OP-199 [Beekeeping for Rural Development]
Beyond educational benefits, integrating stingless beekeeping into school activities generated additional income for the institution through honey and hive sales

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Problem-solving skills are essential 21st-century competencies, particularly in the digital era characterized by complexity and uncertainty. Developing these skills requires structured, analytical thinking and adaptability to overcome challenges sustainably. This study explores the integration of stingless beekeeping into school curricula as an experiential learning approach to enhance youth problem-solving abilities while fostering engagement in sustainable apiculture.

In collaboration with 25 teachers, the research team designed an interdisciplinary learning model incorporating stingless beekeeping into subjects such as mathematics, science, and Thai language from early childhood to secondary school levels. The approach emphasized experience-based learning, transformative learning curves, and real-world problem-solving. Teachers received training on stingless bee management, its ecological and economic benefits, and pedagogical techniques for integrating beekeeping into classroom instruction. They subsequently developed and implemented learning activities for over 200 students. For instance, in mathematics, students applied measurement concepts to construct stingless bee hives.

The program consists of seven subjects and two rally activities, which have been implemented in a total of seven schools. These include three primary schools in rural areas, one primary school for indigenous students, and four secondary schools in area of Ratchaburi Province, Thailand. The learning outcomes have been assessed through researcher observations, student interviews, and teacher questionnaire responses. The study assessed students' academic knowledge and problem-solving skills using various methods such as tests, observations, interviews, and reflection. Significant transformations were observed in both teachers and students. Teachers demonstrated increased competence in designing lessons based on real-world scenarios and improved interactions with students. Meanwhile, students exhibited greater enthusiasm for learning, enhanced analytical and systematic thinking, decision-making, and problem-solving skills across all grade levels. Beyond educational benefits, integrating stingless beekeeping into school activities generated an additional income of 5,000 Thai Baht per year, accounting for 15% of the family's income for the institution through honey and hive sales. This initiative not only reinforced students' engagement but also inspired entrepreneurial thinking, enabling them to explore beekeeping as a potential livelihood for their families. The findings highlight the potential of stingless beekeeping as a transformative educational tool that cultivates essential problem-solving skills while promoting environmental sustainability and economic empowerment.

King Mongkut's University of Technology Thonburi

Thailand Science Research and Innovation

NHBEE&P NATIVE HONEYBEE AND POLLINATOR RESEARCH CENTER

KMUTT RATCHABURI

Beyond Educational Benefits:

Integrating Stingless Beekeeping into School Activities Generate Additional Income

Panutda Yodsang

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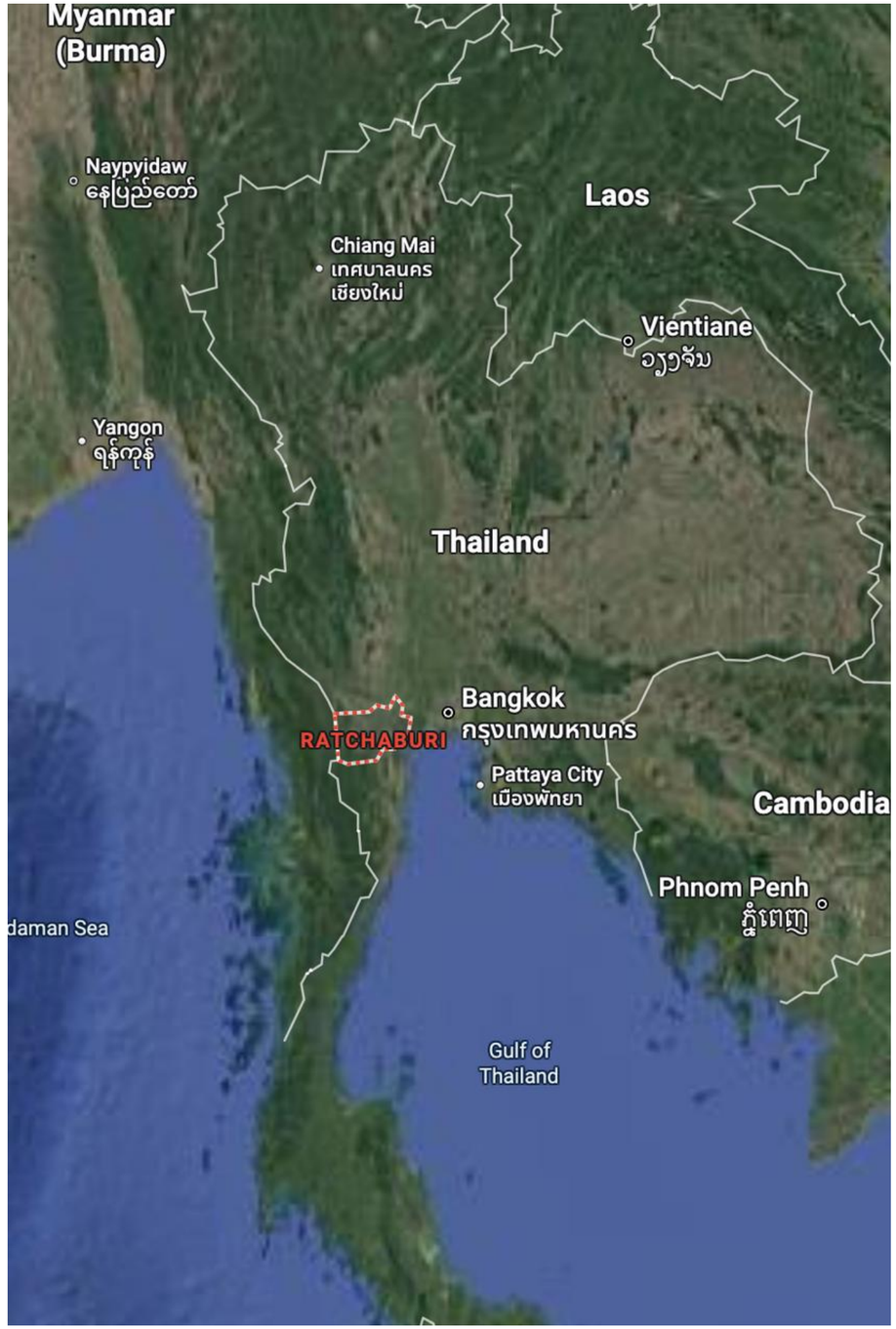
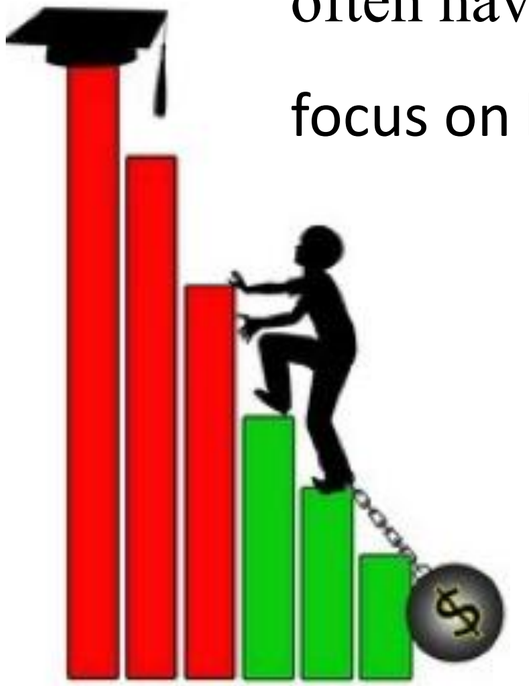
Ratchaburi Campus

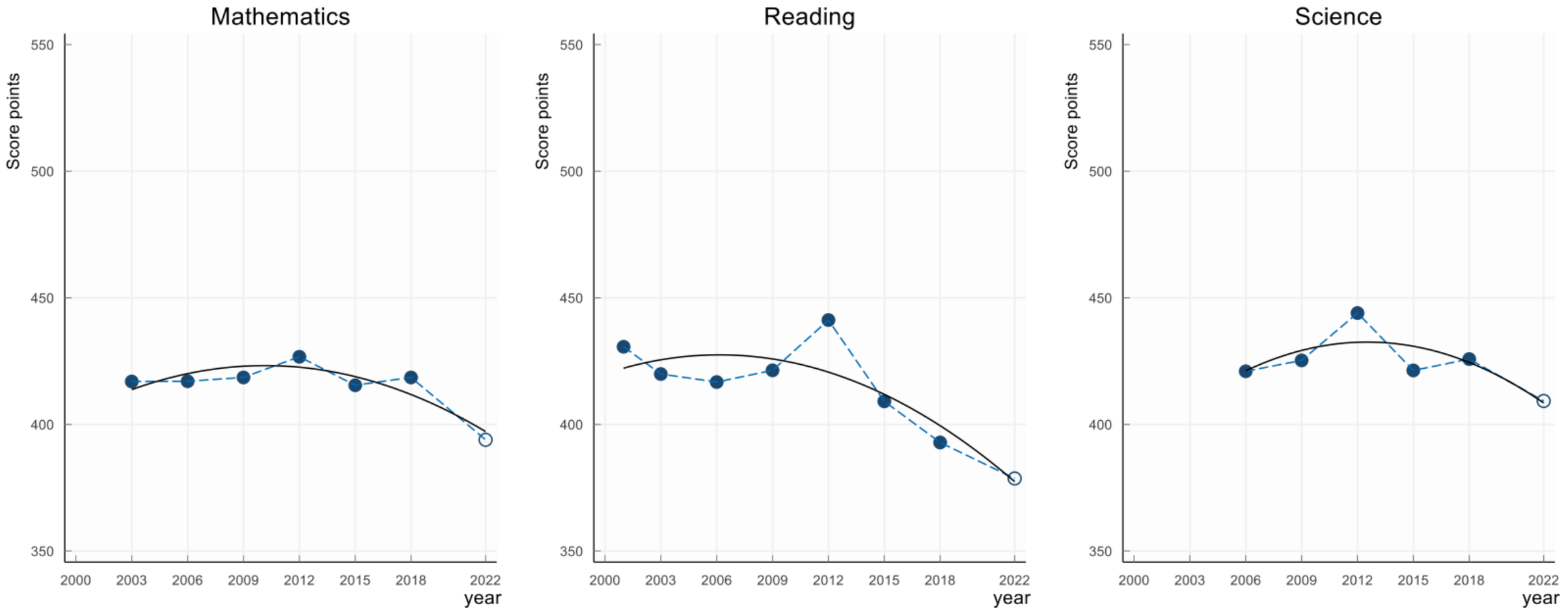
26 September 2025



Ratchaburi, Thailand

- Educational inequality
- Over 3,500 students at risk of dropping out
- Many families are low-income, and children often have to work causing students to lose focus on learning





PISA 2022 for Thailand: Mathematics, Reading, and Science

(Ref: Organisation for Economic Co-operation and Development)

Goals

Enhance students' problem-solving abilities via community resources-- **stingless bees.**

Why Stingless Bees for Authentic Task Design?

A group of bees
without functional stingers.

Native Honeybee and
Pollinator Center

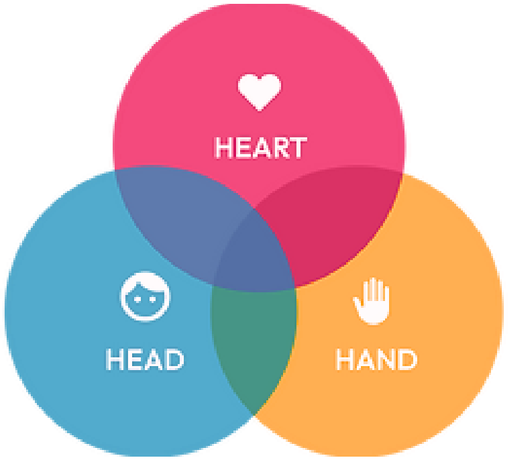
25 teachers across multiple schools in Ratchaburi Province.

300+ students from early childhood to secondary levels.

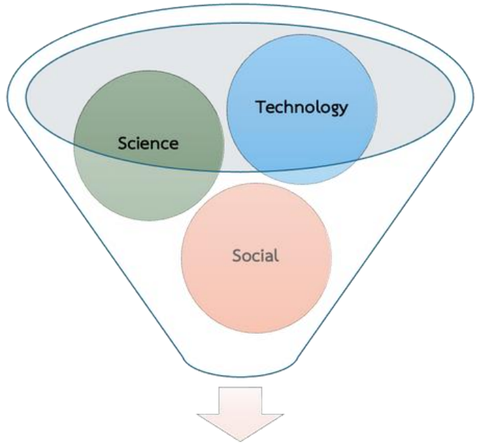
3 local experts : stingless beekeepers and learning designers.

Pedagogical Approach

Holistic Learning

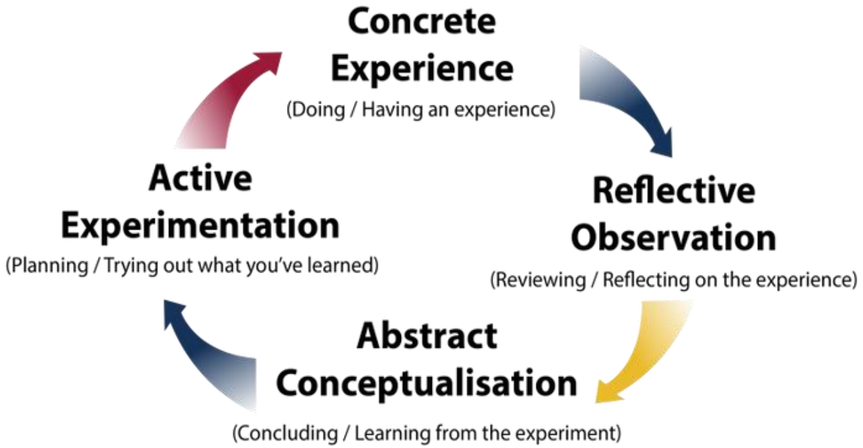


Integrated Learning

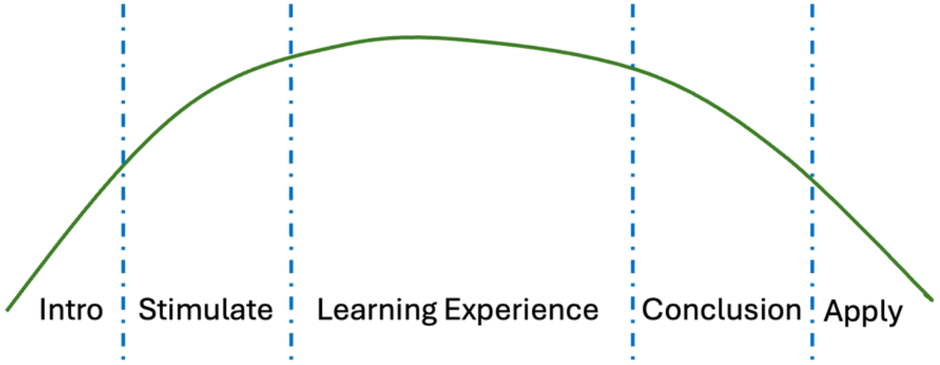


Transdisciplinary

Experience-based Learning



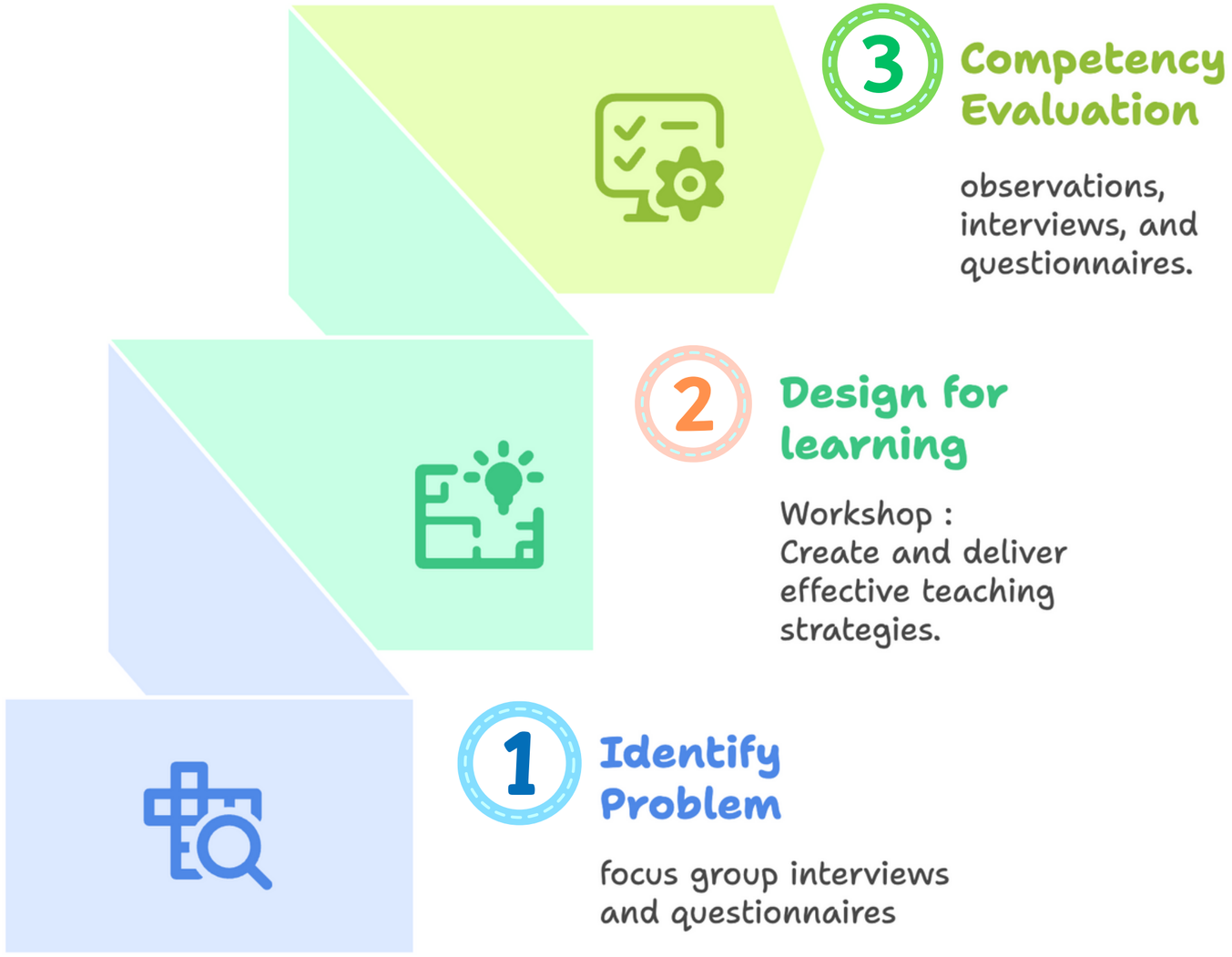
Transformative Learning



Learning ecosystem

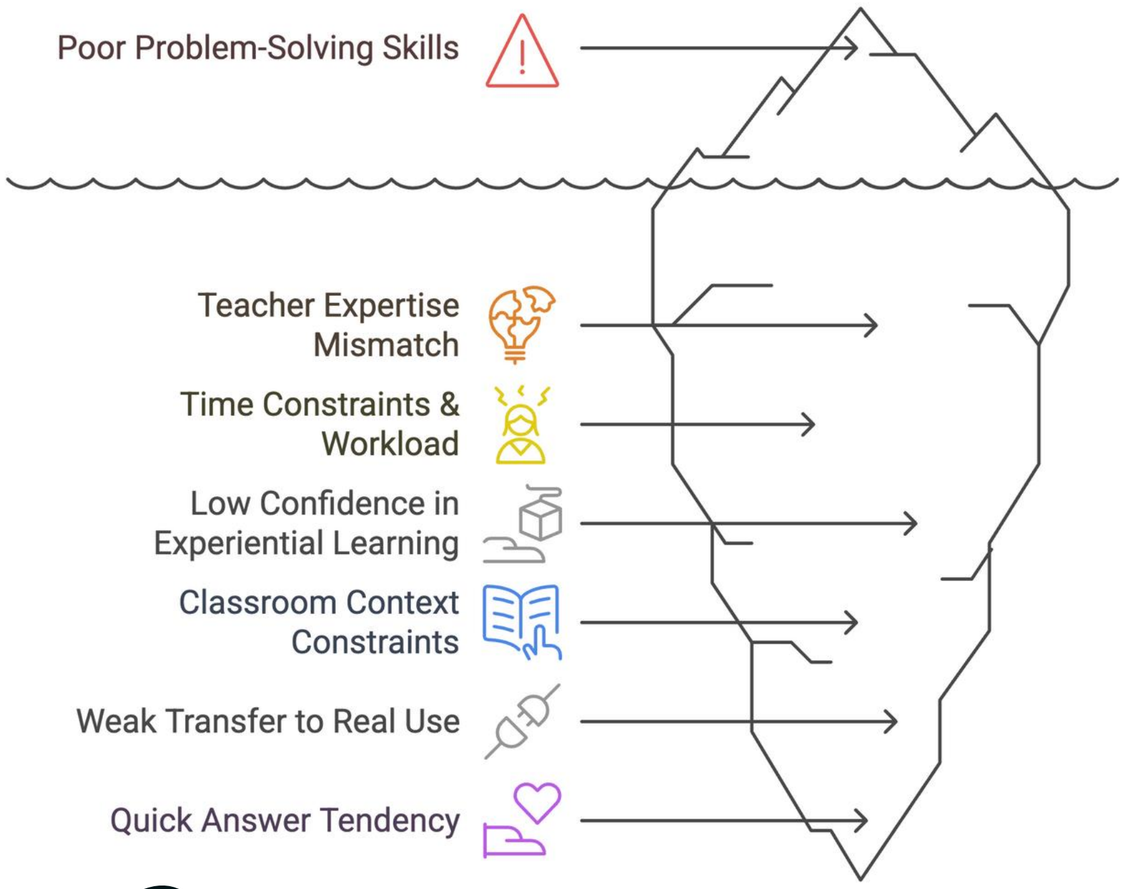
Researcher

3 Step Implementation Model

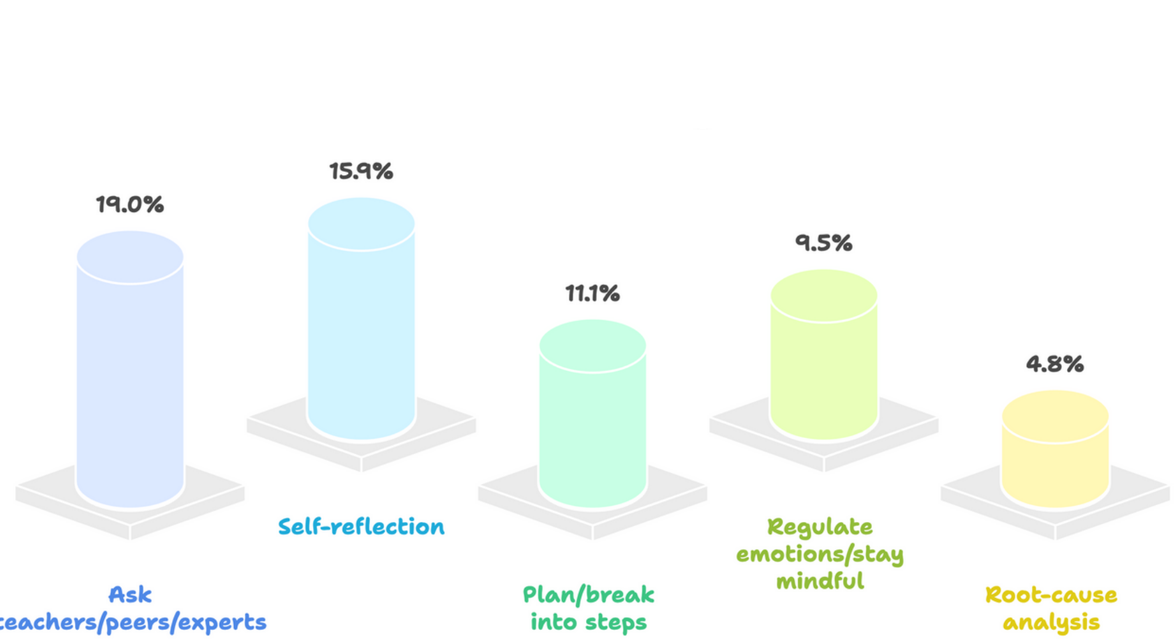


1 Identify problems

Challenges in Teaching Problem-Solving Skills



Teachers



Students

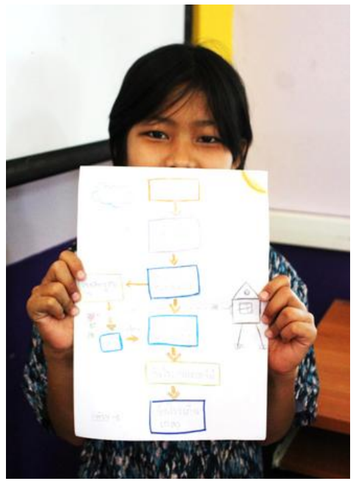
2 Design for Learning

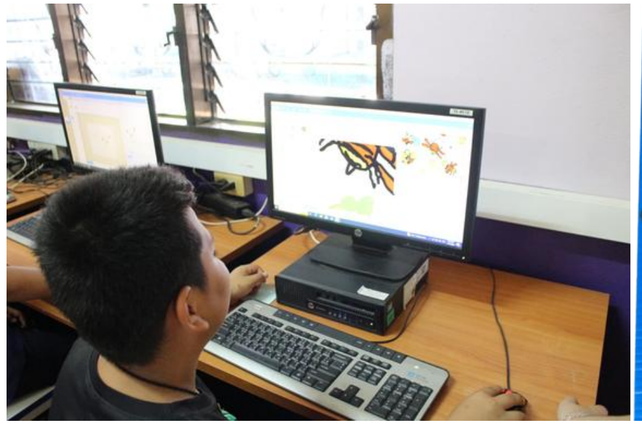
Teacher training :

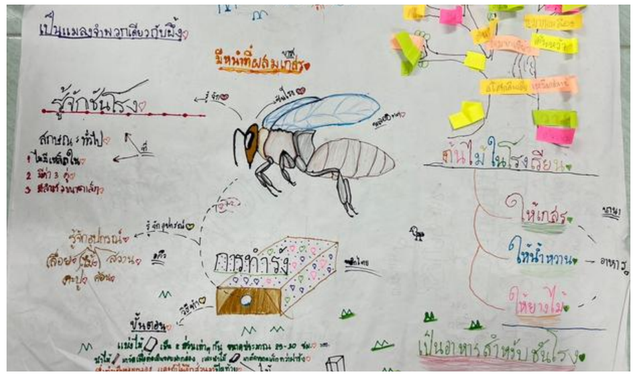
Learning Design via Experience-base Learning

remembered what it means to **“be a teacher”** and learn the basics of stingless beekeeping

2 Learning Model 1 : Integrated to the classroom







Outcomes :

1. Analytical thinking
2. Creative Thinking
3. Systematic Thinking

combining three subjects: Computer, Art, and Science.

2 Learning Model 2 : Becoming a Beekeeper

Competencies :

1. Stingless beekeeping
2. Environmental awareness & engagement
3. Entrepreneurial mindset

3 Competency Evaluation

Pedagogical Shifts

Teachers adopted student-centered strategies and enhanced their instructional repertoire.

Empathy and Reconnection

Teachers rediscovered the joy of learning and the importance of emotional connection.

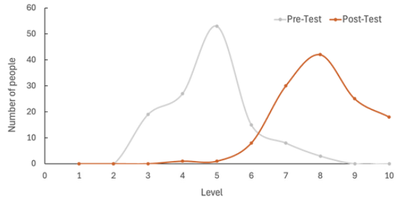
Collaborative Practices

Teachers from different schools collaborated, creating a professional learning community.

Teachers

Thinking

Improved analytical, systematic and problem solving skills



Engagement

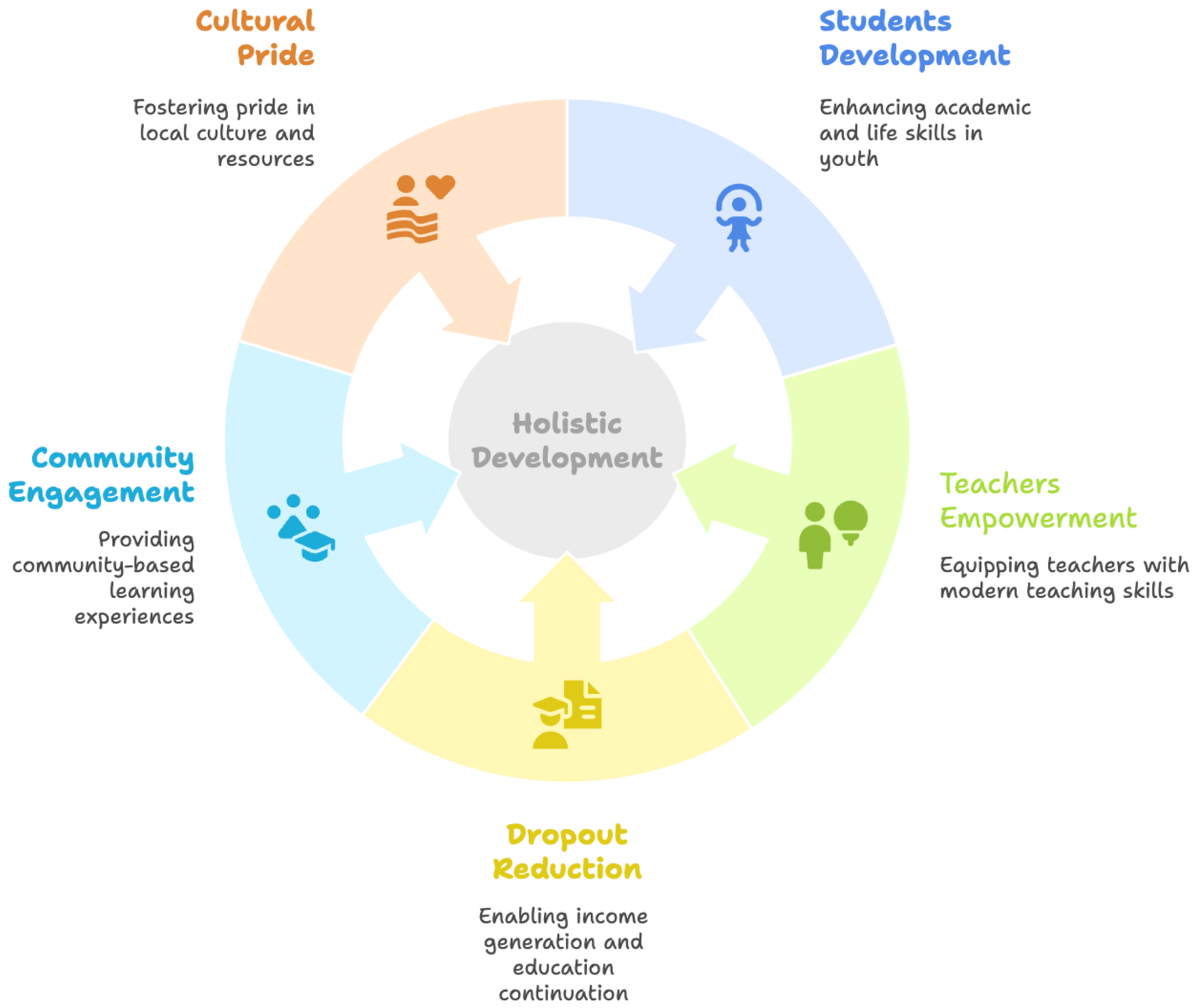
Higher enthusiasm for learning

Income

Additional income for students "5,000 THB per year"

Students

Conclusion


Cultural Pride
Fostering pride in local culture and resources
Students Development
Enhancing academic and life skills in youth
Holistic Development
Community Engagement
Providing community-based learning experiences
Teachers Empowerment
Equipping teachers with modern teaching skills
Dropout Reduction
Enabling income generation and education continuation

LEARNING
IS
HAPPINESS