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Utilizing Lotus through Knowledge Management for Creative Economic Development: A Case Study in Nakhon Nayok Province, Thailand

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Abstract

This qualitative research investigates the indigenous knowledge related to the utilization of lotus components in the Ban Khlong San Chao community, Nakhon Nayok Province, and explores the effectiveness of knowledge transfer through both in-person training and online dissemination. The study targeted 15–20 community members and implemented a structured training program divided into five phases, encompassing eight key topics on lotus utilization—from upstream cultivation processes to midstream processing and downstream commercialization. The training aimed to enhance local capacity by promoting the value-added use of lotus in various forms. Participants reported a high level of satisfaction with all five phases of the knowledge transfer activities. As a result, community members successfully developed a range of lotus-based products, including lotus varieties, lotus stem bread, lotus cookies, dried lotus flowers, and dyed lotus leaves. These products have been distributed both within and outside the community. Overall, the initiative contributed to increased household income and supported the development of a localized creative economy grounded in traditional knowledge and sustainable practices.

Introduction

The global economy has increasingly transitioned into a knowledge-based paradigm, where knowledge serves as a critical driver of innovation and value creation. Organizations, communities, and small enterprises are expected to harness and apply knowledge to develop products and services that yield higher value (Phurirungpinyo & Phosirawat, 2014). This transition aligns with Thailand's 13th National Economic and Social Development Plan, particularly Milestone 8, which envisions the establishment of smart, livable, and sustainable cities. One core strategy involves the utilization of knowledge to generate value-added products within communities, thereby contributing to the broader national strategy (2018–2037) that emphasizes inclusive growth, decentralization of development, and the enhancement of local capacity for self-reliance (Office of the National Economic and Social Development

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Council, 2022). To achieve this, it is essential for local communities, particularly community leaders and stakeholders to possess a foundational understanding of knowledge management. By leveraging the collective wisdom and experience embedded in community members, especially the elderly, communities can create sustainable innovations. Knowledge management is a structured process of capturing, organizing, and utilizing information, experiences, and insights to create accessible knowledge resources (Noomnam, 2012).

Community knowledge management is a strategic mechanism that mobilizes "community capital" to support the development of a creative economy. This process brings to light tacit local knowledge and facilitates its application in economic and social development (Makapol et al., 2017). The Ban Khlong San Chao community, located in Ongkharak District, Nakhon Nayok Province, exemplifies such potential. With abundant natural resources, including a rich diversity of lotus species (e.g., red, white, and royal lotus), the community embodies a unique blend of environmental richness and traditional knowledge. Much of this knowledge resides informally among community elders and is at risk of being lost if not systematically documented and transferred.

Recognizing this, the present study emphasizes the importance of organizing structured knowledge transfer activities within Ban Khlong San Chao. These initiatives aim to preserve, distribute, and institutionalize community knowledge, thereby enabling local residents to enhance their livelihoods through innovative use of local resources. According to the creative economy framework, communities should harness various forms of capital—human, social, material, and cultural—to enhance the uniqueness and marketability of their products (Sangchumnong, 2019). Additionally, Strategy 2 of the 13th National Economic and Social Development Plan promotes the generation of income at the community level through circular economy practices and low-carbon initiatives. Sub-strategy 2.2 advocates for income generation rooted in biological and cultural diversity, eco-tourism, and environmental stewardship—underscoring the role of community engagement in sustaining natural and cultural heritage (Office of the National Economic and Social Development Council, 2022).

In this context, the current research undertakes the organization of community-based knowledge management activities centered on the lotus plant. By guiding community members through upstream, midstream, and downstream processes related to lotus utilization, the initiative facilitates experiential learning and fosters collaborative innovation. Preliminary data were gathered through document analysis and interviews with community leaders to inform the design of targeted knowledge transfer activities. The ultimate goal is to build a community of learners who are capable, self-reliant, and equipped to contribute meaningfully to the local creative economy.

Objectives

1. To collect knowledge from individuals and relevant organizations in order to develop guidelines for transferring technology that adds value to lotus-based products in the Ban Khlong San Chao community.

2. To formulate practical guidelines for the utilization and processing of lotus products for the benefit of local residents.

Conceptual Framework

Figure 1. Conceptual Framework

Research Methodology

This study employed a structured seven-step knowledge management process adapted from the framework proposed by the Provincial Community Development Office, Community Development Department (2016). The process includes the following stages: (1) Knowledge Identification, (2) Knowledge Creation and Acquisition, (3) Knowledge Organization, (4) Knowledge Codification and Refinement, (5) Knowledge Access, (6) Knowledge Sharing, and (7) Learning.

The research began with a comprehensive review of existing literature, including academic publications, textbooks, and official reports, to gather explicit knowledge related to lotus cultivation and utilization. Simultaneously, tacit knowledge was collected through interviews and informal discussions with subject-matter experts and community members possessing practical experience in relevant areas. This body of knowledge was synthesized to inform the development of training content and instructional media such as handbooks and online

resources, which was used for dissemination to the target community. The overarching aim was to facilitate broad knowledge exchange and promote the integration of local wisdom into a sustainable creative economy.

The following steps outline the methodology used in implementing the knowledge management activities:

1. Area Selection and Identification of Knowledge Management Topics

The first phase involved identifying an appropriate community site and determining relevant knowledge management topics through participatory engagement with community stakeholders.

1.1 Selection of Area and Target Participants

A preliminary needs assessment was conducted through consultations with community leaders and local representatives to determine interest, readiness, and capacity for participating in knowledge exchange initiatives. The Ban Khlong San Chao community, located in Sai Mun Subdistrict, Ongkharak District, Nakhon Nayok Province, was selected based on the following criteria:

- Availability of raw materials, particularly lotus plants, in the surrounding environment;
- Presence of a suitable venue for organizing learning activities;
- Demonstrated community interest in leveraging local resources to enhance livelihoods.

Although the community exhibited potential for value-added production using lotus, there remained a knowledge gap in effective utilization and processing methods. Importantly, Ban Khlong San Chao is part of an OTOP Nawatwithi community and benefits from established tourism infrastructure, offering a platform for the sustainable distribution of community products.

Target participants for the knowledge exchange program were recruited through an open and voluntary process. Local residents expressing interest in lotus-based product development were invited to participate in the training activities. The aim was to foster active engagement and ensure that knowledge transfer would result in practical and sustainable applications.

1.2 Determination of Knowledge Management Topics

The core knowledge management topics focused on the full utilization of lotus components, addressing the entire value chain: from upstream (resource cultivation), midstream (processing and transformation), to downstream (product development and commercialization).

Topics were identified through a series of stakeholder engagements, including:

- Brainstorming sessions with community leaders and residents;
- In-depth interviews with local experts;
- Informal focus group discussions to capture community perspectives.

The above engagements were conducted in a flexible, semi-structured manner to allow participants to freely express ideas and share experiences. The resulting knowledge domains were categorized and structured as key thematic areas to guide the development of content for knowledge transfer activities, as illustrated in Figure 1.

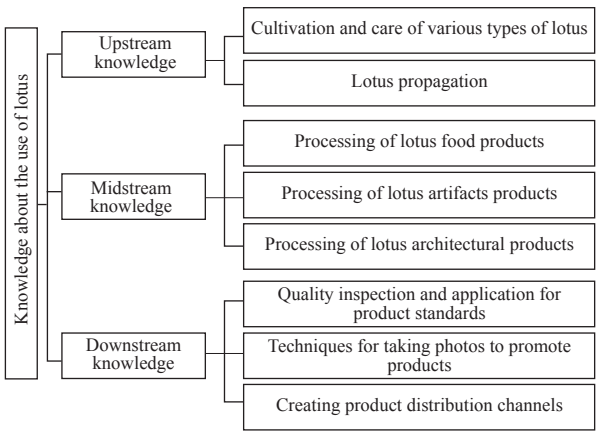

Figure 1 Issues in knowledge management regarding lotus.

Once the knowledge management issue was completed, the research team held a meeting with community leaders and village representatives to determine important topics and issues in the knowledge management process. This involved using data from surveys of community population needs to organize knowledge transfer activities. For population groups to participate in activities to exchange knowledge and transfer knowledge together, as shown in Figure 2.

2. Organizing activities to transfer knowledge about the utilization of lotus components into creative economy products.

The project involved organizing a series of knowledge transfer activities aimed at promoting the utilization of lotus components in creative economy products. Targeted participants were selected based on specific criteria, with each activity accommodating 15–20 individuals. Community leaders played a key

Figure 2 The research team met with leaders of the Ban Khlong San Chao community to carry out knowledge transfer activities.

role in publicizing the events and inviting interested community members to join the knowledge exchange sessions.

The design of each learning activity included both theoretical and practical components. Experts from relevant fields delivered lectures on key topics, followed by hands-on workshops structured into five sequential phases:

• Phase 1: Upstream Knowledge Transfer – Focused on the cultivation and maintenance of various lotus species.

• Phase 2: Midstream Knowledge Transfer (Food Processing) – Covered methods for processing lotus into food products.

• Phase 3: Midstream Knowledge Transfer (Handicrafts) – Addressed the production of handicrafts using lotus components.

• Phase 4: Midstream Knowledge Transfer (Decorative Products) – Focused on the creation of architectural and decorative items derived from lotus.

• Phase 5: Downstream Knowledge Transfer – Included topics such as quality assurance, product standard certification, media and photography for product promotion, and the development of distribution channels through both online and offline platforms.

These structured activities enabled participants to apply their learning in practical settings, fostering a deeper understanding of how to utilize lotus components in innovative ways. At the conclusion of each session, participants engaged in evaluations and group discussions to reflect on the outcomes of the knowledge transfer activities. The insights gained from these discussions were used to further analyze and refine the overall knowledge transfer process, as illustrated in Figure 3.

Figure 3 Discussion of the results of organizing knowledge transfer activities.

The effectiveness of the knowledge transfer activities was assessed using a structured satisfaction questionnaire designed to evaluate the transfer of technology aimed at adding value to lotus products and creating a distinctive product identity for commercialization by the Ban Khlong San Chao community. The questionnaire consisted of two parts: Part 1: General Information – Captured demographic data of participants, including gender and age. Part 2: Evaluation of Satisfaction and Knowledge Application – Assessed participants' satisfaction and understanding across four key dimensions: (1) quality of the speakers, (2) appropriateness of the location and duration of the activities, (3) cognitive gains, and (4) practical application of acquired knowledge. Satisfaction was rated on a 5-point Likert scale. The instrument demonstrated high reliability and content validity (Content Validity Index = 0.868; Cronbach's Alpha = 0.991) based on the criteria of Burns & Grove (2001). Data were analyzed using descriptive statistics that included the percentages, means, and standard deviations to evaluate participant satisfaction across the different phases of the activity

3. Promoting and disseminating knowledge management for the creative economy

To support the transition toward a creative economy, the research team compiled critical knowledge into two knowledge management manuals: (1) *Cultivation and Propagation of Lotus,* and (2) *Processing of Lotus Products*. These manuals serve as comprehensive references for individuals and groups interested in leveraging lotus-based innovations. In addition to printed resources, knowledge dissemination efforts included the development of online content, particularly via YouTube, to broaden accessibility. A community-based focus group discussion was held with local leaders from the Ban Khlong San Chao community in Ongkharak District, Nakhon Nayok Province. The session was used to collaboratively select appropriate content for multimedia materials, determine dissemination channels, and devise strategies for future outreach.

Results

1. Results of area selection and determination of knowledge management issues.

A preliminary field survey was conducted in the Ban Khlong San Chao community, Ongkharak District, Nakhon Nayok Province, to identify suitable sites for knowledge transfer activities related to lotus utilization. Three primary locations were selected for organizing various phases of the project.

Location 1: Community Pond Area. According to Google Maps, this site is located at latitude 14.1272376620619 and longitude 101.0226178576248 (see Figure 4). The area features a rectangular pond with clay soil that is high in potassium which is an ideal condition for lotus cultivation. Based on these characteristics, the site was designated for the transfer of upstream knowledge, specifically focusing on the cultivation, maintenance, and propagation of lotus plants. Participants were given opportunities for hands-on practice in cultivating various lotus species and understanding propagation techniques in a real-world setting.

Location 2: Multipurpose Building, Ban Khlong San Chao Community. According to Google Maps, this open-air multipurpose facility is located at latitude 14.125155854890263 and longitude 101.024182111246 (see Figure 5). Situated adjacent to the community pond, the building provides a flexible space ideal for organizing lectures and hands-on workshops on the processing of various lotus-based handicrafts. The area's adaptable layout allows for the reconfiguration of the training environment, making it a suitable venue for both knowledge transfer and the dissemination of information related to lotus product innovation.

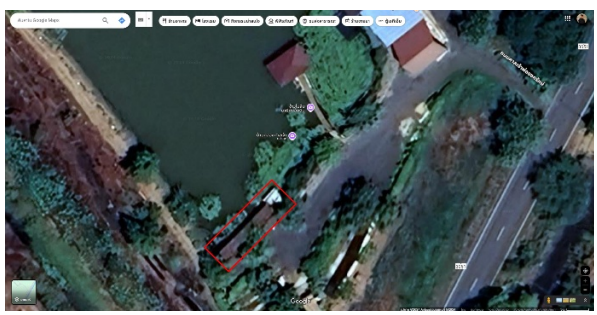

Figure 5 shows the location of the multi-purpose building area.

Location 3: Processing and distribution building for Ban Khlong San Chao community products. This facility, located at latitude 14.125485702822571 and longitude 101.02452085515287 (see Figure 6), consists of an enclosed structure equipped with essential tools and electrical appliances required for food product processing. The building also features an extended covered area suitable for outdoor training sessions. In collaboration with community leaders, the research team

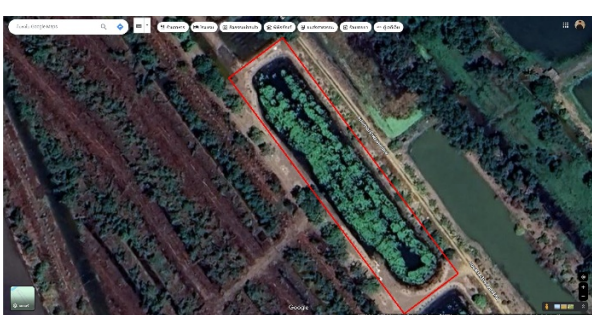

Figure 4 Shows the location of the pond area in the Ban Khlong San Chao community.

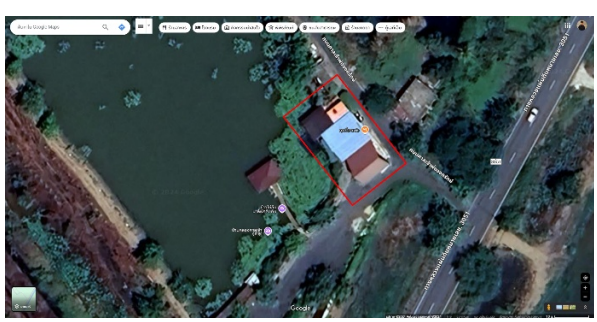

Figure 6 shows the location of the building for processing and distributing products from the Ban Khlong San Chao community.

designated this location for transferring knowledge related to the processing of lotus food products. It also serves as a center for product display and distribution within the community.

2. Results of the activity to transfer knowledge about the utilization of lotus components into creative economy products.

Based on the identified themes, the research team and community leaders organized knowledge transfer activities across five key phases:

Phase 1: Upstream Knowledge Transfer – Cultivation and Maintenance of Lotus

This phase comprised two core activities:

• Activity 1: Lecture on Lotus Cultivation and Maintenance Delivered foundational knowledge on cultivation techniques and care practices for various lotus species.

• Activity 2: Practical Training in Lotus Cultivation and Propagation Participants engaged in hands-on training to cultivate and propagate commercially viable lotus species, including *Nymphaea lotus, Nelumbo nucifera,* and *Victoria amazonica,* within the community pond (see Figure 7).

Figure 7 Implementation of knowledge transfer regarding lotus cultivation.

Participant feedback indicated a high level of satisfaction, with an average score of 4.42 ± 0.51. Trainees reported increased capacity to apply the knowledge in the cultivation and commercial utilization of lotus stems for various products.

Phase 2: Midstream Knowledge Transfer – Processing of Lotus-Based Food Products

This phase included four interrelated activities:

• Activity 1: Lecture on Selection and Preparation of Raw Materials Focused on criteria for selecting and preparing lotus components suitable for food processing.

• Activity 2: Lecture on Preservation and Storage Provided guidance on food safety, storage techniques, and preservation methods for lotus-based products.

• Activity 3: Hands-on Training – Savory Lotus-Based Foods Participants practiced preparing savory food items, including salted egg dishes and lotus petal juice, as well as soy sauce-infused pickled eggs using lotus petals.

• Activity 4: Hands-on Training – Lotus-Based Snacks and Bakery Products Included the preparation of snack items such as red lotus bread, red lotus cookies, and red lotus crackers (see Figure 8).

Figure 8 Knowledge transfer process regarding lotus food product processing.

Participants expressed the highest level of satisfaction with this phase, reporting an average score of 4.57 ± 0.51. The activities significantly enhanced participants' practical skills and confidence in developing careers related to lotus food product processing. Notably, some trainees successfully applied this knowledge to initiate small-scale production of items such as red lotus cookies for commercial sale within the Ban Khlong San Chao community.

Phase 3: Midstream Knowledge Transfer – Processing of Lotus-Based Handicraft Products

This phase focused on enhancing participants' skills in processing lotus into various handicraft items. It consisted of four core activities:

• Activity 1: Lecture on the Use of Chemicals in Lotus-Based Artisanal Products Provided an overview of chemical agents commonly used in the processing of lotus for art and craft applications.

• Activity 2: Practical Workshop on Dyeing Lotus Leaves Participants practiced dyeing lotus leaves using chemical dyes and applied the processed leaves to create practical and decorative items such as notebooks and pencil cases.

Figure 9 Knowledge transfer process regarding the processing of lotus handicraft products.

• Activity 3: Training in Lotus Essential Oil Extraction and Product Development Included hands-on practice in extracting essential oils from lotus flowers and using them to produce scented soap, incorporating aesthetic design elements.

• Activity 4: Workshop on Creating Dried Lotus Flower Souvenirs Trainees learned to preserve small lotus flowers using silica sand to maintain their color and shape. These preserved flowers were then creatively arranged in glass jars for use as gifts and souvenirs (see Figure 9).

Participants reported the highest level of satisfaction with this phase, with an average score of 4.57 ± 0.51. The skills gained enabled them to create a variety of marketable souvenir products, including dyed lotus-leaf items, lotus-scented soap, and preserved floral arrangements for sale within the Ban Khlong San Chao community.

Phase 4: Midstream Knowledge Transfer – Architectural Decorative Applications of Lotus Materials

This phase introduced the use of lotus materials in decorative applications for architectural spaces, and consisted of the following four activities:

• Activity 1: Lecture on Material Selection for Architectural Decoration Educated participants on techniques for selecting lotus components such as leaves, stems, and dried seed pods for use in decorative architectural elements.

• Activity 2: Workshop on Designing and Constructing Ceiling Panels with Dyed Lotus Leaves Participants collaboratively designed and constructed decorative ceiling panels for the community learning center using dyed lotus leaves, highlighting the uniqueness of the center as a hub for lotus-based innovation.

• Activity 3: Workshop on Crafting Architectural Decor from Dried Lotus Pods and Water Hyacinth Fibers Participants practiced weaving simulated lotus leaves using water hyacinth ropes to produce decorative items for community buildings.

• Activity 4: Workshop on Column Decoration Using Dried Lotus Pods and Stalks

Trainees designed and decorated columns of the community learning center by combining wire-mounted dried lotus pods with woven lotus stems and water hyacinth ropes, forming graceful floral and leaf motifs for symmetrical display on either side of the entrance (see Figure 10).

The overall satisfaction level for Phase 4 activities was high, with an average score of 4.50 ± 0.52.

This phase contributed to the beautification of the community's learning center and increased its attractiveness as a local tourism and educational site.

Figure 10 The process of transferring knowledge regarding the processing of architectural products.

Phase 5: Downstream Knowledge Transfer – Product Standardization, Promotion, and Distribution

The final phase of the knowledge transfer program focused on equipping participants with practical knowledge for product quality assurance, media creation, and market expansion. Activities included:

• Activity 1: Lecture on Quality Control and Product Standard Certification Provided guidance on inspecting the quality of lotus-based food and handicraft products prior to distribution, along with procedures for applying for product standard certifications to ensure consumer trust.

• Activity 2: Lecture and Demonstration on Media Creation and Product Photography Introduced techniques for creating effective promotional materials for online platforms (e.g., Facebook, TikTok) and demonstrated the use of the 9-grid photography technique to enhance product visual appeal.

• Activity 3: Lecture on Developing Product Distribution Channels Covered strategies for both offline marketing (e.g., local markets, community storefronts, exhibitions) and online marketing through social media platforms such as Facebook, TikTok, Instagram, and YouTube (see Figure 11).

This phase also included instruction on enhancing online discoverability by using tools such as Google Maps. As a result, the Ban Khlong San Chao community now has a dedicated Google Maps link for customers to locate and visit the community's product display site: https://maps.app.goo.gl/qyxLretKAfxPa3EV9.

Participants expressed a high level of satisfaction with Phase 5, with an average score of 4.43 ± 0.76. The knowledge gained empowered them to implement quality control measures, create promotional content, and expand sales through diversified distribution channels, both offline and online.

Figure 11 Implementation of downstream knowledge transfer on Product Standardization, Promotion, and Distribution

3. Results of promoting and disseminating knowledge management towards the creative economy.

Through the implementation of five phases of knowledge transfer activities related to the use of lotus components in creative economy products, the research team systematically collected both tacit and explicit knowledge. This process culminated in the development of two comprehensive knowledge management manuals:

Cultivation and Propagation of Lotus and Processing of Lotus Products (Figure 12). These manuals address a broad range of community-identified topics and serve as educational resources for individuals seeking to develop or expand career opportunities and income-generating activities based on lotus utilization. In addition to the printed manuals, the research team disseminated knowledge through two educational episodes published on YouTube: Episode 1 – *Planting Lotus, Awakening Opportunities* (https://www.youtube.com/ watch?v= C5lDrm aGqm4) and Episode 2 – *Processing Lotus, Adding Value* (https://www.youtube.com/watch?v= CIPUMR38BOU).

Figure 12 Outcome: Two Comprehensive Knowledge Manuals

In addition, the Ban Khlong San Chao community can also generate additional income from using the knowledge they have gained to further develop their own careers by distributing their products in the community market and participating in various exhibitions, resulting in income generation and a creative economy within the community, as shown in Figure 13.

Discussion

Area Selection and Knowledge Management Topics

Ban Khlong San Chao, Moo 7, Sai Mun Subdistrict, Ongkharak District, Nakhon Nayok Province, was selected as the pilot site for the knowledge transfer activities due to its favorable conditions for both theoretical and practical learning. The location features essential infrastructure such as a learning center, a product promotion building, and natural water sources suitable for lotus cultivation. These characteristics align with Suwannaro (2007), who emphasizes that ideal lotus cultivation sites should be level, near a water source, and have clay-rich soil. The research team adopted a knowledge management framework based on the principles outlined by Senge (1990), which advocates for continuous learning, collaborative innovation, and shared development. Knowledge topics were selected to support occupational development among community members, promoting learning across the lotus value chain such as from cultivation to product commercialization. This approach corresponds with Panyanuwat (2005), who emphasizes the need for locally relevant, occupation-linked knowledge that can adapt to evolving community needs. Furthermore, Arthan & Chatraphorn (2013) highlight the importance of participatory planning in fostering successful community-based knowledge management.

Figure 13 Monetizing knowledge management outcomes

Cultural and Scientific Relevance of Lotus

The lotus (Nelumbo nucifera, family Nelumbonaceae) has long held cultural significance in Thai society, particularly in Buddhist traditions, where it symbolizes purity and devotion. Scientifically, the lotus is notable for its emergent leaves and flowers (Petcharat et al., 2009), which offer aesthetic, medicinal, and practical applications. The research activities were designed to integrate both cultural reverence and practical value into the learning process. The training curriculum was developed based on the instructional design model proposed by Cheamvarasart & Supapongpichate (2010), encompassing needs analysis, objective setting, content selection, instructor preparation, materials development, evaluation, and follow-up. Training emphasized the practical application of lotus components in areas aligned with local livelihoods, including food processing, arts and crafts, and architectural decoration.

Medicinally, lotus stems possess antispasmodic, laxative, and diuretic properties, and are beneficial for bone and dental health, as well as for stress reduction and cancer prevention (Janglek et al., 2014). Handicraft training focused on preserving lotus flowers using silica sand, which is a method that maintains the flowers' natural appearance and shape for ornamental use (MacDermot, 1974; Petchnin et al., 2023). Lotus leaves were dried and dyed for use in eco-friendly craft products, capitalizing on their aesthetic vein patterns (Chulacupt, 2015). The stems were repurposed as materials for decorative architectural elements. The design of these knowledge-sharing activities was based on the occupational needs and contextual conditions of the community, ensuring both relevance and sustainability of learning outcomes.

Training Methodology and Outcomes

The training activities combined theoretical instruction with hands-on workshops, allowing participants to apply learned concepts in practice. This blended approach has been shown to improve skill acquisition and foster meaningful learning (Duangpummes & Kaewurai, 2017). In addition, the dissemination of information via online platforms and social media broadened access to knowledge beyond the immediate community. According to Khositphiphat (2018), social media enables expansive communication, networking, and user-generated content sharing, supporting the formation of digital learning communities. As a result of the knowledge transfer activities, residents of Ban Khlong San Chao were able to establish sustainable careers based on lotus cultivation and processing. The knowledge was also disseminated to neighboring communities, generating additional income and supporting the growth of a creative economy rooted in local identity.

Conclusion

The five-phase knowledge management and technology transfer initiative successfully fostered value-added lotus-based products that reflect the cultural and commercial identity of the Ban Khlong San Chao community. The phases included: 1. Lotus Cultivation and Care, 2.Food Product Processing, 3. Art and Craft Product Development, 4. Architectural Decorative Applications, 5. Downstream Marketing and Distribution Activities. Evaluation of participant satisfaction, based on a 5-point Likert scale, revealed consistently high to very high levels of satisfaction across all phases:

- Phase 1: 4.42
- Phases 2 and 3: 4.57
- Phase 4: 4.50
- Phase 5: 4.43

Two knowledge management manuals were produced: Cultivation and Propagation of Lotus-covering species identification, planting, propagation methods, pest control, and maintenance; and Processing of Lotus Products - focusing on food, handicrafts, architectural decoration, and marketing strategies. These resources serve as reference materials for community members and interested learners, supporting sustainable community development and creative economic growth.

Suggestions

Practical Suggestions for Communities

Communities should be encouraged to develop skills in business management and cost-benefit analysis, and to establish collaborative networks among producers across all aspects of lotus products, to strengthen and sustain local entrepreneurs. Furthermore, the developed manual should be used as a community learning resource on an ongoing basis and developed into a digital medium for easier access. Demonstrations or workshops should also be held regularly to stimulate community participation and product development.

Research or Future Development Suggestions

In-depth market demand studies should be conducted to develop a broader range of lotus products that better meet consumer needs. Long-term project

impacts on the economy, society, and the community's quality of life should be systematically monitored. Research should also be conducted to establish standards for Lotus products to support future market expansion. Furthermore, branding and creative communication methods should be explored, and digital marketing capabilities should be developed to enhance the competitiveness of Lotus products at a broader level.

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