Mathematics Teacher Standards and Lesson Study
How do you define good teacher?
How can we develop

Researcher is teacher.
If it is correct, how do you diffine good teacher.

Teacher is researcher.
If it is correct, how do you diffine good teacher.

Masami Isoda

PhD (Waseda U.) & h.c PhD,(Khon Kaen U)

Professor of Mathematics Education

CRICED, University of Tsukuba, Japan.

Honorary Professor,

Sets of Questions

- *What is the good teacher?*
- *Why we can say it is the definitions/ frameworks of good teacher?*
- *Why we need the regional instead of national?*
- *Why we do not discuss difference?*
- *Direction of more deeper: Elementary, Secondary, University: is it the same?*
- *Direction how to use: At pre-*

What is a good teacher?

What do you fill in?

- *Before defining the Profession and Professional Development*

A narrative by a teacher

I was appointed to be a class teacher at the fifth grade of primary school.

One of the pupils in my class was low-performing in his study, dirty and scruffy in appearance.

I always gave him low marks.

One day, I had a chance to read his report of the first grade by his class teacher. The record described that he was a cheerful, friendly and take care of others with high achievements.

I thought that it was some misunderstanding by his teacher and started to check his other records.

The report in his second-grade described that he was looking after his sick mother and it sometimes caused him to come to school late. The third grade report stated that he was full of sorrow since his mother passed away. His fourth grade reported that his father became alcoholic with grief. The report also showed the risk of violence by his father.

A narrative by a teacher(2)

At that moment, I felt great compassion and love for him. I could imagine that the boy was struggling and fighting for his life.

One day after school, I had a chance to talk with him. I told him that I would stay and work at the class room until evening and asked if he would like to study with me. The boy smiled. From that day, we started to study together.

The following year, even though I was not his class teacher anymore in his final grade, he gave me a card at the graduation ceremony. The boy said in his message that you have become another mother to me, and acknowledged with the wording: thank you for everything that you did for me.

He sent me letters occasionally since then. In one of his letters, he wrote "thanks for your support, I passed the exam for the medical college with scholarship" and in another letter, he wrote "I became a doctor as I have dreamed, now I do my best in healing and take care of the

A narrative by a teacher(4)

Recently, I received a letter from him inviting me to his wedding ceremony and asked "to sit in his mother's seat".

We do not chose the teacher as our profession but chose the life as a teacher.

Akira Moromizato, Former Director of
n Center

Why I shared this story with you at the beginning of this workshop?

What do you fill in?

Teacher Standards

- Dimension 1: Professional Knowledge
- Dimension 2: Professional Teaching and Learning Process
- Dimension 3: Personal and Professional Attributes
- Dimension 4: Professional Communities

Objectives of Mathematics Education

CRICED
University of Tsukuba

Objectives of Mathematics Education on CCRLS Framework for Mathematics by SEAMEO-RECSAM for ASEAN(2017: Dom, Isoda, Pedro, & Kimho et al.)

Mathematical Values, Attitudes and Habits for Human Character

Mathematical Values:
Generality and Expandability
Reasonableness and Harmony
Usefulness and Efficient
Simpler and Easier
Beautifulness

Mathematical Attitude attempting to:
See and think mathematically
Pose question and develop explanation such as why and when
Generalize and extend
Appreciate others' idea and change representation to conceptualize

Habits of mind for Citizen to live:
Reasonably and critically with respecting and appreciating others
Autonomously Creatively and innovatively in harmony Judiciously using tools such as ICT
Empowerly in imagining the future through lifelong learning

Appreciation

Mathematical Thinking and Processes

Mathematical Ideas for:
Set, Unit, Compare, Operate, Algorithm, Fundamental principle, and
Varied representation such as table, diagram, expressions, graph and translations.

Mathematical Thinking:
Generalization and Specialization
Extension and Integration
Inductive, Analogical and Didactical reasoning
Abstracting, Concretizing and Embodiment
Objectifying by representing and symbolizing
Relational and Functional thinking
Thinking forward and backward

Mathematical Activities for:
Problem Solving
Exploration and Inquiry
Mathematical Modeling
Conjecturing, Justifying and Proving
Conceptualization and Proceduralization
Representation and Sharing

Reflection

Content

- Numbers & Operations
- Quantity & Measurement
- Shapes, Figures and Solids
- Pattern & Data Representations

- Extension of Number and Operations
- Measurement & Relations
- Plane Figures & Space Solids
- Data Handling & Graphs

- Number & Algebra
- Space & Geometry
- Relationship & Functions
- Statistics & Probability

Acquisition

How can we develop?
Human Character,
Thinking-Process Skill,
and Knowledge

Reference

Couse of Study by MOE, JAPAN (Shimada, Kawaguchi (1987). Attitude, Way of Thinking, and Ideas in Content
Isoda & Katagiri (2012) Mathematical Thinking

What is lesson study?

Lesson study is plan, do and see activities with various groups. Through the shared knowledge, PCK has been theorized and being integrated and unified as teachers' theories for teaching mathematics..

Participating Teachers

Theories for Education

Lesson study

- Teacher
- Children
- Subject M. Theory of Mathematics

Theorization Teachers' Knowledge by PCK and MKT, However for what?

Shulman, L. S.(1986) categorized teachers' knowledge bases for necessary their teaching practice into seven categories. Pedagogical Content Knowledge (PCK) is a category which will be integrated with Content knowledge, Pedagogical knowledge, and so on in teaching context.

Shulman (1987) proposed following developmental process of PCK.

9 TEACHING FOR MATHEMATICAL PROFICIENCY

10 DEVELOPING PROFICIENCY I TEACHING MATHEMATICS

Didactical Reasoning

Comprehension

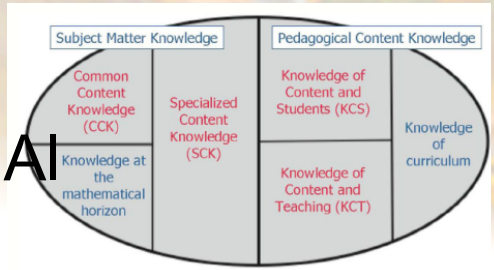
(Didactical) Transformation:
preparation, representation, selection, adaptation and tailoring

Instruction

Evaluation

Reflection

Teaching Activity



Ball, et. Al (2002)

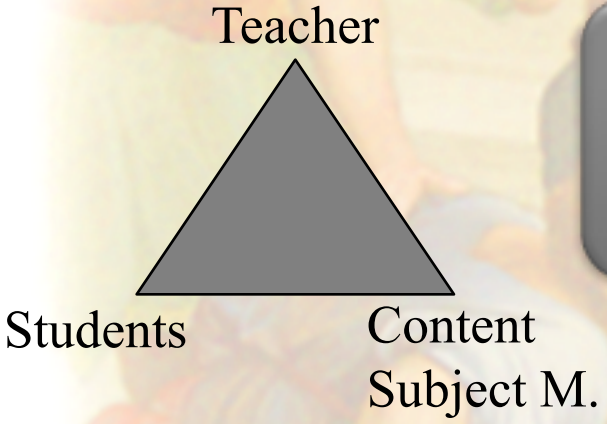
Why they focused on PCK & MKT?

For knowing objective for teaching Act.!

What activity support the finding of Ob?

Teacher Standards

- Dimension 1: Professional Knowledge
- Dimension 2: Professional Teaching and Learning Process
- Dimension 3: Personal and Professional Attributes
- Dimension 4: Professional Communities



Mathematics + Objective = Content for Teaching (Sub. M)

They should learn four dimensions through lesson study

Lesson study is learning community. What shall they learn?

The science for reproduce better practice for children.

JP Lesson Study Oriented:

- Teacher C. A.<Students C. A.<Content C. A.

JP LS based on Hermeneutics:

CRICED
University of Tsukuba

LS project for developing subject matter (1993-2004)

With technology (ICT): 1993-1998

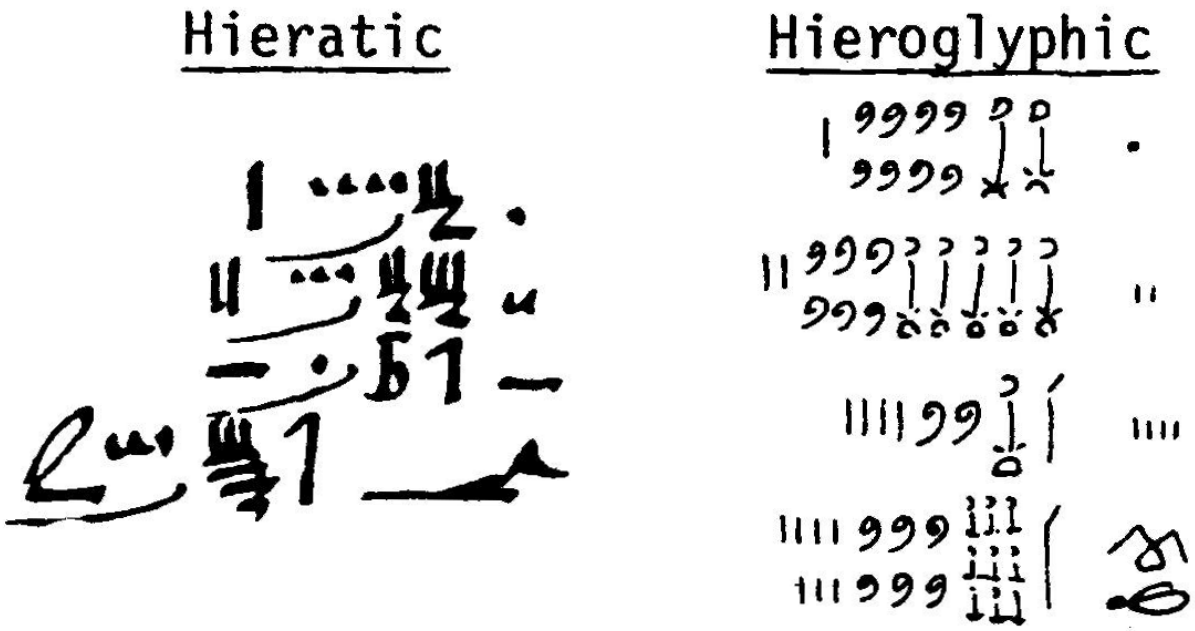
With historical text: 1998-2004

One year project by 14 MS students, every year.

1. *Learning last year products from students*
2. *Reading and searching content with Isoda*
3. *Developing teaching content by and for themselves*
4. *Engaging in teaching classes by team (students, teachers and me) with survery*
5. *ir*

Dimension 1: Professional Knowledge
Dimension 2: Professional Teaching and Learning Process
Dimension 3: Personal and Professional Attributes
Dimension 4: Professional Communities

Rind Papyrus Problem (Arcavi, Isoda 2007)



Hermeneutics: The theory for interpretation for getting others perspective.
Isoda, M. (2002). Hermenautics for Humanizing Mathematics Education, Tsukuba Journal of Educational Study in Mathematics. Vol.21. 1-10.

Isoda's History Project Website:
http://math-info.criced.tsukuba.ac.jp/Forall/project/history/index.html
http://math-info.criced.tsukuba.ac.jp/museum/Mathematics_tools/index.htm

Aims and schedules on the Lesson Study project with History and Technology

The Lesson Study project aimed to develop materials for giving high school students cultural awareness in mathematics, improve their attitudes and brief in mathematics by conducting lessons, and to demonstrate the educational value of the developed materials. The schedule to engage in the Lesson Study in the school year 2001 was as the following;

Phase 1) Transition period (almost April – June):

Teacher educator (project director) explained first-year students a year plan of the project and explained what kinds of activities were expected. Second-year students in master program who engaged in last year's projects conduct new first-year students' classes to review the activities from their actual lessons on the previous year's project. First-year students learned how to use the computers in their Lesson Study from second year students and began the project.

Phase 2) Reading of historical sources in mathematics (almost July – August):

Students read historical textbooks (English readings or Japanese translations of primary sources) for excavating teaching materials and A History in Mathematics Education (John Fauvel, Jan Van Maanen. 2000) for learning the educational value and teaching methods of mathematics history. Teacher educator supported their reading, made clear interesting points when compared with today's mathematics and excluded the misinterpretation originated from reading mathematics history books with today's mathematics such as Bourbaki..

Aims and schedules on the Lesson Study project

Phase 3) Subject matter development (almost September – November):

Students developed subjects from historical texts, conceptualized lessons, established aims and goals, and developed teaching materials such as textbooks using original (or English translation) texts, slides and activities with computer. Teacher educator helped to find interesting materials from historical texts and supported students to develop structures of textbooks and lessons.

Phase 4) Lesson implementation (almost November – December):

Students conducted the lesson. Teacher educator supported students to expect classroom students' activities, especially classroom students' responses and how teachers can use the response. Teacher educator also supported how to use classroom equipments such as projecting students' notebook activities to the screen for sharing students' ideas in the classroom.

Phase 5) Report preparation (almost December – February):

Students wrote their research reports, created their web site. Teacher educator supported their references depending on their research problems and also supported their preparations for presentations among the mathematics education society.

After the phase 5, for knowing prospective teachers' experience and for knowing didactical meaning of each phases, the researcher asked to represent how they changed through the project into the graph of emotions.

Methodology 1 (Isoda: PME2000)

Graphs of Emotions; Drawn by students & Hart Rate

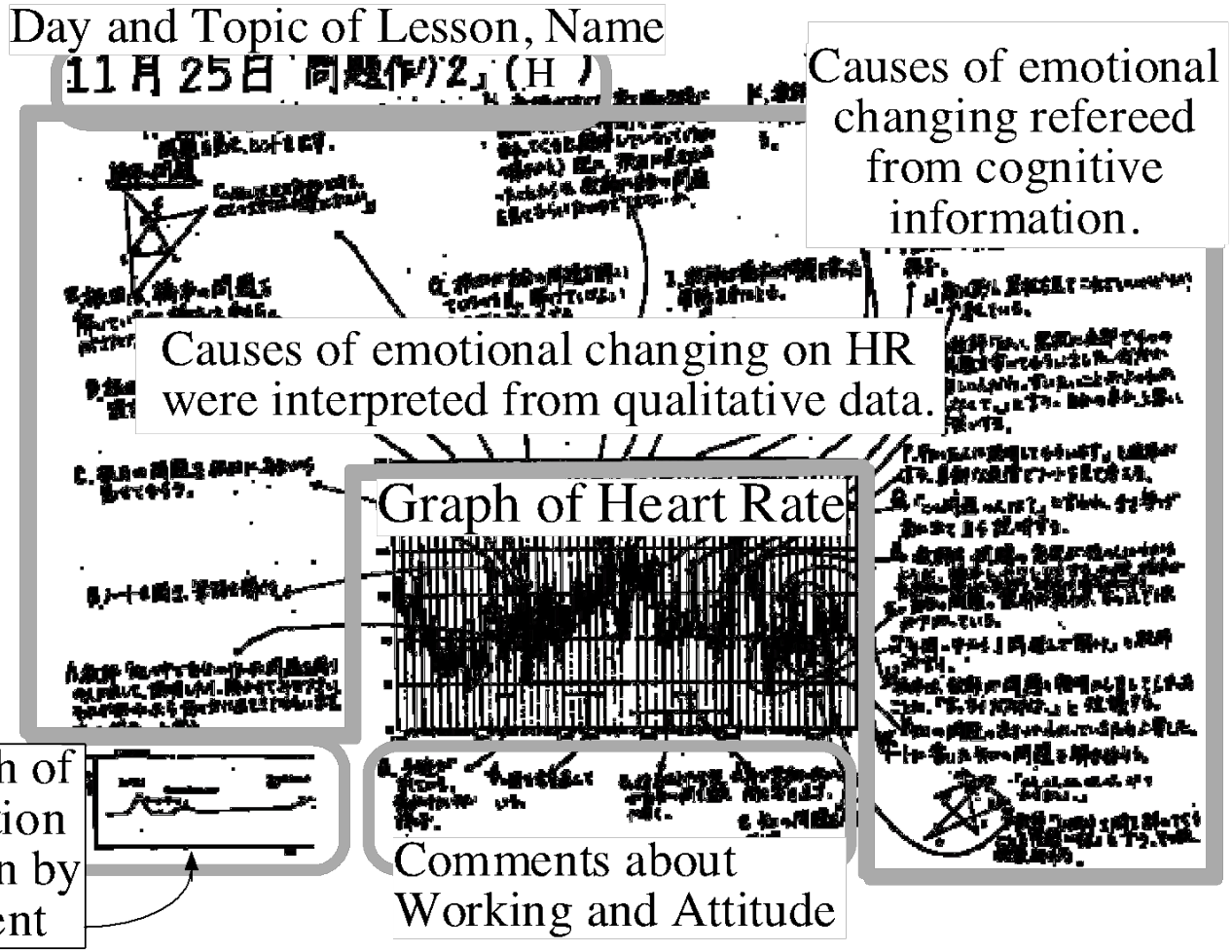
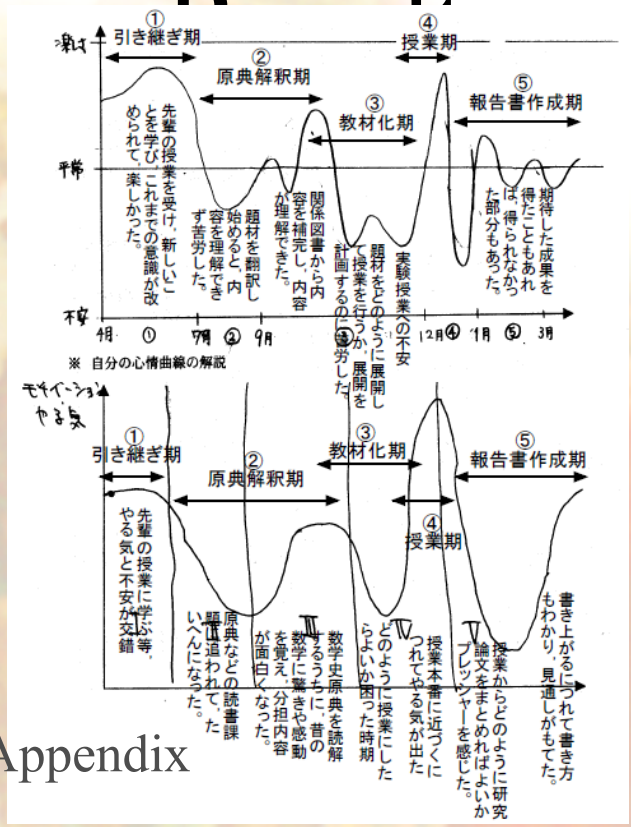


Figure 2. Synthesized Description of HR Change and Activity

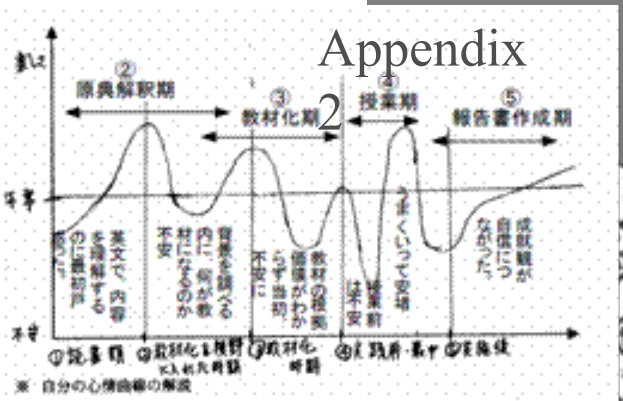
- *x-axis: time scale is given by drawer.*
- *y-axis: free by drawer.*
- *Comments are given by drawer.*
- *After phase 5, we asked prospective teachers.*

- *Even if each person's y axis meaning is very different, the phases are well reflected on their graphs*
- *The periods* ① ~ ⑤ *are rewritten in relation to Phase 1~5, not as same as original periods written by the persons.*

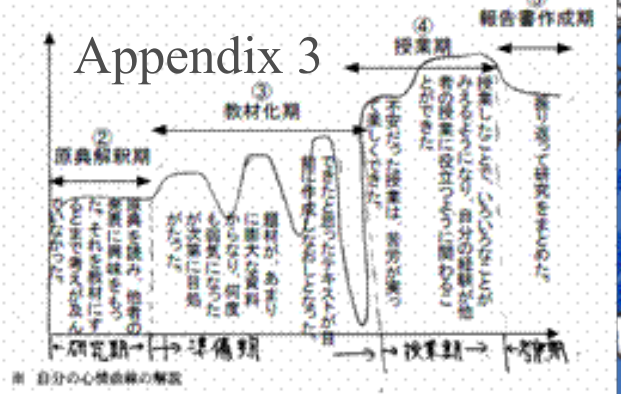
Appendix 1



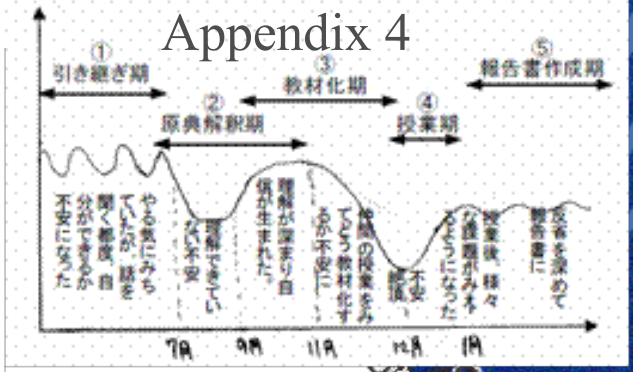
Appendix 2



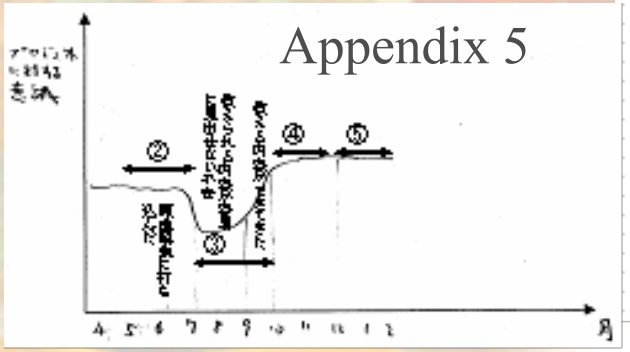
Appendix 3



Appendix 4

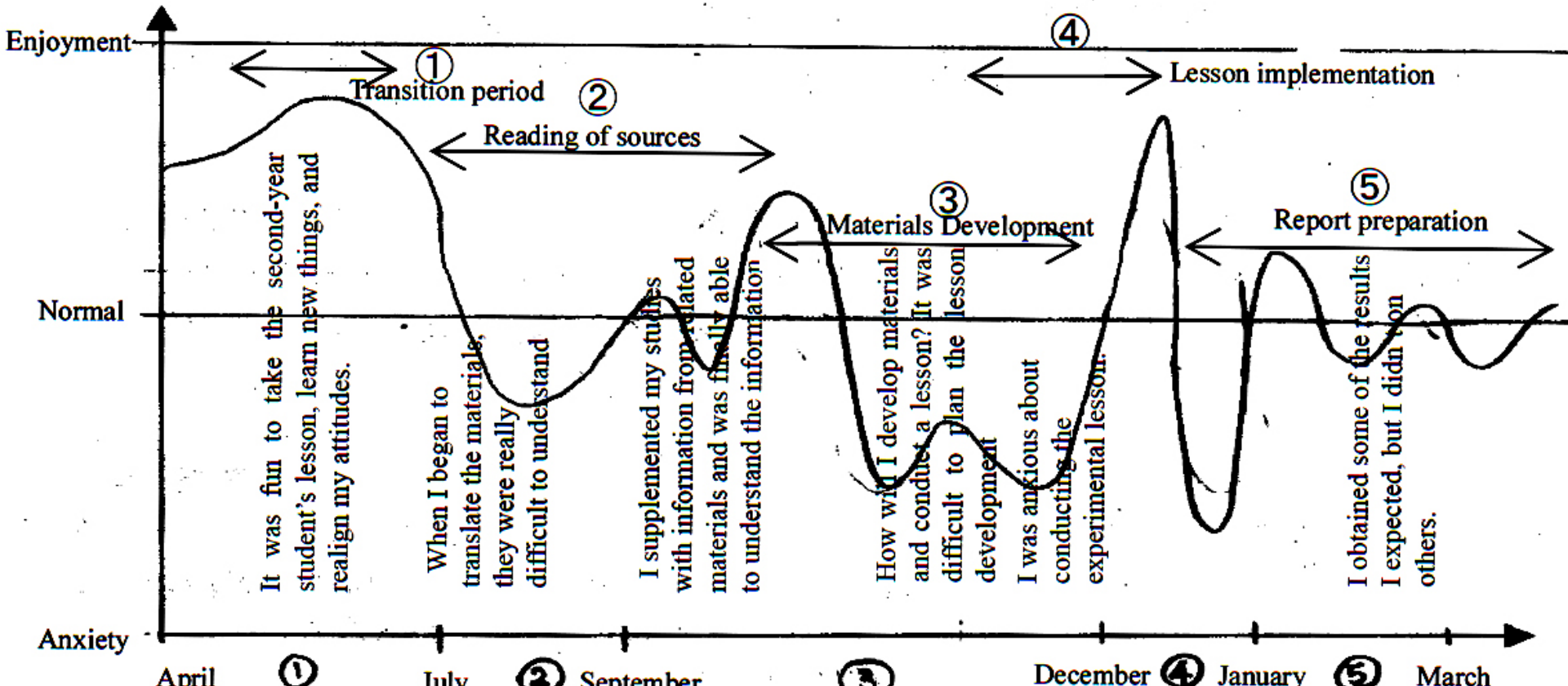


Appendix 5



An interpretation of experience in a case prospective teacher: How can we interpret?

- *Depending on emotional theory by George Mandler (1984) based on the Piajetian cognitive model, emotional arousal is related with obstacles and challenges, and results such as overcoming obstacles give positive emotional feed backs. This cognitive cycle until reflection is also reasonable from the educational meaning of experience described by John Dewey. Based on Mandler's meaning of emotional change, we can interpret one down-up in the graph recognized as a strong experience.*



What is the misdirection for the Pedagogical Content Knowledge? For you or for observers

Misdirection 1: for observers

- *Try to analyze, to check the assessments by others*

Misdirection 2: for you

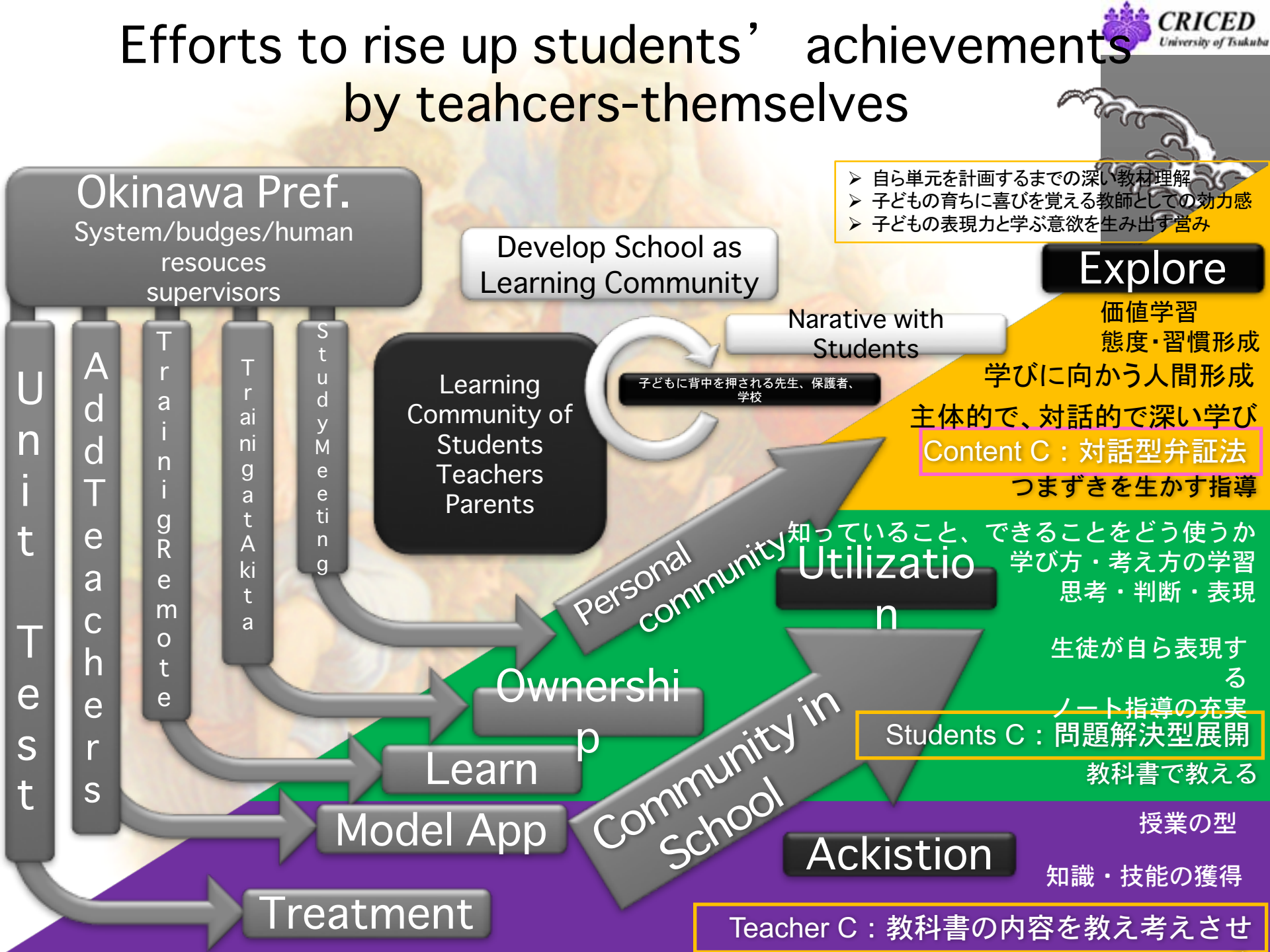
- *Focus on the methods of teaching instead of experiencing the content of teaching deeply*

Your direction: for whom?, for what?

- *Minimum preparation for class: Embed your objective of education into content for teaching*
- *Objective: Human Character Formation, Thinking Skills, and Knowledge*
- *Content knowledge and curriculum knowledge for teaching*
  - *Today's content of teaching is the preparation for future*
  - *We must use what they already learned*

Efforts to rise up students' achievements by teahcers-themselves

CRICED University of Tsukuba



Checking List for Prob. Solving Approach 2007-2008 in Japan. in Ozone Elementary School

CRICED
University of Tsukuba

- *Lesson Planning Checklist*
- *Lesson Plan Checklist*
- *Blackboard Planning Checklist*
- *Children's Checklist for listening, explaining and notebook writing.*

etc.

Isoda, M. Olfos. R. (2009). El Enfoque de Resolucion de Problemas. Chile: Ediciones Universtarias de Valparaiso

Problem Posing — **Self-Evaluation**

1. The lesson sets tasks that can be solved in a variety of different ways by a
   learned knowledge, and presents the content to be learned.
2. The lesson planned with tasks (problem given by teacher) and proble
   students), and promotes problem (problematic) awareness.
3. The teacher expected methods and solutions before.

Independent Solving

1. The children can recall and apply what they have already learned.
2. The children's ideas are predicted before.
3. Inappropriate solutions are predicted, and advice and hints are prepared for them befor
4. The teacher, walking around, observes and helps children to insure that childr
   mathematical representation to solve the problems.
5. Notebook are written and taken in a manner such that they will be helpful for presenta
   well.

Comparison and Discussion

1. Steps (Validity, Compare, Similarity and Generalization or Selection) are plann
   comparative discussion.
2. The ideas to be taken up are presented in an order that is planned before.
3. The method for writing presentation sheets is planned in advance and
   provided.
4. In addition to develop the ability to explain, children are also fostered with
   listen and the ability to question.
5. When ideas are brought together (generalized), it is important to experi
   themselves.
6. The reorganization or integration of ideas proceeds smoothly from the pr
   communication of children.

Summary

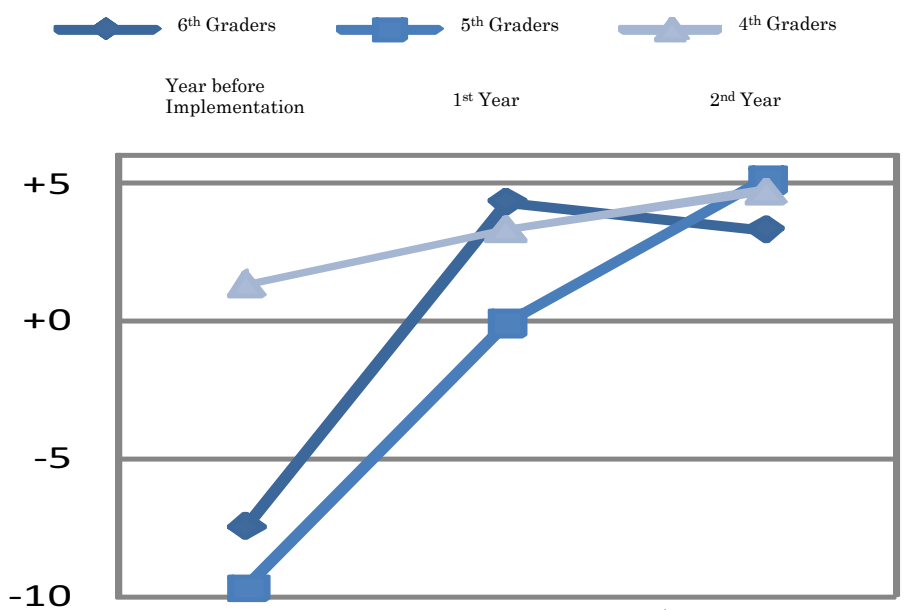
1. Activities are incorporated that let children experience for themselves the mer
   and procedures that are generalized.
2. The summary matches the aims and problems (problematic) of this lesson.
3. It is recognized that both correct and incorrect answers (to the task) have som
   the foundation of their ideas.
4. Children are made to experience the joy and wonder of learning.

Yes, we can.
Ordinally teachers can!

Through the self-evaluation each other in whole school LS

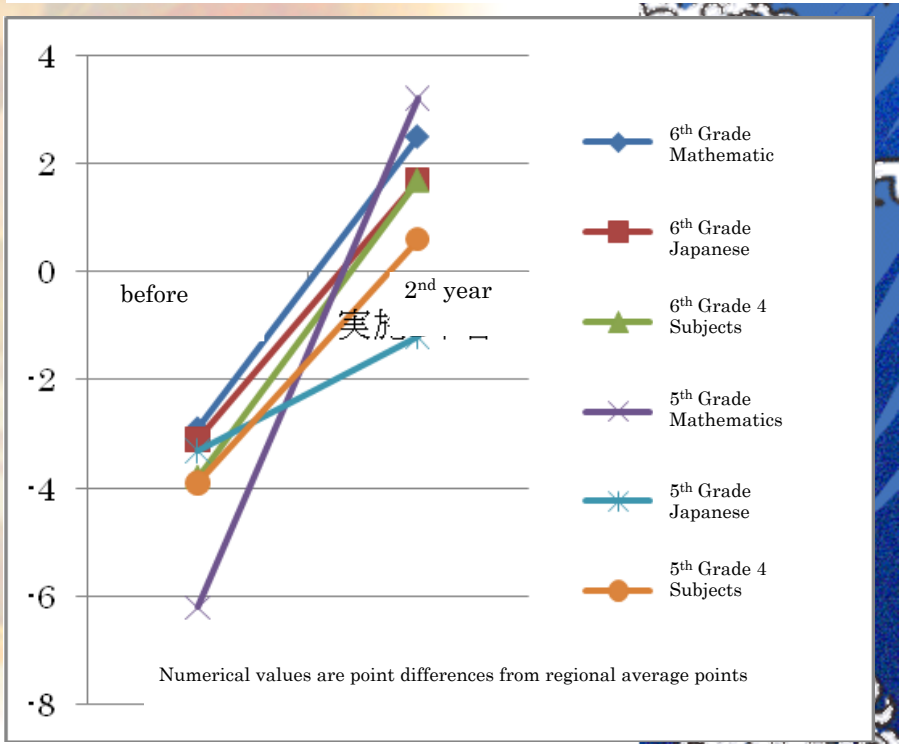
- *The power of School Level Lesson Study Approach for improvement of the quality of whole education through mathematics*

Figure 5. Ozone Elementary School's Academic Abilities Compared to the Regional Average



Difference from average in mathematical thinking problem set (converted to 100 points)

Figure 6. Ozone Elementary School's Academic Abilities Compared to the Regional Average

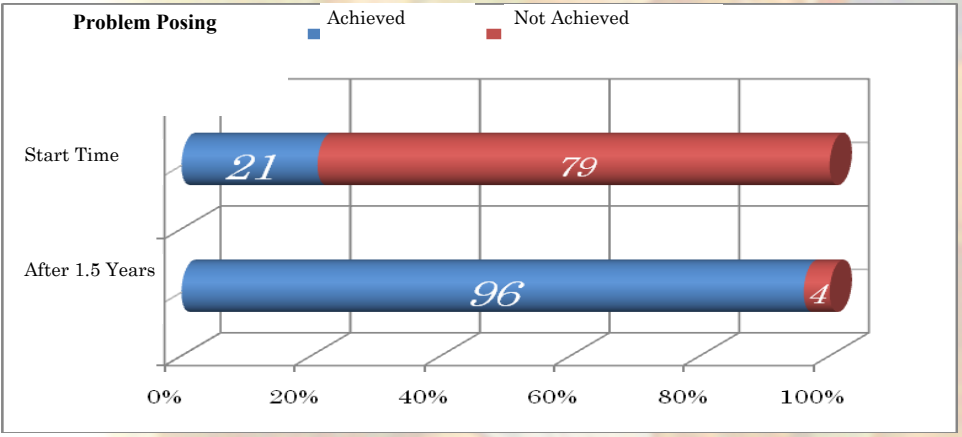


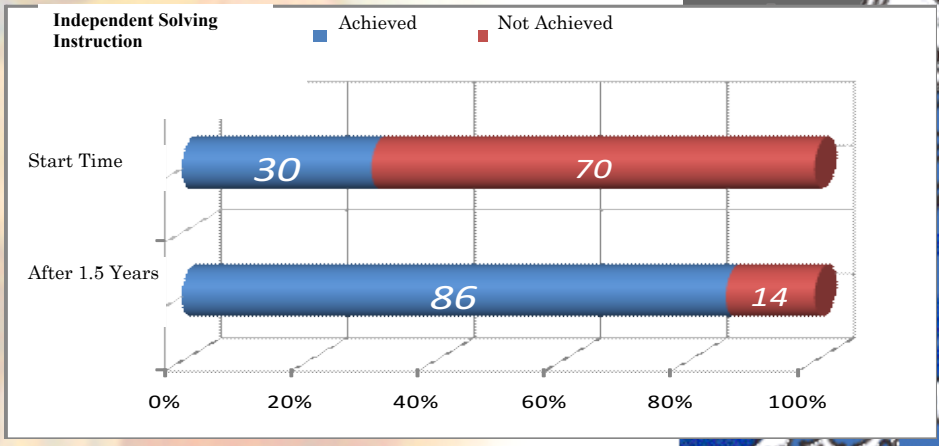
Numerical values are point differences from regional average points

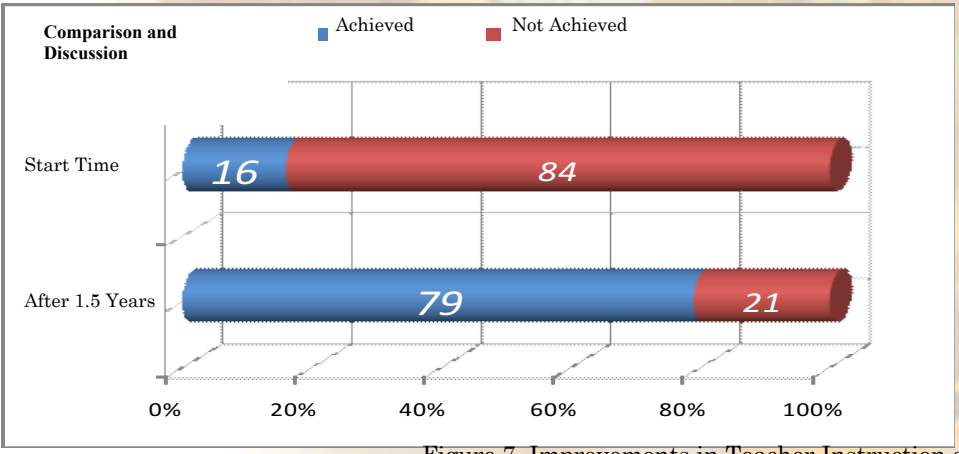
Through the self-evaluation each other in whole school LS

Through understanding the Prob. Sol. Approach:

- *Promised Approach if whole teachers challenge*







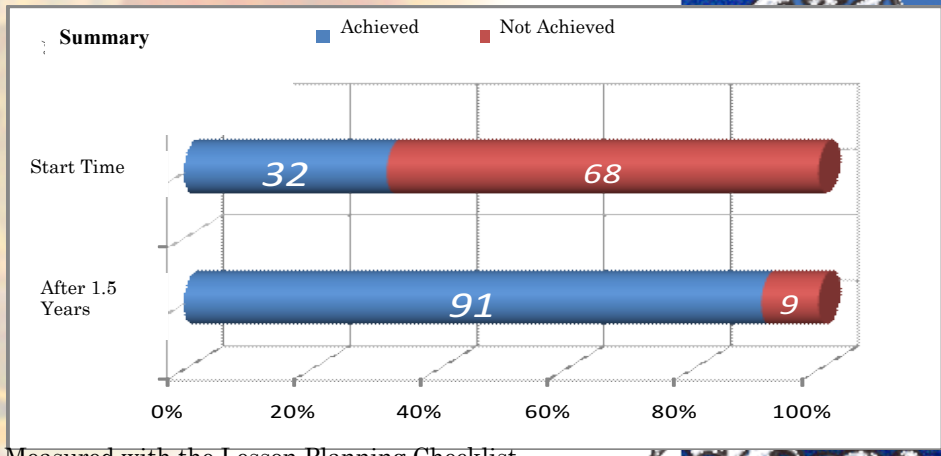


Figure 7. Improvements in Teacher Instruction as Measured with the Lesson Planning Checklist

Three Notebooks

ノートの種類	ノートの役割
授業ノート	・授業中の思考過程や学習内容を記録する。
	・新たな問題に出会った際のひらめきや気づきを記録する。
	・自分の考えと友だちの考えを交流し，気づいたことや，さらに考えたことを記録する。
家庭学習ノート	・今日の授業を家に帰って再生し，考えを整理する。
	・今日の学習内容を定着させる。
算数交換日記	・家庭学習ノートで自分の中に落とし込んだ考えや思考の過程を友だちに説明する。
	・考え方や方法などをグループで共有する。

Class Notebook:

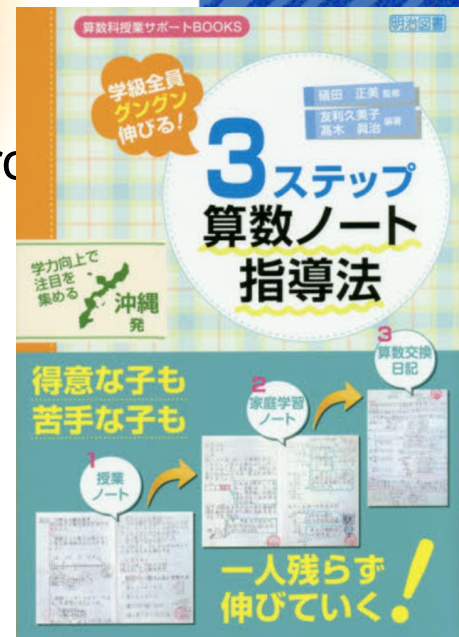
Thinking and Learning Process, Awareness of Problematic and Findings, Learning and finding from others

Homework Notebook:

Re-present and re-learning the today's class, Acquisition thro practice

Daily-Exchange Group-Notebook:

Explain one's understanding to the others,
Sharing the ideas within group



The end of the year from Child

6年生になってがんばること

①五年生になって成長したことはたくさんあります。一つ目は、四年生の頃と比べて、発表に自信をもって発表することです。あと、とくに成長したことは、ノートまとめです。今は、だれにでも自まんできるくらい上手くなってます。

②次に、僕を支えてくれたみんなは、最高の友でした。ときにはけんかもあり、ときには、一緒に喜んでいて、とっても愉しかったです。愉しかった毎日が、だんだん減ってくるのがさみしかったです。

③最後に、僕をここまで育ててきた先生。本当にありがとうございました。僕は一番この一年で知ったことは「信頼」です。毎日この信頼があったからこそたくさんの思い出が出来たと僕は思います。いつまでも先生を、忘れません。思い出しただけで、僕も涙が出てきそうでした。

藪亀 悠人

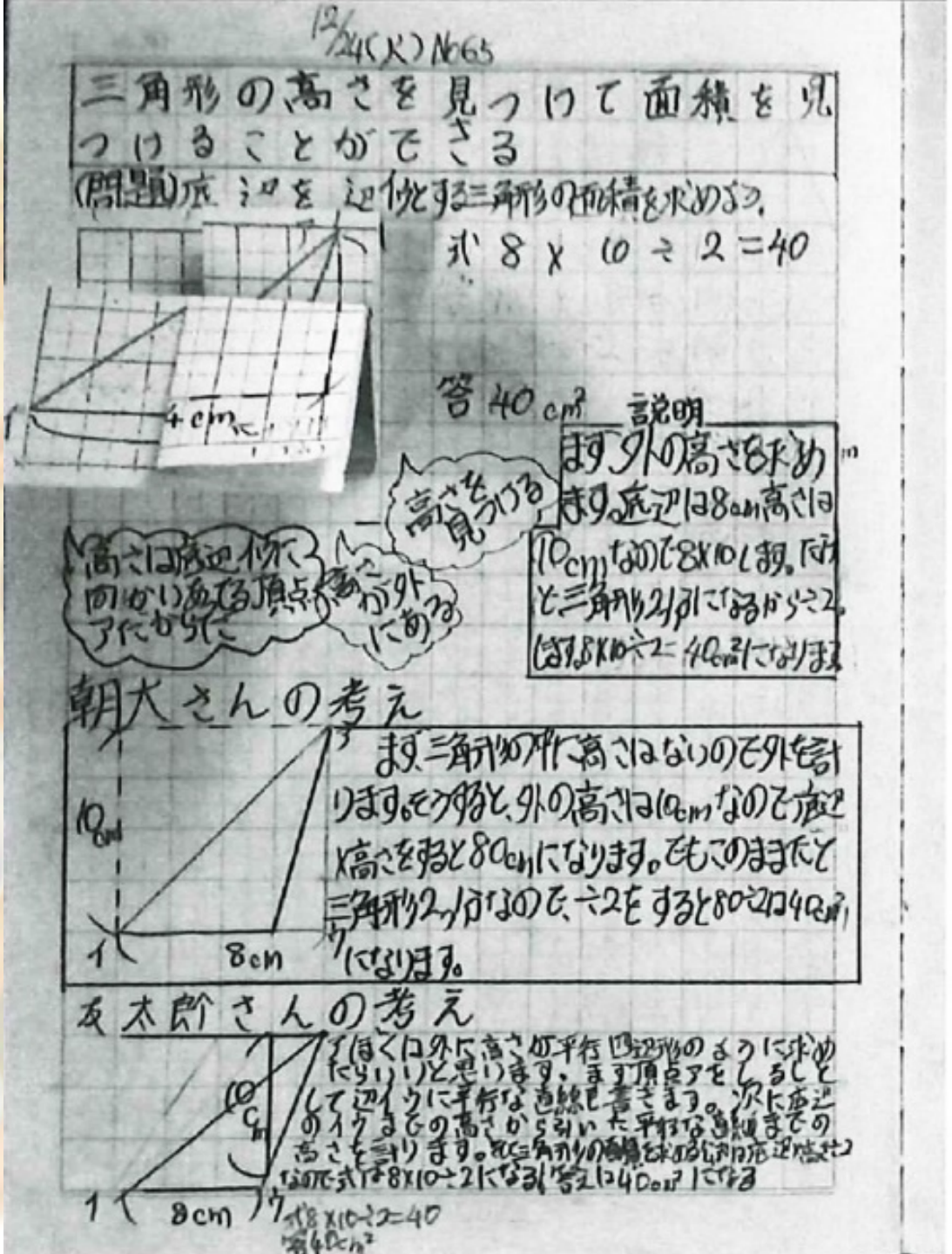
From Parents

一年間がんばりノートやその他の学習を間近で見てきて一番感じたことは親がどこまで関わることができるかで，学習の質，量の両面に僅かながらサポートが出来る可能性があるということでした。部活や習い事で家庭学習の時間を有意義な時間とすることが難しかったと本人が一番感じていたと思いますが，その限られた時間でとても頑張って学習していました。それを親としても少しは応援したい思いから，がんばりノートにコメントを記入したり，プリントの解答見直しを子どもと一緒にしています。子ども自身も「誰かに見られている」を意識し，ノートのまとめ方や丁寧さがこの一年でとても成長することができたのではないかと思います。

最後に，悠人へ。この一年よく頑張ったね！　６年生になってもこの調子でやっていこうな？

Class Notebook:

Thinking and Learning Process, Awareness of Problematic and Findings, Learning and finding from others

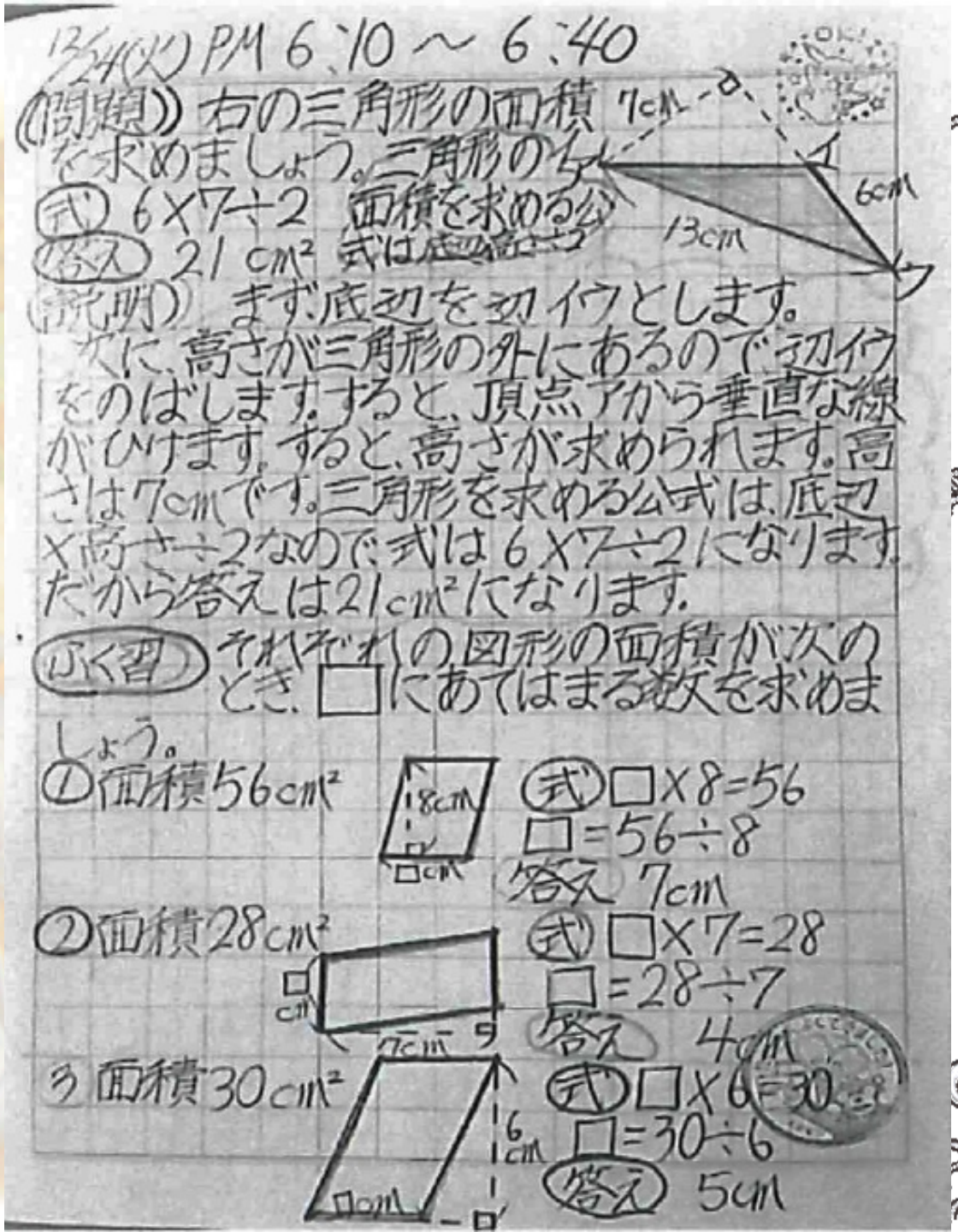


Notebook:

Thinking and Learning Process, Awareness of Problematic and Findings, Learning and finding from others

Homework Notebook:

Re-present and re-learning the today’s class, Acquisition through practice



Class Notebook:

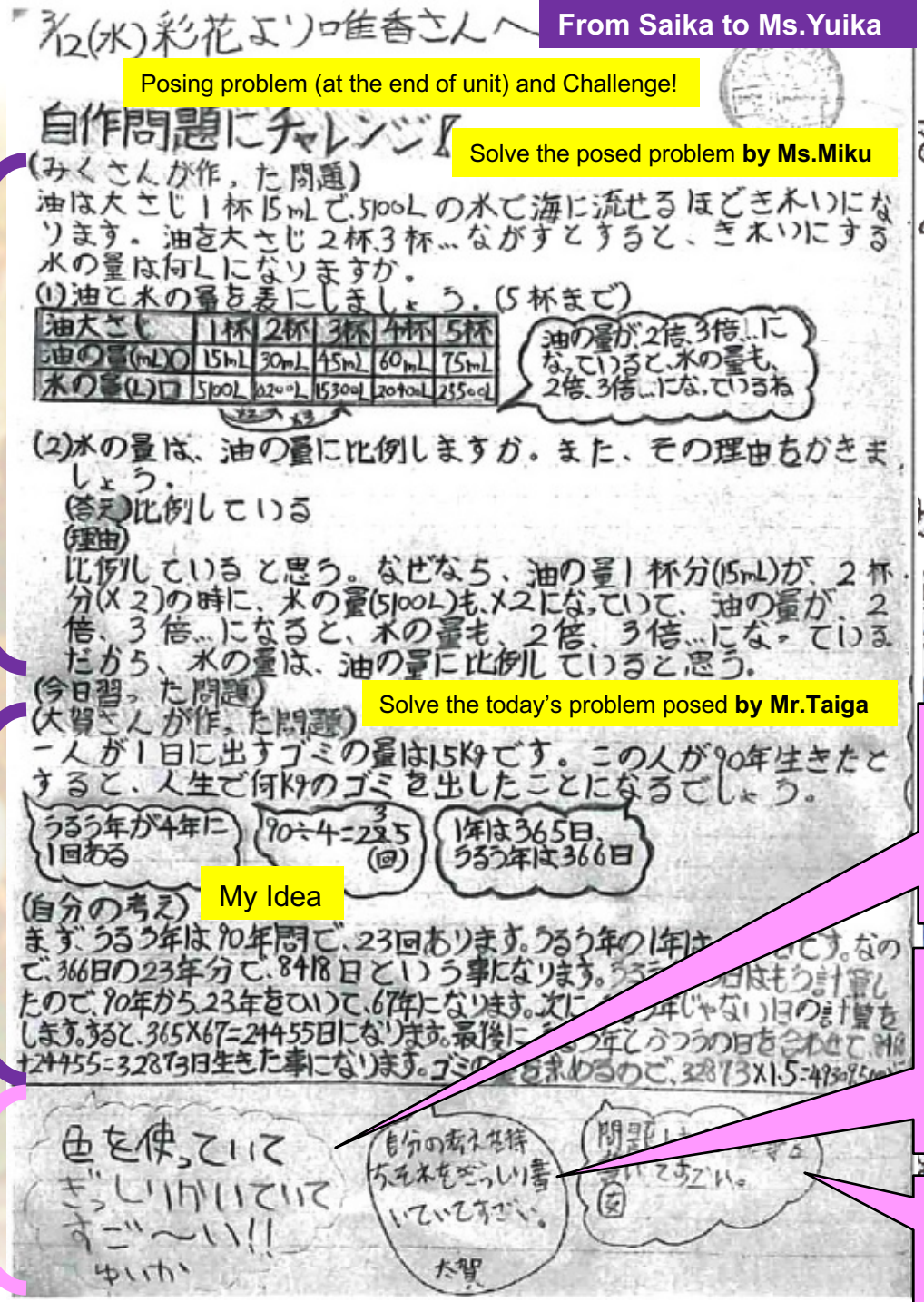
Thinking and Learning Process, Awareness of Problematic and Findings, Learning and finding from others

Homework Notebook:

Re-present and re-learning the today's class, Acquisition through practice

Daily-Exchange Group-Notebook:

Explain one's understanding to the others, Sharing the ideas within group



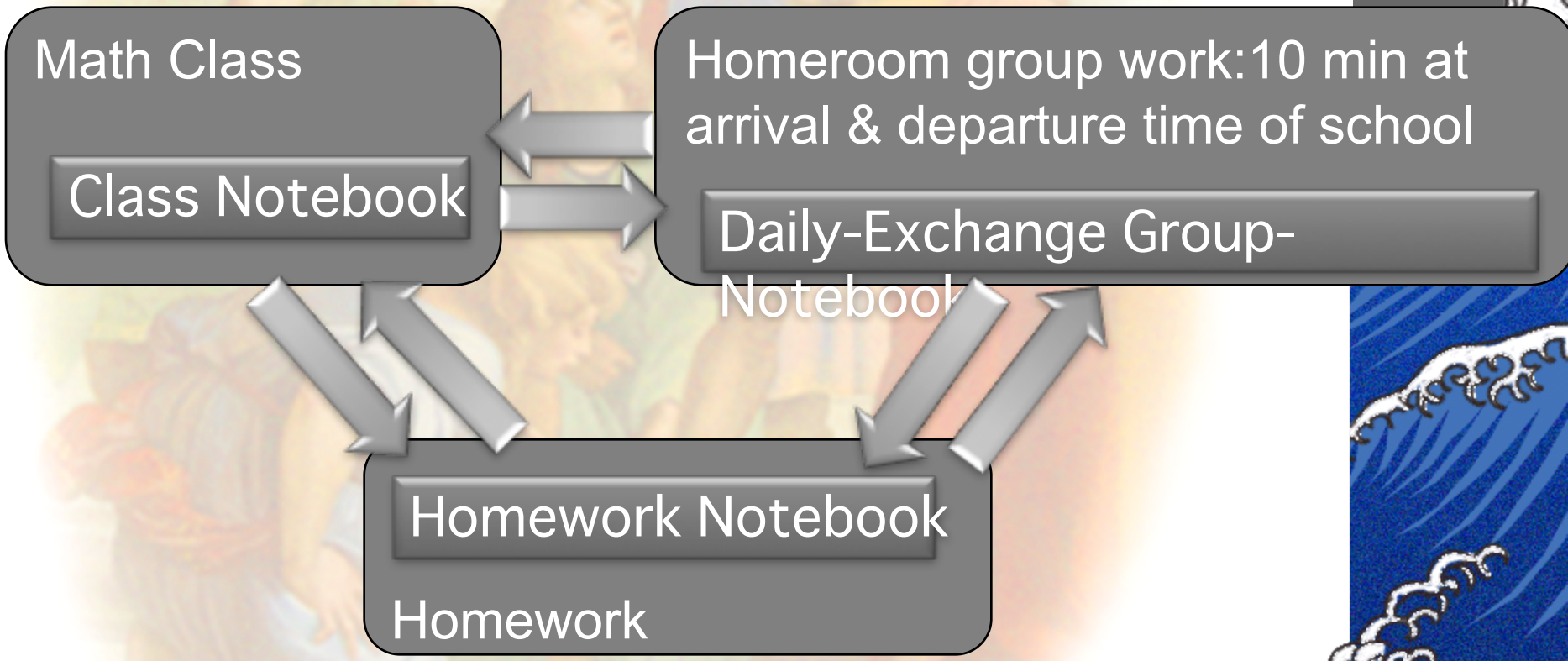
CRICED
University of Tsukuba

How cool full explanation using distinguished collars is!
By Yuika

How wonderful developing and describing your own idea is!
By Taiga

How Great your finding is!
By Tomo

Mutual Relations on Three Notebooks in Teaching Activity for Developing Children Who Learn Mathematics by and for Themselves

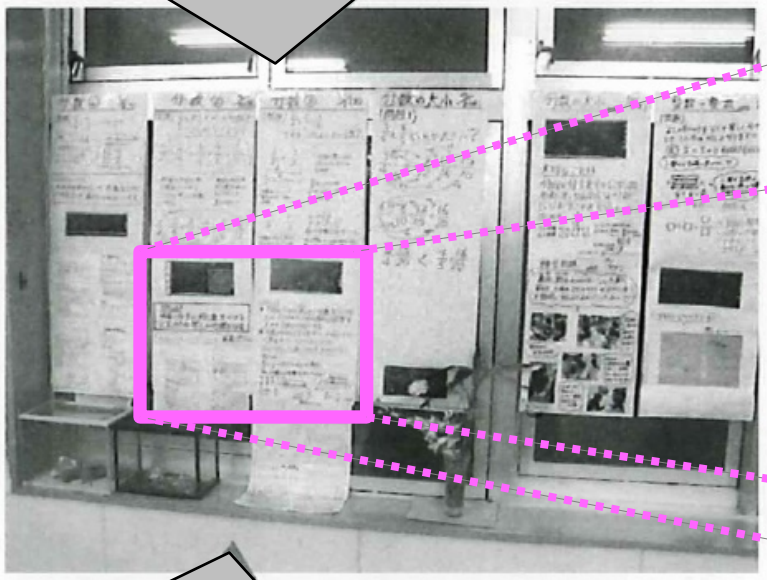


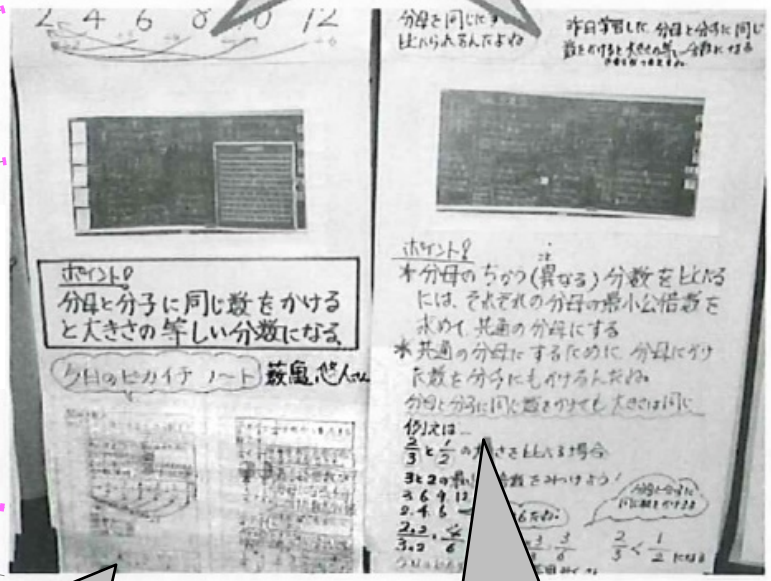
Institutionalization of self-learning system via using three notebooks through encourage each

For Institutionalization in the classroom, decorate resume of the class with notebooks at every unit.

Display resume of every math class with picture of board, points and copy of notebook through the unit in the homeroom class: for What?

Picture of Board





Paste children's notebooks who were not presented at the class

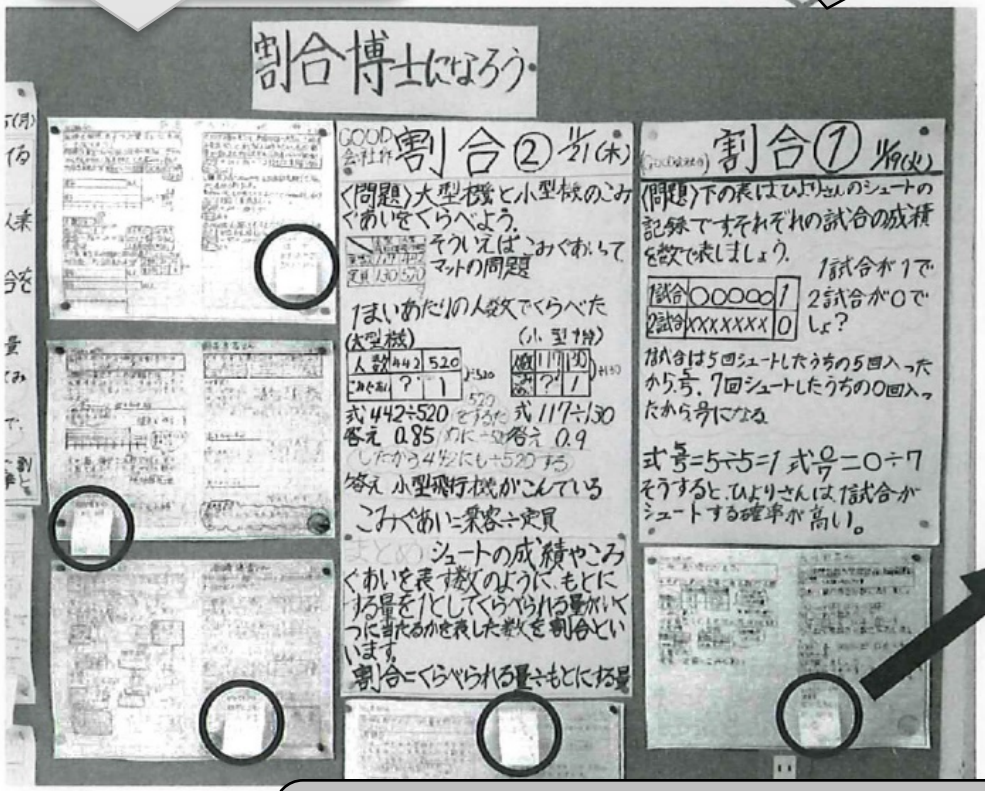
Best notebook as for exemplar!

Point of the class!

Bulletin Board: Let’s become professor!

Posing problem each other

Children select best answers and write the reason why.



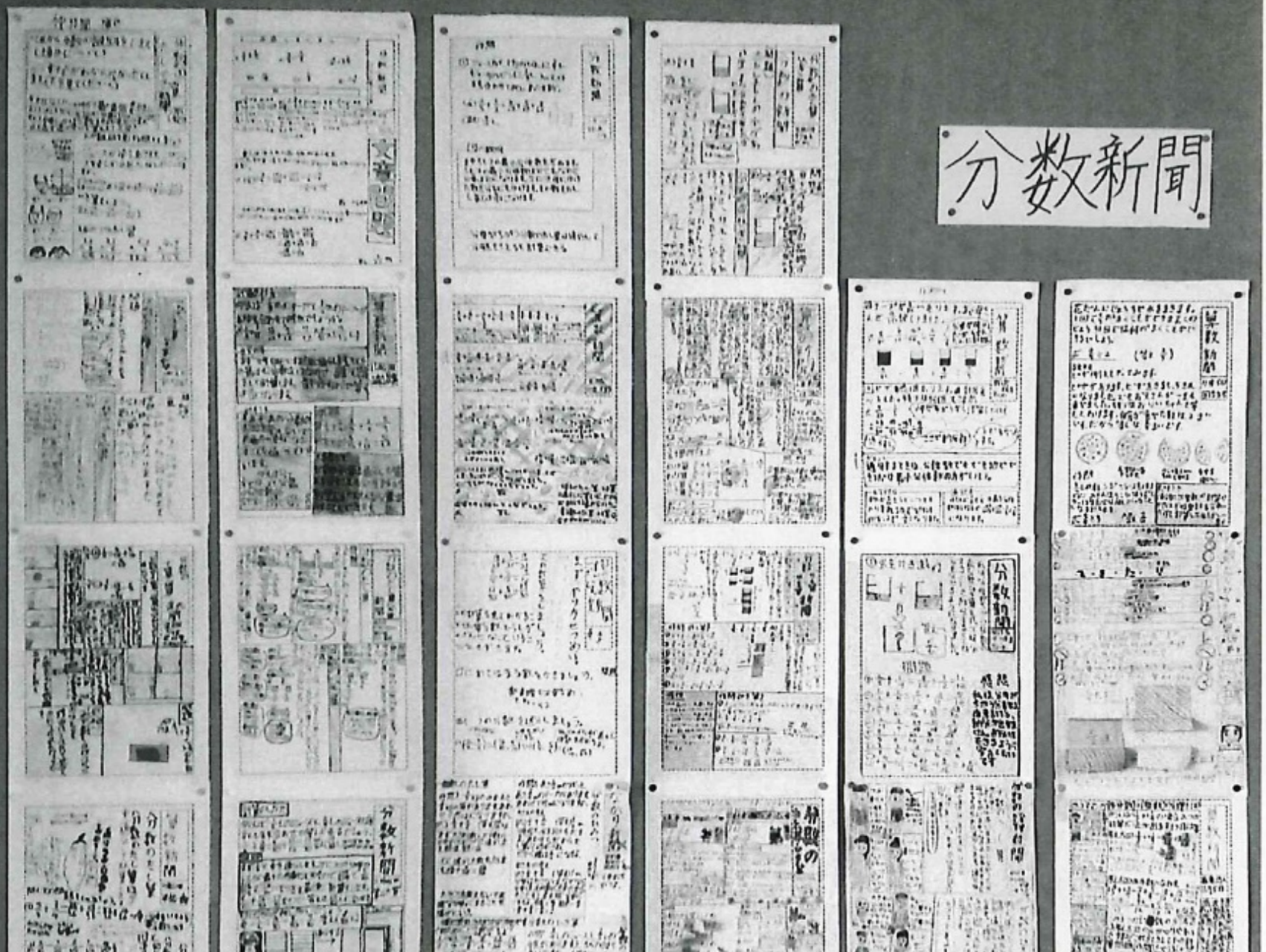
Why it is best!

倍割表や数直線で説明されている！

○○

Through sharing why it is best answers, children learn how to write the better notebook for leaning.

At the end of every unit, every child develops the newspaper in relation to what they learned and how they use it.



CRICED
University of Tsukuba

Three Notebooks

ノートの種類	ノートの役割
授業ノート	・授業中の思考過程や学習内容を記録する。
	・新たな問題に出会った際のひらめきや気づきを記録する。
	・自分の考えと友だちの考えを交流し，気づいたことや，さらに考えたことを記録する。
家庭学習ノート	・今日の授業を家に帰って再生し，考えを整理する。
	・今日の学習内容を定着させる。
算数交換日記	・家庭学習ノートで自分の中に落とし込んだ考えや思考の過程を友だちに説明する。
	・考え方や方法などをグループで共有する。

Class Notebook:

Thinking and Learning Process, Awareness of Problematic and Findings, Learning and finding from others

Homework Notebook:

Re-present and re-learning the today's class, Acquisition through practice

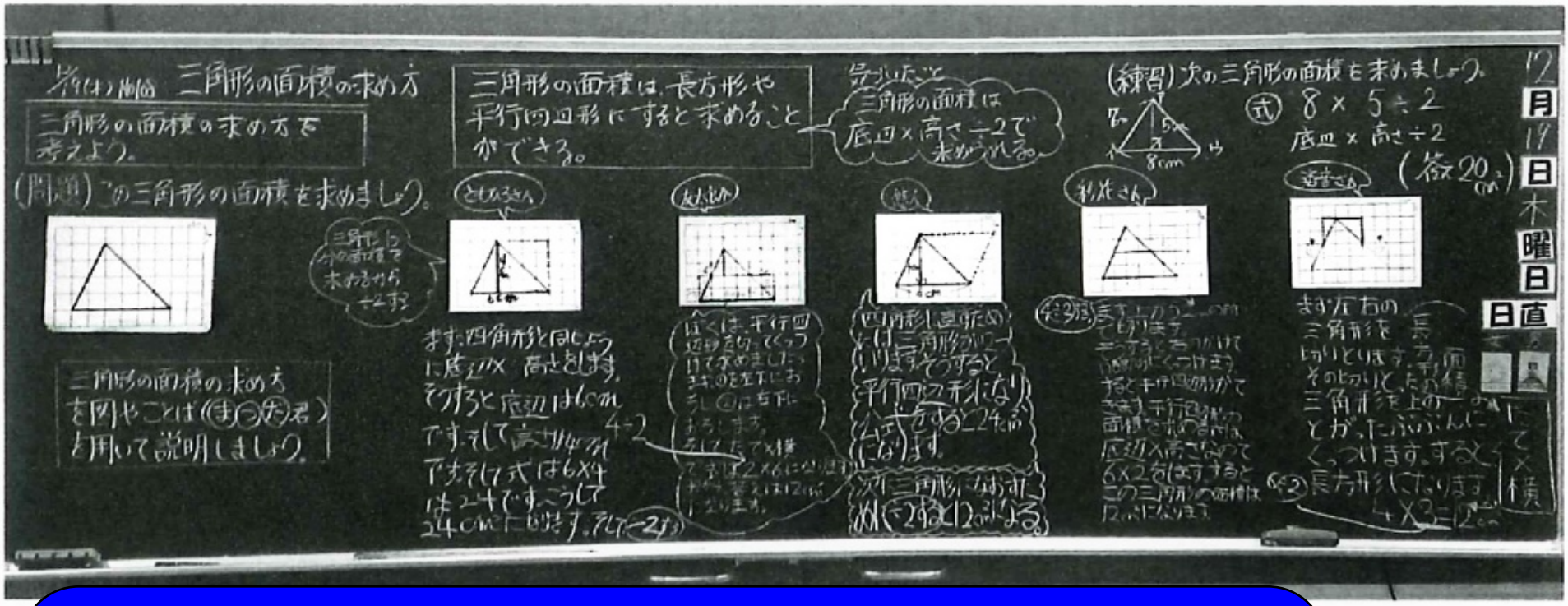
Daily-Exchange Group-Notebook:

Explain one's understanding to the others,
Sharing the ideas within group

CRICED
University of Tsukuba

Class Notebook is based on the class:

Thinking and Learning Process, Awareness of Problematic and Findings, Learning and finding from others



The notebook describe one's process of thinking and finding based on one's problem solving and learned ideas from others. Teacher must takes care children to write their own ideas on the notebooks and present from their notebooks. Every child represents his/her reasoning and wrote on the notebook what s/he understood. It is not the same as the board which teacher managed in the class.

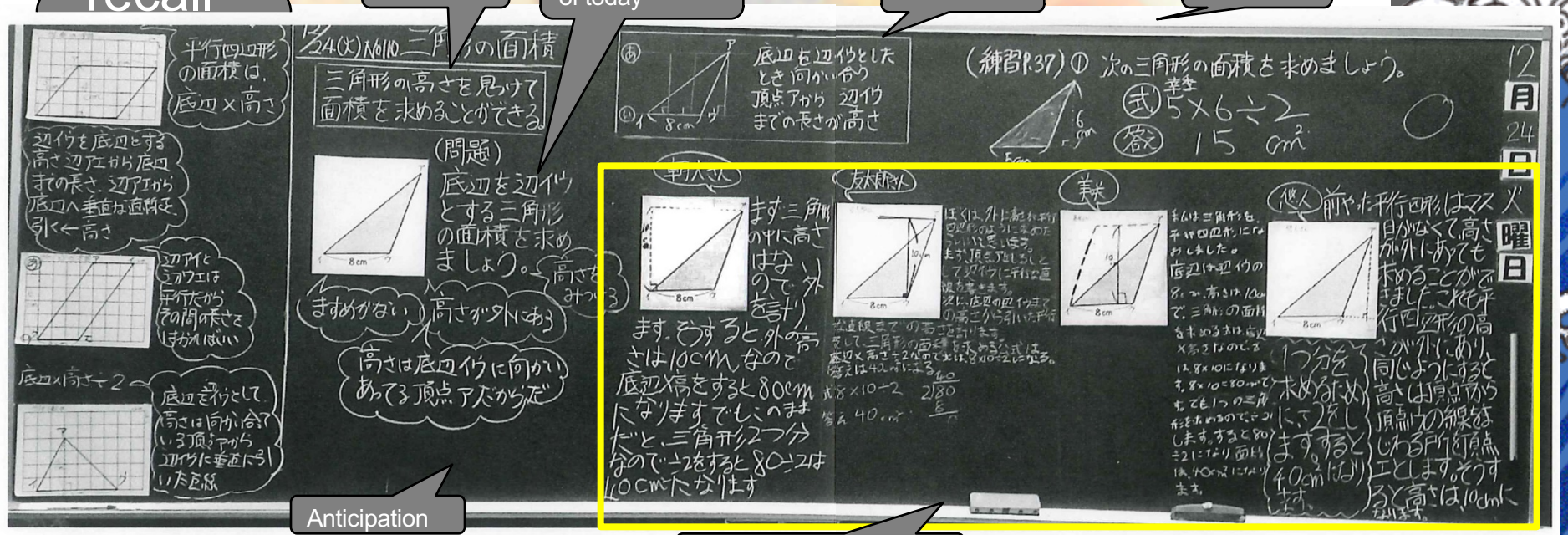
recall

Objective

Main Problem of today

Summarize

Exercise



Anticipation

Comparison, Selection

Class Notebook(two pages)

CRICED University of Tsukuba

Left page

right page

Day,,Math Class No., Unit name, Textbook page.

Summarize

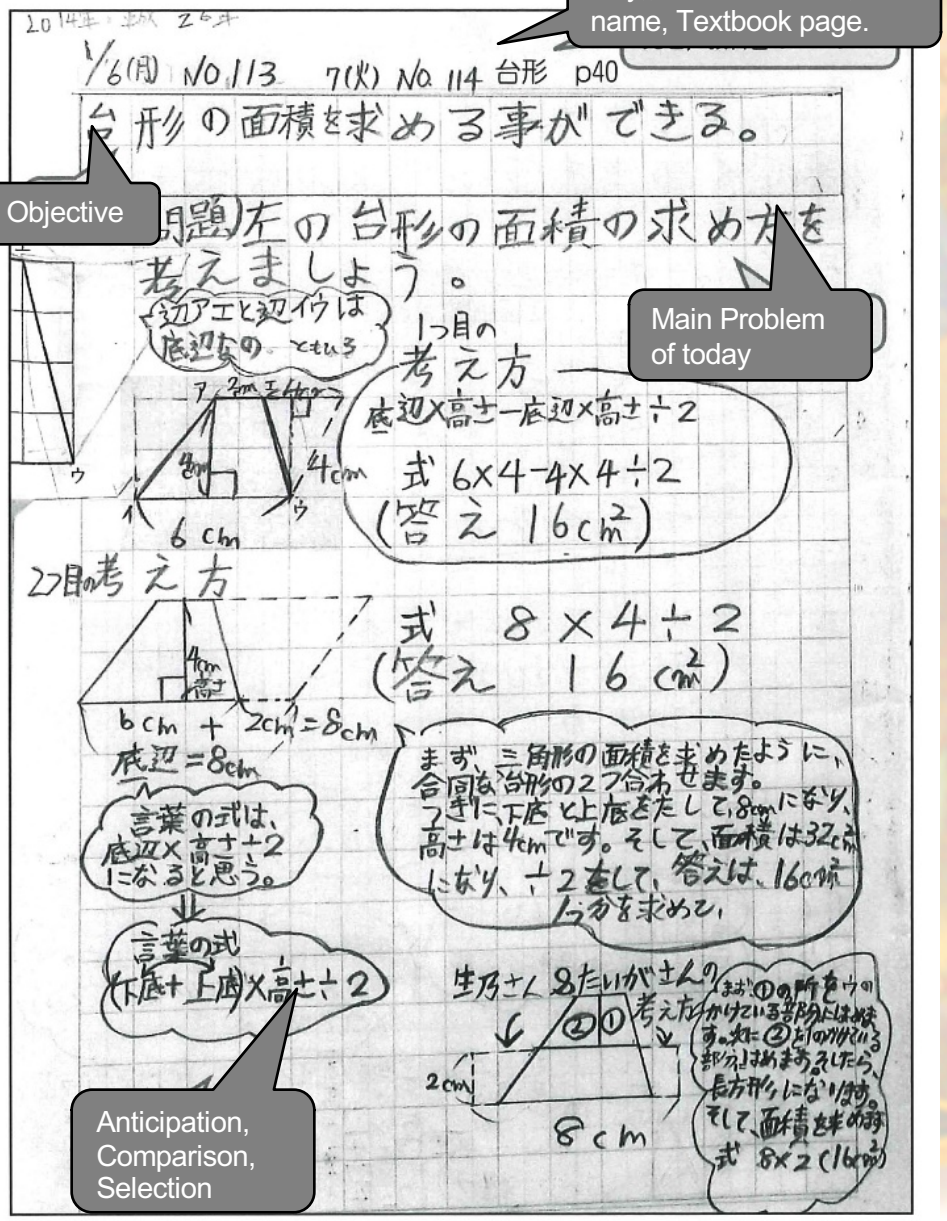
Objective

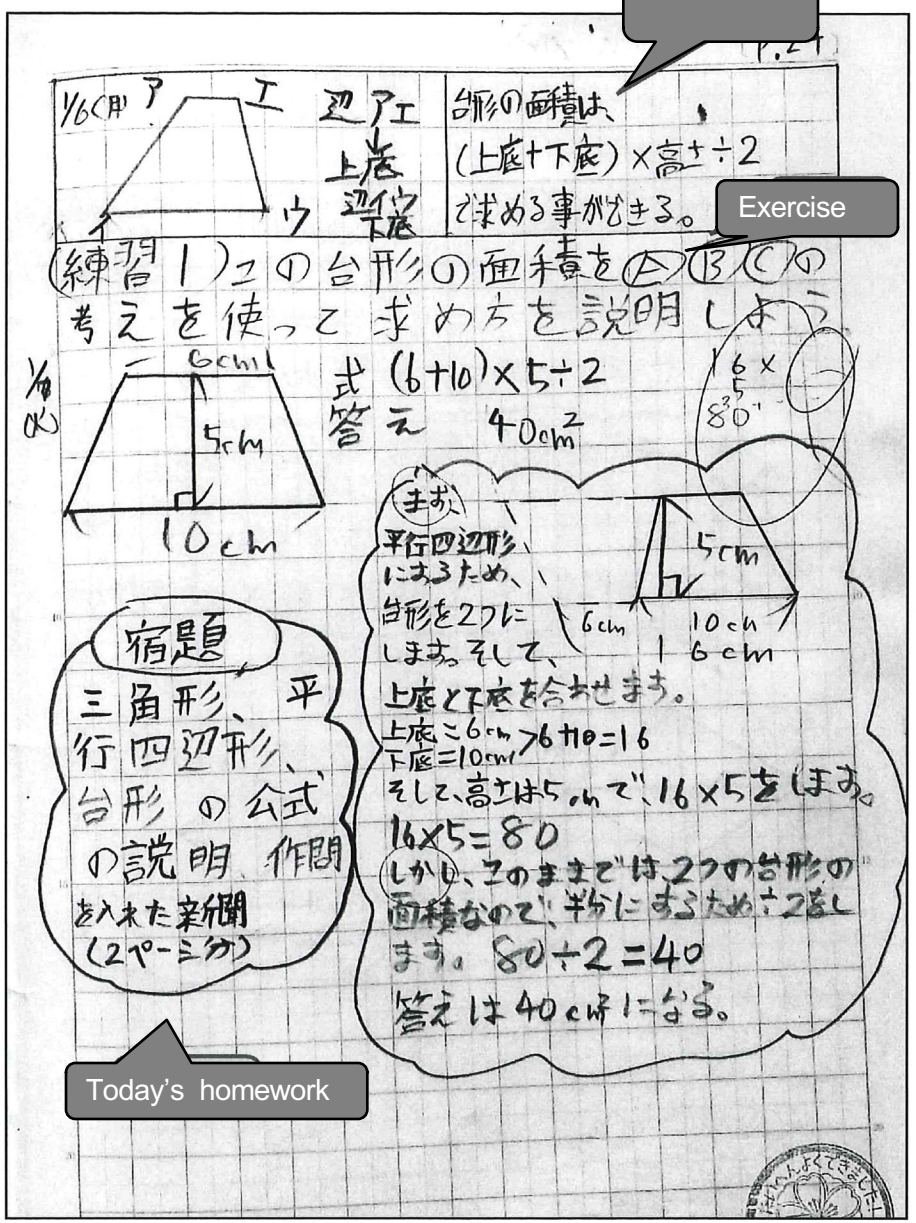
Exercise

Main Problem of today

Anticipation, Comparison, Selection

Today's homework





Three Notebooks

ノートの種類	ノートの役割
授業ノート	・授業中の思考過程や学習内容を記録する。
	・新たな問題に出会った際のひらめきや気づきを記録する。
	・自分の考えと友だちの考えを交流し，気づいたことや，さらに考えたことを記録する。
家庭学習ノート	・今日の授業を家に帰って再生し，考えを整理する。
	・今日の学習内容を定着させる。
算数交換日記	・家庭学習ノートで自分の中に落とし込んだ考えや思考の過程を友だちに説明する。
	・考え方や方法などをグループで共有する。

Class Notebook:

Thinking and Learning Process, Awareness of Problematic and Findings, Learning and finding from others

Homework Notebook:

Re-present and re-learning the today's class, Acquisition through practice

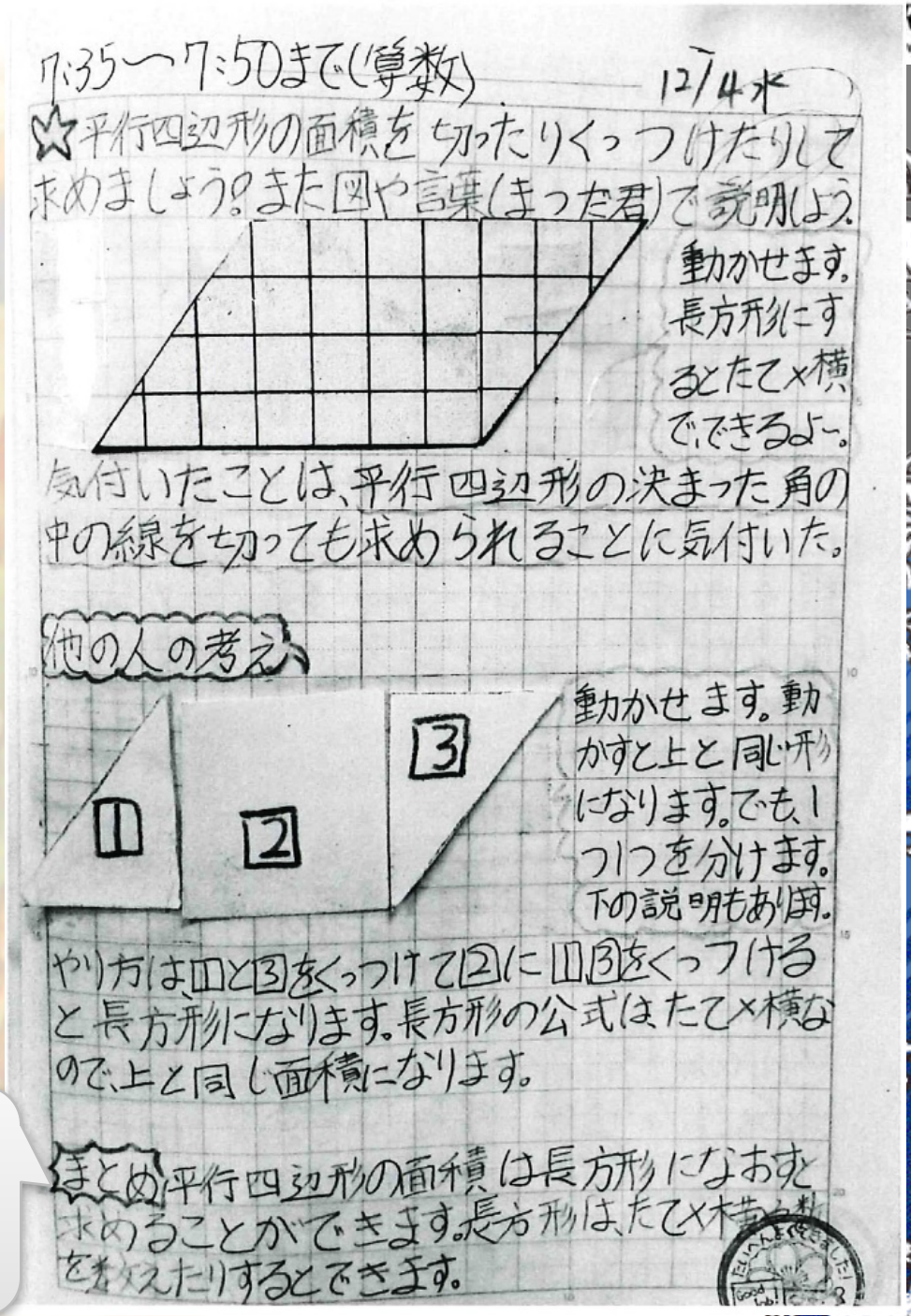
Daily-Exchange Group-Notebook:

Explain one's understanding to the others,
Sharing the ideas within group

Homework Notebook:

Re-present and re-learning the today’ s class, Acquisition through practice

Re-learning on the notebook though recalling the class usually reconstruct the class and produce his/her self-understanding based on necessary components of the class.
Developing custom of learning at home.



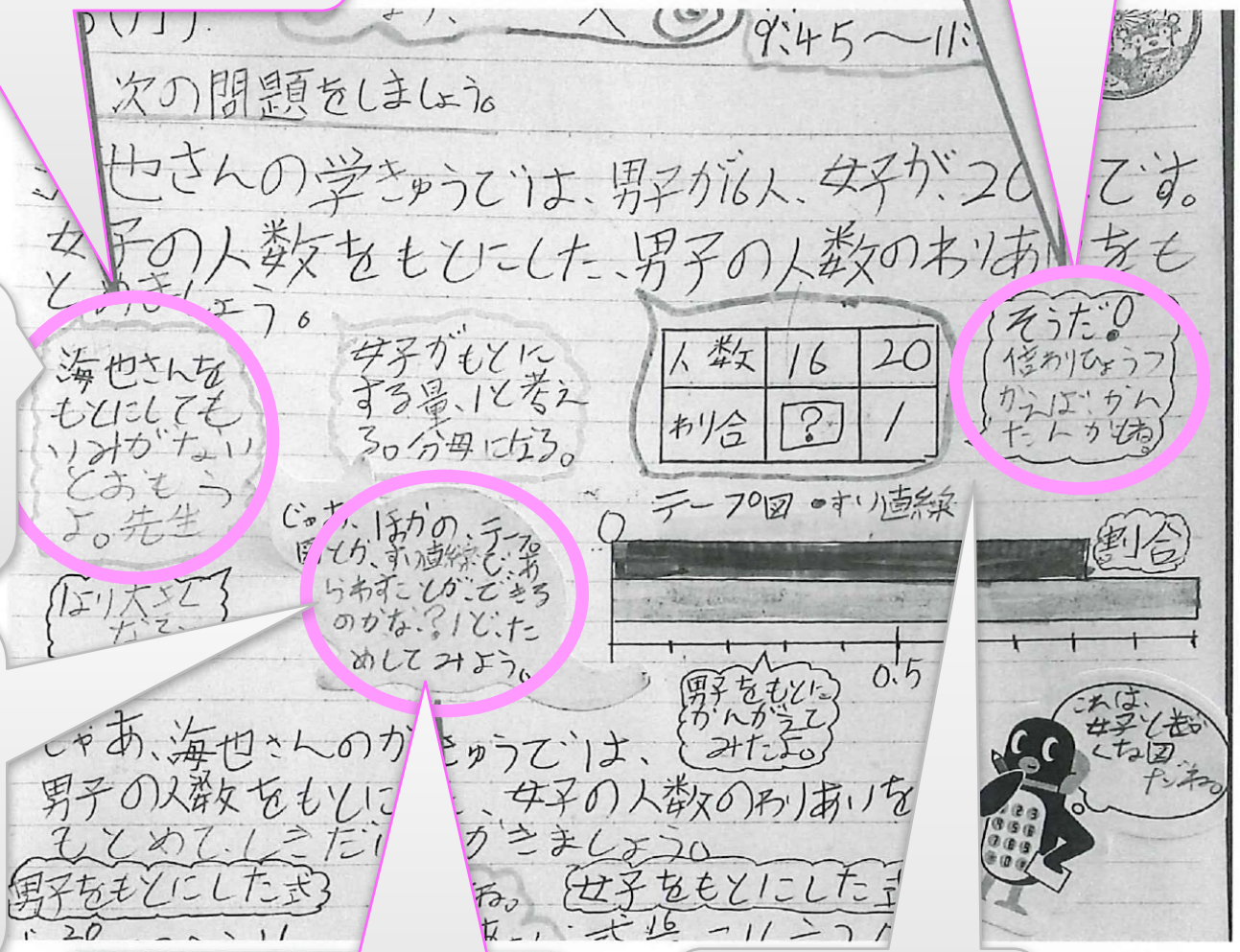
Area of parallelogram can be given if we change it to the

Represent the inner representation for re-learning of the class at home

CRICED
University of Tsukuba

In relation to class, he is discussing: it is evidence of reflection of their learning experience.

New finding in the process of re-learning at homework

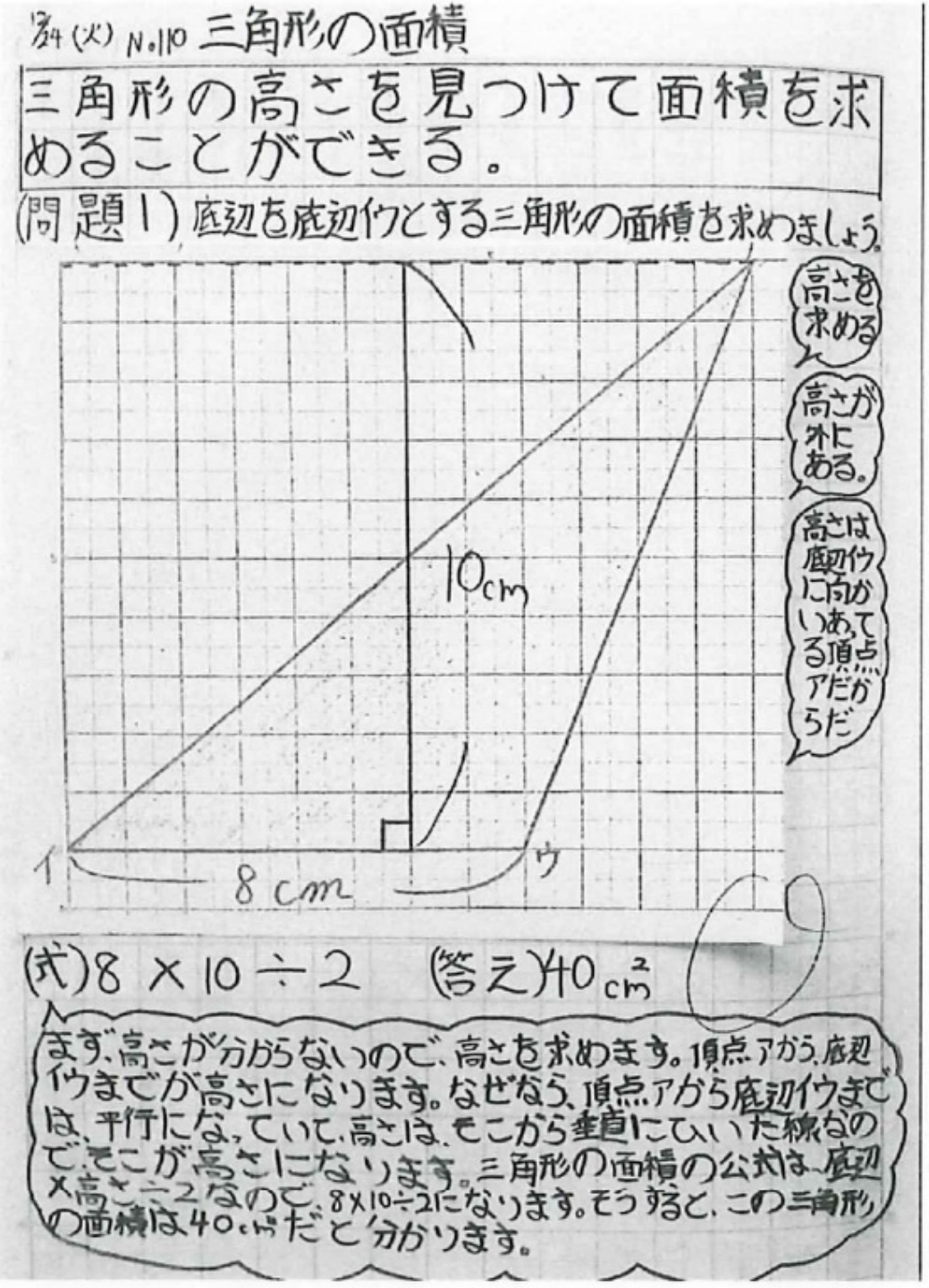


Ms. Tomori, the idea of Umiya cannot apply, right?

Then, can we use tape diagram and number line for explanation? Let's challenge.

It means that he has a wish to challenge extremely new methods for him.

Aha! If we use rule of three on the table, easy!

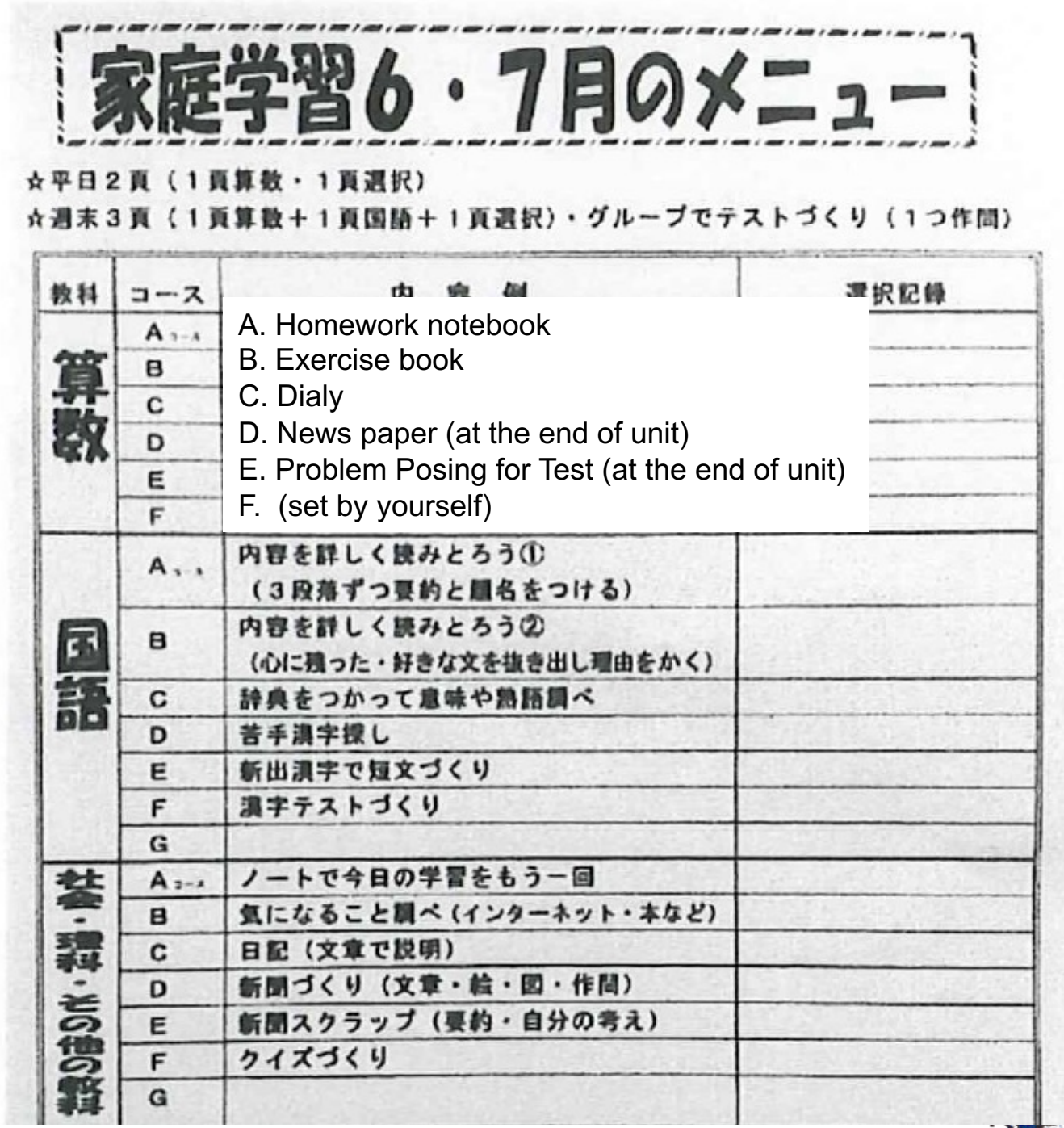


can use barroom in their notebook. On the board writing in the class, teacher teach children how to use barroom for writing their whispering in their mind. On the homework, the established custom supports children's reasoning step

Menu for Homework on Jun and July:

Why we need the menu for homework ?

Math 1page + Other subject 1page



家庭学習6・7月のメニュー

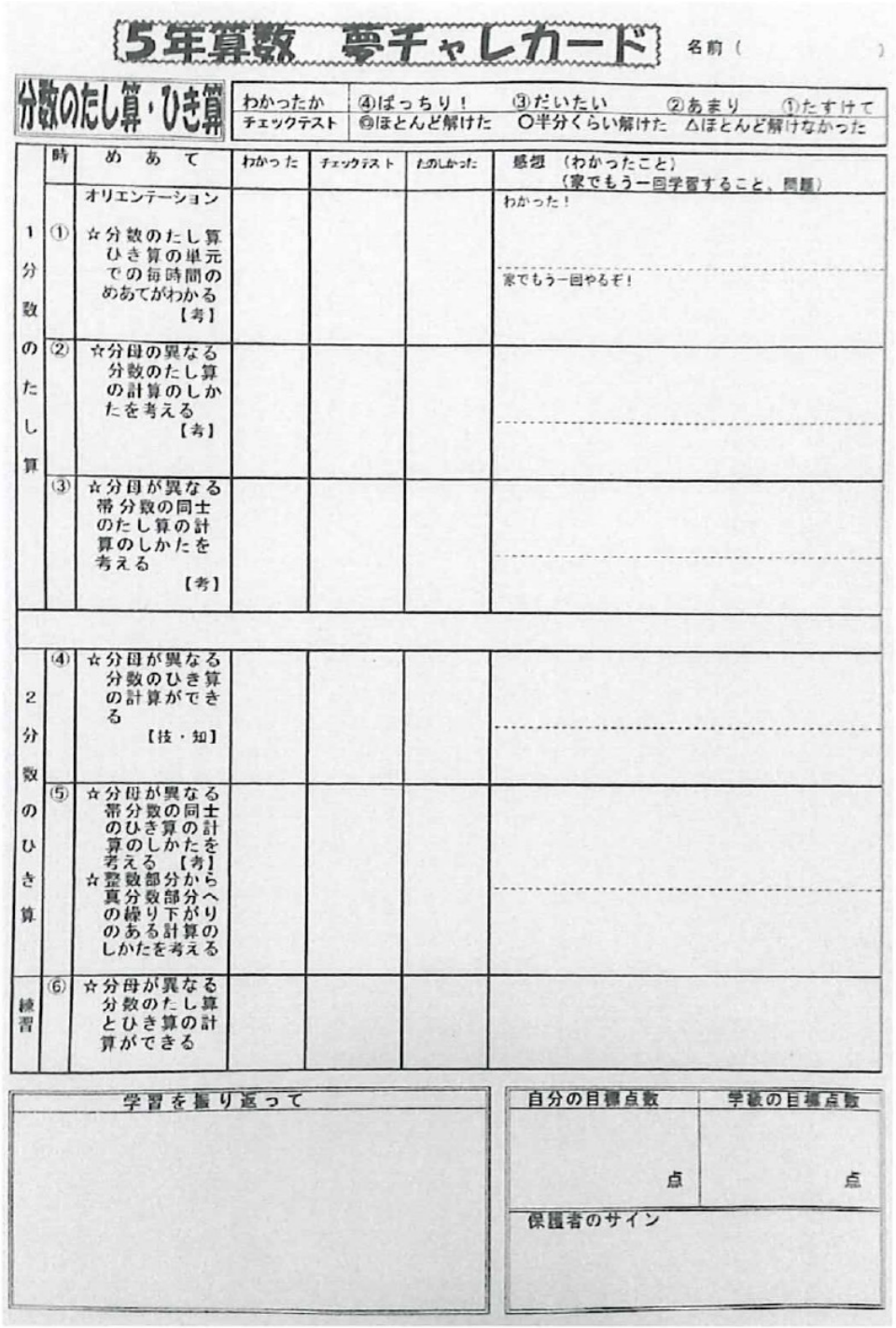
☆平日２頁（１頁算数・１頁選択）
☆週末３頁（１頁算数＋１頁国語＋１頁選択）・グループでテストづくり（１つ作問）

教科	コース	内容例	選択記録
算数	A	A. Homework notebook	
	B	B. Exercise book	
	C	C. Dialy	
	D	D. News paper (at the end of unit)	
	E	E. Problem Posing for Test (at the end of unit)	
	F	F. (set by yourself)	
国語	A	内容を詳しく読みとろう①（３段落ずつ要約と題名をつける）	
	B	内容を詳しく読みとろう②（心に残った・好きな文を抜き出し理由をかく）	
	C	辞典をつかって意味や熟語調べ	
	D	苦手漢字探し	
	E	新出漢字で短文づくり	
	F	漢字テストづくり	
	G		
社会・理科・その他の教科	A	ノートで今日の学習をもう一回	
	B	気になること調べ（インターネット・本など）	
	C	日記（文章で説明）	
	D	新聞づくり（文章・絵・図・作問）	
	E	新聞スクラップ（要約・自分の考え）	
	F	クイズづくり	
	G		

CRICED
University of Tsukuba

Self-evaluation for learning and planning.

- *Math-Dream challenge sheet.*
- *Show assessment condition to children and ask selfevaluation.*



5年算数　夢チャレカード　名前（　　）

分数のたし算・ひき算

わかったか　④ばっちり！　③だいたい　②あまり　①たすけて
チェックテスト　◎ほとんど解けた　○半分くらい解けた　△ほとんど解けなかった

	時	めあて	わかった	チェックテスト	たのしかった	感想（わかったこと）（家でもう一回学習すること、問題）
1 分数のたし算		オリエンテーション				わかった！
	①	☆分数のたし算ひき算の単元での毎時間のめあてがわかる【考】				家でもう一回やるぞ！
	②	☆分母の異なる分数のたし算の計算のしかたを考える【考】				
	③	☆分母が異なる帯分数の同士のたし算の計算のしかたを考える【考】				
2 分数のひき算	④	☆分母が異なる分数のひき算の計算ができる【技・知】				
	⑤	☆分母が異なる帯分数の同士のひき算の計算のしかたを考える【考】☆整数部分と分数部分からなる帯分数のひき算の繰り下がりのある計算のしかたを考える				
練習	⑥	☆分母が異なる分数のたし算とひき算の計算ができる				

学習を振り返って	自分の目標点数	学級の目標点数
	点	点
	保護者のサイン	

Three Notebooks

ノートの種類	ノートの役割
授業ノート	・授業中の思考過程や学習内容を記録する。
	・新たな問題に出会った際のひらめきや気づきを記録する。
	・自分の考えと友だちの考えを交流し，気づいたことや，さらに考えたことを記録する。
家庭学習ノート	・今日の授業を家に帰って再生し，考えを整理する。
	・今日の学習内容を定着させる。
算数交換日記	・家庭学習ノートで自分の中に落とし込んだ考えや思考の過程を友だちに説明する。
	・考え方や方法などをグループで共有する。

Class Notebook:

Thinking and Learning Process, Awareness of Problematic and Findings, Learning and finding from others

Homework Notebook:

Re-present and re-learning the today's class, Acquisition through practice

Daily-Exchange Group-Notebook:

Explain one's understanding to the others,
Sharing the ideas within group

CRICED
University of Tsukuba

Questions for presupposition
On APEC project, we are adapting lesson study for innovation of mathematics education

What is the role of lesson study for you?

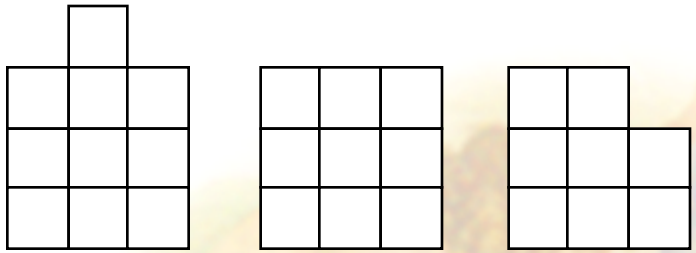
- *A method for knowing the objective of teaching class more deeply.*
  - *Before lesson study, we usually write the objective however it usually revised after the class and post-class discussion.*

What is the theory of lesson study for you?

- *A theory is able to support to do new practice*

What is the nature of the subject Mathematics for you?

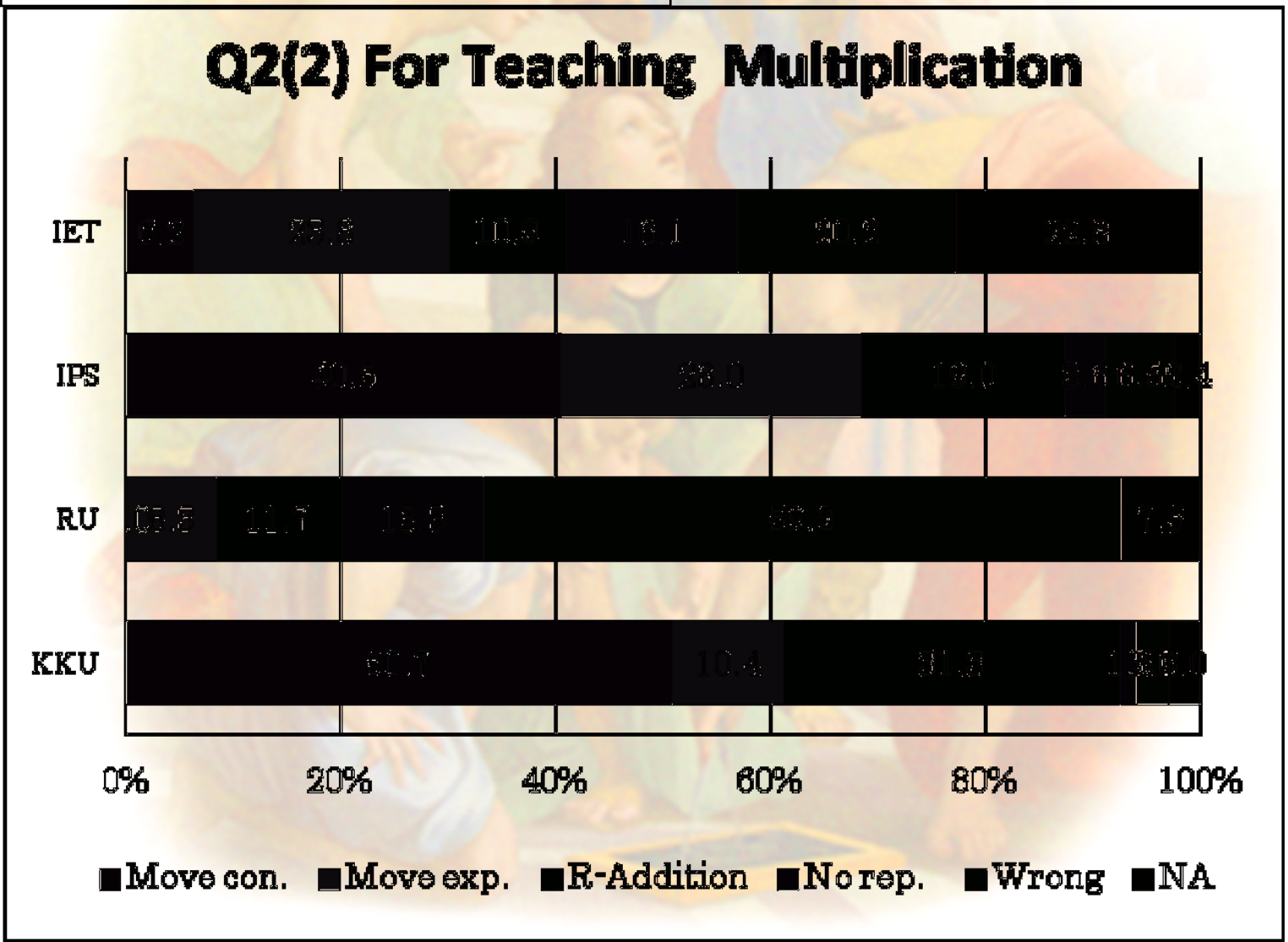
- *Mathematics can be learned based on what learned before even if we have to ask learners to extend their ideas.*



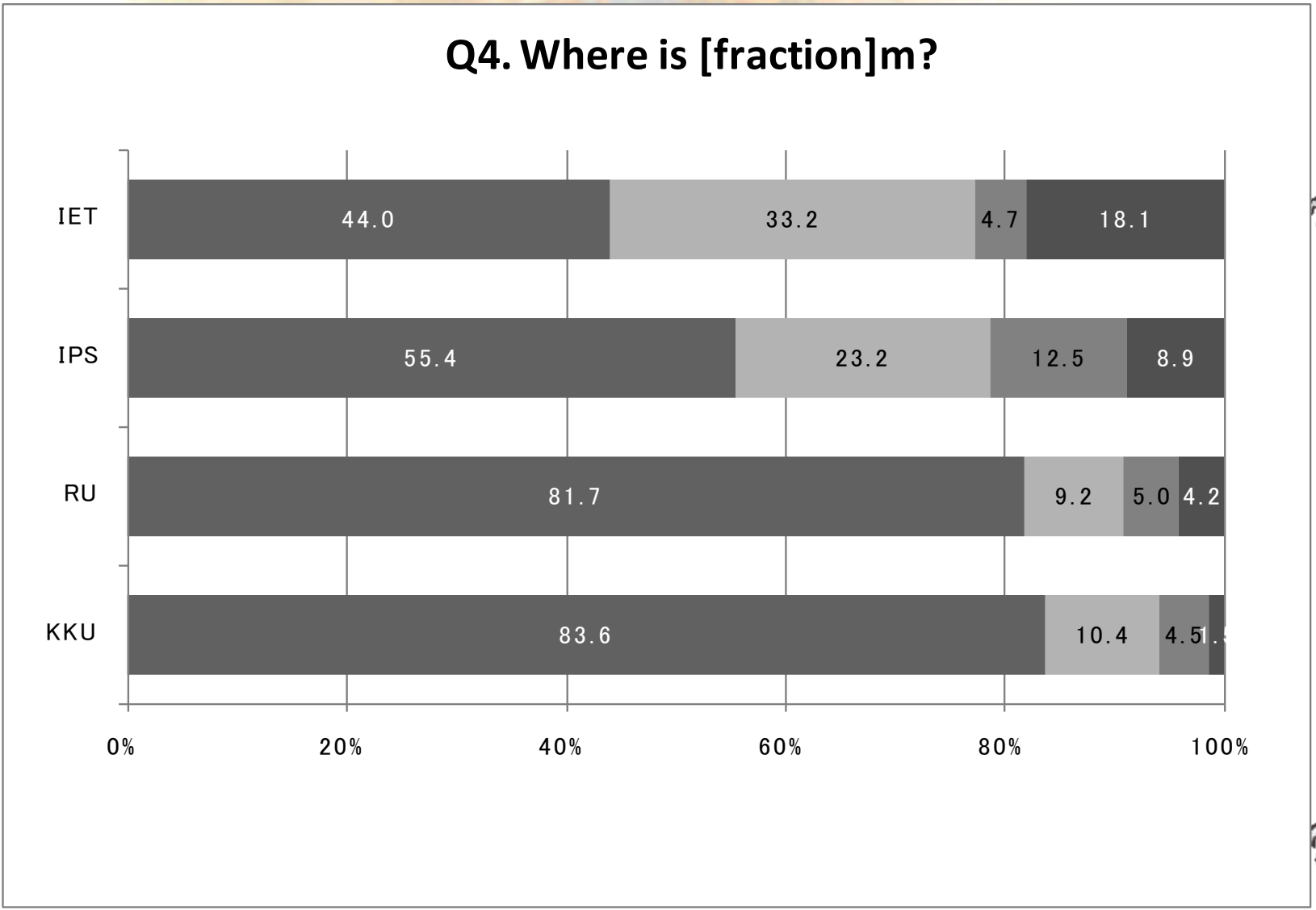
How Many?

By Isoda, Inprasitha, Anake

CRICED
University of Tsukuba



By Isoda, Inprasitha, Anake



Reference

- Abraham Arcavi and Masami Isoda, Learning to listen: from historical sources to classroom practice, *Educational Studies in Mathematics*, Vol. 66, No. 2, The History of Mathematics Education: Theory and Practice (October, 2007), pp. 111-129
- Masami Isoda（2007）, Lesson Study in Teacher Education Programs: How do Students Become Teachers That Implement Lesson Study? In Isoda et al edited. *JAPANESE LESSON STUDY IN MATHEMATICS Its Impact, Diversity and Potential for Educational Improvement, Singapole: World Scientific (pp176-179).*
- *Isoda (2006). NESTING FEATURES OF DEVELOPING TEACHERS' PERSPECTIVES: A LESSON STUDY PROJECT FOR PROSPECTIVE TEACHERS IN MATHEMATICS WITH HISTORY AND TECHNOLOGY Masami Isoda University of Tsukuba, Japan。APEC KKU conference, 2006. http://www.crme.kku.ac.th/APEC/PDF2006/file5Masami%20Isoda.pdf*
- *Isoda, M., Nakagoshi, A.(2000) A case study of student emotional change using changing heart rate in problem posing and solving Japanese classroom in mathematics,Edited by Nakahara, T., Koyama, M., Proceedings of the Conference of the International Group for the Psychology of Mathematics Education 24th, Hiroshima University Vol. 3, 87-94.*