bangkok**
RIECE's archives	1) Video recording teachers' activities 2) Video recording Nited team's training 3) Audio recording RIECE's meeting
Document (RIECE)	1) RIECE's internal document 2) RIECE's marketing document
Public documents	News about early childhood education and childcare centers

Interview Data

Interviewees	Total	Interview	
		Number	Duration (min)
SAO chief executives	21	9	236.83
SAO education officers	40	5	123.64
Local teachers	120	37	683.72
RIECE teachers	20	8	192.87
RIECE team members	7	2	65.64
Total		61	1302.7

Framework for High-fidelity Adoption
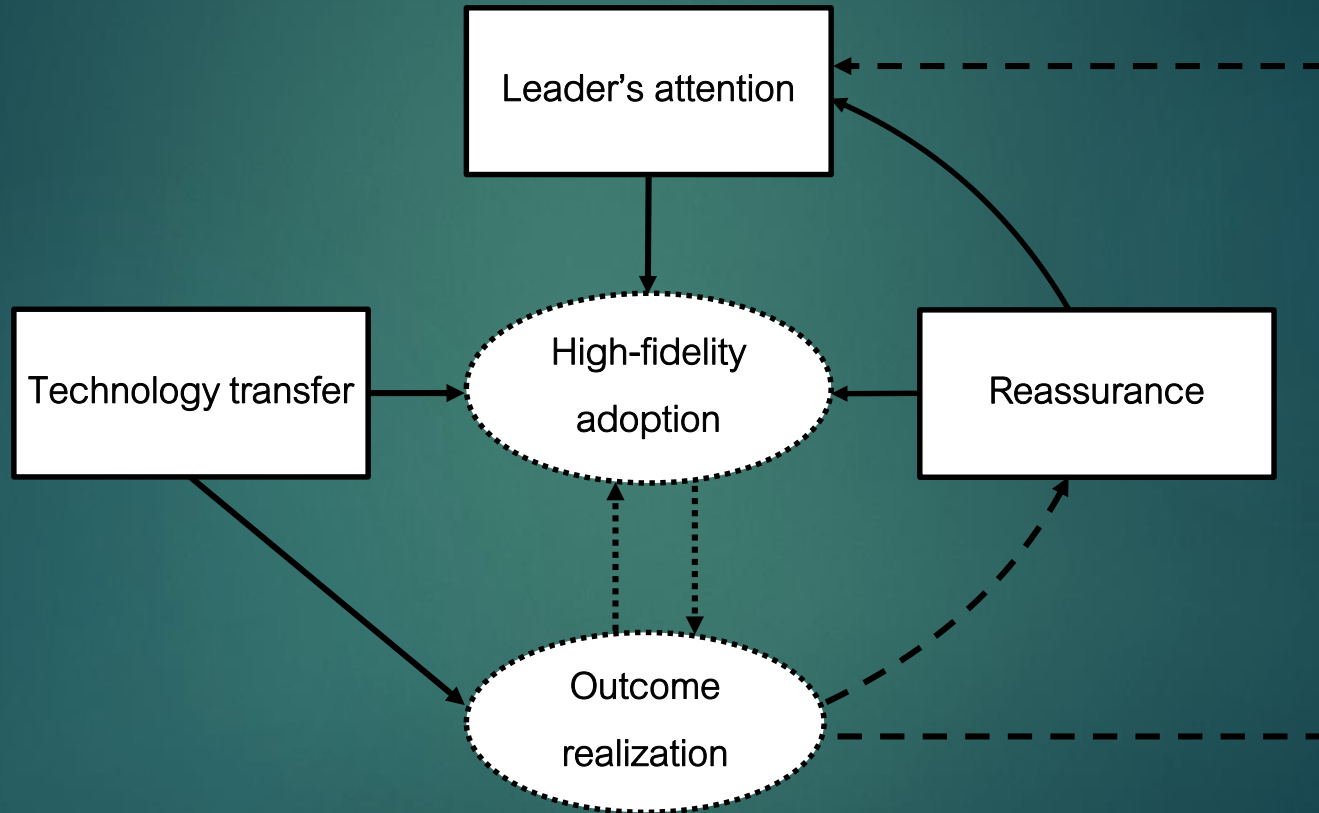
Conclusion and Implications

- Both qualitative and quantitative found that **co-teaching by RIECE teachers** is an effective technology transfer.
- High-fidelity adoption needs co-existence of three factors: **technology transfer**, **reassurance**, and **leader's attention**.
- To improve the lives of the majority, it is not only about creation of an effective technology, but more attention should also be paid to **promote high-fidelity adoption of an effective existing technology**.