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Research Article

Effects of the ACTIVE training program on teachers' development of key competency-based active learning and project-based learning

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Abstract

This study examined the effects of the ACTIVE Training Program on teachers' development of competency-based active learning and project-based learning (PBL). The ACTIVE Training Program—Activate-Connect-Transform-Integrate-Validate-Empower—was designed to address the gap between Thailand's educational policies and classroom implementation. Using a mixed-methods pre-experimental design, the study involved 50 basic education teachers from a private elementary school in Satun province, Thailand. Results demonstrated significant improvement in teachers' knowledge, with a normalized gain index of 0.77 (high level), and mean scores increasing from 9.68 to 17.58 points. Teachers showed high ability in designing learning activities integrating four active learning dimensions with five key competencies. Qualitative analysis revealed substantial changes in understanding of active learning concepts (62.00%), learning activity design skills (38.00%), and classroom application intentions (82.00%). Activities with greatest impact included the self-reflection letter writing and thinking/problem-solving tasks. Teachers reported highest satisfaction with the trainer and atmosphere, followed by the training process. The findings suggest that structured professional development incorporating emotional engagement, reflective practice, and collaborative design can transform teachers from content deliverers to learning architects capable of implementing competency-based education. The study contributes to understanding how teacher training can bridge policy-practice gaps in the Thai context, while offering a promising approach for teacher professional development aligned with 21st-century learning.

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Introduction

In the 21st century, the world is experiencing rapid and complex changes across technological, economic, social, and environmental dimensions. These transformations have necessitated urgent shifts in global education systems from content-based knowledge toward comprehensive competency development (World Economic Forum, 2023, p. 4; OECD, 2023, p. 3). Higher-order thinking abilities, creative problem-solving, communication, collaboration, and lifelong learning have become essential components of contemporary learning approaches.Thailand has established policies and educational development guidelines aligned with these global changes, such as the National Education Plan 2017-2036, which emphasizes learner competency development in line with the vision of "Thai people being high quality citizens of the country and the world" (Office of the Education Council, 2023, p. 6). However, policy reviews by OECD and UNESCO indicate that Thailand's education system still faces challenges in curriculum development, competency

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assessment, teacher preparation, and technology integration for learning (OECD/UNESCO, 2016, pp. 4-5). Research on Future Trends in Thai Education 2030 reveals that Thailand continues to emphasize fragmented learning approaches, lacking integration between knowledge, skills, and learner characteristics. Additionally, technology use remains limited in fostering participatory learning (Office of the Education Council, 2016, pp. 10–12). These challenges are evident at the school level. For instance, in the participating school—despite having a vision aligned with active learning and a commitment to moral, academic, and language development—teachers still encounter limitations in designing well-integrated activities that balance physical, mental, social, and intellectual dimensions while authentically connecting to core student competencies. To address these challenges through teacher professional development, the researcher has specifically designed the 'ACTIVE' Training Program as a teacher training methodology. This process—Activate-Connect-Transform-Integrate-Validate-Empower—aims to equip teachers with the knowledge and skills needed to implement competency-based active learning and Project-Based Learning (PBL) in their classrooms. Each component of the ACTIVE process serves a specific purpose in transforming teacher practice: 1) Activate stimulates teachers' awareness and enables context analysis; 2) Connect helps teachers link core concepts with student competencies; 3) Transform facilitates mindset shifts through student-centered approaches like PBL; 4) Integrate guides teachers in balancing physical-mental-social-intellectual dimensions in learning activities; 5) Validate creates opportunities for teachers to present their instructional designs and receive peer feedback; and 6) Empower strengthens teachers' professional capacity and supports implementation planning for their specific classroom contexts. This teacher training approach aligns with contemporary professional development trends that position teachers as learning designers and "change agents" rather than mere policy implementers (OECD, 2021, p. 3; WEF, 2024, p. 5). By focusing on teacher development through the ACTIVE process, this research aims to bridge the gap between educational policy and classroom practice, ultimately enhancing student learning experiences.

Therefore, this research examines the effects of the 'ACTIVE' Training Program on teacher development, specifically investigating how this structured training approach impacts teachers' knowledge, skills, and attitudes regarding competency-based active learning and PBL. The study seeks to determine whether teachers trained through this process can effectively design and implement learning activities that integrate student competencies with active learning approaches in ways that align with institutional, national, and global educational goals.

Objectives

This study examined the effects of the 'ACTIVE' Training Program on teachers' development of competency-based active learning and project-based learning. Specifically, this study aimed to:

- Determine the extent to which teachers' knowledge and understanding of competency-based active learning and project-based learning increased after participating in the ACTIVE training program;
- Assess the level of ability teachers demonstrated in designing learning activities using competency-based active learning and project-based learning concepts;
- Explore how teachers reflected on their professional learning experiences and pedagogical changes after the training program; and
- Evaluate teachers' satisfaction with the format, content, and process of the ACTIVE training program.

Research Problems

The main research problem focuses on investigating how the 'ACTIVE' Training Program affects teachers' knowledge, abilities, reflections, and satisfaction regarding competency-based active learning and project-based learning. Specific sub-problems include:

- To what extent does teachers' knowledge and understanding of competency-based active learning and project-based learning (PBL) increase after participating in the ACTIVE training program compared to before training?
- What level of ability do teachers demonstrate in designing learning activities using competency-based active learning and project-based learning concepts during the ACTIVE training process?
- How do teachers reflect on their professional learning experiences and pedagogical changes after participating in the ACTIVE training program?

- What is the level of teacher satisfaction with the format, content, and process of the ACTIVE learning training program?

Method

Research Design

This study employed a mixed-methods pre-experimental design (one-group pretest-posttest) to evaluate the effects of the 'ACTIVE' Training Program on teacher development. Quantitative methods assessed changes in teachers' knowledge and measured satisfaction levels using rating scales, while both quantitative and qualitative methods were employed to analyze teachers' reflections and satisfaction with the training. This methodological approach allowed for comprehensive evaluation of both objective learning outcomes and subjective participant experiences, aligning with contemporary program evaluation practices in educational research. The design was appropriate for this educational context despite lacking a control group, as it efficiently measured specific intervention effects within resource constraints.

Participants and Sampling

The study initially had 60 registered participants, including 5 male teachers (8.33%) and 55 female teachers (91.67%). However, the final sample consisted of 50 basic education teachers (45 females and 5 males) who completed both the pre-test and post-test and consented to have their data used in the research. Most participants (48%) were aged 35-44 years, followed by those aged 25-34 years (30%), and 45-54 years (14%). Participants represented various subject areas, with the largest group teaching at the early childhood level (32%), followed by foreign languages (20%), Thai language (14%), science and technology (12%), and mathematics (10%). Participants were recruited through purposive sampling from a private school in Satun province that promotes active learning policies and provides opportunities for continuous professional development for teachers.

Data Collection Tools

The research instruments included: Knowledge assessment test: A 20-point pre-test and post-test to measure teachers' knowledge and understanding of competency-based active learning and project-based learning before and after training. Learning activity design assessment forms: Rubric-based assessment tools using 5-3-1 scoring criteria to evaluate teachers' ability to design learning activities during the training. The assessment covered six dimensions: alignment with Active Learning 4 dimensions, integration of 5 key competencies, implementation of Project-Based Learning concepts, contextual relevance and feasibility, reflective practice, and creativity and application. Reflection forms: Open-ended questionnaires capturing teachers' reflections on their key learning points, impactful activities, changes in perspectives, and intentions to apply knowledge after participating in the training. Satisfaction questionnaire: A 5-point Likert scale survey (1.00-1.80 = lowest, 1.81-2.60 = low, 2.61-3.40 = moderate, 3.41-4.20 = high, 4.21-5.00 = highest) to assess teachers' satisfaction with the format, content, and process of the ACTIVE learning training across three main categories: content satisfaction, training process satisfaction, and trainer and atmosphere satisfaction.

Instrument Validation

All research instruments underwent a rigorous validation process to ensure their content validity before implementation. A panel of four experts with backgrounds in educational measurement and evaluation (1), curriculum and instruction (2), and Project-Based Learning and Training (1) reviewed the instruments. These experts assessed each item's relevance, clarity, and appropriateness using the Index of Item-Objective Congruence (IOC) method.

The expert validation yielded positive results across all instruments. The knowledge assessment test received an IOC score range of 0.67-1.00 with a mean IOC of 0.89, indicating strong content validity. The learning activity design assessment forms received an IOC range of 0.67-1.00 with a mean of 0.91. The reflection forms and satisfaction questionnaire received IOC scores of 0.78 and 0.86 respectively, both exceeding the 0.60 threshold for acceptable content validity.

Expert feedback included recommendations for minor revisions to improve clarity and precision. These included revising certain knowledge test items to eliminate ambiguity, refining the wording of some rubric descriptors in the

assessment forms, adding more specific prompts to the reflection forms, and adjusting the satisfaction questionnaire rating scale descriptors. All recommended modifications were implemented before finalizing the instruments for data collection, ensuring that they accurately measured the intended constructs and were appropriate for the target participants.

Data Analysis

The collected data were analyzed using the following methods:

Quantitative analysis

Descriptive statistics (frequency, percentage, mean, standard deviation) were used to analyze demographic data, knowledge test scores, and satisfaction levels.

The normalized gain index (g = [post-test score - pre-test score]/[maximum score - pre-test score]) was calculated to determine the level of improvement in teachers' knowledge, with interpretation criteria: <0.30 = low level, 0.30-0.70 = medium level, >0.70 = high level (Hake, 1998).

Score distribution analysis was conducted to examine the pattern of changes in teachers' knowledge levels before and after training.

Qualitative analysis

Content analysis was applied to examine teachers' reflection responses, categorizing the data into themes and calculating frequencies and percentages for each theme.

Four main areas of reflection were analyzed: key learning points from the training, activities that most impacted teachers' thoughts and feelings, changes in perspectives after training, and intentions to apply knowledge from the training.

Representative quotes from teachers were selected to provide deeper insights into their learning experiences and changes in perspectives.

Procedure

The training and data collection were conducted on May 14-15, 2025, at a private school in Satun province. The training followed the 'ACTIVE' Training Program developed by the researcher:

Activate: Stimulating awareness of the importance of change in teaching approaches through engaging activities such as brain gym exercises, thought-provoking games like the Hanoi Tower, and emotional video clips that connected with teachers' personal experiences and motivations.

Connect: Linking competency-based concepts with teachers' experiences, focusing on Active Learning 4 dimensions (physical, emotional, social, and intellectual) and the five key competencies (communication, thinking, problem-solving, life skills, and technology use).

Transform: Transforming thinking paradigms through new approaches such as PBL, challenging teachers to reconsider traditional teaching methods and adopt more student-centered approaches.

Integrate: Guiding teachers to design learning activities that integrate Active Learning 4 dimensions, competencies, and PBL principles, with opportunities for hands-on practice and collaborative work.

Validate: Creating space for teachers to present their learning designs and exchange constructive feedback with peers, fostering a professional learning community.

After the Validate phase, the post-test and reflection questionnaires were administered to collect data on knowledge gains and teachers' opinions about the training experience. This strategic timing ensured that all participants completed the assessments before proceeding to the final phase.

Empower: For the final phase, teachers created encouraging messages on post-it notes to share with the entire group. In a symbolic act of community and shared purpose, teachers collaboratively arranged these notes to form the abbreviation of their school name, surrounding it with marbles in a heart shape. This visual representation symbolized their collective commitment to the school's vision and to implementing the new teaching approaches. Selected representatives then delivered motivational speeches to their colleagues, reinforcing the community of practice and strengthening their dedication to transforming classroom practice.

This thoughtfully designed conclusion to the 'ACTIVE' Training Program not only collected comprehensive data but also created a meaningful, emotionally resonant experience that strengthened teachers' sense of community and purpose as they prepared to implement their new knowledge in their classrooms.

Results

To address the research problems investigating the effects of the 'ACTIVE' Training Program on teachers' development, the findings are presented in four sections corresponding to each research sub-problem. Prior to these results, demographic data of the participants are described to provide context for the study.

Teachers' Knowledge and Understanding Before and After Training

The first research problem examined the extent to which teachers' knowledge and understanding of key competency-based active learning and project-based learning increased after participating in the 'ACTIVE' Training Program compared to before training.

Table 1. Mean scores, standard deviation, gain scores, and normalized gain index of teachers' knowledge and understanding before and after training (n = 50)

Test	Maximum Score	Mean	SD	Gain Score	% Gain	Normalized Gain*	Interpretation
Pre-training	20	9.68	3.22	7.90	39.50	0.77	High level
Post-training	20	17.58	2.95				

Normalized Gain (g) = (Post-test score - Pre-test score)/(Maximum score - Pre-test score), with interpretation criteria: <0.30 = low level, 0.30-0.70 = medium level, >0.70 = high level (Hake, 1998)

The analysis revealed that before training, teachers had a mean score of 9.68 points (SD=3.22), which increased to 17.58 points (SD=2.95) after training. The average gain was 7.90 points, representing a 39.50% improvement. The normalized gain index of 0.77 indicates a high level of improvement according to Hake's (1998) criteria.

The score distribution analysis showed a clear shift in performance levels. Before training, most teachers (48.00%) scored in the 6-10 range, while after training, the majority (80.00%) scored in the high range (16-20 points), as shown in Table 2.

Table 2. Frequency distribution and percentage of teachers' knowledge and understanding scores before and after training

Score Range	Pre-training		Post-training	
	Frequency	Percentage	Frequency	Percentage
16-20	4	8.00	40	80.00
11-15	14	28.00	8	16.00
6-10	24	48.00	2	4.00
0-5	8	16.00	0	0.00
Total	50	100.00	50	100.00

The areas where teachers showed the most significant improvement were in understanding key competency-based learning design connected to real-life situations and backwards assessment, with correct responses increasing from 34.00% to 92.00% and from 36.00% to 90.00%, respectively.

These findings indicate that the 'ACTIVE' Training Program was highly effective in enhancing teachers' knowledge and understanding of key competency-based active learning and project-based learning, with improvement measured at a high level according to established educational research criteria.

Teachers' Ability to Design Learning Activities

The second research problem examined teachers' abilities to design learning activities using competency-based active learning and project-based learning concepts during the 'ACTIVE' Training Program.

Teachers were divided into 7 teams, and their learning activity designs were evaluated using a 5-3-1 scoring rubric (excellent-satisfactory-needs improvement) across six dimensions. Analysis of the designs revealed the following:

Table 3. Assessment scores of teachers' learning activity designs

Teacher Team	D1: Active Learning 4 Dimensions	D2: 5 Key Competencies	D3: PBL Implementation	D4: Contextual Relevance	D5: Reflective Practice	D6: Creativity	Total Score (out of 30)
1.1	5	5	5	5	4	5	29
1.2	5	5	5	5	4	5	29
2.1	5	5	5	5	4	5	29
2.2.1	3	3	3	5	3	3	20
2.2.2	5	5	5	5	3	3	26
3.1	3	3	3	3	3	3	18
3.2	4	4	4	4	3	4	23
Mean	4.29	4.29	4.29	4.57	3.43	4.00	24.86
SD	0.95	0.95	0.95	0.79	0.53	0.96	4.74

The overall mean score (24.86/30 or 82.87%) indicates a high level of ability in designing activities that incorporate competency-based active learning and project-based learning principles. "Contextual relevance and feasibility" received the highest average score (4.57/5), while "Reflective practice" scored lowest (3.43/5) with the smallest standard deviation (0.53), suggesting a consistent area for improvement across all teams.

High-scoring designs demonstrated: (1) explicit integration of all four active learning dimensions; (2) clear connections between activities and competencies; (3) well-structured PBL methodology; (4) strong real-world relevance; and (5) innovative applications in culturally appropriate contexts.

Common areas for improvement included: (1) enhancing reflection components; (2) strengthening competency-activity connections; (3) providing more detailed implementation guidance; (4) better balancing emotional and social dimensions; and (5) incorporating more diverse technological applications.

These findings indicate that the 'ACTIVE' Training Program effectively developed teachers' abilities to design competency-based active learning and project-based learning activities, while highlighting reflection as an area requiring continued professional development.

Teachers' Reflections on Learning Experiences and Changes

The third research problem examined teachers' reflections on their learning experiences and changes after participating in the 'ACTIVE' Training Program. Qualitative content analysis of open-ended responses from 50 participants revealed significant reflective patterns across key areas.

Key Learning Points from the Training Program

Content analysis of responses to the question "What was the most important thing you learned from this training program?" revealed several significant themes as presented in Table 4.

Table 4. Frequency and percentage of key learning points from the training program

Key Learning Points	Frequency	Percentage
1. Conceptual Knowledge and Principles	31	62.00
- Active Learning	10	20.00
- Key Competency-Based Learning	8	16.00
- Project-Based Learning (PBL)	4	8.00
- Four-Dimensional Active Learning (Physical-Emotional-Social-Intellectual)	9	18.00
2. Learning Activity Design and Implementation Skills	19	38.00
- Designing Diverse Activities	8	16.00
- Integrating Learning	5	10.00
- New Teaching Techniques and Processes	6	12.00
3. Classroom Application	8	16.00
- Applying Knowledge in Classrooms	7	14.00
- Application Across Subject Areas	1	2.00
4. Collaborative Skills	7	14.00
- Unity and Teamwork	5	10.00
- Exchange of Ideas	2	4.00
5. Training Experience	4	8.00
- Enjoyable Training Atmosphere	3	6.00
- Trainer Quality	1	2.00
6. Thinking Skills	7	14.00
- Analytical Thinking and Creativity	5	10.00
- Thought Stimulation	2	4.00
No Response	3	6.00

Note: Table shows frequency of learning points mentioned by teachers from a total of 50 respondents, calculated as percentage of all teachers mentioning each point. Some teachers mentioned multiple points.

The majority of participating teachers (62.00%) identified conceptual knowledge and principles as their most important learning, particularly "Active Learning" (20.00%) and "Four-Dimensional Active Learning" (18.00%), which directly aligned with the main objectives of the training program. Learning activity design and implementation skills ranked second (38.00%), with "Designing Diverse Activities" being the most frequently mentioned (16.00%).

Teachers also valued classroom application (16.00%), indicating that the training program motivated them to transfer their newly acquired knowledge to authentic teaching contexts. "Collaborative Skills" (14.00%) and "Thinking Skills" (14.00%) were equally emphasized, reflecting the 'ACTIVE' Training Program's comprehensive development of knowledge, practical skills, and collaborative attributes.

Representative quotes included:

Regarding conceptual knowledge: *"Active Learning requires placing students at the center of learning while teachers function as scenario designers to develop real-life competencies and project-based learning."*

> Regarding learning activity design: *"Diverse activities can be integrated across subject areas to help students gain knowledge, stimulate interest, and participate. For example, in Thai language learning, the magical box arrangement activity (using the same principle as Tower of Hanoi but with 5 different-sized plastic boxes) can be used for proverb learning."*
>
> Regarding classroom application: *"Learning four-dimensional active learning activities that can be applied in the classroom."*

Activities with Greatest Impact on Teachers' Thinking or Feelings

Content analysis of responses to the question "Which activity or session in the training program had the greatest impact on your thinking or feelings? And why?" revealed several significant patterns, as presented in Table 5.

Table 5. Frequency and percentage of training activities with greatest ımpact on teachers' thinking or feelings

Impactful Activities	Frequency	Percentage
1. Letter Writing to Self Activity (after watching "Gratitude" video)	21	42.00
2. Thinking and Problem-Solving Activities	8	16.00
- Tower of Hanoi Activity (using plastic boxes)	5	10.00
- Card Pyramid Construction Activity	1	2.00
- Critical Thinking Activities (unspecified)	2	4.00
3. Video Clip Viewing Activities	6	12.00
- "Gratitude: What Measures a Person's Value?" Video	5	10.00
- America's Got Talent (AGT) Clip on Critical Thinking	1	2.00
4. Experience/Idea Exchange Activities	4	8.00
5. Project Design/PBL Activities	3	6.00
6. All Activities	3	6.00
7. Others	1	2.00
No Response/No Reason Given	4	8.00

Note: Table shows frequency of activities mentioned by teachers from a total of 50 respondents, calculated as percentage of all teachers mentioning each activity. Some teachers mentioned multiple activities.

The self-reflection letter writing activity, conducted after viewing the "Gratitude" video, had the most significant impact on teachers (42.00%). This activity emphasized deep reflection and connection with personal feelings. Teachers reported that this activity allowed them to "express emotions," "reflect on their lives," and "encourage themselves."

The second most impactful were thinking and problem-solving activities (16.00%), particularly the Tower of Hanoi adaptation (10.00%), which teachers described as "stimulating thinking" and "clearly drawing out thinking abilities." Video viewing activities (12.00%) also significantly affected teachers' thinking and feelings, especially the "Gratitude" video.

Interestingly, the activities that teachers identified as most impactful primarily engaged the emotional dimension, suggesting that the 'ACTIVE' Training Program effectively reached teachers' emotional dimension. This reflects a balance between cognitive and emotional development, aligning with the core principles of the Four-Dimensional Active Learning approach that emphasizes holistic learner development.

Representative quotes included:

> *Regarding the letter writing activity: "The self-love letter activity allowed me to express emotions, thoughts, life goals, and the path I need to follow."*
>
> *Regarding thinking and problem-solving activities: "The Tower of Hanoi activity stimulated thinking, and pairing to exchange teaching experiences with others facilitated knowledge and experience sharing."*
>
> *Regarding video viewing activities: "The video activity showing a teacher taking their mother to school made me think about those watching over my success and gave me strength to continue."*

Changes in Perspectives or Understanding After Training

Content analysis of responses to the question "What did you previously view or understand in one way that changed after participating in this training program?" revealed significant transformations in teachers' perspectives, as presented in Table 6.

Table 6. Frequency and percentage of changes in teachers' perspectives or understanding after training

Changes in Perspectives or Understanding	Frequency	Percentage
1. Understanding of Concepts and Principles	22	44.00
- Four-Dimensional Active Learning	5	10.00
- Project-Based Learning (PBL)	4	8.00
- Key Competency-Based Learning	5	10.00
- Teaching and Learning Overall	8	16.00
2. Teaching Skills and Techniques	11	22.00
- Open-Ended Questioning	2	4.00
- Higher-Order/Diverse Thinking Processes	5	10.00
- Teaching Flexibility	3	6.00
- Other Teaching Techniques	1	2.00
3. Integration and Application	4	8.00
- Integration Across Subject Areas	2	4.00
- Classroom Application	2	4.00
4. Perspectives on Training	1	2.00
5. Emotional and Feeling Aspects	2	4.00
6. No Change/Not Clearly Specified	5	10.00
No Response	5	10.00

Note: Table shows frequency of perspective changes mentioned by teachers from a total of 50 respondents, calculated as percentage of all teachers mentioning each change. Some teachers mentioned multiple changes.

The most significant changes in teachers' perspectives occurred in their understanding of concepts and principles (44.00%), particularly regarding teaching and learning overall (16.00%), four-dimensional active learning (10.00%), and key competency-based learning (10.00%). The second most significant area of change involved teaching skills and techniques (22.00%), especially higher-order/diverse thinking processes (10.00%).

An interesting finding was one teacher's changed perspective on professional development itself, stating: *"I used to think training was boring but not with this training program,"* indicating that the 'ACTIVE' Training Program was engaging and effectively captured teachers' interest. Additionally, some teachers reported changes in emotional states, such as "reduced anxiety," demonstrating that the training affected not only cognitive and skill domains but also emotional well-being.

Representative quotes included:

Regarding concepts and principles: *"After participating in the training, many perspectives changed, especially regarding shifting from content teaching to creating learning experiences."*

Regarding teaching skills: *"Using open-ended questions before teaching to promote higher-order thinking in students."*

Regarding integration and application: *"I learned that PBL teaching can be integrated across multiple subject areas and can be applied in future teaching."*

Intentions to Apply Knowledge from the Training Program

Content analysis of responses to the question "How do you intend to apply what you learned from this training program?" revealed strong motivation for classroom implementation, as presented in Table 7.

Table 7. Frequency and percentage of teachers' ıntentions to apply knowledge from the training program

Intentions to Apply Knowledge	Frequency	Percentage
Application in Teaching and Learning	41	82.00
- Designing and Implementing Active Learning Activities	15	30.00
- Teaching with Four-Dimensional Active Learning	7	14.00
- Teaching Based on Five Key Competencies	5	10.00
- Project-Based Learning (PBL) Implementation	5	10.00
- Application in Specific Subject Contexts	4	8.00
- General Application (unspecified)	5	10.00
Application in Specific Teaching Steps	8	16.00
- Lesson Introduction/Interest Stimulation	4	8.00
- Questioning and Participation Creation	2	4.00
- Games and Movement Activities	2	4.00
Lesson Plan Development	6	12.00
Self-Development	3	6.00
No Response/Not Clearly Specified	2	4.00

Note: Table shows frequency of intended applications mentioned by teachers from a total of 50 respondents, calculated as percentage of all teachers mentioning each intention. Some teachers mentioned multiple intentions.

Most common intention among teachers was application in teaching and learning (82.00%), particularly designing and implementing active learning activities (30.00%), followed by teaching with four-dimensional active learning (14.00%), teaching based on five key competencies (10.00%), and project-based learning implementation (10.00%).

Teachers also intended to apply their knowledge in specific teaching steps (16.00%), especially during lesson introductions and interest stimulation (8.00%), as well as in lesson plan development (12.00%). Some teachers (6.00%) mentioned intentions related to self-development, reflecting the training program's impact on professional growth.

These findings suggest that the 'ACTIVE' Training Program successfully motivated teachers to apply their newly acquired knowledge in authentic contexts, aligning with teacher development goals that aim to create changes at the levels of thinking, understanding, and practice.

Representative quotes included:

> Regarding teaching and learning application: *"I will apply four-dimensional active learning to science teaching, designing learning activities such as the Tower of Hanoi, card pyramid construction, and brain gym for students to solve problems and think together."*
>
> Regarding specific teaching steps: *"I will stimulate questions to increase student participation."*
>
> Regarding lesson plan development: *"I will improve teaching plan writing to cover all four dimensions of active learning and the five competencies."*

Suggestions for Training Program Improvement

Content analysis of responses to the question "Do you have any suggestions for improving or developing this type of training program in the future?" revealed several key themes, as presented in Table 8.

Table 8: Frequency and percentage of suggestions for training program ımprovement

Suggestions for Program Improvement	Frequency	Percentage
1. Time Management Improvements	14	28.00
- Increasing activity time	10	20.00
- Increasing training frequency	2	4.00
- Time-related comments (unspecified)	2	4.00
2. Venue and Facilities Improvements	5	10.00
3. Activity Implementation Improvements	3	6.00
4. No Suggestions/Satisfaction with Training	19	38.00
5. No Response	7	14.00
6. Unclear Suggestions	2	4.00
Total	50	100.00

Note: *Table shows frequency of suggestions mentioned by teachers from a total of 50 respondents, calculated as percentage of all teachers mentioning each suggestion.*

A significant proportion of teachers (38.00%) had no suggestions or expressed satisfaction with the training program, suggesting that it met their needs to a considerable extent. The principal suggestion for future training development was "Time Management Improvements" (28.00%), particularly "Increasing activity time" (20.00%), reflecting that the training activities were perceived as valuable but time might have been insufficient for optimal learning.

The second most common suggestion concerned "Venue and Facilities Improvements" (10.00%), followed by "Activity Implementation Improvements" (6.00%). These suggestions provide valuable input for future development of similar training programs.

Representative quotes included:

Regarding time management: *"Extend the time for each activity to make each activity more effective."*

Regarding venue improvements: *"I would like the table arrangement to be modified, as the current setup affects participants sitting at the back who cannot hear the trainer clearly."*

Regarding satisfaction: *"None. It was a very perfect training program."*

Additional Suggestions

Content analysis of responses to the open-ended question "Additional suggestions (if any)" revealed several themes, as presented in Table 9.

Table 9. *Frequency and Percentage of Additional Suggestions*

Additional Suggestions	Frequency	Percentage
1. Activity and Content Suggestions	3	6.00
2. Organizational Suggestions	11	22.00
- Increase duration	4	8.00
- Request for similar training programs in the future	2	4.00
- Teachers wanting to extend learning to develop more diverse teaching activities	2	4.00
- Venue for activities	2	4.00
- Organize more teacher development training like this	1	2.00
3. General Satisfaction	3	6.00
4. No Additional Suggestions	19	38.00
5. No Response	14	28.00
Total	50	100.00

Note: Table shows frequency of additional suggestions mentioned by teachers from a total of 50 respondents, calculated as percentage of all teachers mentioning each suggestion.

The majority of teachers either had no additional suggestions (38.00%) or did not respond to this question (28.00%), which may indicate that teachers had already provided their feedback in previous questions. Some teachers offered

additional suggestions, particularly regarding organizational aspects (22.00%), primarily related to increasing the duration (8.00%) and requests for similar training programs in the future (6.00% combined). Suggestions related to activities and content (6.00%) focused on increasing practical learning based on current situations and requests for training on other topics. Additionally, some teachers expressed general satisfaction with the training program (6.00%).

These additional suggestions reflect teachers' desire for continuous professional development and their satisfaction with the ACTIVE Training Program, which can inform future training program planning to more effectively respond to teachers' needs.

Teachers' Satisfaction with the Training Program

Satisfaction with the Training Program

Analysis of satisfaction data from 50 participating teachers across all evaluation categories revealed consistently high satisfaction levels as presented in Table 10.

Table 10. Mean, standard deviation, and satisfaction levels with the training program

Satisfaction Items	Mean	SD	Level
Category 1: Content Satisfaction	4.79	0.45	Highest
Category 2: Training Process Satisfaction	4.90	0.33	Highest
Category 3: Trainer and Atmosphere Satisfaction	4.95	0.22	Highest
Overall Mean	4.88	0.33	Highest

Note: Interpretation criteria for mean scores: 1.00-1.80 = lowest, 1.81-2.60 = low, 2.61-3.40 = moderate, 3.41-4.20 = high, 4.21-5.00 = highest

Participating teachers reported the highest level of satisfaction with the overall training program (Mean = 4.88, SD= 0.33). Category 3: Trainer and Atmosphere Satisfaction received the highest satisfaction rating (Mean = 4.95, SD = 0.22), with "Overall satisfaction with this training program" scoring highest (Mean = 4.96, SD = 0.20). Category 2: Training Process Satisfaction followed (Mean = 4.90, SD = 0.33), with highest ratings for "Training activities were diverse and inspiring" and "Process fostered participation through diverse activities" (both Mean = 4.92, SD = 0.27).

The highest-rated individual aspects were: overall satisfaction (4.96), trainer's clarity and friendly atmosphere (4.94), and diverse and inspiring activities (4.92). These findings indicate that the 'ACTIVE' Training Program was highly successful across all dimensions, particularly regarding the trainer, atmosphere, and the process that emphasized diverse activities, participation, and hands-on practice. This aligns with effective teacher development principles that emphasize creating learning experiences that lead to actual changes in classroom practice.

Analysis of What Training Participants Found Most Impressive

From detailed examination of responses from all 50 training participants regarding what they found most impressive about the training, the following patterns emerged:

Table 11. Categories of ımpressive aspects in training

Category of Impressive Aspects	**Frequency**	**Percentage**
- Trainer (friendliness, engaging teaching, clear explanations)	16	32.00
- Diverse and interesting activities	10	20.00
- All activities in the training	7	14.00
- Training atmosphere (fun, relaxed, engaging)	6	12.00
- Specific activities (Tower of Hanoi, blindfolded walking, video clips)	5	10.00
- 4-Dimensional Active Learning activities	3	6.00
- Participant engagement	2	4.00
- Practical application of knowledge	1	2.00

Approximately one-third of participants (32.00%) identified the trainer as the most impressive aspect, noting qualities such as friendliness, clear explanations, and engaging teaching style. One-fifth of participants (20.00%) appreciated the

diversity of activities, which they found intellectually challenging while maintaining interest. The training atmosphere (12.00%) was also highlighted for being relaxed yet productive.

Representative quotes included: *"Impressed by the trainer, with engaging teaching that wasn't boring and delivered substantial content"* and *"Activities that grabbed attention because they were exciting and stimulated thinking and challenge."*

The key factors contributing to the success of the 'ACTIVE' Training Program were: quality trainers (32.00%), diverse and engaging activities (20.00%), positive learning environment (12.00%), emotional engagement through activities like the mother video (10.00%), and strong theory-practice connections (8.00% combined from 4-Dimensional Active Learning activities and practical application).

These findings suggest that effective teacher training programs should prioritize trainer quality, maintain diverse activities, foster positive atmospheres, include emotionally engaging elements, and strengthen connections between theory and classroom practice.

Analysis of Activities with Greatest Impact on Participants' Learning

After detailed re-examination of responses from all 50 participants regarding which activities had the greatest impact on their learning, the following patterns emerged:

Table 12. Activities with greatest ımpact on participants' learning

Activities with Greatest Learning Impact	Frequency	Percentage
- Project-Based Learning (PBL)	11	22.00
- All training activities	7	14.00
- Tower of Hanoi activity	6	12.00
- Letter writing to self activity	4	8.00
- 4-Dimensional Active Learning concept	4	8.00
- Other specified activities	9	18.00
- Unclear responses/off-topic answers	9	18.00

Project-Based Learning (PBL) had the greatest impact on participants' learning (22.00%), with teachers noting that *"PBL activities can be adapted to enhance science projects, making them more interesting and creative."* The second most impactful was the collective experience of all training activities (14.00%), with participants stating these *"increased experience and knowledge for future use with students."* The Tower of Hanoi activity ranked third (12.00%), described as *"both fun and thought-provoking"* and *"requiring planning"* skills.

Other significant activities included the letter writing to self activity (8.00%), which *"allowed us to know ourselves and what we're currently thinking,"* and the 4-Dimensional Active Learning concept (8.00%), which provided a comprehensive framework for instruction.

These findings suggest that effective teacher training programs should:

- Emphasize Project-Based Learning with increased practice time
- Maintain diverse activities that can be directly applied in teaching
- Include cognitive challenges like the Tower of Hanoi that model thinking skills
- Balance academic content with reflective activities for holistic professional development
- Connect theoretical concepts with classroom applications

The 'ACTIVE' Training Program successfully incorporated a variety of activities that impacted learning in different ways, with PBL having the greatest impact, aligning with the research objective of developing teachers' competency-based active learning and project-based learning management skills.

Analysis of Concepts and Methods Participants Intend to Apply in Learning Management

After examining responses from all 50 participants regarding concepts or methods they intend to apply in their learning management, the following patterns emerged:

Table 13. Concepts and methods participants ıntend to apply in learning management

Concepts/Methods to Apply	Frequency	Percentage
Attention activities/Brain Gym	6	12.00
Games and interest-stimulating activities	6	12.00
Integrated teaching	5	10.00
4-Dimensional Active Learning activities	5	10.00
Project-Based Learning (PBL)	4	8.00
Activities promoting student thinking and expression	4	8.00
Other specified approaches	8	16.00
Unclear responses/No answer	12	24.00

The most frequently mentioned concepts were attention activities/Brain Gym and games/interest-stimulating activities (12.00% each), with teachers noting these would *"stimulate greater interest in learning"* and *"help with the lesson introduction process."* Integrated teaching and 4-Dimensional Active Learning activities (10.00% each) followed closely, with participants intending to *"organize teaching to cover all 4 dimensions"* and *"integrate all activities to best suit students."*

Project-Based Learning (PBL) and activities promoting student thinking (8.00% each) were also prioritized, aligning with core training objectives. However, a significant proportion of participants (24.00%) provided unclear responses or no answer, suggesting a need for more concrete application planning.

Based on these findings, recommendations for promoting knowledge application include:

- Organize practical application workshops with concrete planning activities
- Develop subject-specific application guides and sample lesson plan
- Establish post-training support systems and teacher learning networks
- Enhance reflective processes and implementation planning during training
- Create follow-up mechanisms to support actual classroom implementation

Most participants intended to apply concepts from the 'ACTIVE' Training Program in their teaching practice, particularly focusing on student engagement techniques, integrated teaching approaches, and activity-based learning. However, the high percentage of unclear responses indicates a need for more structured application planning to ensure training leads to genuine changes in classroom practice.

Analysis of Concepts and Methods Participants Plan to Apply in Future Teaching

Examination of responses from all 50 participants regarding concepts or methods they plan to apply in future teaching revealed the following patterns:

Table 14. Concepts and methods participants plan to apply in future teaching

Concepts/Methods to Apply	Frequency	Percentage
Improving teaching processes	6	12.00
Attention activities/Brain Gym	5	10.00
Project-Based Learning (PBL)	3	6.00
Integrated teaching	3	6.00
Games and interest-stimulating activities	3	6.00
Other specified approaches	6	12.00
Unclear responses/No answer/None	24	48.00

The most concerning finding was that nearly half of participants (48.00%) provided unclear responses, no answer, or indicated "None," suggesting potential challenges in knowledge transfer. Among those who provided clear responses,

improving teaching processes (12.00%) was most frequently mentioned, though often without specific methods: "New and diverse teaching approaches" and "Teaching that reaches children more effectively."

Attention activities/Brain Gym (10.00%) was the second most mentioned approach, with participants noting these would "stimulate greater interest in learning." Project-Based Learning, integrated teaching, and games/interest-stimulating activities (each 6.00%) were also identified as approaches participants planned to implement.

Based on these findings, recommendations for promoting knowledge application include:

- Improve assessment and data collection methods to better capture application intentions
- Incorporate concrete planning activities at the end of training sessions
- Develop subject-specific case studies and sample lesson plans
- Establish post-training support systems and professional learning communities
- Create incentive systems to recognize effective knowledge application
- Provide follow-up training on high-interest topics

This analysis indicates that while some participants from the 'ACTIVE' Training Program had clear intentions for application, there is a significant need to strengthen the connection between training and implementation, particularly through structured application planning and ongoing support systems.

Analysis of General Suggestions for Training Improvement

Analysis of responses from all 50 participants regarding general suggestions for training improvement revealed the following patterns:

Table 15. General suggestions for training ımprovement

Type of Suggestion	Frequency	Percentage
Increase training duration	9	18.00
Venue arrangement	5	10.00
Training frequency	3	6.00
Training timing	1	2.00
Satisfaction/compliments	3	6.00
No suggestions	12	24.00
No response	17	34.00

Increased training duration was the most frequent suggestion (18.00%), with participants noting that *"activities were fun and provided much knowledge, but time was limited."* Venue arrangement followed (10.00%), with specific concerns about table setup affecting learning efficiency. Some participants (6.00%) requested continuous training sessions, suggesting *"hold training once per semester"* to sustain professional development.

Notably, a majority of participants (58.00%) either indicated "no suggestions" (24.00%) or provided no response (34.00%), which may reflect general satisfaction with the training or insufficient appreciation for the importance of feedback.

Based on these findings, recommendations for improving future training include:

- Extend training duration, especially for activities requiring deeper thought and practice
- Improve venue arrangements to enhance participation and learning efficiency
- Plan continuous training sessions on a regular schedule (e.g., once per semester)
- Consider scheduling training before semester begins when teachers have fewer responsibilities
- Enhance evaluation methods to increase response rates and quality of feedback
- Develop a continuous improvement plan based on participant suggestions

These recommendations could help the 'ACTIVE' Training Program better meet participants' needs and enhance its effectiveness in developing teachers' competency-based active learning and project-based learning skills.

Discussion

This study examined the ACTIVE Training Program's impact on teachers' competency-based and active learning design capabilities. Results show significant improvements, with a normalized gain index of 0.77, demonstrating the program's effectiveness. The discussion addresses six key areas: teachers as learning designers, practice-based professional development, emotional engagement, implementation readiness and barriers, teacher agency, and methodological considerations. These findings align with national and international educational reforms, particularly Thailand's shift toward competency-based learning frameworks.

Teachers as Learning Designers in a Competency-Based Framework

The significant increase in teachers' knowledge—from 9.68 to 17.58 points—reflects their enhanced understanding of competency-based education (CBE) and their evolving role as learning designers. This shift aligns with OECD's (2019, 2021) vision of teachers as co-creators of learning experiences that integrate knowledge, skills, attitudes, and values (Paniagua & Istance, 2018). In the Thai context, Sangwanglao (2024) emphasized that implementing CBE effectively requires equipping teachers with design capacity and curriculum adaptability. The World Economic Forum (2024) also advocates personalized, purpose-driven education, where teachers are empowered to shape learning paths. High-quality professional development supports this transformation by connecting theory to practice (Darling-Hammond et al., 2017; OECD/UNESCO, 2016).

Impact of Structured, Practice-Based Professional Development

The high performance in learning design (82.87%) underscores the effectiveness of structured, experiential professional development (PD). Kolb's (1984) experiential learning cycle and Schön's (1983) reflective practitioner framework provide a theoretical foundation for the ACTIVE training program. These principles are echoed in recent studies emphasizing the role of active engagement, experimentation, and contextual reflection in sustainable PD (Ajani, 2023; OECD, 2018). Effective PD fosters deep understanding and practice transfer, especially when grounded in relevant, classroom-based tasks (Darling-Hammond et al., 2017).

Emotional Engagement and Reflective Transformation

The "letter to self" activity—identified as the most impactful by 42% of participants—demonstrated the role of emotional connection in transformative learning. Mezirow (1991) asserts that perspective shifts often begin with emotionally disorienting experiences, which trigger critical reflection. Knowles (1984) supports this through adult learning theory, in which autonomy and personal relevance drive intrinsic motivation. Recent perspectives reaffirm that emotional engagement enhances learning depth and retention in teacher development (Ajani, 2023; Fleming, 2018; Schön, 1983).

Readiness and Barriers to Implementation

While 82% of participants expressed intent to apply new knowledge—particularly through PBL and attention-stimulating activities—variation in response depth suggests differing levels of readiness. The Concerns-Based Adoption Model (CBAM) explains that teachers must progress through affective and behavioral stages to achieve successful implementation (Hall & Hord, 2015; SEDL, 2010). Similarly, the SAMR model helps analyze how innovations are adopted and transformed in practice (Hamilton et al., 2016). In Thailand, Sethakul and Utakrit (2019) identified systemic barriers such as rigid curricula and limited institutional support as key obstacles. Therefore, post-training support mechanisms like coaching, PLCs, and responsive leadership are crucial to sustaining change (LPI, 2017; WEF, 2023).

Satisfaction and Emergent Teacher Agency

The high overall satisfaction rating (M = 4.88) reflects more than positive sentiment—it signals a growing sense of teacher agency. Agency, as defined by Priestley et al. (2015), is an ecological construct shaped by capacity, context, and culture. Teachers' reflections indicated ownership of learning and intention to lead change—aligning with Biesta et al. (2015), who argue that agency involves purposeful, professional action. PD that supports autonomy, dialogue, and emotional engagement fosters this development (OECD, 2021; Sethakul & Utakrit, 2019).

Methodological Limitations and Future Research Directions

This study employed a pre-experimental design without a comparison group, which limits causal inference. Creswell and Guetterman (2019) recommend quasi-experimental and longitudinal designs for more robust evaluation. Caruana et al. (2015) and Desimone et al. (2002) emphasize that teacher learning outcomes should be tracked over time to understand sustainability. Antoniou and Kyriakides (2013) propose dynamic PD models that include embedded evaluation cycles. In the Thai context, Sangwanglao (2024) calls for longitudinal research to examine the alignment between policy expectations and classroom realities—reinforcing the importance of evidence-informed reform strategies.

Conclusion

The ACTIVE Training Program significantly enhanced teachers' competencies in implementing active learning and project-based learning approaches, as evidenced by the high normalized gain index and strong learning activity design capabilities. Key success factors included emotionally engaging activities, particularly the letter writing activity and project-based learning experiences, collaborative practices, and structured design tasks. The high satisfaction ratings confirm the program's effectiveness. This study highlights the importance of positioning teachers as learning designers, balancing theory with practice, incorporating emotional engagement in professional development, and providing systematic post-training support. Despite methodological limitations, the findings offer valuable insights for teacher development in Thailand's educational reform context. Future research should examine implementation sustainability through longitudinal and comparative studies.

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Research Article

Development of a learning set on animal injection training tools for beef cattle raising course: a case study at Ubon Ratchathani College of Agriculture and Technology

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Abstract

The research on the development of a learning set on animal injection skill training tools for beef cattle raising at the vocational certificate level, Ubon Ratchathani College of Agriculture and Technology, Ubon Ratchathani Province, is combined research to solve the teaching and learning problems in beef cattle raising. Three stages of the study were carried out. The following are the study's findings: 1) A research of the requirements for improving teaching management in a particular sample group of 68 students and 10 teachers in the Animal science department revealed that the demands were the greatest. High-level management of the skill training tools' overall learning was problematic. There weren't enough experimental animals for training, and the equipment was out of date; 2) The learning set was mostly created using the data from phase 1. One essential tool, a learning set on animal injection skill training tools, was chosen. It included a demonstration manual, a tool quality assessment form, and an animal injection skill training tool. Overall, it was determined that the tools were of excellent quality, suitable, and consistent with a number of components. The sample group had the greatest satisfaction with the design, content, and use after testing; and 3) the learning set was used with Vocational certificate students, a sample group of 25 individuals who enrolled in the course, used the learning set. Findings showed statistically significant at the 0.01 level in learning accomplishment results before and after studying. Thus, it can be said that the sample group was the most satisfied and that this set of learning activities can be employed effectively.

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Introduction

Beef cattle farming in Thailand has experienced steady growth in recent years. However, the supply of domestically produced beef remains insufficient to meet increasing consumer demand, both in quantity and quality. This rising demand is driven by population growth, economic development, and heightened awareness of food safety and nutrition (Bunmee et al., 2018). As a result, there is a growing need to upgrade traditional smallholder beef cattle operations—typically low-investment and secondary in nature—into knowledge-based, commercially viable enterprises (Prasitwuttisak & Prakarnkamanant, 2020). Despite progress, over 90% of beef cattle in Thailand are still raised by smallholder farmers who often lack access to modern technologies, veterinary knowledge, and farm management systems (Department of Livestock Development, 2022). This underscores the urgent need to strengthen human capital through

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vocational education, particularly in animal science programs offered by agricultural and technological colleges. At institutions such as the Ubon Ratchathani College of Agriculture and Technology (URCAT), beef cattle farming is a core subject designed to develop students' technical competencies through theory, hands-on practice, and collaboration with industry. The course emphasizes practical skills in animal health, breeding, farm management, and production, aligning with the needs of Thailand's evolving livestock sector (OECD, 2021). Rooted in the belief that structured learning and practice can help all learners reach their full potential, this study explores the challenges and needs faced by both instructors and students in the beef cattle farming course at URCAT. The findings aim to support curriculum development and teaching strategies that align vocational training more closely with real-world labor market demands, contributing to the modernization and sustainability of Thailand's beef cattle industry (Eamcharoen, 2024).

In the context of large animal science education—particularly in courses related to beef and dairy cattle—it is essential that students acquire not only theoretical knowledge but also critical hands-on skills directly applicable to professional practice. Practical competencies such as administering injections, managing animal health, handling livestock safely, and applying herd management strategies are fundamental for graduates aiming to work in livestock production, veterinary services, or agricultural extension. Without structured and repeated practice in these areas, students may lack the confidence and proficiency required by modern animal husbandry enterprises. Embedding skill-based training into the curriculum is vital to ensure that vocational graduates are workplace-ready, capable of contributing effectively to the livestock sector, and equipped to meet both industry standards and the expectations of future employers. This emphasis on practical skill development aligns with the objectives of agricultural vocational education in Thailand, which is designed to produce graduates competent in hands-on practice and capable of transitioning directly into the workforce. According to the Vocational Education Curriculum for Agricultural Programs 2019 issued by the Office of the Vocational Education Commission (OVEC, 2019), the curriculum prioritizes experiential learning, technical proficiency, and the application of knowledge in real-world agricultural settings. By integrating core skills such as animal health management, breeding techniques, and farm operations into student training, the program ensures that learners are not only equipped to meet industry needs but also empowered to pursue careers with confidence and quality. This approach supports national strategies to strengthen the agricultural sector through human resource development and practical innovation. Studies have shown that integrating practical skill development into vocational education enhances student engagement and learning effectiveness (Panyakom *et al.*, 2020; OECD, 2021). Moreover, sustainable approaches for developing professional skills in vocational education students have been explored to ensure long-term success in the workforce (Srisuantang et al., 2014).

Objectives

- To study the needs, problems of teaching and learning, and solutions for the subject of beef cattle raising, vocational certificate level, Ubon Ratchathani College of Agriculture and Technology, Ubon Ratchathani Province
- To create a Learning set on the subject of animal injection skill training tools, beef cattle raising, vocational certificate level, Ubon Ratchathani College of Agriculture and Technology, Ubon Ratchathani Province
- To study the learning achievement and satisfaction in learning by using the learning set on the subject of animal injection skill training tools, beef cattle raising, Ubon Ratchathani College of Agriculture and Technology, Ubon Ratchathani Province

Method

The research on the development of a learning kit on animal injection training tools, beef cattle raising, vocational certificate level, Ubon Ratchathani College of Agriculture and Technology, Ubon Ratchathani Province, is combined research to solve the teaching and learning problems in beef cattle raising. The research was conducted in 3 phases:

Phase 1: Conduct survey research on the needs, problems of teaching and learning, and approaches to solving problems in the beef cattle raising course, vocational certificate level, Ubon Ratchathani College of Agriculture and Technology, using questionnaires and interviews. Data was collected by purposive sampling from 10 teachers of the

Animal Science Department and 68 students studying in the Animal Science Department who had studied the beef cattle raising course in the 2022 academic year out of a total of 252 students. The instruments in this phase were use in-depth interview and questionnaire

Phase 2: Creating a learning set: This was done by using data from the study results in Phase 1 as important data for creating the learning kit. The learning kit was evaluated by 5 experts using the learning kit quality assessment form.

Phase 3: Using the learning set by studying the learning achievement and satisfaction in learning using the learning kit on animal injection training tools with vocational certificate students. There were 14 people who registered for the meat farming course in the second semester of the academic year 2023. The learning achievement test, behavioral observation form, and satisfaction questionnaire were used as data collection tools.

Table 1. Criteria for interpreting the formula

Score	Scale Limits	Description
5	4.21 - 5.00	Highest
4	3.41 - 4.20	High
3	2.61 - 3.40	Moderate
2	1.80 – 2.60	Low
1	1.00 – 1.80	Lowest

Research instruments in this phase included testing form, questionnaires, and assessment forms. The content validity and consistency of objectives were inspected using the IOC value (0.06-0.10), followed by improvements based on expert suggestions. The collected data were analyzed using descriptive statistics and paired-samples t-test, with the results interpreted through content analysis. He satisfaction ratings were utilized as estimation scales, employing a 5-point rating scale. Criteria for interpreting the formula calculation were Table 1 (Punpinij, 2011; Leekitwattana, 2012).

Results

The needs, problems of teaching and learning, and solutions for the subject of beef cattle raising

Research of the requirements for improving teaching management in a particular sample group of 25 students and 10 teachers in the Animal Science Department revealed that the demands were the greatest. High-level management of the skill training tools' overall learning was problematic. There weren't enough experimental animals for training, and the equipment was out of date.

Table 2. The need for tools to facilitate training in injection skills in animals raising and management of the respondents

Items	Teachers (N=10)		Students (n=25)	
	Frequency	Percentage (%)	Frequency (n=68)	Percentage (%)
Need	10	100.00	59	86.76
Don’t need	0	0	9	13.24
Total	10	100.00	68	100.00

It can be seen at Table 2, it was found that 86.76% of the respondents expressed a need for tools to facilitate training in injection skills for animal husbandry and management, while only 13.24% indicated no such need. In term of teachers need, it was discovered that all of the teachers needed tools to help them learn how to inject animals and handle the respondents.

Table 3. Teaching needs in the subject of beef cattle raising

Item	$\bar{x}$ (n=68)	S.D.	Description
1. Theoretical content in beef cattle raising is sufficient.	3.86	0.91	High
2. Practical content in beef cattle raising is sufficient.	3.73	0.88	High
3. You can apply both theoretical and practical content well.	3.46	0.91	High
4. Materials, equipment and tools used in the study are sufficient.	3.26	1.03	Moderate
5. Materials, equipment and tools are modern.	3.40	0.92	High
6. You can use materials, equipment and tools well.	3.66	0.81	High
7. You can apply the skills from using materials, equipment and tools in the practice to your future career.	4.06	0.88	High
8. Are you interested in developing new innovations or tools in the beef cattle breeding course?	3.93	0.79	High
9. What level of beef cattle breeding practice hours and practice training do you want?	4.00	0.75	High
10. What level of materials, equipment and tools do you want to provide for the practice?	4.20	0.86	High
11. Animal injection skills are another important skill for future animal production careers.	4.26	0.88	Highest
12. What level of tools do you want to provide for animal injection skills?	4.20	0.86	High
13. What level of smart farm (IOT) materials, equipment and tools do you want?	3.93	0.70	High
14. What level of modern private farm training do you want?	3.95	0.79	High
15. What level of beef cattle breeding practice training do you want?	4.00	0.75	High
Over all	3.84	0.86	High

It can be revealed that the overall level of students' teaching needs in the beef cattle raising subject was high ($\bar{x}$= 3.87; 0.86) at Table 3. With a man score of 4.26, it was discovered that one item stood out as having the greatest level: animal injection skills are another crucial ability for future professions in animal production. Just one item was at a moderate level, while thirteen items were at a high level.

According to data from in-depth interviews with 10 animal science teachers and 25 animal science students—15 vocational certificate students, first through third year, five students per year, and 10 advanced animal science certificate students, first through second year, five students per year—teachers of large animals, like dairy cows and beef cattle, and small animals, like pigs, must teach their students how to inject animals. They must also make an animal injection skill training kit before students inject real animals, so that students can practice injecting animals until they are proficient before the practice. Additionally, it is advised to develop a model that includes media and a handbook that students may readily learn on their own using internet channels. It is portable, long-lasting, and easy for teachers to use for field instruction. Students also believe that models ought to be made in the same manner as professors' remarks, and they recommend making material that is readily available online so that it may be viewed and studied later on mobile devices. Furthermore, the injection skill training model needs to be portable to the animal enclosures for comparison. and is capable of parallel training.

Creating a learning set

This was done by using data from the study results in Phase 1 as important data for creating the learning set, according to the findings, there are five steps for creating a learning set:

- Gaining an understanding of the user's issue by conducting interviews with Ubon Ratchathani College of Agriculture and Technology's Animal Science Department teachers and administering questionnaires to students pursuing bachelor's degrees, higher vocational certificates, and vocational certificates. Finding the true issue through interviews or questioning the problem-seekers directly requires time and in-depth understanding of the issue.

- Identifying the problem and problem framework, defining the problem, summarizing the information, and responding to the questions of who must do what and why. Having a clear answer and defining the problem that needs to be solved are essential after comprehending the issue.
- Thinking creatively, gathering ideas, and looking for fresh concepts that can best address user wants and issues as well as next-step suggestions. A timeline for innovation must be established, concepts must be chosen, and any other problems must be taken into account.
- Developing inventions that can assist in addressing user demands and assessing, following the development of a learning set, whether or not the developed concept can address users' issues and requirements. Before moving on to the learing set creation phase, evaluation of the innovation might gather feedback and recommendations.
- The last stage is to evaluate the learning set in order to gather data. The design thinking process will assist guarantee that the products we create can effectively address user demands and issues.

Figure 1. Developing a set of educational resources to support instruction in injection techniques for animal care and management

Figure 2. Shows the learning set's documentation and data in the form of video files recorded on DVDs for online upload

Table 4. The assessment of the learning set on Animal injection skill training tool in the beef cattle raising subject in terms of learning set and structure for support instruction in injection of experts

Items	**Level of opinion (N=5)**		
	Mean ($\bar{x}$)	**S.D.**	**Description**
1. A robust and long-lasting learning set and structure for support instruction in injection	4.50	0.87	Highest
2. The framework and learning materials for assist training in injection design are innovative.	4.75	0.56	Highest
3. The structure and learning materials for support instruction in injection color are lovely	4.50	0.87	Highest
4. Every part is detachable for effortless mobility	4.63	0.60	Highest
5. The materials utilized are usable	4.75	0.54	Highest
Over all	**4.63**	**0.72**	**Highest**

It can be revealed that the mean score of 4.63, the experts provide the greatest overall score of opinion The items with the highest mean were the framework and learning resources for help training in injection design are unique and the materials utilized are useful, with a mean of 4.75 for both items. It was discovered that all specialists expressed the highest level of opinion while evaluating each item.

Using the learning set

Using the learning set by studying the learning achievement and satisfaction in learning using the learning set on animal injection training tools with vocational certificate students. There were 25 students who registered for the meat farming course in the second semester of the academic year 2023. The learning achievement test, behavioral observation form, and satisfaction questionnaire were used as data collection tools. The results were follows:

Table 5. A number of students, an average mean score, and standard deviation of the score begin and after learning avidities.

Item	**A number of students (n=25)**	**15 Points ($\bar{x}$)**	**S.D.**	**t**	**sig**
Begin learning	25	5.06	1.48	-23.971	0.001**
After learning	25	13.88	0.81		

**statistical significance level of 0.1

It can be seen that the Table 5 students completed the pre-test and post-test, which had 15 items and had varying mean scores, according to the data analysis results displayed in Table 4. Learning outcomes using the learning set were better than learning outcomes prior to learning. Compared to the pre-test results, which had an average score of 5.06 points, the learning outcomes after learning had an average score of 13.38 points out of 15 points. The learning set on "Animal injection skill training tool" in the beef cattle raising subject could successfully improve learners, as evidenced by the learning achievement results that differed significantly at the 0.01 level.

Table 6. Mean, standard deviation and level of student satisfaction towards using the learning set

Items	Level of opinion (n=25)		
	Mean ($\bar{x}$)	**S.D.**	**Description**
1. The teacher clearly explains and informs the topic and teaching objectives	4.56	0.63	Highest
2. Able to explain the content and steps of the training continuously and in relation to each other	4.50	0.82	Highest
3. Uses appropriate and easy-to-understand language in teaching	4.62	0.72	Highest
4. Has teaching equipment, media/documents, making it easier to understand the content	4.76	0.58	Highest
5. Teaching methods make students interested in learning all the time	4.81	0.54	Highest
6. The teacher can answer questions clearly	4.75	0.59	Highest
7. Teaching methods make students interested in learning all the time	4.63	0.72	Highest
8. Starts and ends teaching on time	4.56	0.73	Highest
9. Teaches content that is in line with the objectives of the learning activity set	4.62	0.72	Highest
10. Summarizes issues/content in line with learning objectives	4.63	0.62	Highest
11. The teacher has a good personality, dresses well, and has a clear and appropriate tone of voice	4.68	0.70	Highest
12. To what extent do students like learning this topic?	4.75	0.58	Highest
Over all	**4.66**	**0.65**	**Highest**

It can be ssen that Table 5, the respondents' satisfaction levels with the learning set, which showed the highest level of satisfaction overall with a mean of 4.66. With the highest mean satisfaction in the top three rankings, the respondents were most satisfied with all items: Teaching strategies consistently pique students' enthusiasm in learning ($\bar{x}$=4.81, SD: 0.54), Features teaching aids, media, and documents that make the material easier to understand ($\bar{x}$=4.76, SD: 0.58); how much students enjoy learning this subject ($\bar{x}$=4.75, SD: 0.58); the teacher can clearly respond to questions ($\bar{x}$=4.75, SD: 0.59); and the teacher is well-mannered, has a pleasant demeanor, and speaks in a clear and appropriate tone ($\bar{x}$=4.68, SD: 0.70), respectively.

Discussions

The study focused on developing a learning module incorporating animal injection training tools for beef cattle raising course at the agricultural vocational level. Survey results indicated a strong demand for such tools among both teachers and students. Notably, significant challenges were identified in the management of skill-based learning, particularly in the practical aspects of animal injection. All participating teachers reported the need for appropriate instructional tools to support the teaching of animal injection techniques and livestock handling. These findings align with the emphasis in Thailand's vocational education curriculum on hands-on learning and competency-based training (Office of the Vocational Education Commission, 2019), and echo international research highlighting the effectiveness of simulation-based tools in improving veterinary students' practical skills and confidence (Chowdhury & Khalil, 2021). The evaluation of teaching needs revealed that students exhibited a high overall demand for instruction in beef cattle raising. Among the assessed competencies, animal injection skills ranked highest, reflecting their critical importance for students' future employment in the animal production sector. This is consistent with research by Raksasat and Phonchaiya (2022), which emphasized that practical competencies, such as animal treatment and injection techniques, are foundational for vocational students preparing for agricultural careers.

According to data from interviews, the respondents were emphasized the critical need for hands-on training in animal injection skills, particularly in the context of both large and small livestock. Teachers noted that students must first practice with simulation kits to build confidence and competency before handling real animals. Both teachers and

students agreed that the training model should be durable, portable, and suitable for classroom and field instruction. They also recommended integrating multimedia learning resources and self-study handbooks accessible through online platforms and mobile devices, to allow flexible, self-paced learning. This approach is consistent with OECD (2021), which stresses the importance of practice-oriented and self-directed learning tools in vocational education to better prepare students for specialized labor markets. The development of the learning set was guided by a five-step design thinking process: empathizing with user needs, defining problems, ideating creative solutions, prototyping, and testing. This approach ensured that the learning materials effectively addressed real-world challenges faced by learners. Expert evaluations yielded a high overall satisfaction, with the instructional framework and material usefulness receiving the highest ratings. The implementation of the "Animal Injection Skill Training Tool" in the beef cattle raising course significantly enhanced student learning outcomes. Students reported high satisfaction, particularly appreciating the engaging teaching methods and the inclusion of multimedia resources that simplified complex content. These findings align with Eamcharoen's (2024) study, which demonstrated that integrating design thinking into vocational education enhances student engagement and learning effectiveness. In addition, these findings align with studies demonstrating that integrating design thinking into vocational education enhances student engagement and learning effectiveness (Lin et al., 2023; Pratomo et al., 2021; McLaughlin et al., 2022).

In the context of large animal science education—particularly in courses related to beef and dairy cattle—it is essential that students acquire not only theoretical knowledge but also critical hands-on skills directly applicable to professional practice. Practical competencies such as administering injections, managing animal health, handling livestock safely, and applying herd management strategies are fundamental for graduates aiming to work in livestock production, veterinary services, or agricultural extension. Without structured and repeated practice in these areas, students may lack the confidence and proficiency required by modern animal husbandry enterprises. Embedding skill-based training into the curriculum is vital to ensure that vocational graduates are workplace-ready, capable of contributing effectively to the livestock sector, and equipped to meet both industry standards and the expectations of future employers. This emphasis on practical skill development aligns with the objectives of agricultural vocational education in Thailand, which is designed to produce graduates competent in hands-on practice and capable of transitioning directly into the workforce.

According to the Vocational Education Curriculum for Agricultural Programs 2019 issued by the Office of the Vocational Education Commission (OVEC, 2019), the curriculum prioritizes experiential learning, technical proficiency, and the application of knowledge in real-world agricultural settings. By integrating core skills such as animal health management, breeding techniques, and farm operations into student training, the program ensures that learners are not only equipped to meet industry needs but also empowered to pursue careers with confidence and quality.

This approach supports national strategies to strengthen the agricultural sector through human resource development and practical innovation. Studies have shown that integrating practical skill development into vocational education enhances student engagement and learning effectiveness (Panyakom et al., 2016; Poungsuk & Junlek, 2021). Moreover, a critical review of agricultural education in Thailand emphasizes the need for curricula that are responsive to the changing contexts of national development, balancing competitiveness and sustainability in Thai agriculture (Traimongkolkul & Tanpichai, 2005).

Recommendations

The following are the suggested for practice-related implications and future research:

- Expansion to Other Large Animal Science Courses: The training module and injection tool set should be extended to other relevant courses such as dairy cattle, swine, goats, and other livestock species, given the similar instructional needs identified among teachers and students.
- Integration with Blended and Self-Paced Learning: To enhance accessibility and flexibility, the module should be supported by digital learning components such as e-learning content, instructional videos, interactive

quizzes, and online manuals, allowing students to engage in self-directed learning through mobile and web platforms.

- Capacity Building for Teachers: Training programs should be provided to instructors to ensure effective use of the injection training tool, including strategies for simulation-based teaching, classroom facilitation, and competency-based assessment.
- Development of a National Teaching Innovation Model: the training module can serve as a best practice model for vocational agricultural education. It should be considered for recognition and dissemination as an innovative teaching tool supporting large animal science instruction and practical skill development.
- Longitudinal Studies on Graduate Outcomes: Future research should examine the long-term effects of the training module on students' performance during internships, professional licensing exams, and real-world employment in the livestock sector.
- Experimental Studies Comparing Instructional Approaches: Research comparing learning outcomes between students using the injection training tool and those receiving traditional instruction would help quantify its effectiveness in terms of skill acquisition, confidence, and job readiness.

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Research Article

Kapeng Barako and the roots of Batangueño Identity: A cultural, historical, and ethnographic study

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Abstract

This study explores Kapeng Barako—the distinct Coffea liberica variety cultivated in Batangas, Philippines—as a symbol of Batangueño identity and cultural resilience. Through a qualitative approach combining historical analysis, ethnographic interviews, and cultural documentation, the research examines how coffee transcended its agricultural function to become a core component of Batangueño heritage. Drawing on archival records and oral histories from farmers, historians, and local residents, the study traces the historical trajectory of coffee from its ancient origins in Ethiopia and Yemen to its introduction and flourishing in Batangas during the Spanish colonial era. The findings illustrate how Kapeng Barako not only served as an economic commodity but also evolved into a cultural emblem associated with strength, hospitality, and community solidarity. The discussion highlights key historical transformations—from the 18th-century coffee boom in Lipa to the catastrophic decline caused by coffee rust in the late 19th century, followed by postwar revitalization and contemporary sustainability efforts. Moreover, the paper contextualizes Kapeng Barako within the global coffee narrative, emphasizing its unique characteristics and its potential use as a base for specialty coffee beverages. The research underscores the need for renewed local and governmental support to sustain Coffea liberica cultivation, integrate it into agro-tourism, and preserve Batangas' cultural heritage. Ultimately, Kapeng Barako emerges as both a product and a metaphor of Batangueño endurance—linking agricultural history, cultural identity, and economic revitalization. The study calls for continued appreciation and promotion of Kapeng Barako as a symbol of regional pride and a living tradition in Philippine coffee culture.

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Introduction

Coffee is a fundamental element that characterizes the dietary habits of all globally civilized persons who follow rational eating practices (Al Mokha, 2024). An overwhelming majority of about 90% of adults from various backgrounds consider coffee to be their beverage of choice. In addition to its fundamental importance for human existence, they perceive coffee as a basic need that has moved beyond its previous classification as a luxury or indulgence. This viewpoint establishes coffee as a fundamental stimulant that drives human energy levels and operational effectiveness. Working people consider coffee the essential energy source that maintains their drive, which results in increased productivity levels during their workday.

Coffee (Coffea) plants represent a member of the *Rubiaceae* family, including Madder plants. These species exhibit distinctive characteristics, including the production of purine-type alkaloid caffeine. The chemical entity in question

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demonstrates a capacity to prolong the operational lifespan of various hormonal agents like adrenaline. The stimulant effect of coffee serves as a counteragent to the depressant properties found in certain alkaloids, according to Elpel's 1997 study.

Coffee is the most contested nonalcoholic drink due to its classification as a religious superstition coupled with medical prejudice. For a time, coffee had significant opposition and numerous financial barriers, including inequitable taxation and burdensome duties. Despite facing many adversities throughout its development, this beverage managed to withstand these obstacles and achieve a dominant status among widely consumed drinks (Al Mokha).

This paper presents the historical trajectory of coffee from its primordial origins to its eventual arrival in the province of Batangas while also analyzing how coffee became ingrained in Batangueño culture. This relationship has led to the term *Kapeng Barako*, intrinsically linked to Batangueño identity.

Coffee occupies a critical position in the formation and evolution of Batangueño identity, as it has become deeply embedded in their everyday existence. Because of the Batangueños' profound affection for coffee, the province has cultivated a rich and intricate history of coffee cultivation, particularly exemplified by varieties such as *Kapeng Barako*. This distinctive coffee mirrors the province's agricultural methodologies and traditions and engenders a sense of pride and cultural affiliation. Therefore, when one utters the term *Kapeng Barako*, individuals instinctively associate it with Batangas, recognizing that Batangas is the unequivocal origin of *Kapeng Barako.*

In the early epochs of Batangas, coffee is the nucleus of social gatherings and interpersonal interactions. Sharing a coffee nurtures relationships, making it an indispensable element of communal life, from familial reunions to local festivities. Hence, it is not uncommon for passsersby to overhear Batangueño residents say: "*Sinsay muna dine at makapagkape*" or "*Parne muna at magkape*" (Come over and have some coffee). Such invitations signify not merely hospitality but also an overture of friendship and camaraderie, which resonates deeply within the culture of the community.

Coffee is integral to the existence of Batangueños; thus, the coffee industry serves as a vital source of livelihood for numerous individuals in the region. The coffee cultivation, production, and distribution bolster local economies and play a crucial role in preserving traditional farming practices. However, the presence of coffee farms has catalyzed a growing interest among tourists in agro-tourism, particularly in the province of Batangas—most notably in Lipa and its adjacent cities and municipalities. This phenomenon highlights the region's rich agricultural heritage and reinforces the identity of Batangueños through shared experiences centered around coffee. Although there may be challenges ahead, the significance of coffee in this context remains profound and multifaceted.

The odyssey of Batangas coffee, navigating from the agricultural land to the final cup, serves as a poignant reflection of the resolute spirit of the Batangueños. These individuals have adeptly navigated through various challenges; however, they have steadfastly preserved their cultural traditions. During the late 1880s, the coffee sector experienced a significant downturn in output, primarily due to the proliferation of coffee rust (a pathogenic disease instigated by the fungus *Hemileia vastatrix*) and the infiltration of coffee borers (arthropods that inflict harm upon coffee crops). Nonetheless, the Batangueños did not perceive this situation as a definitive termination of their agricultural pursuits. Instead, coffee cultivators temporarily diverted their efforts towards alternative crops such as sugarcane, citrus, and rice. When the opportunity arose to cultivate a new coffee variant, the agricultural industry began to rebound, little by little, until it ultimately acquired substantial momentum. Thus, coffee became intrinsically interwoven into the essence of Batangueño identity, symbolizing community cohesion and resilience.

The author finds this study significant in various academic, cultural, and socio-economic contexts. By examining the role of *Kapeng Barako* in Batangueño identity, this study contributes to the documentation and preservation of the region's rich cultural heritage. It highlights how coffee is more than a commodity but a living tradition that reflects Batangas values, character, and history. It also provides an in-depth analysis of how *Kapeng Barako* has influenced the identity and traditions of Batangueños over generations. It contributes to local history and cultural anthropology by documenting the historical significance of coffee cultivation in Batangas.

Moreover, understanding the cultural and economic importance of *Kapeng Barako* can help promote sustainable farming practices, support local coffee farmers, and advocate for policies that protect and revitalize the declining *Coffea liberica* industry in the Philippines. Since the research explores how *Kapeng Barako* serves as an archetype of Batangueño identity, symbolizing strength, resilience, and pride, this endeavor can serve as a means for the government to support the proliferation of the *Kapeng Barako* variety throughout the province of Batangas to increase its yield. This paper contributes to identity studies by showing how regional products shape self-perception and social belonging.

In addition, this research adds to scholarly discussions on food studies, cultural symbolism, and regional identity in the Philippines, serving as a reference for future studies on coffee culture and identity information. Ultimately, this study emphasizes the need to protect, promote, and sustain *Kapeng Barako* as a cultural and economic asset, ensuring that the legacy continues to thrive for future generations.

Methodology

The investigation presented in this paper utilizes a qualitative research design that incorporates historical, ethnographic, and cultural analysis methods to explore how *kapeng barako* represents Batangueño identity. The approach involves an examination of historical records and events through detailed analytical methods. The researcher undertook extensive archival research to document the historical evolution of *kapeng barako* in Batangas by examining its initial introduction, subsequent peak popularity period, followed by its decline and the efforts for revival. An extensive analysis of primary and secondary sources, alongside historical records, was conducted to establish the context of its importance within Batangueño heritage.

In addition to her other methods, the researcher conducted direct interviews with local coffee farmers to gather their viewpoints regarding the cultural heritage and economic importance of *kapeng barako*. Experts in history and culture participated in interviews to deliver detailed analyses regarding *kapeng barako's* influence on Batangueño identity formation. Furthermore, the researcher underwent an extensive consultation process involving coffee shop proprietors and baristas to examine the methods of coffee marketing alongside its perception in modern environments. Simultaneously, researchers interviewed long-established Batangas inhabitants to document their oral histories and personal narratives about *kapeng barako*. The research employed qualitative methodologies to construct an extensive cultural and historical account of *kapeng barako* while examining its persistent influence on Batangueño identity formation.

Results and Discussion

The History of Coffee in the World

Ancient scholars believed that the first cultivation of coffee in Yemen can be traced back to 575 CE. Although the authentic source of coffee may remain eternally obscured, shrouded in myth and folklore, scholars have amassed substantial evidence indicating that coffee has been acknowledged in Ethiopia "since time immemorial," and the proofs they presented appeared plausible. Records suggest that quite possibly, the cradle of humanity—the ancient territory of Abyssinia (or Ethiopia)—functions as the birthplace of coffee.

Of the many legends about coffee, one of the most captivating features is the dancing goats (Pendergrast, 2019). This particular tale recounts the story of an Ethiopian plateau known as Kefa (Kaffa),[2] where a goat herd named Kaldi delighted in tracing the meandering paths of his goats as they foraged for sustenance on the mountainsides. When the goats did not respond to Kaldi's call, he searched for them and found them engaged in a lively display: they butted one another, danced upon their hind legs, and bleated with exuberance. He saw that the goats were eating the glossy green leaves and red berries of a nearby tree and realized that the trees have induced a form of madness in his goats. He tried to taste the berries and experienced a peculiar sensation (Myhrvold, 2024).

[2] The Kaffa Afromontane rainforest in Southern Ethiopia is believed to be the birthplace of *Coffea Arabica*, a coffee plant which grows wild only in Ethiopia. As one of the last remaining evergreen coffee forests in Ethiopia, the Kaffa Zone is regarded as a site of international importance and lies within the Eastern Afromontane Hotspot, one of the 34 global priority areas for conservation (National Picture Library).

Kaldi told this encounter to his father, who disseminated this information to the community until coffee became a part of the Ethiopian cultural identity. They called the leaves and beans *Bunn* (the early name of coffee). The Ethiopians devised more gratifying methods for extracting further, as they ground the beans and combined them with animal fat to create an expedient snack for energy. Additionally, they crafted a fermented wine from the pulp and an exquisite beverage known as *qishr*, derived from the mildly roasted husks of the coffee cherry. This beverage is presently known as *kisher*[3].

Throughout this century, there were also enduring Mohammedan traditions asserting the preeminence of the initial utilization of coffee as a beverage. One such narrative recounts how, in 1258 CE, Sheik Omar stumbled upon the coffee drink serendipitously in proximity to a desert cave near Ousab in Arabia, where he had been exiled. According to this legend, this discovery was not merely fortuitous; it was imbued with profound significance. According to the legend:

> The dervish (a member of a Muslim Sufi religious order who has taken vows of poverty and austerity) Hadji Omar was driven by his enemies out of Mocha into the desert, where they expected he would die of starvation. Due to extreme hunger, he tried to taste some strange berries growing on a shrub. While they seemed edible, they were very bitter. He tried to improve the taste by roasting them. When it became very hard and so he softened it with water. The berries turned harder but the water turned brown. Omar drank the water and it refreshed him, enlivened his sluggishness and raised his drooping spirits. He returned to Mocha where his salvation was considered a miracle. Because of this, coffee became well-known and Omar was made a saint (Ukers).

Regardless of the origin of coffee, its stimulating properties rendered it widely valued. Although Islamic authorities declared it intoxicating, much like alcohol—and consequently prohibited by the Qur'an, numerous Muslims remained drawn to the beverage, viewing it as an alternative to alcohol. However, despite the looming threat of severe penalties, the consumption of coffee proliferated swiftly among Arabs and their adjacent communities, ultimately leading to the emergence of a novel social and cultural phenomenon: the **coffeehouses** (Myhrvold).

After the Ethiopians discovered coffee, the distribution of coffee occurred through trade interactions with the Arabs, traversing the narrow expanse of the Red Sea. According to Pendergrast, it is plausible that during their approximately 50-year dominion over Yemen in the 6th century, the Ethiopians purposefully established coffee plantations. Thus, this period marks the inception of the Arab's growing appreciation for the invigorating beverage. They cultivated the coffee trees using irrigation systems in the proximate mountains, calling the beans *qahwa*— an Arabic term signifying "brew." The term "coffee" found its way into the English lexicon in 1582, derived from the Dutch word *koffie*, which, in turn, is rooted in the Ottoman Turkish *kahve*, ultimately from *qahwa*. Notably, *qahwa* may denote coffee as an appetite suppressant because the Arabic term *qahiya* means "to lack hunger." Furthermore, the Arabic root *qhh* signifies 'dark color,' while *qahwah,* the feminine variant of *qahwa*, also connotes 'wine' or a beverage characterized by its dark hue.

During the 15th century CE, coffee gained greater appreciation. Individuals began cultivating coffee trees in the Yemeni district of Arabia (National Coffee Association, 2024). Notably, the first reliable reference to coffee appears in written form in the year 1454. The *Mufti* (a Muslim legal expert endowed with the authority to issue rulings on religious matters) of Aden, called Muhammad Ibn Said Al Dhabhani, encountered this intriguing beverage during a journey through Ethiopia. Upon returning to his home in Aden, he fell ill. He used several medications yet remained sick. He remembered the dark, bitter drink he met in Ethiopia and wondered whether it might improve his condition. He instructed his servants to procure some dark beverages. Upon drinking this concoction, he felt better and more active and he could postpone the onset of sleep. He endorsed this beverage to the *Sufis* (also called dervishes), who maintained that it would endow them with the vitality necessary to "spend the night in prayers or other religious exercises with more attention and presence of mind" (Kerr). The endorsement of Al Dhabhani transformed coffee into an immensely fashionable drink within the confines of Yemen.

[3] In Yemen, *kisher* coffee is considered the classic afternoon ritual for many households. When the host serves *kisher* coffee, socializing with family and guests starts. It is also best for digesting after a heavy meal, as it is usually accompanied by spices such as cinnamon and ginger (https://yemenkitchen.wordpress.com).

In its beginning phases, coffee was not considered a beverage but a medicinal substance or a spiritual adjunct (to religious practices). Later on, it became part of everyday life. As a societal appreciation for coffee consumption flourished, many affluent families (in various regions) constructed coffee rooms in their residences for ceremonial indulgence. Conversely, individuals lacking the means to establish such a space would frequent coffeehouses, commonly called *kaveh kanes*. By the end of the 15th century, Muslim pilgrims had disseminated coffee across the Islamic realm—covering Persia, Egypt, Turkey, and North America, rendering it a highly sought-after commodity.

According to "The Rich History of Coffee" (Nescafe, 2024), individuals made coffee part of their daily routine. They consumed coffee within the domestic sphere and extended it to their visitors as a facet of their hospitality. This widespread appreciation for the beverage prompted the Turks to establish a coffeehouse in Constantinople (now Istanbul), Turkey, in 1475. People frequented these establishments to savor coffee while participating in the discourse, enjoying musical performances, observing entertainers, engaging in chess, gossiping, and keeping abreast of current events. Coffee houses became the epicenter for exchanging and gathering information and were characterized as "Schools of the Wise."

The Coffee Detractors

Due to the growing popularity of coffee, its cultivation grew from Yemen to Mecca and Medina, where people used it for religious purposes. Because of the unprecedented rise of coffee popularity, controversies emerged against ardent coffee enthusiasts. The act of consuming coffee earned a reputation as a subversive indulgence. For some political authorities, individuals appeared to derive excessive enjoyment from the coffeehouses. In his exploration of the Arab coffeehouses, Ralph Hattox (1985) wrote: "There has been a lot of improper pastimes occurring at coffeehouses, ranging from gambling to involvement in irregular and criminally unorthodox sexual situations." Although many circles revered coffee, people should not overlook the societal implications of its consumption because some deemed it a catalyst for moral decay.

During the 1500s, various Arab rulers and religious leaders denounced coffee. The Grand Vizier Kuprili of Constantinople, fearing sedition amidst a war, issued a decree that led to the closure of the city's coffeehouses. He mandated that anyone caught drinking coffee a second time would be stitched into leather bags and thrown into the Bosporus (situated in Istanbul, Turkey). But despite this strict regulation, many individuals continued drinking coffee. Consequently, the authorities withdrew the ban.

In 1511, the young governor of Mecca called Khair-Beg,[4] while exiting the mosque, saw a group of men drinking in a hidden corner. These people were merely preparing for an evening of prayer, but Khair-Beg thought they were drinking wine. Learning that the entire populace of the city partook in this beverage, he investigated and ultimately concluded that he should suppress this drink. He called his religious, medical, and legal advisers for a meeting and recounted his observations at the mosque. The congregants engaged in musical performances, danced, and participated in games of chance for monetary gain—all of which opposed the sacred law. Some of the dignitaries present attempted to justify the beverage. Ultimately, the opposing faction prevailed, promulgating an edict prohibiting coffee consumption. The governor emphasized that, like wine, he should ban coffee according to the Qur'an; hence, even the coffee reserves housed in municipal warehouses were burned (Lucket, 2024). Many individuals perceived the edict as an ill-informed and inequitable decision. Many coffee enthusiasts discreetly disobeyed the edict, but the *mufti* supported the beverage. Nevertheless, the authorities persisted in penalizing those who violated the order.

In 1524, Sultan Suleiman I[5] reprimanded the governor of Mecca for his actions in banning what was, in fact, something perfectly acceptable in Cairo, Egypt. Because of this, the authorities lifted the prohibition immediately. The coffee enthusiasts perceived justice in the eventful fate of Khair-Beg, who was ultimately convicted of being an extortionist and a thief. His punishment was severe; he was then tortured to death (Kerr). What accounts for the enduring practice of coffee consumption amidst adversity? Numerous scholars have posited that coffee is an intellectual

[4] Hayir Bey (sometimes spelled Kha'ir bey or Kha'ir Beg) or Khayrbak ruled Egypt in the name of the Ottoman Empire from 1517 until he died in 1522 [https://dbpedia.org/page/Hayir_Bey].

[5] Sultan Suleiman is the only son of Sultan Selim I (reigned 1512-1520). Selim I was the one who introduced coffee in Constantinople in 1517 (Kerr).

stimulant, facilitating a pleasurable elevation of energy levels without overtly detrimental consequences. Furthermore, coffeehouses emerged as vital social hubs. In Turkey, the integral role of coffee became apparent, as a lack thereof at home could furnish justification for a woman to pursue a divorce (Pendergast).

Coffee in Other Middle Eastern Countries

Around 1570, prominent Muslim clerics voiced their dissent regarding coffee consumption, primarily because the coffeehouses thrived while their mosques remained desolate. For this reason, several religious figures believed that attending a coffeehouse was more sinful than frequenting a tavern that served alcoholic beverages.

In 1580, Murad III (whose reign spanned from 1574 to 1595) proclaimed that they should categorize coffee in the same vein as wine. He, therefore, mandated the prohibition of coffee according to the dictates of the Prophet Mohammed. However, this legislative measure did little to deter the people from clandestine consumption.

Coffee Entered Europe

In 1536, when the Ottoman Turks established their dominion over Yemen, coffee beans emerged as a significant export commodity within the expansive Turkish Empire. The Turks procured these beans from the Yemeni port of Mocha. However, despite earlier assertions regarding the origins of coffee beans in the mountainous terrains of Western Ethiopia, it is in 12thcentury Yemen that we find the earliest documented evidence of coffee cultivation. Historians have posited that they most likely transported coffee across the Red Sea by Ethiopian invaders during their incursions into Yemen. Once planted, coffee became an integral element of Islamic culture on the Arabian Peninsula, as the favorable agronomic conditions present in the Yemenite highlands facilitated the cultivation of the preferred species of the coffee aficionados—*Coffea arabica* (McGonigal, 2024).

As Yemeni coffee took root and demand arose, the beans crossed the hills towards Mocha Port on the Red Sea. The beans acquired another well-known name: *mocha*. For centuries, this small city served as the exclusive channel for coffee sold on the international stage. Although tightly regulated by their Ottoman overlords, authorities mandated that coffee beans could not exit Yemen without undergoing the roasting process—this precaution ensured that they could not propagate in foreign locales (McGonigal).

The commercial trajectory of coffee necessitated its transportation to the Suez Canal. Here, French and Venetian merchants would subsequently acquire the commodity. This increasing coffee trade emerged as a significant source of revenue; however, the Turks zealously protected their monopoly over the cultivation of coffee trees in Yemen.

Ultimately, the Europeans developed a profound appreciation for coffee, disseminating it throughout various cities across the continent. Conversely, many individuals regarded the consumption of coffee as morally dubious; indeed, some labelled it as the devil's beverage. This sentiment persisted until Pope Clement VIII (24 February 1536 to 3 March 1605) sampled the Muslim concoction, prompted by his priests, who requested him to prohibit its use. In response, he exclaimed: Why, this Satan’s drink is so delicious that it would be a pity to let the infidels have exclusive use of it. We shall fool Satan by baptizing it and making it a truly Christian beverage (Pendergrast). **The Development of Coffee Business in Europe**

Throughout the initial half of the 17th century, people continued regarding coffee as an exotic elixir. Its primary use was as a costly pharmaceutical reserved for the elite. However, in the ensuing fifty years, Europeans unearthed the Arabian drink's social and medicinal advantages. Thus, by the 1650s, coffee became readily available on the streets of Italy and sold by *aquacedratajo* (or lemonade vendors), who also sold chocolate drinks and liquor (Pendergast).

In 1651, a Jewish entrepreneur named Jacob inaugurated a coffeehouse in Oxford, England (Atreum, 2024). Observing the flourishing profitability of these establishments, a multitude of others soon emerged, particularly within the confines of London. During this era, coffeehouses functioned predominantly as male sanctuaries. Those who opted for coffee in exchange for alcohol began their days with heightened alertness and energy; consequently, their productivity markedly improved.

The appreciation for coffee led to the emergence of coffeehouses as pivotal centers of social interaction and discourse in the main centers of the cities of England, Austria, France, Germany, and Holland. In England, coffee centers called

'Penny Universities[6]' proliferated, garnering widespread acclaim because a customer could procure a cup of coffee for merely a penny while participating in intellectually stimulating dialogues (National Coffee Association). However, despite the proliferating enthusiasm for coffee among the French, they were somewhat tardy in embracing the concept of coffeehouses compared to their Italian and British counterparts.

Because of the growing coffee craze, many detractors from the different distillers in London emerged because of their financial losses. These critics connected the act of coffee consumption with the 'godless Turks' responsible for introducing coffee from Constantinople. In 1674, there was a circulation in England entitled "The Women's Petition Against Coffee," which served as retribution because coffee consumers, men in particular, prohibited women from entering cafés unless they were prostitutes. The petition attributed sexual impotence in men to coffee consumption. Women asserted that their husbands were perpetually absent from their homes and families, thus neglecting their domestic responsibilities (turning Turk, indeed) all for "a little base, black, thick, nasty, bitter, stinking, nauseous, puddle water" called coffee (Luckett). The evidence suggests that the petition opposing coffee did not significantly influence the coffee industry, primarily because by the year 1675, England boasted over 3,000 coffeehouses. Some establishments even provided overnight accommodations, mimicking the Turkish coffeehouse model.

As the subsequent century unfolded, the café continued to allure esteemed philosophers, writers, and notable figures, including Voltaire, Jean-Jacques Rousseau, Denis Diderot, and Benjamin Franklin (Pendergrast). Coffee also facilitated a livelihood for fortune-tellers, as they purportedly could interpret coffee grounds. The widespread appreciation for coffee not only diminished alcohol consumption but also led to the emergence of cafés, which served as remarkable intellectual hubs. These venues ultimately contributed to the onset of the French Revolution.

During the 1700s, the consumption of coffee experienced a meteoric rise in Sweden. Similar to the situation in England and other countries, governmental authorities harbored suspicions regarding coffeehouses, perceiving them as bastions of subversion wherein opponents of the monarchical regime would conspire to orchestrate revolts. Consequently, King Gustav III promulgated a law in 1746 that explicitly condemned coffee drinking. Furthermore, he imposed excise taxes on coffee consumption and ordered that those who neglected to remit the tax face penalties.

In curtailing this escalating phenomenon, the government also outlawed coffee paraphernalia, leading to the police confiscating cups and dishes. King Gustav engaged in a series of experiments involving two identical twins to substantiate his claims regarding the deleterious effects of coffee and the detrimental consequences of coffee consumption, and this medical trial was considered the first clinical trial conducted in Sweden: the king ordered that one twin drink substantial quantities of coffee daily, whereas his counterpart was mandated to consume equivalent volumes of tea, ostensibly to establish that coffee could reduce lifespan. However, it is ironic that King Gustav met his death first, having been assassinated in 1792; subsequently, the two physicians overseeing the trial also died. Meanwhile, in stark contrast, the tea-drinking prisoner lived to the venerable age of 83. The final individual to pass away was the twin, who should have suffered an early and excruciating death attributed to coffee (Luckett). Eventually, coffee ascended to the status of the predominant beverage in Sweden. The nation has since transformed into one of the highest consumers of coffee per capita worldwide.

In 1766, King Frederick II of Prussia instituted a state monopoly on coffee imports, a strategic economic move where he maintained that coffee was a beverage suited for the aristocracy. He subscribed to the perspectives of Prussian physicians, who asserted that coffee would affect one's health because it induces effeminacy in men and sterility in women. Consequently, on September 13, 1777, the king promulgated this decree:

> It is disgusting to notice that everybody is drinking coffee instead of beer. Consider the amount of money we are losing. We must drink beer. Your king was brought up on beer, and so were his ancestors and his

[6] In 17th-century Britain, coffee houses were referred to as "Penny Universities" (a term that reflects their cultural significance). These establishments served as gathering places for academics, artists, and intellectuals; however, their impact extended beyond mere socialization. They democratized learning, opening avenues for individuals of diverse backgrounds to engage in scholarly discourse. This phenomenon was particularly noteworthy because it included those who could not access higher education—although such barriers existed, the coffee houses provided a space for intellectual exchange. Thus, these venues contributed to the broader dissemination of knowledge [https://bigthink.com/the- the-past/penny-universities-coffeehouse/].

> officers. Many battles have been fought and won by soldiers nourished on beer. I do not believe that coffee-drinking soldiers can be depended upon to endure hardship or to beat their enemies in case of the occurrence of another war (Luckett).

However, over the next 30 years, coffee became a cultural staple in Austria, Germany, Spain, and the rest of Europe. Although the Europeans greatly appreciated coffee, growing coffee in Europe was a struggle because of its colder climates. For this reason, European traders began growing coffee elsewhere.

Coffee in North America

Captain John Smith, the illustrious founder of the Virginia colony at Jamestown, introduced coffee to North America in 1607. He became well-acquainted with this stimulating beverage during his journey in Turkey. When New Amsterdam (now known as New York) existed under Dutch governance, the colonizers imported coffee from Holland. Coffee was accessible in the Amsterdam market as early as 1640, and the merchants transported substantial quantities of the green bean from Mocha. However, no evidence substantiates this claim. What is known is that before the introduction of coffee, the Dutch consistently imported tea from Holland across the Atlantic. Tea emerged as the favoured libation among colonists because of British cultural influence. Although coffee enjoyed limited popularity, it engendered a modest following among merchants, intellectuals, and political figures who convened in coffeehouses to exchange ideas and engage in commerce.

In 1773, during the infamous Boston Tea Party, the inhabitants of Boston (disguised as Indigenous peoples) boarded English vessels anchored in the Boston harbor, subsequently throwing their tea cargo into the bay. This event triggered the emergence of the coffee industry across North America. Later on, cities such as New York, Pennsylvania, and Charleston also engaged in their protests against tea, thereby facilitating the ascendance of coffee to the status of *King of the American Breakfast Table* and its designation as the preeminent beverage of the American populace (Ukers).

In 1919, coffee received the highest honor awards. An American general proclaimed it as the most essential element that contributed to the victory of the Allied Forces in World War I. By the early 19th century, there was an increase in coffee consumption within the United States. The growing demand led to a need to cultivate coffee in Central and South America, regions whose climates were particularly conducive to its growth. Consequently, the United States became a prominent importer of coffee from Latin America, especially Brazil and Colombia. This reliance on coffee imports fostered partnerships between Americans and their Latin American counterparts.

Maxwell House was founded in 1892, leading to the widespread appreciation of coffee. Instant coffee began in 1901, but it did not gain commercial success until Nescafe introduced its instant variety in 1938. This innovation facilitated rapid and convenient coffee preparation, appealing to busy and pragmatic Americans. During World War II, instant coffee generated increased popularity, particularly among soldiers in the field.

After World War II, coffee consumption grew in the U.S., where coffee became a cultural norm, particularly within workplaces where coffee became a productivity enhancer. Diners and coffee shops proliferated throughout the 1950s and the 1960s, solidifying coffee's image as an integral component of American life. Peet's Coffee and Tea was founded in 1966 in Berkeley, California, and became a seminal force in the specialty coffee movement, emphasizing the importance of high-quality, freshly roasted beans. Inspired by this trend, Starbucks emerged in 1971 in Seattle, offering specialty coffee and catalyzing increased public interest in espresso beverages and café culture.

The Arrival of Coffee in the Philippines

The Philippines, which boasts a complex and profound coffee history, has a timeline that goes back several centuries. The evolution of coffee cultivation in this nation has undergone numerous shifts primarily due to economic demands, colonial influences, and changing agricultural conditions. The world recognized this country as one of the leading producers of coffee globally. However, today, there is a palpable desire to reclaim the former glory of Philippine coffee, particularly Batangas coffee. Although the challenges are significant, Batangueños are working diligently to revive the *Kapeng Barako* industry because this legacy is worth preserving.

In her article entitled "Coffee Anyone," Atienza (2024) wrote:

> Spain was arguably the most prosperous nation in Europe at the beginning of the 17th century, with a large colonial empire and holdings in Europe. Spain's wealth came from gold and silver mines in its South American colonies.
>
> However, in the mid-17th century, its power declined due to successive wars that weakened and drained Spain's resources. Despite that, Spain did maintain its overseas empire until the early 19th century. To recapture lost glory and revive its prestige marked the spirited attempt to stimulate economic development in the Philippines. Thus, triggering economic recovery. That's when the coffee industry was established among others.

According to Rafael Bartolome, in 1740, a Spanish friar named Claudio de la Concepcion brought three *gantas* of coffee, allegedly instructing a servant to plant these seeds in a garden located in Laguna or Lipa; later, they also planted them on his father's land in Pinagtung-ulan (Kape de Filipina, 2023). However, *Café de Lipa* gave a different account by saying that two Franciscan friars cultivated coffee, and they taught two Filipino natives the technique of propagating coffee plants. Although these individuals were members of the Macasaet family, who significantly contributed to the growth and care of the *Coffea Liberica* seedlings, this divergence in historical narratives highlights the complexities surrounding the origins of coffee in the Philippines. It is crucial to acknowledge that historical records suggest the introduction of *Coffea Liberica* to the Philippines occurred later (rather than earlier). In contrast, the variety that was brought to this archipelago by the Franciscans was, in fact, *Coffea Arabica*. It is also important to note that the province of Batangas, due to its geographical and ecclesiastical importance, was under the guidance of the Augustinian friars. Consequently, the responsibility of coffee cultivation did not lie solely with the Franciscans. The Augustinians were most likely assigned this task after they obtained coffee beans from their Franciscan colleagues and then facilitated their cultivation in Lipa.

In 1778, Governor-General Jose de Basco y Vargas (1733-1805) arrived in the Philippines to fulfil his role as the governor of the archipelago under the auspices of the Spanish Empire, a position he maintained until 1787. In his term as governor-general, people recognized him as one of the most economically astute governor-generals to have governed the Spanish-ruled Philippines. On March 10, 1785, the government instituted the *Real Compaña de Filipinas* (The Royal Company of the Philippines) through a royal decree (Alchetron, 2024). This Royal Company was a chartered entity designed to establish a trade monopoly throughout the Spanish territories in the Philippines. It aimed to supply Manila with European products while simultaneously facilitating the export of Philippine goods and merchandise sourced from the Orient. It also aimed to promote agricultural development within the Philippines. As the coffee export market flourished, numerous farmers, particularly in Lipa, Batangas, opted to cultivate and propagate coffee (The Kahimyang Project, 2024).

Gobernadorcillo Don Gallo de los Reyes initiated a campaign that underscored the significance of coffee cultivation. He mandated that every household must plant a coffee tree in their backyard. This order remained in effect until 1832, when his son, Santiago de los Reyes, was elected to the same post. Santiago asserted that those who failed to comply with the order would receive beatings and had to walk around the town with an offending sign on their back (Atienza).

In 1814, due to a vigorous influx of agricultural commodities into the global market, an event attributed to the Royal Company of the Philippines and various economic societies, and perhaps also because the Augustinian priests, particularly Frays Elias Nebreda and Benito Varas, were acutely aware of coffee's growing reputation in international trade, they actively encouraged the local populace to engage in coffee cultivation. This initiative subsequently facilitated the dissemination of coffee cultivation practices to other regions with Batangas, including Ibaan, Lemery, San Jose, Taal, and Tanauan. The plant, botanically classified as *Coffea arabica*, flourished in Batangas' tropical climate and volcanic soil; however, this rendered the cultivation process comparatively straightforward.

Coffea arabica spread rapidly and became a highly valued agricultural commodity among Filipino cultivators. The soil and climatic conditions of Batangas, which were exceptionally favorable, established it as a crucial center for coffee cultivation within the archipelago. The humble seedling signalled the beginning of a coffee revolution in the Philippines. Moreover, the climate and topography of Lipa proved to be particularly advantageous for coffee production. By that

point, coffee had become remarkably prevalent among Batangueños. As a result, *Coffea arabica* earned the title *Kapeng Tagalog*, which indicates its indigenous roots. The *Cabeza de barangay* of Lipa, known as Francisco Montuano, amassed significant wealth because of the extensive cultivation of coffee.

Although the eruptions of the Taal Volcano in 1749, 1754, 1781, 1790, 1808, 1873, 1874, and 1878 significantly impacted the coffee industry, coffee farmers continued with great determination in their cultivation efforts. This determination of the coffee farmers led to the growth of the coffee industry, especially when the Philippines adopted Trade Liberalization, a direct result of the cessation of the galleon trade between Mexico, Canton, and Manila. As a result, this unassuming seedling marked the beginning of a coffee revolution in the archipelago since the region has a climate and terrain suited for coffee cultivation. Eventually, as if it were inevitable, the coffee business developed into a thriving industry. In the 1800s, the Philippines had emerged as the fourth leading coffee-producing and exporting nation, celebrated for its rich and aromatic beans. Nevertheless, it was the resilience of these farmers that characterized this period.

Following its promising debut in Batangas, the cultivation of coffee spread to various regions across the Philippines, including Cavite, Laguna, Mindanao, and the elevated terrains of Benguet in Luzon. By the advent of the 19th century, coffee (especially the *Coffea arabica*) had established itself as a popular crop among Filipino farmers. By the midpoint of the 19th century, the increasing demand for coffee in the international market was becoming evident, and the Philippines emerged as a crucial producer of this commodity.

The illustrious coffee era in Lipa spanned from 1840 to 1890, leading to the remarkable growth and expansion of Batangas coffee within the global market despite the fluctuating supply of this esteemed beverage (Atienza). In 1860, the coffee trees that managed to endure the volcanic eruptions continued to thrive and produced an abundance of cherries and the volcanic ash appeared to serve as a fertilizer, which enabled the coffee trees to flourish even more, ultimately elevating Batangas as the fourth-largest coffee supplier worldwide.

In 1869, Batangas emerged as the epicentre of coffee in the Philippines and became the primary supplier of coffee to the United States under the brand name *Batango* Coffee, which commanded the highest prices among various coffees sold in neighbouring countries. Furthermore, the opening of the Suez Canal in that same year, coupled with the American expansion after the Civil War concluded in 1865, significantly opened up vast European and American markets for Philippine agricultural products (Atienza).

By the 1880s, the Philippine archipelago was experiencing a notable coffee boom, and Lipa emerged as the nucleus of the Philippine coffee industry. Thus, it earned the title *Coffee Capital of the Philippines* due to its vast coffee plantations and substantial contributions to the national economy. During this time, the Philippines rose to become the fourth-largest coffee producer in the world, providing a significant share of the global coffee supply. However, at one point, it momentarily claimed the title of the exclusive coffee supplier to the United States. Although other regions of the world, particularly South American countries, suffered from coffee rust, the coffee industry in Batangas thrived, ultimately accounting for 7% of the total Philippine exports. Due to Lipa's economic growth, which reached approximately 4 million pesos, Queen Regent Maria Cristina of Spain issued a decree granting Lipa the title *Villa de Lipa*. This title allowed the city to utilize the Coat of Arms, facilitated through Don Victor Balaguer.

The Decline of the Philippine Coffee Industry in the Late 19th Century

During the latter years of the 1880s, the coffee industry in the Philippines declined because of the disastrous epidemic *of Hemilia vastatrix* (commonly known as coffee rust) and an invasion of coffee borers. These insects cause substantial harm to coffee plants. These coffee afflictions ravaged a significant portion of the *Arabica* crop, recognized as *Kapeng Tagalog*, particularly in Batangas. The emergence of fungi and *genus Aphhis* severely weakened the entire coffee sector. This calamity happened between 1890 and 1894, just before the Philippine-American revolution.

During this time, Brazil emerged as a formidable force in the coffee sector, swiftly ascending to become the world's largest coffee producer. Many Filipino farmers, particularly those in Batangas, abandoned coffee cultivation in favor of

alternative crops, such as sugarcane, citrus, and rice. Although this transition was due to economic reasons, it ultimately diminished the Philippines' prominence in the coffee trade.

Despite the significant downturn experienced by the Philippine coffee industry in the latter part of the 19th century, there was a subsequent recovery in the early 20th century. During this period of transformation, the coffee aficionados introduced the *Coffea canephora* (*Robusta*) variety. These cultivars exhibited higher resistance to coffee rust and could thrive at lower elevations. This adaptability rendered them particularly well-suited to the Philippine climate.

During the early 20th century, particularly during the 1950s and 1960s, the coffee industry bounced back, and the Philippine government, in collaboration with various international aid initiatives, actively promoted the replanting of coffee. They introduced *Robusta* to facilitate diversification within the nation's coffee production. For a faster recovery in the coffee industry, aficionados expanded coffee cultivation to diverse regions throughout the Philippines. These regions included Benguet in the northern Cordillera region, parts of Mindanao, and the island of Mindoro. These areas offered favorable climatic and altitudinal conditions for cultivating *Arabica* and *Robusta*; thus, the industry gradually regained its footing. However, challenges remained because the market dynamics were constantly shifting. Although the efforts were significant, the farmers knew they had not attained the full potential of the coffee industry.

The Discovery of the Coffea Liberica

The coffee industry thrives globally, illustrated by the *Coffea arabica*, often regarded as the first variety cultivated in Lipa, and *Coffea canephora*, known as *robusta*. However, another coffee variety debuted in 1843 within the tropical forests of West and Central Africa, Liberia, designated as *Coffee liberica*. This particular variety flourished naturally in Sierra Leone, Cote d'Ivoire, and Ghana (Spring, 2024). Although *arabica* and *robusta* had gained widespread acclaim worldwide, *liberica* was not readily accepted by coffee enthusiasts, except those seeking unique and diverse flavor profiles. This scenario unfolded against an increasing global demand for coffee, which the current supply could not sufficiently satisfy. The dependence on *robusta* alone proved inadequate due to the declining *arabica* stocks strained by coffee rust. At this pivotal moment, *Coffea liberica* was introduced into the international coffee market, acting as a solution to the challenges faced by other coffee varieties.

European colonial powers (including the Dutch and the British) embarked on the cultivation of *liberica* coffee in their colonies, particularly in Southeast Asia, like the Philippines, Indonesia, and Malaysia, and also in the Caribbean. However, because *liberica* shows greater resilience to diseases and pests, it became a viable crop in areas where *arabica* faced challenges. Although it thrives in lowland tropical climates marked by high humidity, this distinct adaptability makes it a valuable alternative to other coffee species.

Coffea liberica was introduced to the Philippines by American colonizers between 1890 and 1894, just before the onset of the Filipino-American Revolution. This specific variety of coffee found an optimal environment in Batangas; however, Manuel Genato was the first to bring the *Coffea liberica* variety to Batangas from Manila. He cultivated three hectares of land in Sitio Abra, Banay-banay, San Jose, and Lipa. Furthermore, he distributed coffee seeds to the towns of Rosario in Batangas, San Pablo in Laguna, and Tiaong and Sariaya in Quezon (Morada, 1925). As a result, the Batangueño coffee farmers referred to the coffee variety as *Kapeng Amerikano* (likely because the Americans introduced this variety to the region) and later transformed into the name *Kapeng Barako* (homophonic) derived from the *Coffea liberica* (kape [li] berica) variety. *Kape Liberica* traditionally adopted *Kapeng Barako*. However, although this particular variety flourished and became a cultural emblem within Batangas—particularly in Lipa and nearby municipalities—it gained notoriety mainly due to its bold and robust flavor, distinguishing it from other types of coffee.

However, despite its manifold advantages, *Coffea liberica* encountered challenges, including its relatively low yields, and this occurs because *liberica* trees yield fewer beans per hectare in comparison to both *Arabica* and *Robusta* cultivars; thereby, rendering them less economically viable for large-scale production. Although the *liberica* coffee is characterized by a robust, smoky, and somewhat bitter flavor profile, which might not resonate with most consumers, this limitation restricts its demand within global coffee markets, which are predominantly influenced by milder *Arabica* blends.

Additionally, coffee farmers have observed that due to the larger size of *liberica* beans than other coffee varieties, distinct processing techniques are needed, thereby introducing additional complexities for producers.

Although a segment of coffee aficionados began to recognize the merits of *liberica* coffee due to its potent aroma and flavor; thus, it emerged as the preeminent choice among the Batangueños. In 1905, this audacious and robust coffee, characterized by its earthly and woody undertones, became popularly referred to as Batango coffee or Batangas coffee. It flourished particularly within the coffee's melting pot in America, especially in the bustling coffee market at Pike Place in Seattle, Washington, where the renowned coffee establishment Starbucks first took root.

Coffee During the American Colonial Period and World War II

When the *liberica* coffee first penetrated the United States market, it emerged as a favored variety within the Philippines, ultimately evolving into a cultural emblem in Batangas and Cavite. *Liberica* continues to possess a distinctive place in Filipino coffee culture to this day.

In 1922, the government authorities distributed more than 60,000 seedlings (of both *liberica* and *excelsa* coffee varieties) among the coffee cultivators of Batangas. The Provincial Inspector Ambrocio Lontok and Municipal Inspector Crispulo Bagui spearheaded this initiative, and these extra trees contributed to a greater yield of coffee in the region.

The Japanese occupation during World War II engendered significant problems in coffee production and trade. Farmers neglected the numerous plantations, resulting in a marked decline in coffee production during this tumultuous period. When the Japanese commandeered international trade routes, they halted coffee exports from the Philippines. Instead of prioritizing coffee cultivation, they redirected agricultural efforts towards local consumption or appropriated by Japanese authorities to bolster their military operations.

During the war, coffee rose to the status of a luxury item for a considerable number of Filipinos, primarily due to its scarcity. Alternative beverages and substitutes emerged, including roasted rice, corn, or sweet potatoes, which they ingeniously brewed to simulate coffee. Those who did not have access to *Kapeng Barako* resorted to stretching their supply by reusing grounds or diluting the brew.

In light of the prevailing hardships that were quite significant, coffee maintained its cultural importance throughout the war. Sharing a cup of coffee—regardless of whether it was a substitute version—became a way for individuals to uphold a semblance of normalcy and community amidst trying times. Coffee, therefore, continued to be a powerful symbol of hospitality, but scarcity often necessitated serving reduced portions or alternative iterations to guests. This dynamic illustrates the complex relationships between tradition and adversity because, despite the challenges, the act of sharing coffee persisted.

Post-War Recovery and Coffee Revitalization

In the aftermath of the war, the Philippines encountered considerable obstacles in reconstructing the agricultural sector, particularly the coffee industry. Numerous plantations, which had previously thrived, were obliterated and the nation grappled with the arduous task of reinstating pre-war production levels. Efforts aimed at cultivating coffee encompassed the promotion of varieties such as *Kapeng Barako* and *Robusta.* These varieties had demonstrated superior resilience under the exigencies of wartime conditions. However, to avert future crises, it became evident to the populace that a transition towards more sustainable agricultural practices and diversification was imperative. The challenges the coffee farmers and their communities encountered during the war underscored their resourcefulness and contributed significantly to the resilience and adaptability inherent in Filipino coffee culture. Indeed, the scarcity of coffee experienced during World War II illuminated the tenacity and perseverance of the Batangueño farmers when confronted with adversity.

During the 1950s up to the 1960s, significant efforts were made to reinvigorate the Philippine coffee sector, particularly in light of the growing global demand for coffee. International interest in *robusta,* especially for its use in instant coffee production, facilitated the Philippines' discovery of a niche market for its coffee offerings. During this period, the archipelago was already home to four predominant varieties of coffee: *Arabica, Robusta, Excelsa* (a variety of

liberica), and *Kapeng Barako* (*liberica*). They cultivated these varieties in distinct regions across the Philippines, with specific locales specializing in particular cultivars. The principal coffeeproducing places in the Philippines at present encompass Batangas (*Kapeng Barako* or *liberica*), Cavite (*robusta*) and the Cordilleras, which includes Benguet and Sagada (*arabica*), as well as Bukidnon and Davao in Mindanao (*arabica* and *robusta*).

In the 1970s, Nestlé, a multinational corporation, partnered with local farmers to facilitate training initiatives and promote large-scale *robusta* coffee production for incorporation into instant coffee blends. The government established the Philippine Coffee Board to bolster the industry and advocate for coffee as a viable agricultural crop for local farmers. During this period, specifically in 1970, numerous Lipeños worked hard to sustain the propagation of *kapeng barako*.

Challenges in the 1980s and the Decline in Coffee Production

During the 1980s, there was a significant decline in coffee production. The global surplus of coffee precipitated a dramatic decrease in prices. This downturn rendered coffee farming increasingly unprofitable. Therefore, numerous Filipino farmers abandoned coffee cultivation, culminating in a marked reduction in production levels. Although many farmers turned to alternative agricultural products because of the volatile pricing of coffee, the Philippine coffee industry encountered substantial setbacks. Because there were about 250,000 farmers who depended on the coffee industry, the government promulgated the Republic Act 2712 to prevent coffee imports to protect local producers (Atienza).

The nation's coffee production plummeted to unprecedented lows. Hence, coffee producers revitalized the coffee sector through various initiatives, including government programs, farmer cooperatives, and collaborations with international organizations. Given the persistent high demand for coffee, the government exerted considerable effort to rejuvenate the industry. For this reason, they implemented the Philippine Coffee Roadmap (2017-2022) to promote sustainable coffee production, augment yields and enhance Philippine coffee quality, enabling it to compete effectively in the global market.

The coffee sector underwent a significant renaissance, primarily due to the growing interest in specialty coffee and the people's increasing affinity for local varieties. Consequently, both local and international demand for unique types such as *kapeng barako, excelsa,* and the *arabica* markedly escalated organizations, including the Philippine Coffee Board, alongside various local non-governmental associations, have collaborated with governmental entities to advance sustainable coffee farming practices, provide essential training, and rejuvenate coffee production.

Kapeng Barako as Base for Specialty Coffee Drinks

Although numerous varieties of coffee have emerged from *arabica, robusta,* and *liberica,* where coffee producers conceptualized specialty coffees, Batangueño baristas have the potential to innovate a specialty coffee using *kapeng barako* as its foundational element. This particular coffee can yield a unique flavor profile for such applications. Traditionally regarded as more robust and potent coffee, often characterized by earthy, nutty, or even faintly bitter notes, specialty coffee can harness distinctive traits. Provided it is prepared and brewed with meticulous attention.

Kapeng barako is frequently, yet not linked to bold, dark brews. However, employing a lighter roast can illuminate more nuanced flavor profiles; thus, it becomes particularly suitable for specialty coffee. Roasting at a medium to light gradient may accentuate delicate notes of sweetness, floral undertones, and acidity that baristas often overlook when brewed excessively dark. However, this approach aligns more closely with the fundamental principles of specialty coffee, which prioritize complexity and flavor diversity.

Although *kapeng barako* has not traditionally been utilized to the same degree in the specialty coffee domain (as beans such as *arabica*), the distinctive flavors and cultural relevance render it a viable foundation for producing high-quality specialty coffee. With meticulous attention to processing, roasting, and brewing methods, *kapeng barako* can emerge as a unique and a flavorful specialty coffee that appeals to local and international consumers.

Making Use of Kapeng Barako in Specialty Coffees

Because of the unique characteristics of *kapeng barako*, it warrants consideration for inclusion in the specialty coffee spectrum. Here is the different specialty coffee where *kapeng barako* can be the base coffee:

Expresso: While Coffea arabica and robusta are the predominant varieties used in espresso coffee, *kapeng barako* offers a distinctive and bold flavor profile that can improve an espresso experience. Its formidable aroma substantially enhances the sensory perception of the espresso shot, and its viscous, syrupy texture is highly sought after in espresso preparation. In contrast to Arabica, renowned for its acidity and fruity notes, *kapeng barako* reveals complex, smoky, nutty, and woody flavors that contribute to an unparalleled espresso profile. When subjected to appropriate roasting and extraction techniques, it possesses the potential to unveil sweet, floral, and dark, chocolate undertones.

Doppio: *Kapeng Barako* is a viable alternative for *doppio*, although its pronounced, smoky, and earthly characteristics may yield a particularly bold doppio compared with traditional *Arabica*-based espresso. Its low acidity with a robust body renders it less sour yet more substantial than its *arabica* counterpart. A *doppio* with *kapeng barako* may be too intense or bitter for some. Hence, it is advisable to opt for a medium roast rather than a dark roast or partner it with *excelsa*, thereby introducing a fruity, complex nuance to the blend.

Ristretto is an espresso variant, being shorter and more concentrated and will amplify the already robust and full-bodied characteristics inherent in *kapeng barako*. Because the *ristretto* uses merely half the water of a standard espresso, it heightens the sweet, bold, and comparatively less bitter notes. Since *kapeng barako* has low acidity and is rich in deep, woody notes, it can yield an exceptionally smooth yet powerful ristretto. If a coffee enthusiast enjoys strong, low-acid coffee with a substantial body, then a *kapeng barako ristretto* represents an excellent selection.

Lungo (translated as long coffee [Italian]) consists of an espresso shot extracted with more water. Hence, *kapeng barako* heightens its bold, earthy, and nutty flavors, rendering the beverage less concentrated than a standard espresso. *Kapeng barako* is well-suited for *caffe lungo* due to its intense, full-bodied profile that maintains flavor even when diluted with additional water. Unlike a*rabica* coffee, which tends to exhibit a weak flavor when over-extracted, *kapeng barako* preserves its assertiveness in a *lungo*.

Caffe Americano. The robust, full-bodied, and smoky characteristics of *kapeng barako* present a compelling alternative has naturally low acidity, resulting in a velvety, mellow Americano. This quality is excellent for those who favor black coffee without sharp acidity.

Long Black Coffee is created by delicately pouring a *doppio* or a double espresso over hot water, thereby preserving the crema and the markedly more concentrated flavor profile than *Caffe americano*. Traditional long blacks crafted from *Arabica* beans can often exhibit excessive acidity. Yet, *kapeng barako* offers a more harmonious, balanced taste. This characteristic renders it ideal for those who favor less sourness and a more substantial black coffee.

Red Eye Coffee. When we use *kapeng barako* as the basis for red-eye coffee, the resultant beverage is characterized by an extraordinary boldness, elevated caffeine concentration, and a remarkably intense flavor profile. Given that Red Eye Coffee integrates an espresso shot into a standard brewed coffee, using *kapeng barako* significantly augments the drink's potency and richness. Notably, *kapeng barako* possesses a higher caffeine content than *arabica*. A red eye crafted with *kapeng barako* serving as both the brewed coffee and the espresso base will be exceptionally caffeinated—ideal for individuals seeking a substantial energy boost.

Cappuccino. Since *cappuccino* is fundamentally composed of a 1:1:1 ratio of espresso, steamed milk and milk foam, the inclusion of *kapeng barako* as the espresso ensures that the flavor characteristics of coffee persist robustly, even when combined with milk. In contrast to *arabica*, which may succumb to the overpowering influence of milk, *kapeng barako* steadfastly preserves its boldness, thus rendering it particularly suitable for aficionados who favor a pronounced coffee essence in their *cappuccino*, while *arabica*based *cappuccinos* may occasionally become overly acidic, especially when harmonized with milk.

Caffe Latte. Given that a *latte* typically comprises a singular shot of espresso and a more substantial quantity of steamed milk (usually adhering to a 1:3 ratio of espresso to milk), the use of *kapeng barako* as the espresso base yields a rich, full-bodied and creamy concoction and this ensures that coffee's flavor remains distinctive, even when combined with milk.

Caffe Mocha. The composition of a mocha—comprising espresso, steamed milk and chocolate (often in syrup or powder form)—is notably enhanced by the use of *kapeng barako* as the espresso base, thereby augmenting the drink's

depth and complexity with its smoky, nutty, and subtly woody flavors, rendering it an excellent complement to the rich and sweet essence of chocolate.

Flat White. Since a flat white is a double shot of espresso and steamed milk with a velvety microfoam texture, a *barako* coffee will give the drink a rich, full-bodied flavor. *Kapeng Barako's* bold and full-bodied profile will stand out even in a drink with more milk. Its naturally low acidity will make it ideal for a flat white because it will create a smooth and balanced cup if paired with steamed milk, preventing the coffee from becoming overly sharp or sour.

***Caffe Macchiato*:** Using *kapeng barako* as the foundational element for *caffe macchiato* engenders a coffee markedly stronger, bolder, and more intense than its *arabica*-based counterpart. A *macchiato*, which has a shot of espresso complemented by a minimal quantity of steamed milk or foam, benefits from incorporating *kapeng barako*. The low acidity inherent in *kapeng barako* becomes an excellent choice for a *macchiato*, as the milk component does not hide the flavor.

Caffe Cortado comprises equal proportions of espresso and steamed milk. The milk in a *cortado* intends to harmonize with the pronounced coffee flavor rather than dominate it. Thus, the robustness of *kapeng barako* remains prominent even when combined with milk.

Café au lait usually consists of equal proportions of brewed coffee and steamed milk, distinguishing it from espresso-based concoctions such as *lattes* or *cappuccinos*. Using *kapeng barako* for the brewed coffee segment will bestow a full-bodied flavor that remains pronounced even in the presence of milk. Indeed, *kapeng barako* harmonizes well with the abundant milk content characteristic of a *café au lait.*

Cold Brew Coffee. *Kapeng barako* is an exceptional foundation for cold brew coffee because the bold, full-bodied, and naturally low-acid profile of *kapeng barako* coffee renders it particularly suitable for this brewing method. As a result, one obtains a smooth, rich, and invigorating coffee concentrate. Unlike the traditional hot brewing techniques that often extract bitterness and acidity, cold brewing accentuates the inherent flavors of *kapeng barako*, thus rendering it an outstanding choice for an iced coffee experience. For the one who seeks a potent morning coffee or an afternoon revitalizer, *kapeng barako* cold brew will undoubtedly deliver.

Caffe affogato. *Kapeng barako,* renowned for its full-bodied, smoky, and subtly chocolatey characteristics, harmonizes exquisitely with the inherent sweetness and creaminess of ice cream, thereby engendering a luxurious juxtaposition of hot and cold, as well as bitter and sweet sensations. Furthermore, *kapeng barako* distinctly asserts itself even against the sumptuousness of vanilla ice cream. Notably, the espresso derived from *kapeng barako* produces a rich, thick crema that enhances the overall texture and creates a sumptuous mouthfeel upon contact with the ice cream. Because *kapeng barako* possesses a higher caffeine concentration than arabica, an affogato crafted from it delivers a more potent kick, making it an exceptional post-meal indulgence or energy revitalizer.

Irish Coffee. Conventionally, Irish coffee comprises hot brewed coffee, Irish whiskey, brown sugar, and a delicate layer of lightly whipped cream—ingredients that harmonize exquisitely with the full-bodied, smoky, and subtly chocolatey profile of *kapeng barako*. This particular drink is renowned for its profound, rich, and smoky flavor, a characteristic that remains pronounced even when combined with whiskey and cream.

Conclusion

Batangueño coffee aficionados typically exhibit a pronounced preference for coffee characterized by its boldness, strength, and full-bodied nature, accompanied by a rich aroma yet possessing low acidity. This inclination arises from the fact that coffee drinkers in Batangas and those from other provinces, who have sampled the pronounced characteristics of *kapeng barako* regard it as a superior option. Those who prefer milder, fruitier, or sweeter blends would find *Arabica* a more suitable alternative. Additionally, individuals who perceive *kapeng barako* as cost-prohibitive due to its limited availability may instead opt for *robusta*, and this raises a pertinent question: why should one choose *kapeng barako*?

Kapeng barako represents a significant facet of Batangueño heritage coffee. Supporting the cultivation of *kapeng barako* not only bolsters the livelihoods of local Batangueño farmers but also plays a crucial role in preserving traditional

Philippine coffee practices and industries. The distinctiveness of *kapeng barako*, especially when compared with other *liberica* varieties, can elevate Batangas' prominence on the global coffee stage. However, the prioritization of *liberica* as a preferred coffee option must originate with the Batangueño farmers themselves, who ought to recognize that the limited availability of *kapeng barako* could be advantageous primarily because the beans will have an enhanced market value relative to other coffee varieties.

The coffee farmers, producers, and roasters of Batangas must establish a standardized processing methodology conducive to the improvement, maintenance, and sustainability of various stages: cultivation, harvesting, brewing, and preparation to produce a more delectable coffee. For a superior and more gratifying *kapeng barako* experience, it is essential to employ precise roasting, grinding and extraction methods, which are crucial for attaining an ideal equilibrium between betterness and sweetness in traditional and specialty coffees.

Training programs must be implemented for aspiring baristas and coffee shop proprietors within the Batangas province, thus positioning Batangas as a sought-after destination for coffee aficionados. An excellent quality cup of *barako* coffee may evolve into a popular term among tourists frequenting various locales in Batangas. In this context, the selection of *Kapeng Barako* emerges as a pivotal factor in promoting Batangas and fostering a sustainable tourism development strategy for the entire province.

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