

Designing Teaching Materials in the On-Demand Classroom Within the Context of Thailand Lesson Study Incorporated With Open Approach: TLSOA

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Abstract

This study aimed to explore how to design teaching materials for the On-Demand Classroom within the context of the Thailand Lesson Study incorporated with Open Approach. Employing a qualitative research methodology, this research involved thirty-one elementary school students and a lesson study team comprising mathematics teachers, researchers, and mathematics and art educators. Data collected from the process of the Thailand Lesson Study incorporated with Open Approach – Collaboratively Plan, Do, and See. Besides these processes, Blended Learning Classrooms, On-Demand Classroom, and Virtual Live Classrooms have been employed. The results revealed that during the collaborative planning process, the LS team designed teaching materials for the On-Demand Classroom, including an on-demand video containing a problem situation, introducing the materials and detailed box assembly instructions, worksheets, and clear guidelines for work submission. Besides, the Problem Situation in the ODC video was meticulously crafted in alignment with 1) Context, which overlaps with the student's experiences and is essential to coping with and engaging Problem Situation, in this study where the box exists daily. 2) Condition, which is the various forms of instruction that play a critical role in supporting students to connect with the PS to cultivate self-learning, students must create a box and unravel it or create it themselves.

Keywords: Teaching Material, On-Demand Classroom, Thailand Lesson Study Incorporated With Open Approach

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Introduction

The COVID-19 pandemic has disrupted education worldwide, leading to the closure of educational and other institutions. Many countries have adopted distance communication to address this, yet most countries encounter obstacles like insufficient infrastructure and limited access to computers and the Internet (Tadesse & Muluye, 2020). In Thailand, the sudden closure of educational institutions raised concerns about the continuity of learning for students at all levels. It was a crucial measure implemented to prevent the outbreak's spreading (Ministry of Education, 2022). While this process was essential for public health, it also brought significant challenges and disruptions to the education sector. The abrupt shift from face-to-face classroom learning to remote learning posed challenges for students, teachers, and parents alike. Notably, the transition to online learning highlighted existing disparities in access to technology and internet connectivity among students, particularly in rural and underserved areas (World Bank, 2021).

Even though learning has changed to distance learning, the ways to approach it are not as effective as studying in an actual classroom setting. This led to the challenge of student learning; some could not reach distance learning because of their economic affordance, staying home for a long time, affecting student learning efficiency, etc. Most educators and stakeholders seek to address this challenge.

However, in addressing this challenge, there is the impracticality of exclusive points out it was not practical to choose solely between online or on-site learning (Ohara, 2020). Notably, Inprasitha (2021; 2023) underscores the importance of effective blended learning, emphasizing the delicate balance between students' self-study time and their interactions with teachers and peers, and proposes the Blended Learning Classroom (BLC) as a teaching approach to address this challenge to improve students' self-regulated learning experiences and engagement by utilizing the Thailand Lesson Study incorporated with Open Approach (TLSOA) model (Inprasitha, 2006; 2011; 2022). As in the BLC model, the on-demand classroom, which contains problem situations in video format, is a critical component that allows students to engage in self-directed learning at their convenience (Inprasitha, 2023a). The problem situation, as designed in the video, plays a critical role in guiding students' self-directed learning and cultivating their ability to formulate and address their problems (Isoda & Katagiri, 2012). Understanding how to design problem situations within the ODC is a central focus of this study. Thus, this research aimed to explore how to design teaching materials in the On-Demand Classroom (ODC) within the context of TLSOA.

Teaching Material

Teaching Material is a meticulously designed lesson plan centered on designing problem situations derived from textbook translation projects of the Center for Research in Mathematics Education (CRME). Prioritizing problem-solving aims to foster the development of student's critical thinking skills by providing them with opportunities for independent thought. Aligned with Inprasitha (2016), a problem situation consists of two crucial components: context and condition. (1) Context: the segment intersecting with learners' direct experiences emerged as a meaningful anchor, particularly when students grappled with tasks, assignments, or problem situations. (2) Conditions: Encapsulated in concise instructions with "keywords," they played a pivotal role in accessing students' conceptualizations, enhancing their ability to navigate and effectively engage with future problems.

Thailand Lesson Study Incorporated With Open Approach (TLSOA)

TLSOA is an implementation model that integrates the Open Approach, a teaching approach for teaching mathematics problem-solving, with Lesson Study processes, and this model serves as a guideline for the school-based professional development of teachers (Inprasitha, 2015; 2022) (Figure 1).

Lesson Study refers to a process/approach that is focused on collaboration among teachers to improve their own and their peers' teaching practices through a constructed cycle to enhance and develop teachers' learning process and professional growth, directly impacting student learning development it consists of three steps as follows (Inprasitha, 2006; 2016; 2022). (1) Collaboratively Plan (Plan): The lesson study team designs the lesson plan and its critical components, such as problem situations (Inprasitha, 2016; 2019), designing teaching material, anticipating students' problem-solving and difficulties toward designed problem situations, and other necessary. (2) Collaboratively Do (Do): one of the lesson study teams implements the planned lesson from Step (1) with the OA as a teaching approach (Inprasitha, 2011; 2015; 2022), and the rest of the members observe the learning activities, prioritizing students' learning process. (3) Collaboratively See (See): conducted once a week as a weekly cycle to discuss the process that they have done during steps (1) and (2), such as the student learning process, the objective(s) of the lesson, the anticipated ideas, and the ideas that take place during step (2), the design of teaching material, etc. (Inprasitha, 2011, 2022). This step makes the TLSOA distinct from other models that, rather than immediately post-lesson as practiced in the Japanese Lesson Study and other countries, focus intensively on the details of the quality of the lesson itself as Inprasitha (2023b).

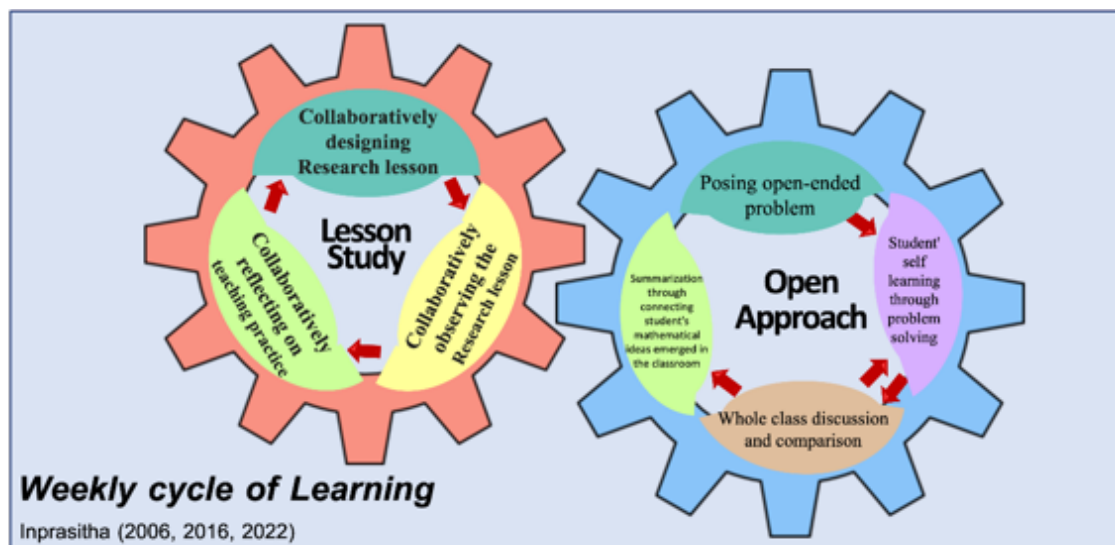


Figure 1: Weekly cycle of Learning based on the concept of Inprasitha (2006, 2016, 2022)

The Open Approach is a teaching approach that emphasizes problem-solving and utilizing open-ended problem situations to encourage students to pose and solve their problems. It is more centered on process-oriented outcomes. As well as emphasizing the student learning process, this approach consists of four steps (Inprasitha, 2006; 2011; 2022):

- (1) Posing open-ended problems: teachers propose the problem situation with the foundation of problem posing and solving, and students are motivated in problem situations and take a problem to themselves (Problematics).

- (2) Students' self-learning: students will individually/group solve the problem and later share every single thought in the group to come up with the group ideas, and the teacher will turn his/her role to observing students' problem-solving and jotting down their ideas – similar to the idea of Kikan- shido or the between desk instruction.
- (3) Whole-class discussion: students present their ideas to the whole class, and in this process, students ask questions to the presenter and discuss the idea together the responsibility of the teacher during this step is to guide mathematical discussions following each student's solution or ideas presentation.
- (4) Comparison and summarizing by connecting students' mathematical ideas: from step (3), teachers and students collaboratively compare and summarize each idea or solution to develop the class ideas and learn “how to” learn.

On-Demand Classroom (ODC)

The On-Demand Classroom (ODC) is a crucial component within the Blended Learning Classroom (BLC) model (Inprasitha, 2021; 2023a), as shown in Figure 2. In this approach, the ODC focuses on fostering informal learning, where students independently engage with educational content based on the context and conditions of tasks or problem situations provided by their teachers. Unlike traditional classrooms, ODC does not require students to schedule appointments with their teachers, enabling them to manage their learning time independently.

Within the BLC model, which also includes the Visual/Virtual Live Classroom (VLC) and the Face-to-Face Classroom (FFC), the ODC stands out as a platform for self-directed learning. Students are encouraged to navigate their learning journey without fixed timelines, allowing flexibility and adaptability. This emphasis on independence aims to empower students to take control of their education, aligning with the broader goals of the BLC model.

The ODC, as part of the BLC model, plays a crucial role in the paradigm shift from a dichotomy of online versus onsite learning to a more nuanced blend of self-learning and interaction. Blended Learning (BL) in this context is defined as the harmonious integration of self-learning and interaction learning and the synthesis of live and on-demand teaching approaches. This strategic combination forms a new extended classroom learning approach designed to seamlessly merge students' self-directed learning with interactive elements, promoting active learning.

Inprasitha (2023a) findings highlight the effectiveness of blending ODC, VLC, and FFC components within the BLC model. This combination offers students flexibility, accessibility, and diverse learning experiences. The approach accommodates various learning styles, enhances student engagement, and caters to individual needs. However, the specific blend and implementation of these approaches may vary based on subject matter, learning objectives, available resources, and student and teacher preferences. The ODC, within this framework, emerges as a dynamic and adaptable space that empowers students to become active participants in their educational journey.



Figure 2: Blended learning classroom (BLC) teaching approach (Inprasitha, 2021; 2023)

Research Methodology

Research Context

The participants comprised The Lesson Study team, which consists of twelve members: one mathematics teacher, three mathematics education researchers, three art teacher educators, and five mathematics teacher educators. Additionally, thirty-one upper elementary students from a northern Thailand school are participating in this study. This school was selected because it has been implementing the TLSOA (Inprasitha, 2022) as school-based professional development and is familiar with this approach.

Research Procedure

Before the program commenced, ethical approval for research was secured from the supervising board. Participants, having read the information, agreed to partake in the program.

Several data collections were recorded in audio and video formats. The video, audio recording, and lesson plan were used as research instruments. The data was collected from students' written worksheets, video recordings in the virtual live classroom, observational recordings, Interviews, field notes, and post-lesson discussion transcripts.

Data Collection and Data Analysis

The research methodology was a qualitative method based on lesson study processes, and the data were analyzed employing a qualitative method (Creswell & Creswell, 2022). Descriptive analysis was applied to interpret the data. The data from the first step of the Lesson Study in the TLSOA model (Inprasitha, 2022) were interpreted considering the framework for designing the problem situation (Inprasitha, 2016). The data was collected from students' written worksheets, video recordings in the virtual live classroom, observational recordings, Interviews, field notes, and post-lesson discussion transcripts. The data provides a comprehensive view and ensures accuracy through triangulation.

Result and Discussion

This study was conducted within the context of the TLSOA and focused on collaboration between teachers to improve their own and their peers' teaching practices through the Plan, Do, and See (Inprasitha, 2006; 2016; 2022), which was divided into two cycles, consisting of: Cycle of Lesson Study 1 (LS1): The LS team designs problem situations for the ODC with

steps 1-2 of the OA. and brings ideas that arise in class to analyze students' ideas and find guidelines for designing teaching in the next session. Cycle of Lesson Study 2 (LS2): Based on reflections in Cycle 1, the LS team used student ideas to design problem situations in Cycle 2 for the VLC/FFC with 4-step OA, as shown in Figure 3.

Cycle of Lesson Study 1

Within the first step – Collaboratively Plan, the lesson study team meticulously designed the students' learning activity, such as teaching materials and problem situations, emphasized the real-world context of students, and incorporated diverse perspectives in the psychomotor domain. This study's lesson plan is centered on crafting a joyful box to enhance students' spatial awareness by navigating between three-dimensional and two-dimensional concepts. The problem situation was separated into two problem situations. The first problem situation presents the task, "Let's create a box similar to those we encounter in everyday life." The conditions students are required to 1) trace each side of a box, 2) cut out the traced sides, 3) join each side together using adhesive paper, and 4) embellish the assembled structure to make it aesthetically pleasing. The second problem situation challenges students to consider the practicality of their creation by asking, "Can the crafted pieces be assembled into a functional box?" The condition is to let students construct a complete box from the pieces they have prepared (Figure 4).

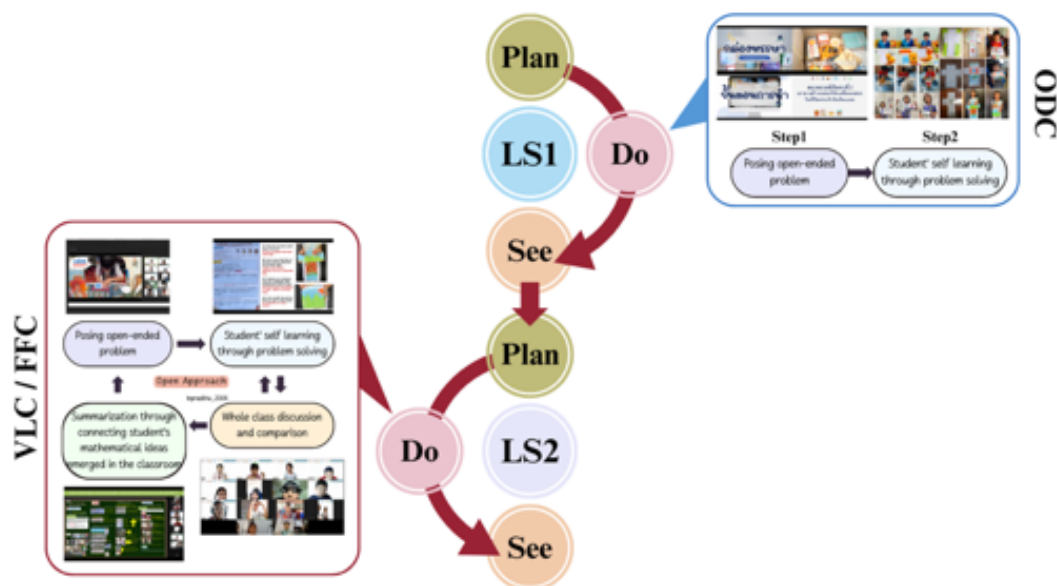


Figure 3: The cycle of Lesson development



Figure 4: Problem Situation, Condition and Anticipating Student Ideas

Collaboratively Do

Students' Ideas Form ODC

Through the activity, students demonstrated their ability to identify connections between two-dimensional and three-dimensional shapes. They successfully recognized relationships between the number of edges and faces. Furthermore, they showcased their creativity by constructing narratives on the unfolded box's faces through drawing and coloring, as shown in Figures 5 to 7.

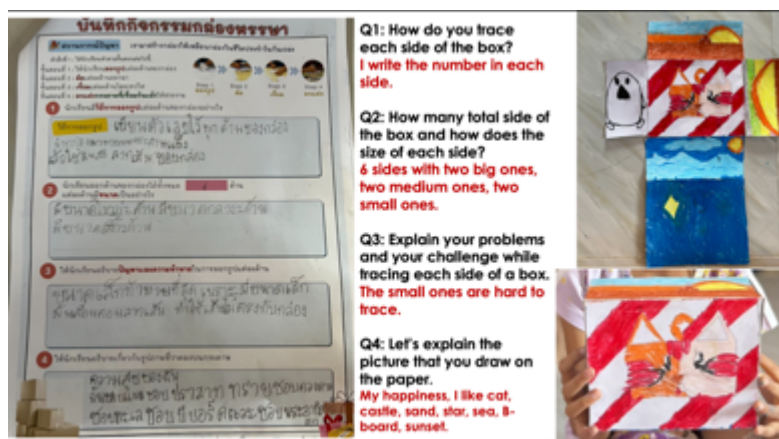


Figure 5: Student worksheet from ODC (1)

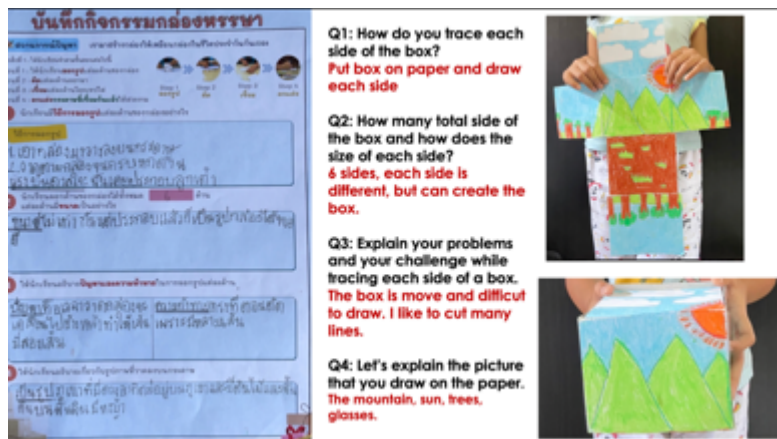


Figure 6: Student worksheet from ODC (2)

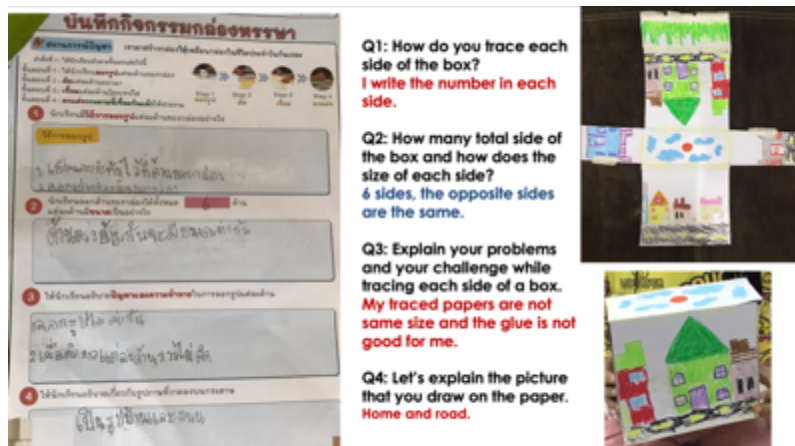


Figure 7: Student worksheet from ODC (3)

Taking the ideas generated from the students' preferences in the classroom, grouping them, and analyzing them to formulate questions for collaborative discussions in a virtual classroom has revealed that the questions elicited responses in the direction anticipated by the team (See Figure 8).

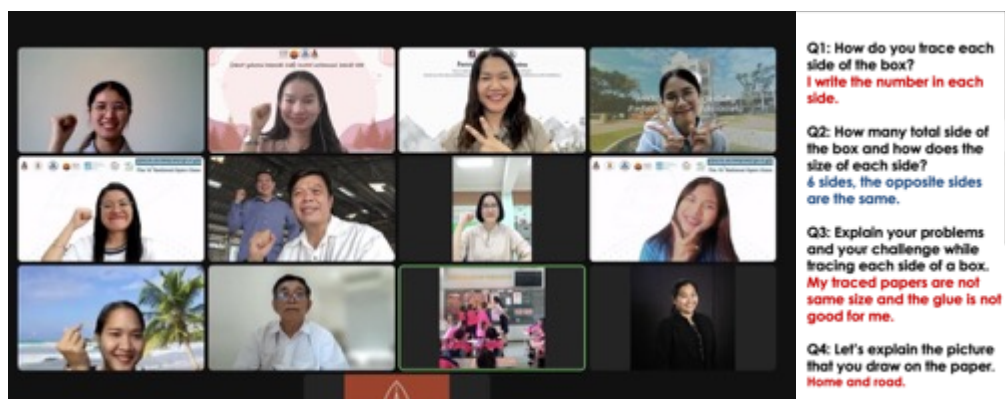


Figure 8: Collaboratively See and Questions

Students feel very confident in themselves and appreciate sharing their ideas in the classroom and appreciate others' ideas, as shown in Figure 9.

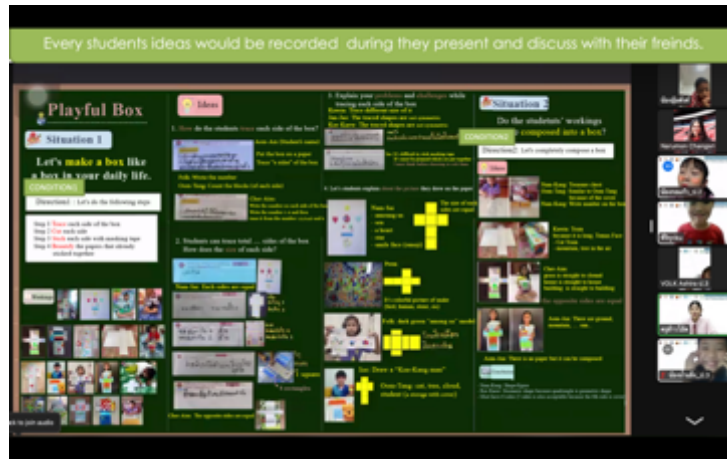


Figure 9: Student worksheet from VLC

Result ODC: Teaching Materials

The Lesson Study team responded to this challenge by creating a comprehensive set of teaching materials for the ODC. These materials included a box kit, an on-demand video, a worksheet, and a teaching guideline. The on-demand video introduced the necessary materials and provided step-by-step instructions for creating the box. Importantly, these teaching materials were deployed within the ODC, enabling students to engage in self-directed problem-solving in the comfort of their homes (Figure 10).

Result VLC: Teaching Material

Furthermore, the outcomes extended into the Virtual Live Classroom (VLC), where students' written works and assignments from the ODC (Figure 11) were utilized as additional teaching materials. This collaborative approach facilitated dynamic interactions between the teacher and students as they collectively presented and discussed ideas. Notably, students reported heightened confidence in expressing their thoughts and showed appreciation for both sharing their ideas and valuing others' contributions.

The results demonstrate successfully integrating carefully designed teaching materials into both the On-Demand and Virtual Live Classrooms. The multi-faceted approach enhanced students' problem-solving skills and fostered a sense of confidence and collaboration within the learning community.

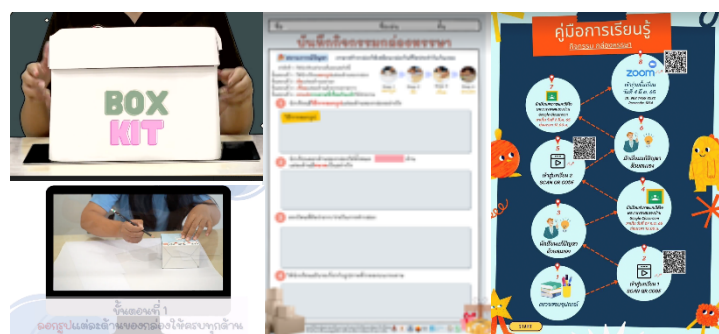


Figure 10: A comprehensive set of teaching materials for the ODC



Figure 11: students' written works and assignments from ODC

Conclusion

This study has shed light on the pivotal role of problem situations within the On-demand classroom (ODC) and the effective integration of innovative teaching approaches. The Lesson Study team designed problem situations for the On-Demand VDO, drawing upon the TLSOA principles (Inprasitha, 2022) and Problem Situations, which emphasized the crucial elements of Context and Conditions (Inprasitha, 2016).

The focus on Context and Conditions extended into the design of teaching materials within the ODC, aligning with the TLSOA implementation model. Integrating the BLC model, coupled with the collaborative efforts of a Lesson Study and an Open Approach, emerged as a potent combination. This synergistic approach not only heightened students' engagement in problem situations but also facilitated diverse modes of communication, including written work, visuals such as pictures and clips, and verbal articulation.

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