

Participatory Management of Older Adult Schools in Rural Thailand: Integrating Local Wisdom for Dementia Prevention, Caregiver Support, and Intergenerational Engagement

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Abstract

Purpose

This study aimed to develop and validate a participatory management model for older adult schools that combines local cultural wisdom with modern health and education strategies. The model was designed to promote dementia prevention, strengthen intergenerational relationships, and support family caregivers in rural northern Thailand.

Methods

The research was carried out in three older adult schools located in Uttaradit, Phrae, and Nan provinces. A total of 195 stakeholders participated, including older learners, caregivers, local wisdom practitioners, and municipal leaders. Data were collected through focus group discussions, individual interviews, needs assessments, participant observations, and evaluation surveys. Quantitative data were analyzed using descriptive statistics and paired t-tests, while qualitative data were coded thematically to identify priorities and guide model development.

Results

The model included dementia risk-reduction activities such as memory games, traditional crafts, exercise sessions, and nutrition workshops. It also incorporated intergenerational programs and caregiver respite opportunities. Flexible delivery modes, including on-site sessions, home visits, and digital platforms, improved access for homebound and socially isolated older adults. Stakeholders rated the model highly for relevance (mean 4.82 out of 5), cultural appropriateness (4.88), and feasibility (4.75). Intergenerational activities increased respect and interaction between generations while providing meaningful relief for caregivers.

Conclusions

A participatory and culturally grounded approach can transform older adult schools into community hubs for cognitive health, caregiver support, and social connection. The model is adaptable to other rural and resource-limited settings and supports global goals for healthy ageing.

1. Introduction

Population ageing is accelerating worldwide, with profound implications for health systems, social care, and community structures (Khan et al., 2024).. The World Health Organization projects that the proportion of people aged 60 years and older will nearly double from 12% in 2015 to 22% by 2050, while the number aged 65 years and above will reach 1.6 billion by 2050 (WHO, 2023). Alongside physical

health, maintaining cognitive function, enabling meaningful social participation, and supporting family caregivers have emerged as key priorities for healthy ageing (UN, 2023a). International frameworks emphasise the need for integrated, community-based approaches that address cognitive impairment prevention, long-term care, and intergenerational solidarity (Sánchez-Cazalla et al., 2025).

Thailand mirrors this global demographic shift. According to the *Situation of the Thai Older Persons 2022* report, the proportion of older adults (aged 60+) is expected to rise from 19% in 2022 to 31.4% by 2042, with rural upper-northern provinces—such as Lampang, Phrae, and Lamphun—already reporting older populations in excess of 26% (Phungviwatnikul and Vorapratchee, 2024). Additional analyses project that Thailand, currently an “aged society,” is on path to become a “super-aged” and even “hyper-aged” society by 2030 (Nontarak et al., (2023). In these settings, ageing intersects with limited infrastructure, personnel shortages, and digital readiness gaps, which together hinder access to lifelong learning and long-term care.

Older adult schools, established across Thailand as community hubs for education and social engagement, have the potential to support cognitive stimulation, foster intergenerational exchange, and provide indirect caregiver respite. Evidence from other countries demonstrates similar benefits—such as Japan’s community salons, Spain’s university programs for older adults, and Taiwan’s intergenerational learning initiatives—which have improved cognitive health, reduced social isolation, and supported family caregivers (Yeh, 2023; Velciu, 2023). However, in rural Thailand, persistent barriers—including inadequate funding, reliance on child-oriented teaching methods, and low digital literacy—limit participation, especially among homebound or marginalized older adults.

At the same time, these communities hold rich reservoirs of local wisdom, including traditional health practices, medicinal herb knowledge, and cultural heritage, often safeguarded by older adults themselves (Nilphat et al., 2023). Integrating this indigenous knowledge into modern educational and health-promotion strategies offers an opportunity to enhance cultural relevance, strengthen community ownership, and embed dementia risk-reduction principles into everyday activities (Afrianto & Yusuf., 2024). Yet, there is limited empirical evidence on management models that combine cognitive stimulation, caregiver support, and intergenerational programming within an inclusive, culturally grounded framework, particularly in rural and resource-limited settings.

This study addresses that gap by developing and validating a participatory management model for older adult schools in rural northern Thailand. The model integrates local and modern wisdom, applies adult learning principles, and incorporates dementia prevention, caregiver respite, and intergenerational engagement strategies. Using a Participatory Action Research (PAR) approach, the study aims to: (1) co-design a culturally relevant management system with stakeholders, and (2) propose inclusive lifelong learning and cognitive health measures adaptable to other rural contexts (Jitdorn et al., 2024). The findings have direct implications for long-term care integration, healthy ageing policy, and cross-generational community resilience.

2. Methods

2.1 Study Design

This study adopted a Participatory Action Research (PAR) framework to design and validate a community-driven management model for older adult schools as a component of healthy ageing, cognitive health promotion, and community-based long-term care (Gaber et al., 2024). PAR was selected because it supports collaborative problem identification, co-creation of solutions, and capacity building—critical features in public health interventions for ageing populations (Riccardi et al., 2023). It is particularly suited to integrating local cultural wisdom with modern educational and health-promotion strategies, fostering both cognitive engagement and caregiver support. The research followed five sequential phases: (1) selection of study areas and stakeholders, (2) stakeholder engagement, (3) data collection and analysis, (4) model development, and (5) system testing and verification.

2.2 Study Setting

As shown in Fig. 1, the study was conducted in three sub-district administrative organizations (SAOs) in upper-northern Thailand: Namkrai in Uttaradit Province, Nongmuangkai in Phrae Province, and Pua in Nan Province. Each municipality had operated an older adult school for at least three years and demonstrated readiness to participate in the research.

Established between 2017 and 2018, these schools offered free, weekly three-hour sessions over a four-month cycle. Enrolment numbers varied from 30–50 learners in Namkrai and Nongmuangkai to 110–130 learners in Pua. Program content spanned five domains: (1) food and health, (2) exercise and longevity, (3) emotion and hobbies, (4) occupation and savings, and (5) caring and sharing.

Geospatial context and accessibility varied considerably across the sites. In Namkrai, villages were scattered across hilly terrain, with distances to the school ranging from 2 km to over 18 km; most older adults relied on motorbikes or rides from family members. In Nongmuangkai, the relatively flat topography allowed easier access, but limited public transportation meant that travel times could still reach 40–50 minutes for those living in outlying villages. In Pua, where the catchment area extended into upland communities, distances of up to 25 km and seasonal road conditions significantly affected attendance, especially during the rainy season. Transport costs for those without personal vehicles ranged from 40–100 THB per session, representing a substantial barrier for low-income participants.

Although some activities already incorporated cognitive stimulation (e.g., traditional crafts, memory games) and caregiver respite, overall participation remained limited. Baseline data revealed that approximately 4,398 older adults in these municipalities had no access to the programs due to physical, financial, or social barriers. These findings underscore the need for a more inclusive, flexible, and dementia-preventive program design capable of reaching homebound and marginalized older adults.

2.3 Participant Selection

Participants were recruited using purposive sampling to ensure representation of key stakeholder groups involved in ageing-related education, caregiving, cognitive health promotion, and community leadership. A total of 195 stakeholders (65 per municipality) participated in the study, comprising members of older adult school committees, leaders of sub-district or village associations, local wisdom practitioners, school officers, municipal administrators, older adult learners (current or prospective), and local officers such as non-formal educators, health personnel, agricultural officers, and herbal medicine practitioners. Eligibility criteria required participants to have resided in the study area for at least two years, to be actively involved in ageing-related programs, caregiving, or health services, and to demonstrate willingness to participate in all phases of the participatory action research process.

2.4 Data Collection

Data were collected in 2022 using a mixed-methods approach to enable methodological triangulation and to capture comprehensive perspectives related to older adult education, caregiving, and cognitive health promotion. Qualitative data were obtained through focus group discussions conducted separately with older adult learners, non-learners, caregivers, and relevant stakeholders to explore patterns of participation, perceived barriers, caregiving needs, and expectations toward educational and care programs. In-depth interviews were undertaken with 20 key informants in each municipality, including older adult school committee members, village leaders, local wisdom practitioners, caregivers, and health personnel, to gain detailed insights into local contexts, management practices, and service integration. Participant observation was used to document learning environments, instructional approaches, learner engagement, and intergenerational interactions within older adult school activities. Quantitative data were collected through needs-assessment surveys employing Likert-scale ratings to prioritize educational, cognitive health, and caregiving support needs. In addition, model evaluation questionnaires were administered to assess the relevance, feasibility, equity, and acceptability of the proposed management system, with particular emphasis on dementia-preventive components and the integration of long-term care services.

2.5 Model Development Process

Model development was conducted through a structured, participatory process designed to address both system design and outcome alignment. In relation to Objective 1, the process commenced with an in-depth exploration of perceptions and lived experiences of older adult learners, non-learners, and family caregivers to establish a contextual understanding of educational engagement and care-related needs. This was followed by a participatory needs assessment to identify and prioritize educational, health-promotion, and cognitive-support requirements, alongside a systematic analysis of structural and contextual barriers to participation, particularly among homebound and cognitively impaired older adults. Insights generated from these stages informed the co-development of contextually appropriate solutions that integrated local wisdom with contemporary practices in health promotion, caregiving, and cognitive stimulation. These components were consolidated into a draft participatory management system incorporating flexible pathways for both in-person and digital delivery. The preliminary model

subsequently underwent iterative testing and refinement through stakeholder workshops to enhance feasibility, cultural relevance, and operational coherence.

To address Objective 2, qualitative data derived from focus group discussions, in-depth interviews, and participant observations were synthesized during structured workshops to refine lifelong learning strategies explicitly aligned with principles of andragogy, dementia prevention, intergenerational engagement, and inclusive lifelong education. This integrative approach ensured that the final model supported cognitive health promotion across diverse functional abilities and social contexts while remaining adaptable to varying community resources and delivery settings.

2.6 Data Analysis

Qualitative data were analyzed thematically, guided by study objectives, with manual coding cross-checked by multiple researchers for reliability. Particular attention was paid to themes related to cognitive stimulation, caregiver support, and cultural adaptation. Quantitative data from surveys and evaluation forms were analyzed using descriptive statistics (frequencies, percentages, means, standard deviations) and paired t-tests to compare pre- and post-prioritization scores.

2.7 Ethical Considerations

The study received ethical approval from the Uttaradit Rajabhat University Research Ethics Committee (Permit No. COA 026/2021). All procedures complied with the Declaration of Helsinki. Written informed consent was obtained from all participants, with assurances of confidentiality, voluntary participation, and the right to withdraw at any stage.

3. Results

3.1 Participant Characteristics

A total of 195 stakeholders participated in the study, with 65 from each municipality. Participants represented diverse roles in older adult education, health services, and community leadership (Table 1). The median age was 61 years (range: 42–78), and 64% were female. Nearly half (47%) reported prior involvement in older adult school activities, while 38% had never attended but were involved in ageing-related community programs.

The predominance of female participants reflects gendered patterns in caregiving and community involvement in rural Thailand, where women are often primary caregivers for both older and younger family members and are more likely to participate in health- and education-related initiatives. Women in these communities frequently serve as cultural custodians, local wisdom practitioners, and leaders in volunteer groups, which positions them as both beneficiaries and key drivers of older adult school activities. This gender dynamic underscores the potential of the program to serve as a platform for empowering older women through skill development, leadership opportunities, and income-generating activities.

Table 1
Participant characteristics

Characteristic	n (%)
Sex	
Female	125 (64.1)
Male	70 (35.9)
Age group (years)	
40–49	18 (9.2)
50–59	56 (28.7)
60–69	82 (42.1)
≥70	39 (20.0)
Role in community	
Older adult school committee	30 (15.4)
Village/sub-district association leader	45 (23.1)
Local wisdom practitioner	15 (7.7)
School officer	18 (9.2)
Municipal administrator	27 (13.8)
Older adult learner (current/potential)	30 (15.4)
Local officer (health/agriculture/education)	30 (15.4)

3.2 Context and Barrier Mitigation to Participation

All three study sites were rural municipalities serving 8–12 villages each. Despite the existence of older adult schools, approximately 4,398 older adults across the municipalities were not participating in educational activities.

Barrier Mitigation identified through focus groups and interviews were ranked by frequency and perceived severity (Table 2). The most frequently cited obstacles were financial constraints, physical and mobility limitations, and unsuitable teaching methods. Emotional and cognitive barriers, such as low self-esteem, anxiety, and memory decline, further limited engagement.

Table 2
Barriers to participation ranked by importance

Rank	Barrier Mitigation	Frequency (%)
1	Financial constraints (transport, materials)	82.6
2	Physical limitations (mobility, vision, hearing)	78.5
3	Teaching methods unsuitable for older adults	74.9
4	Lack of awareness of school programs	66.2
5	Cognitive challenges (memory, attention)	64.8
6	Low self-esteem or anxiety in group settings	60.3
7	Negative prior learning experiences	55.4
8	Limited access to digital devices/internet	50.1

3.3 Needs Assessment Results

The needs assessment demonstrated a strong demand for andragogy-based learning approaches, with participants assigning a high mean priority score of 4.65 ± 0.48 on a five-point scale. Learning needs were consistently oriented toward practical and context-specific content, particularly health literacy, agricultural skills, traditional medicine, and the preservation of local culture. Stakeholder consultations further underscored the importance of integrating local wisdom with contemporary health and livelihood education, alongside the provision of flexible delivery modalities such as on-site sessions, home visits, and online learning platforms to accommodate diverse functional and social circumstances. Particular emphasis was placed on inclusive outreach strategies to ensure the participation of homebound and marginalized older adults. Statistical analysis using paired t-tests revealed significant increases in priority scores following group discussions for the inclusion of digital learning options ($p < 0.01$) and the engagement of local knowledge holders as facilitators ($p < 0.05$), indicating enhanced recognition of their value in supporting accessible and contextually relevant lifelong learning.

3.4 Model Development

The participatory management system was developed using the Context–Input–Process–Product (CIPP) evaluation model to provide a systematic and evidence-informed framework for program design and implementation. Through an iterative co-creation process, key stakeholders—including municipal administrators, educators, older adult representatives, and local wisdom holders—collaboratively shaped the model to ensure contextual relevance and operational feasibility. As illustrated in Fig. 2, the contextual dimension focused on a comprehensive understanding of local demographic characteristics, the identification and mitigation of participation barriers, and the recognition of existing cultural assets within the community. The input dimension emphasized the coordinated mobilization of financial resources, human capital, indigenous knowledge, and appropriate technologies to support learning activities. These inputs were operationalized through the process dimension, which incorporated

participatory planning, blended learning approaches that integrated on-site and distance-based modalities, and inclusive decision-making mechanisms that promoted broad stakeholder engagement. The product dimension represented the anticipated outcomes of the system, including enhanced health literacy, increased self-sufficiency among older adults, preservation and transmission of local culture, and more equitable access to lifelong learning opportunities. Collectively, these interconnected components formed a coherent management model that aligns community resources with sustainable goals in lifelong learning, health promotion, and social inclusion.

The resulting Older Adult School Management Model integrates governance, operational structures, and service delivery into a unified framework designed to support inclusive and sustainable lifelong learning for older adults. As shown in Fig. 3, the model is driven by interrelated mechanisms that include municipal leadership, the systematic integration of local wisdom, and active learner participation, which together provide strategic direction, cultural relevance, and shared community ownership. These driving mechanisms are translated into practice through core operational components structured around inputs, processes, and products, enabling the effective transformation of available resources into meaningful educational, social, and health-related outcomes. Program implementation is supported by multiple delivery strategies, including on-site classes, community-based learning sessions, and digital learning platforms, allowing the model to respond flexibly to diverse learning needs, functional capacities, and geographic contexts. Collectively, this integrated approach positions the model as a coherent and adaptable management system that strengthens local capacity for older adult education while promoting equitable access to lifelong learning opportunities.

3.5 Model Verification Outcomes

Model verification workshops were conducted with 39 key informants, comprising 13 representatives from each municipality, to critically review and refine the proposed system. Overall stakeholder appraisal demonstrated a high level of satisfaction across all evaluation dimensions, with mean ratings on a five-point scale indicating strong perceived relevance, feasibility, equity of access, cultural appropriateness, and potential for digital integration. Qualitative insights further highlighted the model's flexibility across diverse geographic contexts, including lowland, highland, and remote areas, and underscored the importance of incorporating local wisdom holders into health promotion and cultural education activities. Participants also emphasized the role of volunteer-led home visits in reaching socially or geographically isolated learners and recognized the model's potential contribution to community-based long-term care systems by supporting cognitive health, alleviating caregiver burden, and reinforcing local care networks. Collectively, these discussions led to a shared consensus that the model extends beyond a conventional educational program to function as a community care platform, suitable for inclusion in municipal strategic plans, integration within long-term care frameworks, and future scaling to other rural settings.

3.6 Intergenerational Activity Outcomes

Across the three municipalities, nine structured intergenerational activities were implemented to deliberately engage older adults alongside younger participants, including youth volunteers, students, and younger family members. These activities encompassed cultural dance workshops, intergenerational storytelling, collaborative agricultural demonstrations, and digital literacy mentoring in which younger participants supported older adults in the use of smartphones and access to online resources. Qualitative accounts from youth participants consistently reflected enhanced empathy, greater appreciation of local culture, and an increased sense of shared responsibility within the community, indicating reciprocal learning and mutual benefit between generations. Quantitative evidence from pre–post workshop feedback further demonstrated strengthened social cohesion, with 68% of participating youth reporting more frequent cross-generational interactions following the activities. In addition, both older and younger participants rated their understanding of and respect for the other generation more highly after participation, with a mean increase of 0.8 points on a five-point Likert scale. Observational data also revealed sustained informal engagement beyond the organized sessions, such as continued home visits by youth and invitations extended by older adults to community events. Collectively, these findings indicate that intentional intergenerational programming not only enriches educational experiences but also reinforces community bonds, thereby supporting the model's broader objectives of social inclusion and intergenerational cultural transmission.

4. Discussion

This study developed and validated a participatory management system for older adult schools that integrates local cultural wisdom with modern educational approaches, specifically tailored to rural communities in northern Thailand. The findings highlight that a collaborative, community-driven approach—anchored in municipal leadership, andragogical principles, and cultural relevance—can effectively address barriers to participation, particularly for homebound and socially isolated older adults.

4.1 Contribution to Community-Based Dementia Prevention and Gender-Responsive Healthy Ageing

As illustrated in Fig. 4, the participatory management model establishes clear pathways from core inputs—including local wisdom, andragogical approaches, and municipal leadership—to processes such as cognitive stimulation, inclusive learning, and volunteer home visits. These processes lead to interconnected outcomes:

The integration of cognitively engaging activities—such as memory games, problem-solving tasks, traditional crafts, and digital literacy training—aligns closely with dementia risk-reduction strategies recommended by the World Health Organization (WHO) and Alzheimer's Disease International. (de Jager Loots et al., 2024). Such mentally, socially, and culturally enriching activities are associated with delaying the onset or slowing the progression of cognitive impairment (Woods et al., 2023; de Jager Loots et al., 2024).

Table 3 presents a detailed mapping of programme activities against WHO dementia risk-reduction domains, alongside potential future measurement indicators. This alignment shows the model's reach across multiple modifiable risk factors, including cognitive and social engagement, physical activity, diet, cardiovascular health, sensory function, and digital inclusion. For example, traditional dance and light exercise routines promote physical health, while nutrition workshops featuring local foods support healthy dietary patterns.

A notable demographic feature of the study sites is the predominance of female participants, reflecting broader patterns of greater female longevity in Thailand and much of Asia. Beyond their role as learners, older women often act as community health leaders, cultural custodians, and intergenerational knowledge transmitters, sustaining traditional practices and community cohesion. (Cui et al., 2025). Participation in structured, community-based education and health programmes has been shown to enhance older women's social capital, health literacy, and leadership capacity, while addressing gender-specific health disparities such as higher rates of musculoskeletal disorders, chronic disease burden, and caregiving responsibilities (Velicu, 2023; Gashi et al., 2023).

Integrating gender-sensitive approaches—such as tailored health education, empowerment training, and leadership development modules—within older adult school curricula could amplify both individual health benefits and broader community resilience. At the same time, encouraging male participation could diversify peer learning, address underrepresented male health concerns, and foster more inclusive community networks.

Stakeholder feedback during model verification reinforced the preventive and empowerment dimensions of the programme, citing observed improvements in recall, focus, self-confidence, and leadership among participants. Framing gender not merely as a demographic variable but as a strategic lever for healthy ageing and cultural continuity positions older adult schools as vital platforms for advancing both the WHO Decade of Healthy Ageing (2021–2030) and the Sustainable Development Goals, particularly those on health (SDG 3) and gender equality (SDG 5).

Table 3
Alignment of program activities with WHO dementia risk-reduction guidelines and potential future indicators

WHO dementia risk-reduction domain	Current program activities	Potential future measurement indicators
Cognitive stimulation	Memory games, problem-solving tasks, traditional crafts	Mini-Mental State Examination (MMSE) or Montreal Cognitive Assessment (MoCA) pre/post
Social engagement	Group classes, intergenerational storytelling, cultural events	Lubben Social Network Scale; frequency of social interactions
Physical activity	Traditional dance, light exercise routines	Timed Up and Go (TUG) test; self-reported activity logs
Dietary patterns	Nutrition workshops using local foods	Dietary Diversity Score; 24-hour dietary recall
Cardiovascular risk reduction	Health literacy sessions on blood pressure, diabetes prevention	Blood pressure monitoring; fasting blood glucose
Sensory health	Eye/ear health education and screening referrals	Referral uptake rates; self-reported vision/hearing status
Digital engagement	Smartphone literacy classes for health information access	Digital literacy test scores; frequency of online health resource use

4.2 Caregiver Support and Intergenerational Solidarity

An important indirect outcome of the programme was the provision of caregiver respite. Structured school activities offered safe, supervised environments for older adults, enabling family caregivers to attend to personal or work responsibilities without anxiety. This outcome aligns with global evidence that respite opportunities—whether through formal day care or structured community programmes can reduce caregiver stress, improve mental well-being, and enhance the sustainability of home-based care systems. In this respect, the participatory management model functions not only as an educational initiative but also as a complementary component of community-based long-term care.

In parallel, the programme fostered intergenerational engagement through activities such as cultural dance events, agricultural workshops, and storytelling sessions involving younger family members or youth volunteers. These exchanges facilitated the transfer of cultural knowledge, strengthened emotional bonds, and nurtured mutual respect across generations. Evidence from Japan, Korea, and Taiwan demonstrates that structured intergenerational programmes enhance older adults' social inclusion while promoting empathy, cultural awareness, and civic responsibility among younger participants (Liu et al., 2024).

By delivering benefits for both caregivers and cross-generational relationships, the model addresses two critical determinants of healthy ageing: sustained community support for older adults and strengthened

social cohesion. (Wang., 2025). Future iterations could more systematically integrate intergenerational activities as a core programme feature, leveraging them as protective factors for mental health, cognitive stimulation, and community resilience in line with the WHO Healthy Ageing Framework.

4.3 Comparison with Global Older Adult Learning–Health Integration Models

The participatory, locally adapted approach developed in this study reflects global trends in integrating older adult learning with health promotion. In Spain and Taiwan, similar models have been shown to improve health literacy, reduce social isolation, and sustain engagement through culturally relevant, community-based programming (Velciu, 2023; Yeh, 2023). In Malaysia and Hong Kong, participatory action research (PAR) approaches have successfully mobilized community networks to deliver health promotion tailored to local contexts (Li & Wei, 2019; Gashi et al., 2023).

However, this study advances these international frameworks by embedding local wisdom not only as content but also as a delivery mechanism—ensuring cultural resonance, fostering community ownership, and enhancing sustainability. This emphasis on indigenous knowledge integration is less pronounced in many comparable global models (Moges et al., 2023).

A distinctive finding from the present study is the role of digital inclusion readiness in sustaining engagement in blended learning approaches. As shown in Table 4, while smartphone ownership among older adults in the three study municipalities is relatively high (78%), functional digital literacy varies considerably. Most participants are confident with messaging applications—particularly LINE (72% comfortable) and Facebook (65% comfortable)—but fewer have experience with video conferencing platforms such as Zoom (18% comfortable) or with online learning platforms (< 10% prior use). In contrast, participants in Spain, Taiwan, Malaysia, and Hong Kong demonstrate higher familiarity with video conferencing and online learning, often due to greater urban exposure or pandemic-driven adoption.

These patterns underscore the importance of platform familiarity as a determinant of technology adoption among older learners (Vercruyssen et al., (2023). Addressing the digital gap identified in this study will require targeted skills training embedded within program activities, as well as policy measures to improve affordable internet access in rural areas. Drawing from global experiences, pairing connectivity support with tailored digital literacy education has the potential to substantially increase participation and engagement in both local and online components of the model.

Table 4
Comparative digital inclusion readiness: present study vs. global examples

Platform / Skill	Present Study (Namkrai, Nongmuangkai, Pua)	Spain & Taiwan (Velciu, 2023; Yeh, 2023)	Malaysia & Hong Kong (Li & Wei, 2019; Gashi et al., 2023)
Smartphone ownership	78% own smartphones; skills vary	> 85% ownership in urban areas; higher skill in messaging	80–90% ownership; strong messaging app use
Messaging apps (LINE/Facebook)	LINE: 72% comfortable; Facebook: 65% comfortable	WhatsApp/Facebook widely used; >80% comfort	WhatsApp/Facebook common; ~75% comfort
Video conferencing (Zoom)	18% comfortable; low familiarity	55–65% comfortable (urban bias)	~ 40% comfortable; adoption increased during COVID-19
Online learning platforms	< 10% prior use; perceived as complex	40–50% prior use; used for lifelong learning	25–35% prior use; mostly health webinars
Internet access affordability	43% report cost as barrier	Subsidized or free in some regions	Varies; some rural subsidies available

This comparison underscores that, although smartphone penetration is relatively high in the study sites, the functional use for educational purposes remains limited. Global experiences suggest that pairing affordable internet access with tailored digital literacy training can substantially increase adoption and engagement.

4.4 Expanding the Role of Older Adult Schools: Digital Health, Environmental Resilience, and Economic Co-Benefits

Building on the study’s digital inclusion findings (Table 4), integrating digital health tools—including telehealth services, mobile health (mHealth) applications, and wearable devices—presents a critical opportunity to enhance health access for older adults in rural Thailand. Post-COVID global trends have shown rapid uptake of remote health solutions, particularly in underserved areas where in-person services are limited (Jakovljevic et al., 2023; Hua et al., 2024). In the present study, while 78% of participants owned smartphones, functional digital literacy varied widely, with low familiarity in using video conferencing or online learning platforms, consistent with recent evidence showing that eHealth literacy among older adults in middle-income countries remains alarmingly low, with only 19.8% demonstrating high proficiency compared to 65.1% of younger adults (Sainimnuan et al., 2025). Embedding digital health literacy training into older adult school curricula could empower participants to access online consultations, receive medication reminders, monitor vital signs, and engage with community health portals. Evidence from rural ageing initiatives in Asia shows that targeted training and

user-friendly platforms can significantly improve self-management of chronic conditions, reduce travel burdens, and strengthen continuity of care (He et al., 2025; Kwan et al., 2023). Partnerships with municipal health units and local telehealth providers could facilitate implementation, while peer and intergenerational mentorship could address technology confidence gaps.

At the same time, environmental changes—including increasing heat waves, seasonal flooding, and unpredictable weather—pose growing challenges for rural communities in northern Thailand, with direct implications for older adults’ health, mobility, and participation. In Uttaradit, Phrae, and Nan, these climate-related events can disrupt transportation, reduce attendance, and exacerbate pre-existing health conditions such as cardiovascular and respiratory disease. Global research underscores that older adults are among the most vulnerable to climate-related health risks due to physiological susceptibility, higher prevalence of chronic illness, and reduced adaptive capacity (Haq et al., 2024; WHO, 2023). Integrating environmental resilience strategies into older adult school programmes could include seasonal scheduling adjustments, heat-health education, disaster preparedness training, and collaboration with municipal disaster management teams for safe transport arrangements. Embedding these measures ensures programme continuity, safeguards participant health, and aligns with both the WHO Healthy Ageing Framework and the Sendai Framework for Disaster Risk Reduction.

In addition to these health and resilience benefits, older adult schools can deliver tangible economic and social co-benefits. Activities such as traditional craft workshops, cultural performances, and community festivals have the potential to stimulate local economies by attracting visitors, generating small-scale income opportunities, and preserving marketable cultural heritage. Evidence from community-based lifelong learning programmes in rural Asia indicates that integrating cultural tourism, handicraft production, and local food promotion into educational activities can create supplementary income for older adults, strengthen intergenerational knowledge transfer, and support municipal revenue through event hosting (Rahman et al., 2024; Nguyen and Le, 2023). Quantifying these returns—through metrics such as craft sales revenue, cultural event attendance, and the value of volunteer contributions—can provide municipal authorities with concrete evidence of the socio-economic value of older adult education. Partnerships with tourism boards, cooperatives, and small business associations could expand these opportunities, ensuring sustainable markets for products and experiences generated by the schools.

By positioning older adult schools as multi-functional community assets—serving simultaneously as hubs for health literacy, digital inclusion, environmental preparedness, and local economic vitality—municipalities may be more likely to prioritise sustained funding and integrate these programmes into broader healthy ageing and rural development strategies

4.5 Policy Implications for Long-Term Care Integration and Sustainable Development

The findings demonstrate substantial policy relevance by positioning the proposed model as a preventive, community-embedded mechanism that complements existing long-term care systems (Li et

al., 2025). Its emphasis on cognitive stimulation, social engagement, and caregiver relief aligns closely with municipal responsibilities for ageing populations and supports its integration into local long-term care strategies. Embedding older adult schools within the framework of the Primary Health System Act and formally linking them with sub-district health promotion hospitals would enable municipalities to develop hybrid learning–care hubs that simultaneously address educational, preventive health, and supportive care needs (Ministry of Public Health, 2019). Such integration advances multiple Sustainable Development Goals by promoting healthy ageing and dementia prevention (SDG 3), expanding equitable access to lifelong learning (SDG 4), enhancing gender equity through the empowerment of predominantly female participants and caregivers (SDG 5), reducing social and geographic inequalities among marginalized and homebound older adults (SDG 10), and strengthening cross-sector partnerships among health, education, and local governance actors (SDG 17).

From a gender perspective, the predominance of female participation reflects entrenched caregiving roles that may constrain male involvement, yet it also underscores the model’s potential as a platform for women’s empowerment in rural contexts. Participation in leadership roles, facilitation of cultural and health-promotion activities, and engagement in income-generating initiatives—such as craft production and community-based cultural tourism—can enhance women’s agency, social recognition, and economic resilience. These gender-responsive dynamics are particularly salient in ageing rural communities, where women frequently shoulder both caregiving and community-organizing responsibilities.

Considerations of economic impact and sustainability further strengthen the policy case for adoption. Preliminary cost estimates indicate that program implementation, including facilitator stipends, learning materials, and refreshments, averages approximately 1,200–1,500 THB (33–42 USD) per learner per four-month cycle. Substantial in-kind contributions from local wisdom holders, community health workers, and municipal personnel account for an estimated 20–25% of total operating costs, thereby reducing direct municipal expenditure. Beyond educational and cognitive outcomes, the program generates broader local economic benefits through cultural performances and crafts showcased at community events, supplemental income from the sale of handmade products, and increased local market activity associated with program gatherings. Collectively, these co-benefits, coupled with modest per-learner costs, position the model as a cost-effective, gender-responsive, and socially valuable component of rural development and long-term care policy planning.

4.6 Strengths, Limitations, and Future Directions

A key strength of this study lies in its iterative, participatory co-design process, which ensured contextual relevance, cultural fit, and strong stakeholder ownership. The mixed-methods approach enabled both quantitative measurement of community priorities and qualitative exploration of lived experiences, enriching the interpretation of findings. The integration of cognitive engagement, caregiver respite, and intergenerational components further enhances the model’s potential for broad public health impact.

However, several limitations should be noted. The geographical scope—three rural municipalities in upper-northern Thailand—may limit generalisability to urban or culturally distinct settings. The short-term

evaluation period did not allow for assessment of sustained health or cognitive benefits. Digital literacy disparities among participants may influence the scalability of blended learning or telehealth-enhanced delivery modes. Finally, the absence of a control group restricts causal inference regarding observed benefits.

Building on these strengths and limitations, future research should adopt longitudinal designs to track cognitive function, caregiver stress, and quality of life over time. Cost-effectiveness analyses could inform municipal budgeting and scaling decisions. Expanding intergenerational programme elements would further strengthen social cohesion, while testing the model in urban and ethnically diverse contexts could provide evidence for adaptability. Additionally, exploring integration with formal community-based dementia prevention and long-term care services would position the model as a sustainable component of national healthy ageing strategies.

4.7 Scaling and Policy Adaptation of the Model

The participatory management model developed in this study—grounded in local wisdom, inclusive learning, and municipal leadership—demonstrates strong potential for adaptation and scaling beyond the rural Thai contexts of Uttaradit, Phrae, and Nan. Key features such as community co-design, integration of cognitive and social health activities, and flexible delivery modes (onsite and distance) make the model inherently adaptable to diverse socio-cultural and infrastructural settings.

In urban environments, adaptation could focus on integrating digital health tools, strengthening intergenerational linkages in denser communities, and leveraging municipal cultural assets for programme delivery. For ethnic minority groups or communities with distinct linguistic and cultural traditions, the model could incorporate bilingual facilitators, culturally specific activities, and indigenous health practices to ensure relevance and uptake.

At the ASEAN regional level, the framework aligns with shared policy priorities on healthy ageing, noncommunicable disease prevention, and community-based long-term care. Cross-country adaptation would require attention to local governance structures, health system integration, and varying levels of digital infrastructure. Evidence from similar participatory health and education models in Malaysia, the Philippines, and Vietnam suggests that structured stakeholder engagement and targeted capacity-building are critical to successful policy transfer (Thao et al., 2024; OECD, 2025).

By documenting the core principles and context-specific adaptations of the model, this study offers a practical blueprint for policymakers, ageing advocates, and municipal leaders seeking to advance healthy ageing agendas in culturally and economically diverse settings. Embedding such models within national ageing strategies could accelerate progress toward the WHO Decade of Healthy Ageing targets and strengthen resilience across multiple community types.

5. Conclusion

This study demonstrates that a participatory management system for older adult schools—rooted in local cultural wisdom, andragogical principles, and municipal leadership—can overcome barriers to educational access, social participation, and health promotion among rural ageing populations. By embedding dementia risk-reduction strategies, structured cognitive stimulation, caregiver respite, and intergenerational activities, the model extends the role of older adult schools beyond education to function as community-based hubs for healthy ageing and long-term care support.

The model's blended delivery modes, volunteer home visits, and cultural integration ensure inclusion of homebound and socially isolated older adults, while strengthening social cohesion and cultural transmission across generations. Verification results indicate strong relevance, feasibility, and cultural appropriateness, suggesting readiness for municipal adoption and integration into primary health and long-term care systems.

Beyond the rural Thai context, the model offers a transferable framework for other low- and middle-income countries seeking to combine lifelong learning, cognitive health promotion, and caregiver support within community settings. Its alignment with global policy agendas—including the WHO Decade of Healthy Ageing and the Sustainable Development Goals on health, education, gender equality, and reduced inequalities—underscores its potential to inform international strategies aimed at improving the quality of life for older persons worldwide.

Future research should evaluate long-term cognitive, caregiving, and quality-of-life outcomes; assess cost-effectiveness for sustainable scale-up; and adapt the model for urban and culturally diverse settings to enhance its global relevance and impact.

Statements and Declarations

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Author Contribution

Nicharee Jaikhamwang and Anurak Panyanuwat contributed equally to the conception and design of the study. Material preparation, data collection, and data analysis were performed by Nicharee Jaikhamwang, Sasithorn Sukjit, Thanakorn Thanawat, Kanyarat Phuengbanhan, and Anurak Panyanuwat. The first draft of the manuscript was written by Nicharee Jaikhamwang, Anurak Panyanuwat, and Kanyarat Phuengbanhan. All authors critically revised the manuscript and approved the final version.

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Figures



Figure 1

Geographical location of the study sites in northern Thailand



Figure 2

Participatory process steps for model development.



Figure 3

Components of the participatory older adult school management model



Figure 4

