

Lesson Study incorporating Open Approach:

Two practices in Community of Practices to improve Quality of Classroom

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Dujiangyan Dam, Chengdu, Sichuan





Mount Qingcheng and the Dujiangyan Irrigation System

Construction of the Dujiangyan irrigation system began in the 3rd century B.C. This system still controls the waters of the Minjiang River and

distributes it to the fertile farmland of the Chengdu plains.



Mount Qingcheng and the Dujiangyan Irrigation System

Mount Qingcheng was the birthplace of Taoism, which is celebrated in a series of ancient temples.







安澜桥

AnLan Bridge 안 란 교 安 瀾 橋, AnLan Briücke

横跨内外江,全长261米。古名"珠浦桥"宋代重建,名"评事桥",明末毁于战火。清嘉庆八年(公元1803年),邑人何先德夫妇倡议重建。桥成,两岸行人狂澜安渡,更名"安澜桥",时人也称"未妻桥"。

The bridge is 261 metres long across both the inner river and the outer river. It was called Zhupu Bridge in ancient times and was rebuiltin the Song Dynasty and called Pingshi Bridege, in the late Ming Dynasty (1368-1644), it was burned in a war. In the 8th year of Jiaqing Reign(1803 A.D.) Of the Qing Dynasty, He Xiande, a native, and his wife proposed rebuilding it and as a result the people on both banks could cross the raging waves in safety, hence is was called Anlan Bridge and also called Couple Bridge at that time.

길이가261미터로서명나라말기에훼손되였다. 기 원1803년에 하선덕부부의 창도학에 다시 세웠으며 당시 "부부교"라고도불리웠다.

全長は261メートルで、明の末期に壊された。西暦1803年、邑人何先徳夫婦の根照で修復された。

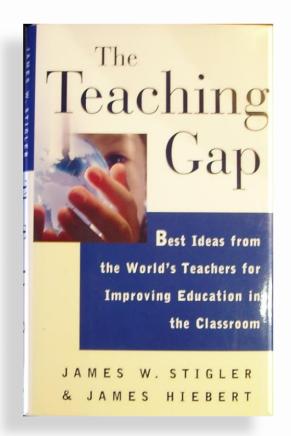
261Meters lang, zerstört em Ende der Ming-Dynastie, wurde in 1803 unter der Volschag des Ehepaar He Xlande winder aufge-baut,nach der Fertigestellung erhielt sie den Namen "Ehepaar Brüche" um dem Paar zu gedenken. Anlan bridge



What I have learned from this world heritage? Creation or Design and dedication values for community We want this kind of "Education"

The term "lesson study" is first used by Lewis and Tsuchida (1997) for the Japanese "Jugyo Kenkyu" and

became popular word when Stigler and Hiebert (1999) used in "Teaching Gap."



の童見枝學小波穗縣圖画 (高四男)

Figure 1: Students' studying at Honami Elementary School (1909) (Source: "Fukuoka ken Honami Shōgakkō jidō no jishū" 福岡県穂波小学校児童の自修, *Kyōiku jikkenkai* 教育実験界 23:4, 1909).

 First developed as an educational practice in the Meiji period of Japan, **Lesson Study** functions as a means of enabling teachers to develop and study their own teaching practices. (Takuya Baba, 2007)



Figure 2: Moral Education Class at Kijō Elementary School (1910) (Source: Kijō Elementary School Archive, used with permission).



Figure 2. 'Reform the Methods of Teaching' (1883)

習學術算の頃の四尋

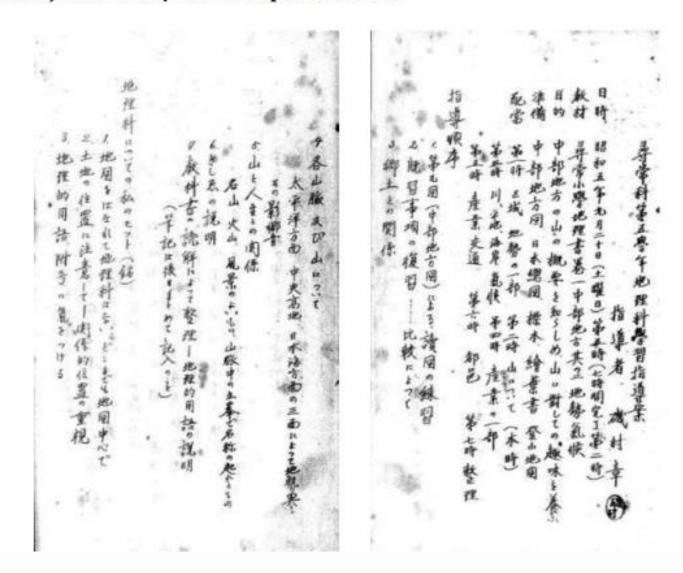


ずでのるす價評を短問てい傑を會表發らかれこでみこさたけ揚に面側び及面正の室教をのもたし書板を題間發自

Figure 3. Problem Posing Approach by Jingo Shimizu (1924)

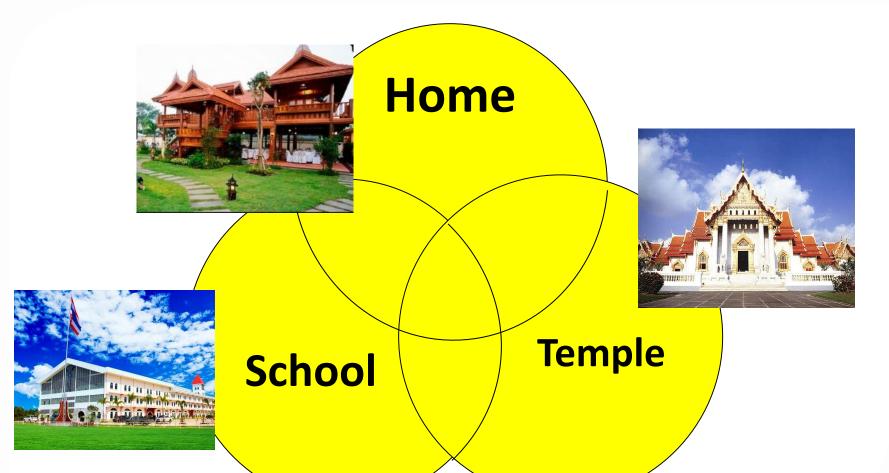
(Isoda, 2010)

Appendix A: Unit Lesson Plan of 5th Grade Geography Classroom Lessons for Lesson Study at Kijō Elementary School (September 1930)



BOR WORN

Home, Temple and School (HTS) Organization: The Learning Organization in the Communities of Thailand



Wat Mahannapharam School

Established 1884. King Rama V

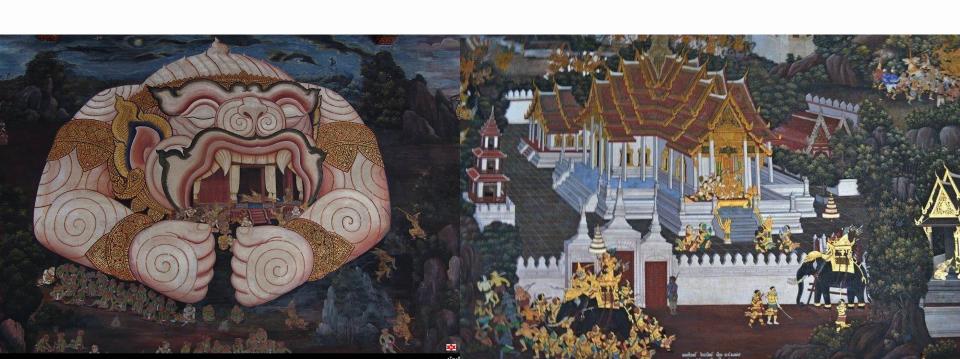








These craft works originated by a variety of communities of practices



Thai Society has become realized that we were blind sight and has been trying to bring our spirit back to this society.

School education is one among other things of the blind sight.

Thus, I personally started the 30 years project of school education reform.

Since 2001, the year that I completed my Ph.D. from the University of Tsukuba, where I used to study for 8 years. And a number of my friends and teachers during those time are being here to support me in this long-term projects



Today, it is 15 years, half of this long journey and I am very happy to take this chance to looking back

What I have done during this 15 years

What I have learned?

What I have learned from this long experience is that if we want someone to learn something, create a community for them to participate/engage in.

To me,

the idea of Community of Practice (COP) put by Lave and Wenger (1981, 1991) is very useful, practical, and appropriate for creating

"a new model for teacher education program in 2004".

Lave, J. and Wenger, E. (1991) Wenger, E. (1998)

What kinds of "Practices" we need for.....

Certainly, on the one hand an answer is "Classroom Teaching Practice (CTP)"

BUT

This is not enough.

One the other hand, we need

"Another Practice"

What kinds of "Another Practice" we need...

"Another Practice" we need is the one to improve "Classroom Teaching Practice"

To me, this one, for most of the teachers, rarely think about it.

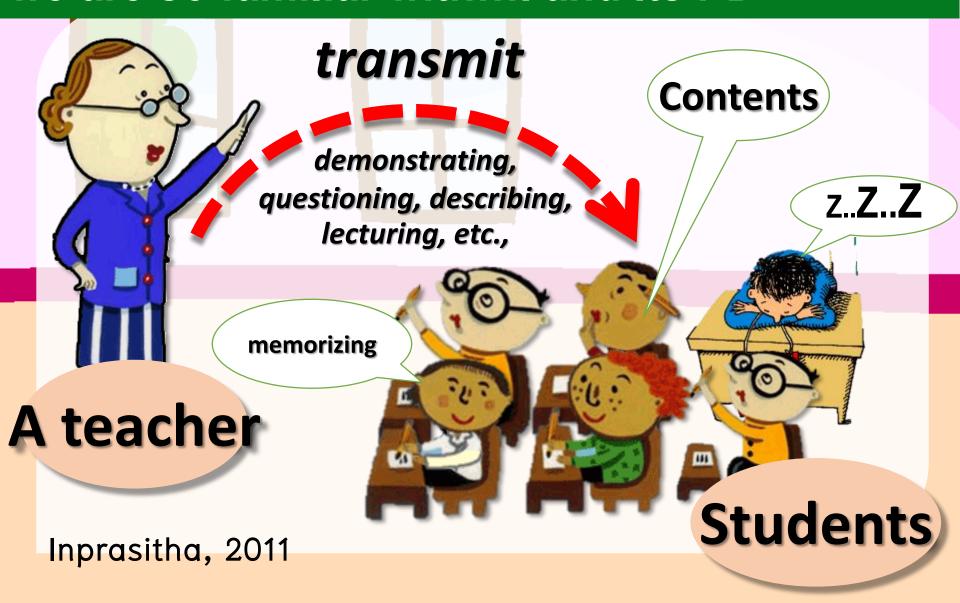
Can you imagine it? Yes, it is "Professional Development."

So, what does a model for these two practices look like?

Classroom Teaching Practice:
Teaching Mathematics in a
traditional way

To improve the classroom teaching practice by PD type such as a sort of short course training

An Example: A traditional teaching approach we are so familiar with.... and Its PD



However, what if, these two practices are not what we are looking for **BUT** still being practiced by the teachers?

Collapse of Traditional Teaching





In Thailand, (Inprasitha, 2006)

Collapse of Traditional Teaching



In Korea



In Japan

Unfortunately,

In most countries around the globe, school teachers have been ignored to do undesirable or without any useful practices instead of encouraging them to participate in "a community of practice"

that useful for them and their students.

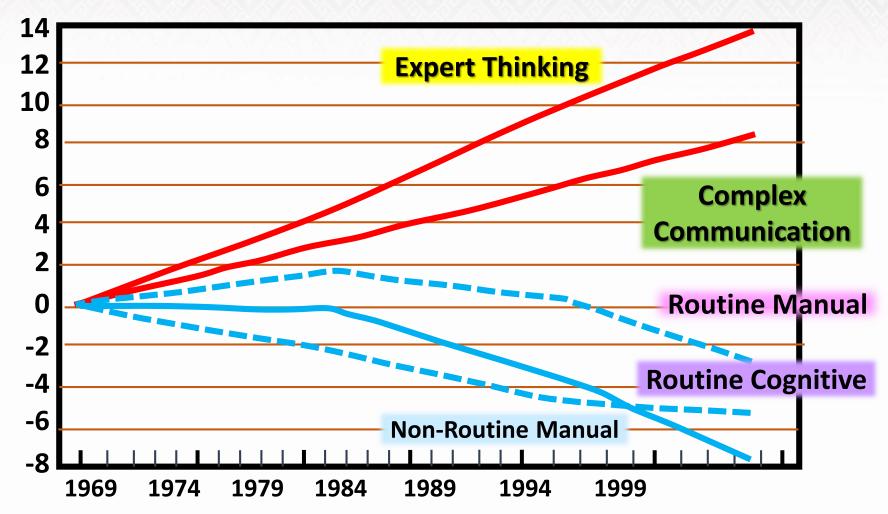
Thus, what are the problems with the above-mentioned model?

- There is a big gap between these two practices.
- Effect on each other is so "minimal"
- No regularity or continuity on these practices.
- Less obvious "community" for teachers to participate in
- •More importantly, teachers themselves are not aware of these practices as tools for their participation in the so called "Professional Development Community" or "Professional Learning Community", which we all are looking for.

Worse situation because new demanding skills for the 21st Century are......

Examples of new demanding skills such as thinking skills or communication skills to live in the 21st Century

New Demanding Skills for the 21st Century



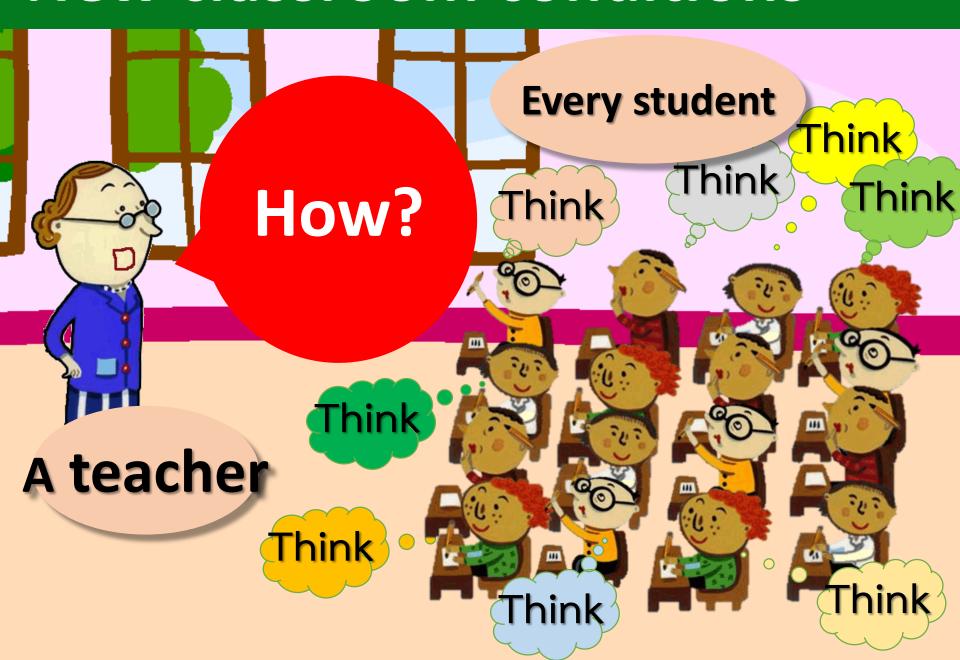
Source: Levy and Murnane (2004). **The new division of labor: How computers are creating the next job marketing.** Princeton University Press, NJ: Princeton University Press.

This graph shows the recognition of which are less demanding skills and are more demanding skills

However, in most countries around the globe still focus on the blue graph instead of red graph.

In respond to the abovementioned demanding skills, what a classroom look like?

New classroom conditions



So, How to create "new classroom teaching practice" and "the way to improve it?"

Looking back into the history should be the best choice and hopefully be useful.

Thus, while I was in Japan for more than 10 years, I then look back into the history of mathematics education in Japan and found two distiguished "developments on practices" during the four decades since 1950s

Educational values influencing Developments in Mathematics Education in Japan (1970s)

In Japan, as *Mathematical thinking* is the central issue in mathematics education since 1950s, the followings are some developments:

- Mathematical thinking first appeared in 1958 in COS (Ueda, 2013)
- Emphasizing on how to approach mathematical thinking both in 'Classroom Teaching Practice' and 'Research Practice'?

Developments in Mathematics Education in Japan (1970s)

In relation to classroom teaching practice, Open-ended Approach is developed in order to grasp and evaluate 'mathematical thinking', especially, higher-order thinking skills in mathematics.

In relation to research practice, 'Lesson Study' has been used as a tool for teachers for teacher to learn together to improve their daily teaching practices.



Endeavors in Mathematics Classroom in Japan

Mathematical thinking as a global goal of teaching mathematics from elementary school level.

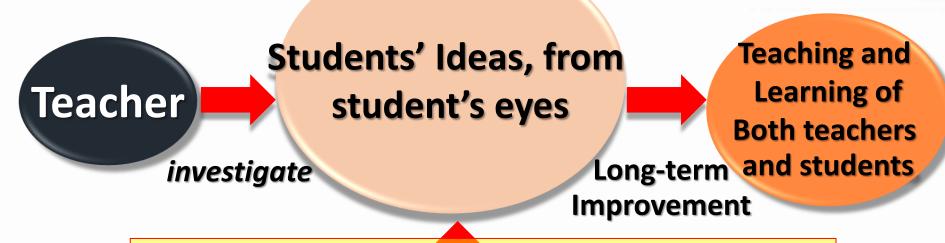
- Focusing on 'mathematical thinking' through analysis of 'classroom activity' (i.e., classroom is used as a unit of analysis)
- "Open-ended Approach' is developed as a teaching approach to engage students in mathematical thinking.

	Year	Topic of Lesson Study	
	1880s	Pestalozzi Method and Dialogue Method (including argumentation between teacher and students)	Not only limited to mathematics.
	1910 s	Mathematics for Life (including problem posing)	Not only limited to mathematics
	1930s	Curriculum Integration in Mathematics (including Open-Ended Problems)	From 1900s
	1950s	Core curriculum movement based on the social study	Under the occupation after WWII.
	1960s	Mathematical Thinking (Japanese way of New Math.)	Related with New Math
	1970s	Open-Ended Approach and Problem Solving Approach	For developing Mathematical Thinking
	1980s	Problem Solving	Related with US
1			Isada M (2010)

Enculturation of new classroom culture for every student can think by themselves.

- Focus on "ways of thinking or students' ideas?"
 by treating students' individual differences as resources for "collaborative learning"
- Reconceptualizing of time period as a tool for collective meaning of development of understanding
- Managing classroom time for all students to solve one particular problem (not many various problems) from various points of views?
- Engaging students in their own or authentic problems

New teaching Approach



Open-Ended Problem

Personal Learning

Teaching Profession (Classroom Teaching Practices)

System of Development of Teaching Profession

Development of Teaching Profession (How to improve teaching?)

Teaching Profession (Focusing on contents)

System of Development of Teaching Profession

Development of Teaching Profession (Training for improve contents)

Weekly Cycle

Teaching Profession
(Focusing on Students'
problem solving)

System of Development of Teaching Profession

Development of Teaching Profession (Lesson Study)

Four phases of Open Approach as Teaching Approach

Posing openended problem



Students' self learning through problem solving



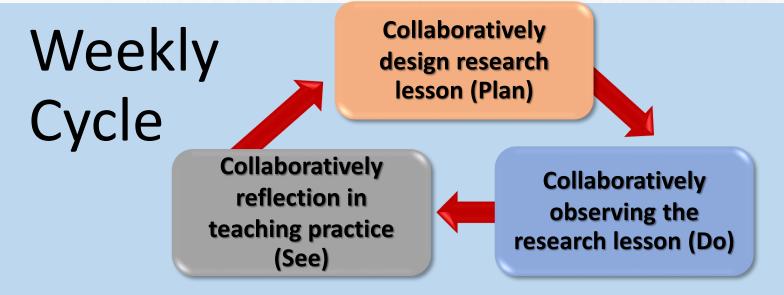
Summarization through connecting students' mathematical ideas emerged in the classroom



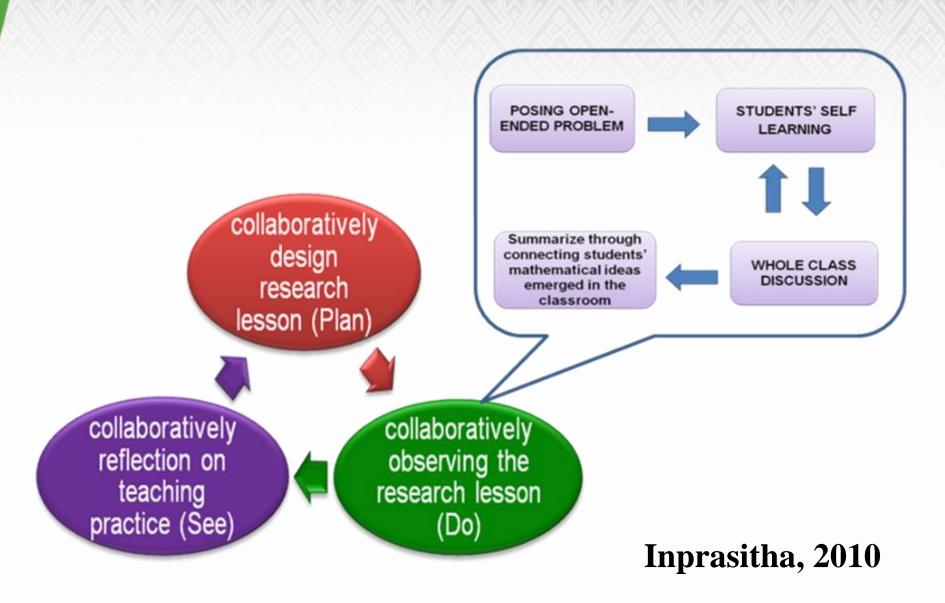
Whole class discussion and comparison

Inprasitha, 2011

Adaptive LS as a Methodology



Lesson Study as a Methodology established small partnerships among principal, teachers, graduate students





2000-2005

Introduce the first Practice

Introducing Open Approach as "mathematical activity" in terms of "Open-ended problem" with 15

student teachers

More than 800 teachers in Khon Kaen area had been trained to teaching students to think by/for themselves via solving opened-problems





Since 2006

Lesson study has been introduced into 2 project schools by incorporated into open approach.

The way Thailand supports school teachers to change the way they teach to teaching using mathematical activity based on open-ended problems has been institutionalized into Thai school culture.



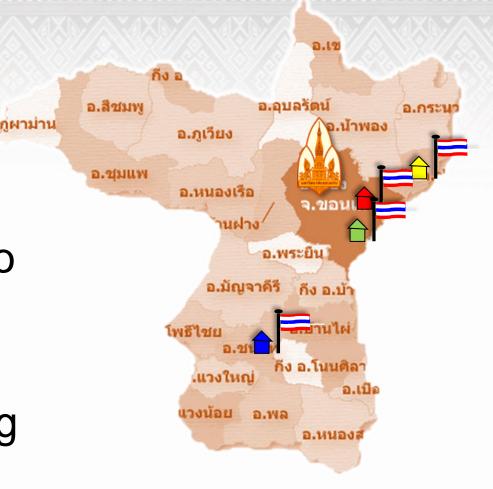
Since 2006

Thailand experiences to adapt lesson study have been shared in APEC members economy via APEC Lesson Study



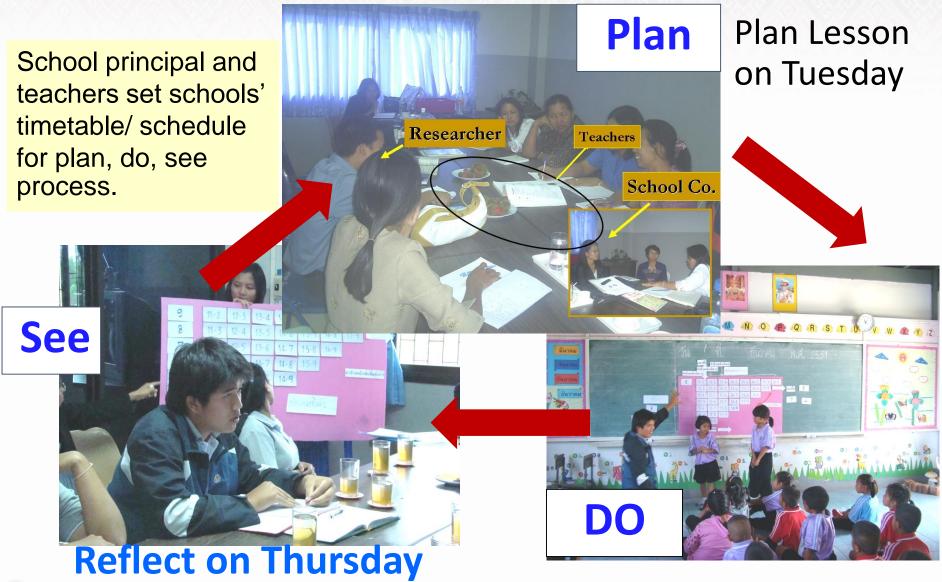
In 2007

Lesson study schools have been increased to 4 schools and started first community of lesson study by sharing experience through Open Class in the end of semester





Scenario at 1st year project school Kookhampittayasan school



Scenario at 1st year project school

Chumchonban chonnabot school



Scenario at 2nd year project school Banbuengniumbuengkrainoon school



Scenario at 2nd year project school Nongtoom Nongngooluem school



5 years later expansion 4 schools to 23 schools

expansion of implementation of LS and OA in 23 pilot schools (13 in North East area and 6 in North area of Thailand). All rights reserved by Center for Research in Mathematics Education, Khon Kaen University

2009-2012

- 1.Khon Kaen (7)
- 2.Chaiyaphum (1)
- 3. Sakhon Nakhon (1)
- 4. Ubon Ratchathani (4)
- 5.Chiang Mai (3)
- 6.Lampang (1)
- 7.Lamphun (1)
- 8.Phisanulok (1)
- 9.Kalasin (1)
- 10. Nakhon Ratchasima (1)
- **11.Susin** (1)
- **12.Bungkan** (1)





25 days for induction workshop at Kosa Hotel, Khon Kaen



In-service Teachers used Open Approach in Mathematics Classroom

2011

Expansion of Lesson Study and Open Approach in 7 pilot schools (5 in North East area and 2 in North area of Thailand) supported by CEM.



Attached School's Workshop



Workshop for using Textbook

There were 30 pilot schools participated the "Project of Professional Development by using Lesson Study and Open Approach", launching by CRME.



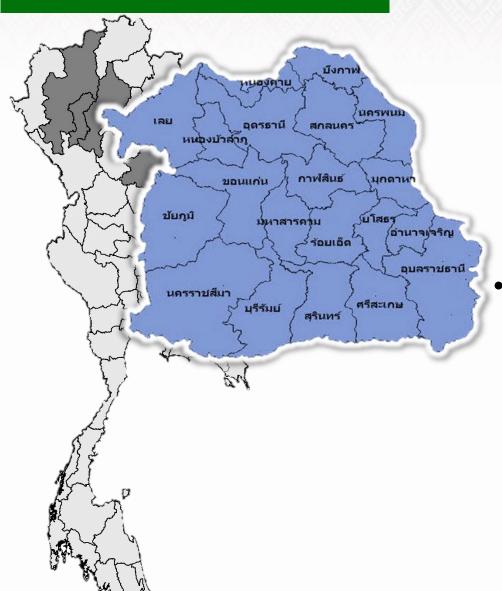






Open Class: The Activity for Expanding the Implementation of LS and OA

2013



All rights reset.

- 2013: KKU had conducting the "Project on Eliminating Education and Public Health Problems in the Isaan Region for Reducing Social Inequality".
- CRME had launching the sub project "Higherorder Thinking in Mathematics Project in Northeast (HTMP-Northeast)"

for Research in Mathematics Education, Khon Kaen University

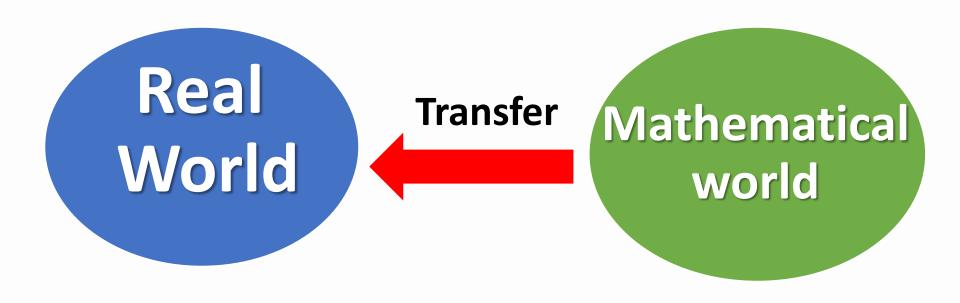
2013

50 schools from 20 provinces in North East of Thailand, participated in this project.





Theoretical Framework for design Mathematical Activities (Traditional)







- ให้นักเรียนเขียนตัวเลขฮินดูอารบิกแสดงจำนวน หนึ่ง
- ให้นักเรียนเขียนตัวเลขไทยแสดงจำนวน หนึ่ง

Real World

๑. ให้นักเรีย

Transfer

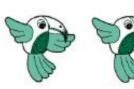
Mathematical world

ให้นักเรียนเร

๒. ให้น้ำ



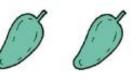












นก**สอง**ตัว

Two birds

ดันไม้สองตัน

Two trees

มะม่วง**สอง**ผล

Two mangos



ให้นักเรียนนับและบอกจำนวนของสิ่งต่อไปนี้







ให้นักเรียนบอกสิ่งต่างๆ ที่มีจำนวน สอง

การเขียนตัวเลขแสดงจำนวน สอง

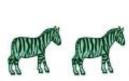
จำนวน สอง เขียนแสดงด้วยตัวเลขฮินดูอารบิก ดังนี้







จำนวน สอง เขียนแสดงด้วยตัวเลขไทย ดังนี้





รถสองคัน







- ให้นักเรียนเขียนตัวเลขฮินดูอารบิกแสดงจำนวน **สอง**
- ให้นักเรียนเขียนตัวเลขไทยแสดงจำนวน สอง





แตงโม**สาม**ผล

Three watermelons



เก้าอื้**สาม**ตัว

Three chairs

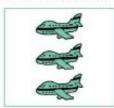
ดอกบัว**สาม**ดอก

Three lotus



ให้นักเรียนนับและบอกจำนวนของสิ่งต่อไปนี้







ให้นักเรียนบอกสิ่งต่างๆ ที่มีจำนวน **สาม**

การเขียนตัวเลขแสดงจำนวน สาม

จำนวน **สาม** เขียนแสดงด้วยตัวเลขฮินดูอารบิก ดังนี้



สาม เขียนแสดงด้วยตัวเลขไทย ดังนี้





จักรยานสามคัน







จักรยาน 3 คัน

จักรยาน ๓ คัน



- ให้นักเรียนเขียนตัวเลขฮินดูอารบิกแสดงจำนวน สาม
- ให้นักเรียนเขียนดัวเลขไทยแสดงจำนวน สาม







ไม่มีต้ม กล่าวได้ว่า มีสัมจำนวนศูนย์ผล จำนวนศูนย์เขียนแสดงด้วย ด้วเลข 0

ไม่มีนก กล่าวได้ว่า

มีนกจำนวนศูนย์ตัว จำนวนคนย์เขียนแสดงตัว

ตัวเลข 0

มีสัม 2 ผล

มีสัม**ศูนย์**ผล



มีนก 3 ตัว มีนก**ศนย์**ตัว



มีปลา 5 ตัว



มีปลา**ศูนย์**ตัว

ไม่มีปลา กล่าวได้ว่า มีปลาจำนวนศูนย์ตัว จำนวนศูนย์เขียนแสดงด้วย ตัวเลข 0

จำนวนศูนย์เขียน ตวเลข

No orange, can be ไม่มีสัม กล่า said "there is zero มีสัมจำนวนๆ orange." and Zero is denoted by 0.

ไม่มีนก กล่ มีนกจำนวน จำนวนศูนย์เขีย ตัวเลข

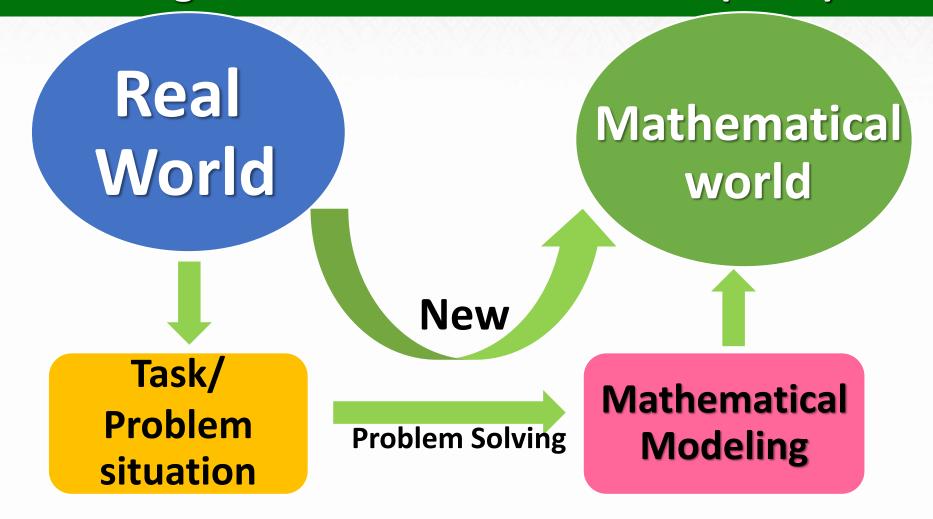
No bird, can be said "there is zero bird." and Zero is denoted by 0.

ไม่มีปลา มีปลาจำน

, No fish, can be said "there is zero fish." จำนวนศูนย์เข็ and Zero is denoted ตัวเล by 0.



Theoretical Framework For design Mathematical Activities (New)



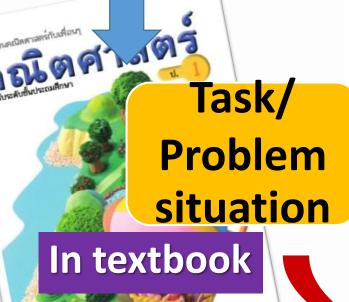




think by themselves in other fields

Such as mathematical thinking scientific thinking creative thinking

Through problem solving (OA)



10 years for adaptive innovations to improve the quality of classroom in KOOKHAM PITTAYASAN SCHOOL

KOOKHAM PITTAYASAN SCHOOL KHON

KAEN, THAILAND

















New Classroom Culture: Foundation of Change from Product Oriented Society to Product-Process Oriented Society





Open Approach and Lesson Study: Innovations for building New Classroom Culture

than KKU Festival 2015



(ฟลีติร์ล) บุญสมมาบูชาน้ำ

23-25 พฤศจิกายน ณ บริเวณบึงสีฐาน มหาวิทยาลัยขอนแก่น



























ขน 2 เวทีชลสถาน

โซน 3 ลานอมฤต โซน 4 ถนนเนรมิตวารี

25 พฤศจิกายน 58

อกแบบที่มีชื่อเสียงระดับประเทศ | คุ้มสีฐาน

ถ่าย "บุญสมมาบูชาน้ำ" | หอศิลปวัฒนธรรม

ประกวดขบวนแห่กระทง | ถนนกัลปพฤกษ์-บึงสีฐาน

การประกวดกระทง | ริมบึงสีฐาน

ี่ฐาน)

าธาตุ | พุทธศิลป์สถาน (อาคารพุทธศิลป์)

การประกวดนางนพมาศ และแฟชั่นโชว์ผ้าพื้นเมือง - เวทีกลางแจ้งหอศิลปวัฒนธรรม นกแอร์ คอนเสิร์ตส่งขึ้ม | เวทีชั่วคราวฝั่งทิศใต้ของศูนย์ประชุมอเนกประสงค์กาญจนาภิเษก

การแสดงศิลปวัฒนธรรมพื้นบ้านอีสานใต้ | เวทีริมบึงสีฐาน ฝั่งทิศตะวันตก)

พมอลำกลอนประยุกต์ โดยหมอลำจินตนา ปากไฟ | สนามหญ้าข้างหอศิลปวัฒนธรรม

ญจนาภิเษก









25 พฤศจิกายน 58

กแบบโคมไฟ และเสวนาโดยนักออกแบบที่มีชื่อเสียงระดับประเทศ | คุ้มลีฐาน

าโยง" / กิจกรรมการประกวดภาพถ่าย "บุญสมมาบูชาน้ำ" | หอศิลปวัฒนธรรม

ประกวดขบวนแห่กระทง | ถนนกัลปพฤกษ์-บึงสีฐาน การประกวดกระทง | ริมบึงสีฐาน

นหน้าหอศิลปวัฒนธรรม

มารี ครั้งที่ 8 | ลานจอดรถ (ประตูลีฐาน)

ภัตรเย็น ลักการบูชาพระบรมสารีริกธาตุ | พุทธศิลป์สถาน (อาคารพุทธศิลป์)

การประกวดนางนพมาศ และแฟชั่นโชว์ผ้าพื้นเมือง - เวทีกลางแจ้งทอศิลปวัฒนธรรม นกแอร์ คอนเสิร์ตส่งขึ้ม | เวทีชั่วคราวฝั่งทิศใต้ของศูนย์ประชุมอเนกประสงค์กาญจนาภิเษก

การแสดงศิลปวัฒนธรรมพื้นบ้านอีสานใต้ | เวทีริมบึงสีฐาน ผั้งทิศตะวันตก) ตร์ - คุ้มสีฐาน หอศิลปวัฒนธรรม หมอลำกลอนประยุกต์ โดยหมอลำจินตนา ปากไฟ | สนามหญ้าข้างหอศิลปวัฒนธรรม

เข้าม ศนย์ประชมอเนกประสงค์กาญจนาภิเษก

ฐาน (ฝั่งทิศตะวันตก)





Thank you for your attention

