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ORIGINAL ARTICLE

Effectiveness of a training model based on intergenerational and participatory learning to enhance health information literacy for the elderly

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ABSTRACT

This study aimed to determine the effectiveness of a participatory training programme to enhance health information literacy among the elderly. The study consisted of three phases; development of training model, development of training programme, and evaluation of the programme. There were four stages of the training model; stimulation, sharing, collaboration, and crystallisation.

The training programme was created through participatory learning to enhance health information. A total of 30 elderly was recruited to evaluate the effectiveness of the programme. The measurement of the study included access to health information, understanding and reliability of health information, and communication of correct information. Paired t-test was performed to examine the effectiveness of the programme. There were statistically significant differences in all measurement sections between pretest and posttest scores (p-value <.001). Higher mean scores were shown in the posttest for access to health information, understanding and reliability of health information, and communication of correct information (8.50, 7.40, and 8.20 respectively). The participatory learning programme was effective for enhancing health literacy. Stakeholders could apply the programme for enhancing health information literacy.

Key words: elderly, health information literacy, training model, intergeneration learning

INTRODUCTION

The distribution of the aging population has increased rapidly since 2005 regarding both the number and proportional population estimates.[1] The Office of the National Economic and Social Development Council (NESDC) reported in 2021 that Thailand will completely enter the "aging society". The elderly population will increase to 20% in 2025 and will continue to increase to 30% in 2050.[2] It is also found that the elderly need health information for their self-care.[3] Health

information literacy is one of the most important skills in the 21st century, especially for those elderly consuming information using rapid technological changes through the convergence of technology and new media to communicate the importance of health information in daily life.[4] Health information is reportedly using many channels because of modernized communication technologies. In addition, because of varied content, both positive and negative influences on daily life activities, receivers should carefully analyse and synthesise the available information.[5]

According to the survey of the National Statistical Office in 2017, only 4.2% of the elderly obtained useful information from the internet or social media.[2] The Thai elderly must be aware of it and able to take advantage of internet, social media via smartphones to enhance various health care information as well as financial transactions to not become a victim by spreading fake news that could lead to violating human rights and property fraud.[5] The elderly constitutes a new group that can be affected by social media such as receiving false information because of ignorant contents. Therefore, educating the elderly using media technologies would be very important.[5] Moreover, the elderly always share pictures and information without validation and scrutiny. The transmission of information reflected an unawareness of the impact on copyright infringement and privacy right violations. The elderly did not consider the reliability of information due to a lack of information.[6] The capacity survey research of the ability to know information and use communication technology amongst the elderly in Thailand found that 86% strongly agreed to urgently promote information literacy skills for the elderly because the elderly understood that forwarded information could be verified.[7] Therefore, they forwarded information to groups of friends and relatives without verifying causing confusion, anxiety and stress. Although at present many organizations are responsible to verify information, as many of the elderly lack literacy skills and still use the information without carefully considering.[8]

Hence, the elderly should develop their capacity on knowledge and information management appropriate in the modern technology era. The elderly should also promote to learn, acquire, seek and access information that is beneficial to themselves to obtain a better quality of life. The Education and Lifelong Learning of Thai Senior Citizens found that 84% of the elderly needs to learn for their health, and 70% needs short term training using participatory learning that integrated various of infotainment and intergenerational learning.[9] The elderly would feel comfortable when they start learning with their grandchildren or close friends and neighbors.[10] The study of factors of enhancing understanding and skills in information technology from training is learned from people nearby who create better understanding skills. Learning and supporting by family members promotes, motivates, and encourages using technologies amongst the elderly.[11] "Intergenerational Learning" is a developed guidance to promote lifelong learning based on the exchange of experiences from different generations. This process increases interaction from joining activities involving the sharing of skills, knowledge and experience that create relationships.[12]

According to the above information, the researcher aims to study the effectiveness of a training model based on intergenerational and participatory learning would be very important to enhance health information literacy amongst the elderly. It would be the key factor in promoting information literacy skills for the elderly to obtain a higher quality of life. Moreover, the ~~gain~~ result from this study would serve

as a role model in proposing a policy to prepare for an active aging society in Thailand.

METHOD

The research and development consisted of three phases using intergenerational and participatory learning to enhance health information literacy for the elderly as shown below:

Phase 1: Development of the training model to enhance learning factors and procedures

Phase 2: Development of the training programme to provide training plan and test of health information literacy

Phase 3: Study the results to evaluate the effectiveness of the training model and programme

Population and sample

The population of the elderly comprises of 60 years of age or older and was a member in a community senior club certified by the Thai government to study the effectiveness of the training model and programme.

The sample was determined using Cohen Statistical Power Analysis, with d-values not over 0.08, and the power set at 0.80, and the alpha level set at 0.05.[13] The sample size was 25 and the power was fixed at .80 (β = .20). Thus, the total of sample size was 30. This also conformed with the suggestions of Luecha, Lerdmaleewong, Laohachinda, Leisuwan, Putwatana & Thanaruk[14] that experimental and quasi–experimental research should provide at least 20 to 30 samples. Hence, the sample of this research was drawn at random from 197 community senior clubs in Ratchaburi Province. After that, the researcher selected 30 elders from Srisurat Subdistrict, Damnoen Saduak District, Ratchaburi using purposive sampling under the conditions that subjects were able to read, write, take care of themselves in daily activities, able to participate in the programme, have smartphones to search information with volunteers who helped the elderly throughout the programme.

Research Instruments

1. The training model was synthesised using principles, theories, and related research which comprises 1) the elderly learning process theory consists old knowledge and experience of learners, needs and interests of learners, participation in learning management, creating atmosphere for learning, self-directing and application in life. [15-17] In addition, 2) the intergenerational learning theory comprises of exchanging knowledge, and reciprocity, i.e., maintaining relationships, exchanging knowledge skills, and desirable characteristics with each other and empowerment. This theory explains social processes, concurrence and appreciation, promotion, development, and providing capacity building to respond to their needs and ability to solve problems by themselves, together with the ability to use the necessary resources for subsistence.[18-20] 3) Furthermore, the participatory learning consisted of learners' experiences, learners' reflective thinking, learners' understanding of building, applying their understanding, exchanging ideas and maintaining equality learning.[21]Therefore, the training model comprises four training stages: (1) stimulation; (2) sharing; (3) collaboration and (4) crystallisation. The factors supporting learning were Environment Management, Training Atmosphere, Dialogue, and Enhancing Learning Volunteers. The developed training model was shown in below figure.

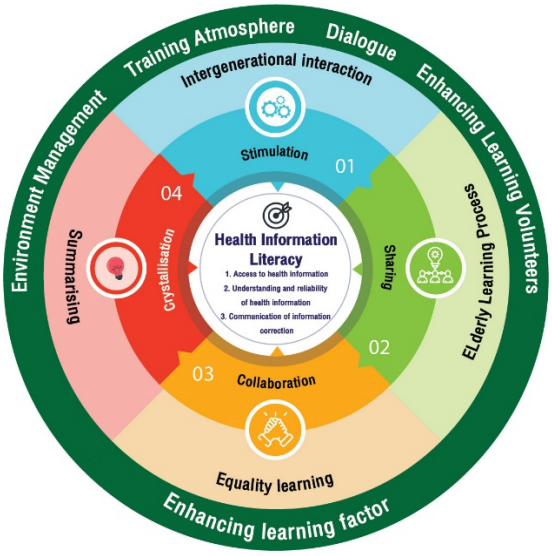


Figure 1 The training model based on intergenerational and participatory learning to enhance health information literacy for the elderly

1. Enhancing learning factors of a training model based on intergenerational and participatory learning to enhance health information literacy for the elderly are explained in detail below:[22]

1.1 Environment Management: providing a learning supportive environment, providing materials and equipment, and facilitating the elderly.

1.2 Training Atmosphere: maintaining temperature and lighting that are suitable for the physical needs of the elderly, and creating a friendly atmosphere that provided the elderly confidence in learning.

1.3 Dialogue: making motivated conversation for learning.

1.4 Enhancing Learning Volunteers: supporting learning and assisting in the training process related to learning communication technology.

2. The components and procedures of a training model were based on intergenerational and participatory learning to enhance health information literacy for the elderly consisting of the following:

2.1Intergenerational interaction: creating a learning atmosphere communication between the elderly participants and volunteers that provided knowledge, ideas and understanding leading to change. This component was defined as **Stimulation** meaning to stimulate the trainees to interact, initiate a conversation process to create relationships amongst each other. [18-20]

2.2 Andragogy: changing behavior of the elderly. This component was defined as **Sharing** meaning to create a familiar and trusting atmosphere to exchange old experiences.[15-16]

2.3 Equality learning: making equal relationships in the related training amongst the people who were training managers and the trainees. They served roles not only as a giver and receiver, but they also learned from each other. This component was defined as **Collaboration** meaning creating participation to plan the learning process together, accept various differences, and indicate their own needs.[21]

2.4 Summarising: understanding the content/information by analysing and synthesising new learning to bring out the concepts as their own knowledge. This component was defined as **Crystallisation**

meaning to motivate the trainees to be able to analyse and synthesise for developing, building on ideas, and applying to their routine.[23]

2. The training programme was synthesised from intergenerational and participatory learning to enhance health information literacy from related documents, principles, theories and related research which included 1) training components that involved (1) direction, (2) programme objectives, (3) roles of speakers and activity leaders, (4) roles of trainees, (5) training plan, (6) timing; 3 hours/unit, (7) process and assessment, (8) training materials and equipment, and 9) venue/location for training.[24-27] In addition, 2) training plan comprised three sections.[28-29] Section 1. Access to health information, Section 2. Understanding and reliability of health information, and Section 3. Communication of information correctly and reliably.

Test of health information literacy knowledge is the measurement. It contained 30 questions that the researcher developed using a literature review.[30-32] The test was divided into three sections which provide 10 multiple-choice questions with four choices, 1 point for the correct answer and 0 for the wrong answer for each section as follow:

Section 1: Test of knowledge on Access to health information consisting of using smartphones, searching health information and health resources, and using search engine

Section 2: Test of knowledge on Understanding and reliability of health information comprising evaluation and investigation of resources and components of reliable information

Section 3: Test of knowledge on Communication of correct information consisting of using applications for communicating and sharing correct health information

Validation of research instrument quality

The training model, training programme, and the test of health literacy information literacy knowledge were submitted to six experts; three experts from Educational Technology and Lifelong Education, and three experts from Education Technology or Information Technology. The experts verified the appropriateness and found the training programme was at the most appropriate level. The results of the Item-Objective Congruence (IOC) were between 0.67 and 1.00.

The research conducted a pilot study to determine the results of the Effectiveness Index (E.I.); the difference in percentage from mean scores of the pre- and posttest after training should be greater than 60% that is E.I = E posttest – E pre-test >60.)[33] The result of an E.I. of the training programme to enhance health information literacy for the elderly with a score of 3 units was higher than 60%. The E.I. of Section 1: Access to health information, Section 2: Understanding and reliability of health information and Section 3: Communication of correct information and reliability were 61.33, 66.67 and 66.66%.

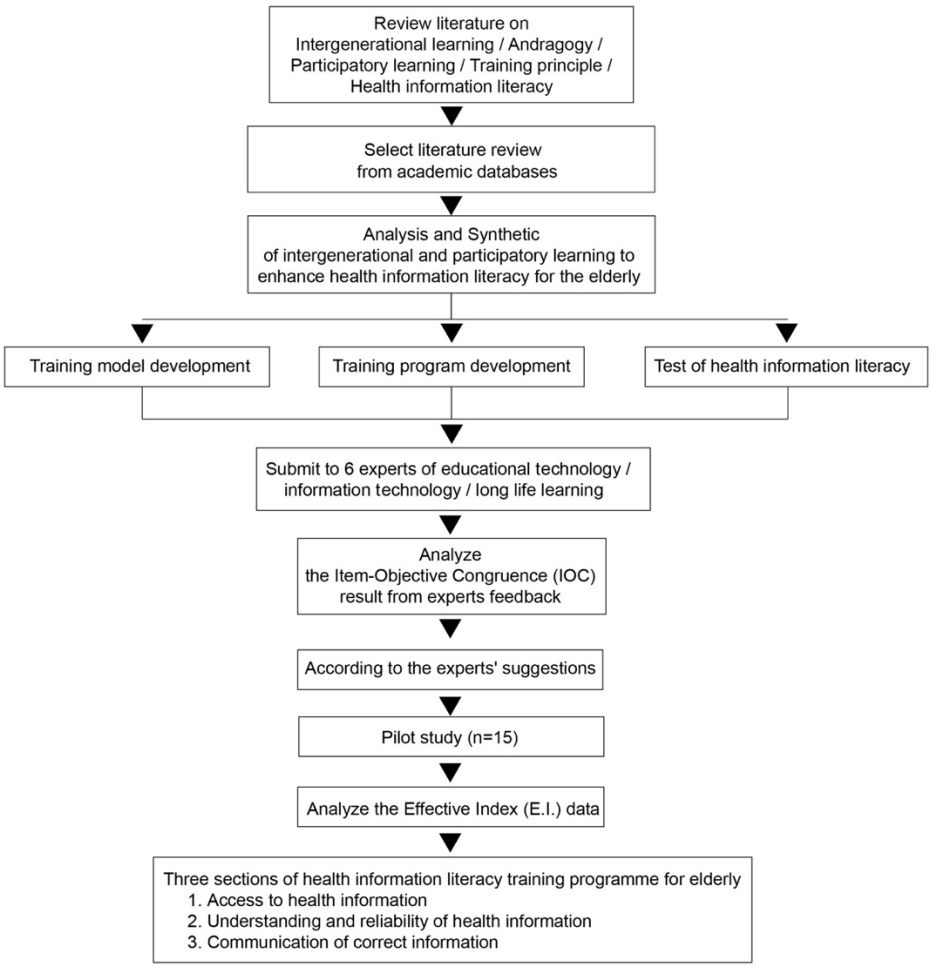


Figure 2 The flowchart of training model and programme development

Statistical Analysis

The training model based on intergenerational and participatory learning to enhance health information literacy for the elderly was synthesied by review literature and critiqued using the IOC.

The training programme based on intergenerational and participatory learning to enhance health information literacy for the elderly was critiqued by the IOC and E.I..

The data of pre- and posttest examination were entered into the Statistical Package for Social Sciences (SPSS) Software. Descriptive statistics was performed to describe the participant characteristics. Paired t-test was employed to determine the effectiveness of the training programme. A p-value < 0.05 was considered as statistically significant.

Ethics Consideration

This research was certified by the Ethics Committee, Srinakharinwirot University on 24 February 2020 (SWUEC/E/G-236/2562). The participants read and signed the informed consent forms before participating in the study. Data on the participants were kept confidential.

RESULTS

Table 1 Characteristics of the study participants (n = 30)

General information	N (30)	Percentage (%)
Gender		
Male	6	20.0
Female	24	80.0
Age (years)		
60-69	22	73.3
70 and above	8	26.7
Education level		
Primary School	3	10.0
High school	18	60.0
Senior high school/ vocational	5	16.7
Bachelor's degree	4	13.3
Living		
With family	28	93.3
Alone	2	6.7

The majority of participants were female (80.0%). Most participants were 60 to 69 years old (73.3%), graduated from high school (60.0%), and resided with their family (93.3%).

Table 2 Comparison of health information literacy between pre- and posttest (n = 30)

Section	Test	$\overline{X}$	S.D.	t	p-value
Access to health information	Pretest	2.80	0.63	31.604	< 0.001
	Posttest	8.50	0.89		
Understanding and reliability of health information	Pretest	1.53	0.93	29.056	< 0.001
	Posttest	7.40	0.82		
Communication of information correction	Pretest	3.07	0.76	24.736	< 0.001
	Posttest	8.20	0.87		

p-value < 0.001

Table 2 shows the pre- and posttest mean scores of health information literacy between pre- and posttest of access to health information were 2.80 (S.D. 0.63) and 8.50 (S.D. 0.89), understanding and reliability of health information were 1.53 (S.D. 0.93) and 7.40 (S.D. 0.82), and communication of information correction were 3.07 (S.D. 0.76) and 8.20 (S.D. 0.87). The overall result of the posttest scores were higher than those of the pretest at a 0.01 level of significant difference (p-value <.001).

Table 3 The comparison of health information literacy knowledge between pre- and posttest of 3 sections (n = 30)

Content	Pretest ($\bar{x}$)	Posttest ($\bar{x}$)
Access to health information		
1. Using smartphone to access health information	2.50	2.80
2. Searching health information and health resources	0.17	3.53
3. Using search engine	0.13	2.17
Understanding and reliability of health information		
1. Comprising evaluation and investigation of resources	0.07	3.70
2. Comprising evaluation and investigation components of reliable information	1.47	3.70
Communication of information correction		
1. Using applications for communicating	1.67	4.03
2. Sharing correct health information	1.47	4.17

Table 3 shows the comparison of health information literacy knowledge between pre- and posttest of 3 sections. Section 1 was composed of using smartphone to access health information, searching health information and health resources, and using search engine pretest were 2.50, 0.17, and 0.13 while as posttest were 2.80, 3.53, and 2.17. Section 2 was composed of comprising evaluation and investigation of resources and comprising evaluation and investigation components of reliable information were 0.07 and 1.47 while as posttest were 3.70 and 3.70. Section 3 was composed of using applications for communicating and sharing correct health information were 1.67 and 1.47 while as posttest were 4.03 and 4.17.

Table 4 The component of training plan

Section	Contents	Targets	Activities
Access to health information	Using smartphone to access health information	The elderly uses the smartphone to communicate and search health information.	Lecture, Pair work, Games, Presentations
	Searching health information and health resources	The elderly knows resources and searches health information.	Lecture, Group work, Pair work, Games, Presentation
	Using search engine	The elderly use search engine to find health information	Lecture, Pair work, Group work, Practice, Presentation
Understanding and reliability of health information	Comprising evaluation and	The elderly evaluates and investigates of resources	Lecture, Group work, Pair work,

Section	Contents	Targets	Activities
	investigation of resources		Group Discussion
	Comprising evaluation and investigation components of reliable information	The elderly evaluates and investigate components of reliable on health information.	Lecture, Brainstorming, Pair work, Discussion
Communication of information correction	Using applications for communication	The elderly uses smartphone and applications for communication.	Brainstorming, Pair work, Games, Practice, Presentation
	Sharing correct health information	The elderly communicates creative and safe information.	Brainstorming, Pair work, Games, Practice, Group Discussion

Table 4 shows the component of training plan of three sections that are contents, targets, and activities to enhance health information literacy for elderly.

DISCUSSION

The result of the effectiveness of a training model based on intergenerational and participatory learning to enhance health information literacy found that the t-test of overall posttest mean score was higher than pretest at statistical significance. It was shown that the developed training programme is effective to enhance health information literacy for elderly on 1. Access to health information, 2. Understanding and reliability of health information, and 3. Communication of information correction. This programme is at the most appropriate level to apply for elderly due to analysis and synthesis using information technology competencies.[28,29,34] The key factors of the effectiveness programme are procedures and training atmosphere that stimulate learning, enhance participation, and respond to their needs, according to elderly of elderly[11] that should organize activities to relate to their needs and social participation. This workshop was designed group work, enhanced learning activities, and concrete experience to benefit for elderly. The training procedures also reflected opinions and self crystallisation. Training atmosphere should be flexible and respect the difference of ages that conformed with intergeneration theory[34] which emphasized group work, respectability, and admire to enhance ability and confident that led to learning participation. The key finding obtained from this study is learning process and volunteers' roles to enhance health information literacy that was applied from intergeneration theory and participation learning theory. The sample were participated training with volunteers who facilitate and stimulate learning according to enhancing learning factors; environment management, training atmosphere, dialogue enhancing learning volunteers and four training stages; stimulation, sharing,

collaboration and crystallisation, using training model.

Results from the test of health information literacy knowledge showed that posttest score of three sections were higher after participating the workshop.

The findings of all three section to enhance health information literacy for the elderly are as follows: section 1: Access to health information, participants can use smartphone to access and search health information and use search engine, section 2: Understanding and reliability of health information, participants can comprise evaluation and investigation of resources and components of reliable information, and section 3: Communication of correct information, participants can use applications for communicating and share correct health information. These findings are in agreement with a study on Yuxiang Zhao's (2017)[35] research revealing that information media literacy improvement for the elderly using collaborative learning involving younger people led to improve knowledge management and learning experiences of elderly. Therefore, intergenerational learning is involved not only in exchanging knowledge with participants at different ages, but also enhancing the relationships. The training model based on intergenerational learning started from motivating their interests and creating the digital handbook. The younger participants serve the role as mentors or facilitators and the elderly could select or create the learning model using their interests online or offline.

According to the training programme each variable was followed-up after training by interview. It was found that the participants can first, access health information; participants can access health information, search for health information, store temporary health information and use information searching tools. Second, participants understood the reliability of health information; participants could evaluate information correctly and reliably. Third, regarding communication of correct information; participants could realize the impact of creating and releasing information, and communicating based on ethics. It was shown that the elderly applies the content of programme to real life. This training programme can develop health information technology and promote long term quality of life by their own, because the elderly wants to use online media and need literacy for self-health care and good quality of life.[36] Therefore, the elderly who perceived knowledge of technology and internet were stimulated their ability in learning, reading, and understanding from the reading information and memory, reducing dementia, and increasing education opportunities, including the elderly realized the benefit and usefulness of using computers.[37] However, this study encountered limitations on participants' smartphone due to various functions and network providers. Therefore, they could not access some applications and had to use volunteers' smartphones for training.

CONCLUSION

The training model, based on intergenerational and participatory learning, was effective to enhance health information literacy for the elderly. The volunteers' roles as training facilitators were the key factors for this study's success that conformed with intergeneration learning theory when learning with familiar people or family members.

RECOMMENDATIONS

Further studies should follow- up health literacy skills of the elderly after training in long term by volunteers, divide the training group according to smart phones' operating systems and provide

internet connection for participants. Moreover, local community members, senior club members or related organizations should apply this model to organize activities for the elderly along with community volunteers together with experts to develop and expand capacity building for local people to enhance their literacy skills.

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