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Innovative Blended Technology for Developing Village Health Volunteers Competency to Support a Full-Fledged aging Society in the Community Surrounding the Urban Society in Nakhon Sawan Province

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Abstract
This study aimed to develop the competency of village health volunteers in the community surrounding urban area of Mueang Nakhon Sawan District, Nakhon Sawan Province. The study also aimed to develop an innovative blended technology for the volunteers and manage the network of village health volunteers in the same area. The researcher used David C. McClelland's competency development concept for this research. The study was conducted on a purposive sample of 312 village health volunteers from the Mueang Nakhon Sawan District. The research instruments included a standard village health volunteer training website and a knowledge test. Data were collected and analysed using descriptive statistics, including the mean and standard deviation.

Research Findings

The results showed that the village health volunteer standard training curriculum consisted of eight subjects: 1) Basic Public Health and Community Health Systems, 2) Village Health Volunteers, 3) Laws related to Village Health Volunteers, 4) Healthy and Happy Life, 5) Essential Health Services,6) Communication in Basic Public Health, 7) Community Planning/Project Development, and 8) Management. The quality of the training website, as evaluated by experts, was at a high level overall ($\bar{x}$)=4.19). Individually, the graphics and design components were rated at the highest level ($\bar{x}$=4.56), followed by the lesson content at the highest level ($\bar{x}$=4.51) Interaction design was rated as high ($\bar{x}$=4.33), internet network techniques were high ($\bar{x}$=4.47), and the lesson introduction was high ($\bar{x}$=4.25). The standard village health volunteer training website can be effectively used for the target population. The management of the new village health volunteer network involved increasing the number of new volunteers by 10% per year, which is 32 people, from the initial 312 volunteers in the community surrounding the urban area, and adding one new community area per year. Competency development of village health volunteers can transform their performance. Therefore, this approach should be applied to a broader range of target groups and adapted for use in other areas as appropriate. Future research should focus on developing ongoing knowledge and skill enhancement for Village Health Volunteers. Additionally, it is recommended to promote activities or platforms for shared learning to foster a greater sense of duty and appreciation for the work.

Keywords: Competency, Network Management, Blended Technology Innovation, Village Health Volunteers, Fully Aging Society, Research & Development, Digital Health Training, Community Health Workers

Introduction

The Ministry of Public Health has established a 20-year national public health strategic plan (2017-2036) in line with the government's policy to move the country towards Thailand 4.0, which aims to support a future with an urbanised and aging society, necessitating the development of public health personnel, especially village health volunteers. This is to cope with rapidly changing situations, such as emerging diseases like COVID-19, digital technology, and the development of the roles and duties of VHVs in

promoting community health. This includes disseminating knowledge, publicizing information, inviting neighbors to participate in public health development activities, and promoting proactive health, building cooperative systems for citizen role development, and creating social measures. Currently, the Ministry of Public Health evaluates the performance of VHVs and disseminates the results to increase their recognition and acceptance by society, as well as to honor and encourage them. However, this evaluation is limited to selecting only those with outstanding and evident performances. Therefore, to enhance the quality of VHVs nationwide so they can become a crucial force in supporting the health system, the role of VHVs was created under the Alma Ata Declaration (1) in 1978 (2521 B.E.). The declaration urged countries to implement public health work based on the principles of Primary Health Care (PHC). This involves a paradigm shift in public health development to emphasise cooperation with other sectors by integrating health as a part of quality-of-life development. It expanded cooperation with various ministries, including the Ministry of Interior, the Ministry of Education, and the Ministry of Agriculture and Cooperatives, and began to emphasise the role of the public by establishing Village Health Volunteers (VHVs) and Village Public Health Reporters (VPHRs). The focus is on providing health services to ensure equity and fairness in accessing essential basic services, with the main goal of achieving long-term health and self-reliance. VHVs are therefore crucial to effective public health services at the village and community levels because they are dedicated individuals who play a proactive role in the community. They are thought leaders and change agents for health behaviours, public health messengers, and assist in disseminating knowledge, planning, and coordinating public health activities. They also promote health, monitor and prevent diseases, provide basic care and first aid, protect consumers, and refer patients to other health professionals. It is stipulated that one VHV is responsible for 10-15 households. In 2020 (2563 B.E.), Thailand had a total of 1,039,247 VHVs divided into two groups with different names and separate databases. The VHV group has 1,028,510 members working in 76 provinces (excluding Bangkok) and is the responsibility of the Bureau of Community Health Support. Overall, the distribution of VHVs covers most of the country; therefore, the number is likely sufficient. If more are needed, they should be added only in areas that are still lacking in data.

Most VHVs are elderly and have primary school education. Therefore, evaluating the quality of VHVs requires a clear and uncomplicated approach appropriate for their context. VHVs are recruited on a voluntary basis, must meet the qualifications, and undergo a process specified by the Ministry of Public Health. Although continuous training is provided to develop the knowledge and skills of VHVs, not all can be trained. The work of VHVs is generally overseen by public health officials at the subdistrict health promotion hospital (HPH) level. Since the VHV qualifications only require them to be able to read and write, it was found that the majority of VHVs have a primary school education (72.8% in 2020). The level of education affects the work efficiency. Additionally, there is no specified retirement age for VHVs, which means that older VHVs with health problems may not be able to perform their duties effectively. There are also problems in performing their roles and responsibilities. The evaluation results show that a significant number of VHVs, ranging from 18-46%, are at the lowest performance levels (1 or 2). This indicates that many VHVs have low competency or potential, which does not align with their specified roles, responsibilities, and duties.

Therefore, this study recognises the importance of enhancing the competency of VHVs in the community surrounding the urban area of Mueang Nakhon Sawan District, which has 17 sub-districts and 3,345 VHVs (fiscal year 2022 data). It emphasises the principles and guidelines for developing VHVs who are entering old age, focusing on Active and Productive Aging. The goal is to build work competency, develop knowledge and skills, and review practical training processes to enhance the potential of VHVs using innovative blended technology. This aims to reduce inequality in accessing and using technology for training to develop VHV competency. It also aims to build a VHV network with a sufficient number of members to meet community needs and improve the quality of

life of elderly VHVs to support a full-fledged aging society.

Review of Literature

The innovative blended technology is an important determinant in enhancing the competency of village health volunteers (VHVs) particularly to assist an ageing population in the community like around urban centres in Nakhon Sawan Province. VHVs are vital primary healthcare services in rural and semi-urban Thailand serving physical and mental health requirements despite organizational and policy limitations (Khanthavudh et al., 2025). The ageing population poses an increasing burden of care demands, and novel technology-driven system of long-term care has demonstrated favourable effects on the attitudes and intentions of volunteer caregivers to utilize the system, which has also boosted the quality of care provided to the elderly in the local areas in Thailand (Chokphukhiao et al., 2024).

The community-based care services have shown a remarkable change in self-rated health status of the elderly, which shows the role of increasing community care competency, which may be achieved with the help of technology-based training of volunteers (Yang et al., 2021). VHVs have access to governmental control and trust of the community that affects their successful health promotion functions in Thailand; the inclusion of the blended learning technologies may additionally improve their performance in the sphere of health education and support of elderly people in semi-urban areas (Kowitt et al., 2015).

Moreover, digital skills have been demonstrated to enhance physical and mental health of the elderly by improving social capital and overcoming urban-rural disparities, which emphasize the role of technology in helping to support healthy aging and competency development as a volunteer (Xiang & Xing, 2025). Finally, the importance of VHVs in developing new competencies to address emerging health issues facing aging populations due to novel learning methods, including blended technology, is the key point that should be mentioned as the latter example of the critical role of VHVs in the community (Tejativaddhana et al., 2020).

Research Objectives

- To develop the competency of village health volunteers in the community surrounding the urban area of Mueang Nakhon Sawan District, Nakhon Sawan Province.
- To develop an innovative blended technology for village health volunteers in the community surrounding the urban area of Mueang Nakhon Sawan District, Nakhon Sawan Province.
- To manage the network of village health volunteers in the community surrounding the urban area of Mueang Nakhon Sawan District, Nakhon Sawan Province.

Research Methodology

This study was a research and development (R&D) project with three phases.

Phase 1: Development of village health volunteer competency in the community surrounding the urban area of Mueang Nakhon Sawan District, Nakhon Sawan Province. This involved studying the content for competency enhancement, which included a basic knowledge group (mandatory) with subjects on major public health issues and management for prevention and problem solving in the community. It also included a specific knowledge group with topics related to local public health problems, policy knowledge for local public health development, and other developmental knowledge affecting public health. The province can adjust the curriculum content as deemed appropriate, as the content may vary depending on local problems and related factors, such as enhancing work competency, developing knowledge, and developing skills.

Phase 2: Development of innovative blended technology for village health volunteers in the community surrounding the urban area of Mueang Nakhon Sawan District, Nakhon Sawan Province. The innovative blended technology development model involved three training formats based on the skills to be developed in the VHVs:

- Blended training for skill-driven learning combines self-paced and facilitator-supported learning to develop knowledge and skills.
- Blended training for attitude-driven learning uses various media for different events to convey knowledge and develop trainees' specific behaviours.

- Blended training for competency-driven learning combines tools that support knowledge creation and management, with instructors providing guidance on competency development.

Blended training formats emphasise skill-, attitude-, and competency-driven learning based on the concept of Valiathan (2002, cited in Wannapiroon, 2008). The training process using innovative blended technology has the following components: Online training content, Electronic advisors, Online collaborative learning , Online knowledge management, Website ,Mobile Learning, Distributable Electronic Media Face-to-Face Tutoring, Coaching or Mentoring, Distributable Print Media

Phase 3: Management of the village health volunteer network in the community surrounding the urban area of the Mueang Nakhon Sawan District, Nakhon Sawan Province. This involved creating a network in each community area by having the original VHVs, who were trained with innovative blended technology, act as mentors for new volunteers. This was achieved by increasing the number of new VHVs by 10% per year from the initial number in each community area and adding one new community area per year.

Scope of Research

Population Scope the population and sample were VHVs in 17 sub-districts of Mueang Nakhon Sawan District, Nakhon Sawan Province,totalling 3,345 people. The sample consisted of 312 VHVs selected by purposive sampling from two sub-districts, which is 10% of the total sub-districts: Nong Kradoen Sub-district (219 people in 17 villages) and Klang Daet Sub-district (93 people in 5 villages).

Content Scope

The standard VHV training curriculum content includes:

Core Subjects (Eight Subjects)

- Basic Public Health and Community Health Systems
- Village Health Volunteers and related laws, rules, and regulations
- Health promotion and disease prevention for a healthy and happy life
- Essential health services
- Health literacy and communication for changing health behaviors
- Community planning/project development
- Being a health change leader and management
- Digital literacy

Research Instruments

- Standard VHV Web base training
- Standard VHV knowledge test

Steps for Instrument Development and Quality Check

Standard VHV Knowledge Test

- A test was developed.
- The quality of the tests was assessed.
- The test was administered to the target group to collect the data.

The Research Instruments were Reviewed by Three Experts

- Assistant Professor Dr. Wutthichai Piluek, Lecturer in Computer and Educational Technology, Faculty of Education, Nakhon Sawan Rajabhat University.
- Assistant Professor Dr. Aphakorn Phodong, Lecturer in Curriculum and Instruction, Faculty of Education, Nakhon Sawan Rajabhat University.
- Dr. Kraiwit Dee-em, Lecturer in Computer and Educational Technology, Faculty of Education, Nakhon Sawan Rajabhat University.

The content validity, language, and appropriateness of the training process activities were assessed using a rating scale developed by the researcher. The criteria were as follows

- 5 means Most Appropriate
- 4 means Very Appropriate
- 3 means Moderately Appropriate
- 2 means Least Appropriate
- 1 means Least Appropriate of all

An open-ended section was included to allow experts to provide suggestions for improvement.

The mean and standard deviation of expert opinions were calculated using the following criteria:

- 4.50 - 5.00 means Most Appropriate
- 3.50 - 4.49 means Very Appropriate
- 2.50 - 3.49 means Moderately Appropriate

- 1.50 - 2.49 means Least Appropriate
- 1.00 - 1.49 means Least Appropriate of all

If the mean of the expert opinions for each aspect was 3.50 or higher and the standard deviation was not more than 1.00, it was concluded that the training process components were consistent and appropriate for use. The content and training process were revised based on the experts' recommendations to ensure their appropriateness.

- The quality of the test was checked for content validity using the CVI. The researcher had experts evaluate the quality of the VHV knowledge test to assess its content validity.
- The Index of Item-Objective Congruence (IOC) was used to check content validity. The scoring criteria were as follows.
  - +1 when certain that the item measures the objective
  - 0 when uncertain
  - -1 when certain that the item does not measure the objective

The criteria for the IOC value were as follows: a value of 0.50-1.00 indicates validity and can be used, while a value below 0.50 requires revision. The IOC of all test items was between 0.67 and 1.00, which is greater than 0.5, indicating content validity. The revised test was then printed, consisting of eight learning units with 20 questions each, for a total of 80 questions. After being checked for content validity and revised, the test was administered to the public (non-sample group). Correct answers were assigned 1 point, and incorrect answers were assigned 0 points.

Statistics Used in Data Analysis

The statistics for research instrument validation included the Index of Item-Objective Congruence (IOC) of the questionnaire. The reliability of the training knowledge test was determined using the Kuder-Richardson Formula 20 (KR-20).

Basic statistics included the mean, percentage, and standard deviation of the knowledge scores before and after training.

Research Findings

The results of the standard VHV training curriculum development showed that it consisted of eight subjects:

- Basic Public Health and Community Health Systems,
- Village Health Volunteers,
- Laws related to Village Health Volunteers,
- Healthy and Happy Life,
- Essential Health Services,
- Communication in Basic Public Health,
- Community Planning/Project Development, and
- Management.

The expert evaluation of the training website's quality was "high" overall ($\bar{x}$= 4.19). The graphic and design components were rated at the "highest" level ($\bar{x}$ = 4.56). The lesson content was also rated at the "highest" level ($\bar{x}$ = 4.51). The interaction design was rated as "high" ($\bar{x}$= 4.33), internet network techniques were "high" ($\bar{x}$= 4.47), and the lesson introduction was "high" ($\bar{x}$= 4.25). The standard VHV training website can be effectively used for the target group. The training website and certificate of completion after training are shown in Figures 1 & 2.

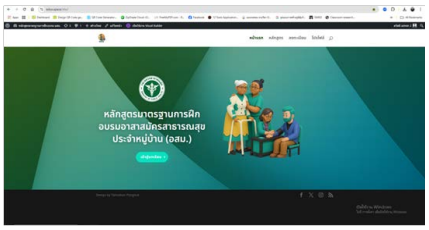

Figure 1 Training Website (https://www.edux.space/vhv/)

Figure 2 Certificate of 3-hour Training Completion

The management of the new VHV network involved increasing the number of new VHVs by 10% per year, or 32 people, from the initial 312 volunteers in the community surrounding the urban area, and adding one new community area each year.

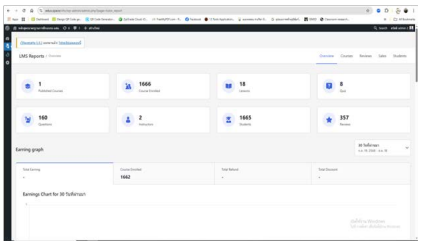

Figure 3 Network Management of Newly Added Village Health Volunteers (VHV)

Discussion

The content of the standard VHV training curriculum, which includes eight subjects, is consistent with the research by Suwannit (2017). Suwannit's research studied the current situation and future development direction of community health using a Mixed Methods Research approach. The study found that the roles of VHVs in community health work included:

The most common role in family doctor teams was surveying/collecting data on the underprivileged, the elderly, bedridden patients, and the disabled to provide health services, and serving as a good role model for health behaviours.

The role of consumer health protection involves disseminating and campaigning for knowledge on accessing health services and benefits. 3) The role in managing health sub-districts and villages involved organising and participating in health campaigns.

The role of working with VHV clubs involved coordinating and exchanging work information for development. The research also found that community health achievements included reducing health problems (e.g. dengue fever, diabetes, and hypertension), reducing risk factors, and improving the environment for good health (e.g. destroying mosquito breeding sites, creating exercise areas, and edible fences). Social measures, such as agreements to abstain from alcohol at religious events, no smoking in schools and temples, and waste segregation, were also found to be effective. Changing unhealthy health behaviours, such as reducing the consumption of sweet, fatty, and salty foods, not smoking, and not drinking alcohol or using drugs, was also identified as a HVV role.

The quality of the standard VHV training website was effectively used with the target group, which is consistent with the research by Sirimark et al. (2016). Their research on developing a training package to enhance the teamwork skills of VHVs using an experiential learning process found that the training package consisted of five modules: leadership, human relations, communication, decision-making, and conflict management. Each module used a 4-step experiential learning process: doing, reflecting, reconceptualising, and applying to the situation. The quality check of the training package showed that it was highly appropriate for use, with an efficiency of 92.25/91.00. The VHVs were highly satisfied with the training, and their knowledge, understanding, and teamwork skills were significantly higher after the training than before. This is also consistent with the research by Braun et al., (2013), who studied community health workers and mobile technology. Their systematic review found that Community Health Workers (CHWs) used mobile technology as a tool to achieve various health goals worldwide, especially in maternal and child health, HIV/AIDS, sexual health, and reproductive health fields. Most CHWs used mobile technology to collect health data, send and receive alerts, facilitate health education, and for one-on-one communication with patients. Other studies have shown that mobile phones are tools that help CHWs improve the quality of healthcare, increase service efficiency, and enhance their ability to monitor programs.

The management of the new network by increasing the number of new members by 10% (32 people) per year is consistent with the research by Jewjinda (2018), who studied a model for VHV development through a participatory process. The study found that 1) most VHVs selected from the community are selfless, kind, and enjoy helping others. 2) VHVs have the ability to demonstrate their roles in short-term successful activities. The work and responsibilities of VHVs require continuous, non-stop, and unscheduled time, and their knowledge and abilities can be developed. 3) Support and encouragement should be provided, especially by creating a participatory process and network for public benefit. 4) The role of VHVs should be adjusted to promote the concept of volunteerism for health. This is also consistent with Lapchit (2007), who studied factors affecting public

participation in supporting the administration of sub-district administrative organisations in Warin Chamrap District, Ubon Ratchathani Province. The study concluded that important factors included: 1) Individual factors: feeling that it is a duty, having a volunteer spirit, knowledge and ability, being brave enough to speak and express opinions, being respected in the community, having skills and experience, and benefiting oneself and the community. 2) Community factors: the community providing support and opportunities to participate, electing representatives, community unity, and groups that support participation. 3) Organizational factors: The sub-district administrative organisation operates in accordance with regulations, is attentive and enthusiastic about problem-solving, and holds public hearings and community forums.

The researcher's opinion aligns with the aforementioned research that public participation creates mass power to effectively carry out activities. Furthermore, the VHV network can be expanded widely with the power of the public and the masses to enhance the community's potential for development. This ensures comprehensive healthcare for people in all service areas.

Suggestions

General Recommendations

Needs Assessment: Evaluate the training needs of the target group to understand their requirements and identify existing challenges.

Systemic Design: Consider creating flexible and user-friendly tools or processes that are appropriate for the context and trainees.

Developing Digital Competence for Village Health Volunteers: To effectively enhance the digital skills of Village Health Volunteers (VHV), training must consider the following: Learning Environment: Manage a conducive learning environment, such as ensuring stable internet connectivity.

Instructor Teams: Form suitable mentoring teams for practical training, ensuring the number of instructors is appropriate for the number of learners. These teams should specialize in using mobile devices from various manufacturers. Learning Groups: Design learning groups based on the trainees' mobile phone brands and analyze the compatibility of devices with the training applications.

Policy and Development: The Department of Health Services Support should prioritise policies that develop the competencies of Village Health Volunteers. This is crucial for keeping pace with the country's transition to a digital society and enabling them to perform their duties efficiently and effectively. Research findings show that VHVs with strong digital skills can work effectively and use credible information to promote health literacy among the public.

Implementation

Organizational Support: Local organisations or agencies should recognise the importance of and provide various forms of support, such as acting as a driving force for the process or providing efficient Internet service networks.

Prototype and Pilot Testing: Prototype Creation: Develop an initial model to test the concept.

Pilot Testing: Conduct a pilot study by testing the tools with a small group to collect data and make improvements.

Training: Prepare users with appropriate manuals or training sessions.

Suggestions for Future Research

Collaborative Knowledge Transfer: Future research should study the process of creating collaborations to build upon the knowledge and skills gained from training, enabling further development or use in solving community problems.

Curriculum Development: Research is needed to develop a curriculum that enhances the competencies of Village Health Volunteers, focusing on: Health Literacy Basic First Aid Leading Physical Exercise Volunteering and Leading Health-Related Change This curriculum should also include practical skills in social assistance, basic first aid, and basic life support (CPR: Cardiopulmonary Resuscitation).

Long-Term Impact and Scaling Up: Long-term Impact Evaluation: Study the long-term effects of the project. Scaling Up: Consider adapting the model for use in other contexts or with different target groups.

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