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Development of a Learning Model to Enhance the Buddhist Way of Temples and Urban Community as a Cremation Model

Phrakhrusangharak Chakkit Bhuripaññño[1], Phrakhru Wirunsutakhunand[1], Toungpetch Somsri[1], Phutthachat Phaensomboon[1], Anek Yai-in[1] & Kittiphat Rattanachan[2]

[1] Faculty of Education, Mahachulalongkornrajavidyalaya University, Ayutthaya, Thailand

[2] College of Industrial Technology, King Mongkut's University of Technology North Bangkok, Bangkok, Thailand

Correspondence: Phrakhru Wirunsutakhunand, Faculty of Education, Mahachulalongkornrajavidyalaya University, Bangkok, Thailand

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Abstract

The objectives of this paper were to 1) study the learning model of the smart crematorium system, 2) create a learning manual on smart cremation management, and 3) promote the development of learning for undertakers to use the smart crematorium. This was mixed method research with qualitative research and action research as parts of the conduct of quantitative research. The samples were from informants that consisted of 10 monks, 5 community leaders, 5 academicians, 17 seminars, 30 participants, a total of 67 people, and content analysis according to the study issues. The research instruments consisted of 1) an interview form, 2) a focus group meeting, 3) an activity participation form, and 4) an activity assessment form. The data collection was as follows: 1) secondary sources, documents, books, journals, and research reports related to concepts, and theories, 2) workshops, 3) in-depth interviews, 4) specific group discussions, and 5) collecting data from measurement reports and analysis of dioxin/furans compounds to categorize the data and analyzed according to the study issues. The findings revealed that

1. A learning model for using a smart crematorium system for the undertakers: 1) filling the fielder with the reaper into the storage tank 2) turning on the air compressor to fill the tank 3) opening the valve to let air into the system 4) checking the wind pressure and 5) checking the air flowing through the system along the main pipes which would pass the Vimutti substances into the crematorium and smoke furnace room continued to for about 30 minutes continuously.

2. Operations of creating a learning manual on smart cremation management that contained details in the book: 1) the problem of pollution from cremation 2) the smart crematorium with new options 3) the benefits of using the smart crematorium. This would introduce the features of a new smart crematorium, how to use and the benefits of using a smart crematorium.

3. To promote and develop knowledge for undertakers to use smart crematoriums and Vimutti substance sprayers by organizing training to educate about dioxins and furans, organized training and demonstrating how to use the smart crematorium and the Vimutti substance sprayers. This was the development of a learning model to enhance the Buddhist way of temples and urban communities as a cremation model.

Keywords: Buddhist Way, Development, Cremation, Learning Model, Urban Community

1. Introduction

Thai society is a society that lives a life related to Buddhism (Chittakhop, 2012). The urban community and the temple can't be separated from each other because the temple was adjacent to the community and environment (Kittichayathorn, 2012). The temples have a funeral or religious ceremonies which these ceremonies are almost daily cremation ceremonies for whoever wants to live in a city with a good environment and there were facilities to encourage new creative thinking in the Buddhist way. The connection between people, places, and identities together creates a Buddhist community that protects the environment with a smart crematorium and the Vimutti substance sprayers (Chaibao, 2018; Widén & Karlsson, 2018; Winzer et al., 2018).

The smart crematorium process and spraying equipment were used in temples, including urban communities.

Before being put into practice, undertakers were trained to use smart crematoriums and Vimutti substance sprayers that were developed by promoting the learning of the Buddhist way and guidelines to be right and appropriate. It is necessary through an educational process for crematorium managers (undertakers), students, and the general public interested in career building (Phanit, 2012; Ratmanee, 2016; Phakdithai, 2018). Especially, the communication of news, and accurate knowledge of using a smart crematorium and Vimutti substance sprayers to be effective. It also inserted knowledge about the environment by interpreting the meaning (Toner, 2020). These could proceed to develop the Pirunsart temple as a learning center for cremation and the management of information centers and press releases (Millet, 1954). The preparation of billboards, brochures, posters, and interpretive manuals would give ceremonial managers (undertakers) a better understanding of the smart crematorium and the Vimutti substance sprayers to apply and improve the life quality urban communities because every human couldn't escape death. It depended on the time and age of each person (Decker et al., 2018; Badge et al., 2016; Thapa, 2022).

Death is a thing that everyone can't avoid. When it happens, what follows is a ritual that arises from death. That is important for people who leave this world or those who are still alive must act toward those who have gone to a better world (Thai Tipitaka 3/189) (Promta, 2002; Prakru Niyomsiridat et al., 2020). As for those who are still alive, peace and tranquility in the prehistoric era. It has been proven that performed rituals for those soulless bodies even thousands of years ago, there were still rituals involving the funeral of the deceased. This was the beginning of the problem of pollution caused by cremation in each temple where these rituals were held (Xue et al., 2018; Cruz et al., 2017)

Therefore, the development of a learning model to enhance the Buddhist way of temples and urban community as a cremation model by promoting the temples and the communities has used smart crematorium. This was to reduce pollution problems that affected the physical health of people in urban communities and protected the environment according to the guidelines of the World Health Organization (WHO) (Bull et al., 2020; Maher & Ford, 2017). In addition, this was to create a learning manual on smart cremation management, and promote and develop knowledge so that undertakers could properly operate the smart crematorium according to the system, leading to the development and enhancement of the Buddhist way of temples and urban communities as a model for cremation.

2. Conceptual Framework

From the study of concepts, theories, and academicians in the country and abroad by collecting data on the cremation of various types of pollution and environmental impact including public health issues to analyze, and synthesize concepts, theories, and knowledge connected with Buddhist rituals, beliefs, and faith. After the deceased, the personal belongings of the deceased must be packed, including the coffin decorated with the Thepanom pattern. Containment in the corpse was the cause of dioxins, furans, odors, smoke, and other pollutants which all were the problems. Social context integrated with concepts, theories, and technological innovations have developed as a learning model to enhance the Buddhist way of temples and urban communities as a model for cremation that created a conceptual framework for research as follows:

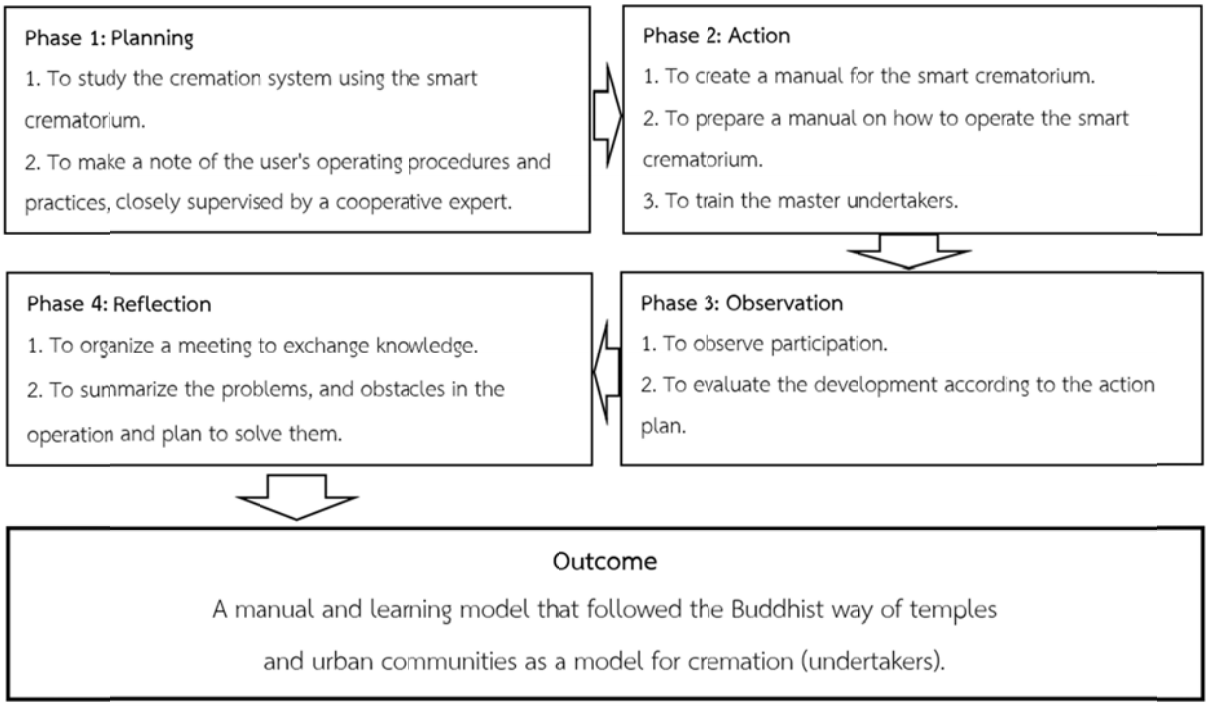

Figure 1.

3. Research Methodology

The development of the learning model to enhance the Buddhist way of temples and urban community as a cremation model was mixed method research with qualitative research and action research as parts of the conduct of quantitative research. The samples were from informants that consisted of 10 monks, 5 community leaders, 5 academicians, 17 seminars, 30 participants, a total of 67 people, and content analysis according to the study issues.

The research instruments consisted of 1) an interview form, 2) a focus group meeting, 3) an activity participation form, and 4) an activity assessment form. The data collection was as follows: 1) secondary sources, documents, books, journals, and research reports related to concepts, and theories, 2) workshops, 3) in-depth interviews, 4) specific group discussions, and 5) collecting data from measurement reports and analysis of dioxin/furans compounds to categorize the data and analyzed according to the study issues (Srinok, 2018; Yamane, 1973).

4. Research Results

1) To study the learning model of the smart crematorium system, it was found that crematorium managers (undertakers) should be encouraged to learn or study the details of the smart crematorium and the Vimutti substance sprayers. This help motivate them to do the job by organizing training and demonstrating how to add Vimutti substance into the collection of Vimutti substances, turn on the air compressor to fill the tank to prevent the backflow of the wind pressure, and open the valve to release air into the combustion system. The final step is to check the air flowing through the system along the main pipes that passed the Vimutti substances into the crematorium. Moreover, the smoke furnace room continuously for about 30 minutes was in the most polluted time. In particular, dioxin and furans from the decomposition of corpses and jewelry, the funeral ritual elements included small dust that affected the health of monks and communities near the temple by doing as follows:

Organizing seminars and civil society forums, explaining to the public about the silent danger. There were sources of religious rituals and cremation was hazardous to health. Currently, the temple adopted environmentally friendly cremation technology.

Smart cremation system has been developed to transform a new way of cremation by installing a Vimutti substances sprayer that was developed to be installed in the old crematorium that the temple already had. The technology that was developed could help reduce pollution, dioxin, furans, odor, and smoke, be non-polluting, and be environmentally friendly.

To promote the use of smart crematoriums for the temple and prepare a document to explain to the National Office of Buddhism, Pollution Control Department, Department of Health, and the Office of the Environment Bangkok to be aware of the modification of crematoriums that could reduce pollution, dioxins, furans, odors, smoke, didn't disturb the community and it was environmentally friendly. furthermore, it also reduced costs.

Good governance was the heart of moving towards the driving force for the urban community for sustainable development. It focused on changing positive attitudes about mourning the deceased with wreaths without foam elements, plastic straws, or other things that caused pollution because, after the ceremony, these were not used.

2) To create a learning manual on smart cremation management, it was important in addition to be a work that showed expertise, experts, and special experts. It also showed that people who had accumulated expertise in career development, had the potential, knowledge, and ability to perform the task by studying and searching to improve themselves continuously. The manual for managing the smart crematorium and the Vimutti substance sprayer was a complicated device to use. Therefore, there must be close training on how to use the correct method. It was necessary to prepare manuals and methods for managing the smart crematorium and the Vimutti substance sprayer correctly according to the crematorium manual.

The design of the Vimutti substance sprayer consisted of the air compressor, collection of Vimutti substances, and a set of Vimutti substances into the crematorium to be installed in a smart crematorium. There was a working process for the Vimutti substance sprayer as follows:

To add the Vimutti substances to the set of Vimutti substances. The appropriate amount for cremation was about 2 kilograms per body.

To turn on the air compressor to fill the tank.

During cremation in the first 30 minutes, it was the time that the air pollution inside the crematorium began, then opening the valve lets the air into the system.

Some of the air would flow through the system into the storage tank of Vimutti substances to create sufficient pressure and distribute the Vimutti substances into the system.

The air flowing through the system along the main pipe would pass through the Vimutti substances into the crematorium and the smoke cremation continuously for about 30 minutes. After this period, the temperature in the furnace would rise, fumes were produced and toxic substances were reduced. Therefore, there was no need to pay for further Vimutti substances.

3) To promote the development of learning for undertakers to use the smart crematorium, promoted the crematorium management career (Undertakers) by integrating Buddhist teachings at Phirunsat Temple, Khlong Luang Sub-district, Lam Luk Ka District, Pathum Thani Province and developed as a learning center for environmentally friendly cremation management with the following activities (Ministry of Natural Resources and Environment, 2019):

Learning Activity 1: New Way of Churchwarden Activity

Activity 1 was an activity to promote a new way of churchwarden jointly organized between researchers and Phirunsat Temple, Khlong 10, Bueng Thonglang sub-district, Lam Luk Ka district, Pathum Thani Province, held at the chanting pavilion by February 15, 2021, with a mission to promote learning new careers for students and those who were interested to create a new career. It was also a volunteer activity to return to society, which promoted learning about life and promoted a new career called "Young Managers for Crematory (Undertakers)" (Phra Somchai Payoko, 2011).

Figure 2. Students participated in the Young Managers for Crematory (Undertakers) activity

Learning Activity 2: Sakkhasa Meditation Activity

Activity 2 was to inmate learned about the customs, beautiful cultures, and traditions of Thailand that have been associated with Buddhism for a long time. These could be used to make a living for self and one family. When there were professional undertakers, they must have professional ethics. The importance was to not discriminate against the poor or the rich. They were responsible for the work in duty from “cleaning the furnace until the bone collection” and had a duty to “inject the corpse”, manage the cremation and burial, kept the corpse from decaying by injecting chemicals into the corpse. It included various ceremonies regarding funeral arrangements (used in mock-up activity) (Marpue, 2013; Mogkaew, 2019).

Figure 3. The mock-up activity

Learning Activity 3: Urban communities weren’t polluted by cremation with smart crematoriums

The incomplete combustion was caused by cremation with the personal belongings of the deceased, thus causing pollution of various toxic gases.

The adoption of the smart crematorium and Vimutti substance sprayer to control pollution dioxins/furans was one of the solutions that could help reduce pollution and dioxins/furans. This was developed into the smart crematorium and designed manuals for the use of crematoriums and the practice manuals of crematorium managers (undertakers) which were very helpful in protecting the environment.

5. Discussion

The results of the 1st objective in the research found that the learning model of the smart crematorium system by conducting seminars was the way to promote learning for crematorium management (undertakers) as follows:

5.1 To Study the Learning Model of the Smart Crematorium System

1) To organize seminars and civil society forums, explaining to the public about the silent danger. There were sources of religious rituals and cremation was hazardous to health.

2) Smart cremation system has been developed to transform a new way of cremation by installing a Vimutti substance sprayer. The technology that was developed could help reduce pollution, dioxin, furans, odor, and smoke, be non-polluting, and be environmentally friendly.

3) To promote the use of smart crematoriums for the temple and prepare a document to explain to the National Office of Buddhism, Pollution Control Department, Department of Health, and the Office of the Environment Bangkok.

The smart crematorium and Vimutti substance sprayer could reduce fuel costs and complete combustion efficiency. It could control pollution, dioxin, and furans to be reduced which was consistent with the research.

In addition, promoting the cremation system using the smart crematorium to control and reduce the number of dioxins/furans, carbon monoxide gas, sulfur dioxide gas, small dust, soot, smoke, and odor which affected the overall health of monks and the communities that had residences near the temple area corresponding research of Hua and Wang (2015) that has studied dioxins and said that the release of dioxins was a worldwide concern because of its residual and persistence in the environment and its carcinogenic and mutagenic effects. The waste disposal pyrolysis combustion process was an alternative to traditional solid waste incineration developed to reduce dioxins. When considering the equilibrium composition of the Deacon reaction, it was found that the gas from the pyrolysis process, when oxidized, produced 7 oxide compounds: CuO, NiO, $CaSO_4$, CoO, Fe_1O_3, Mn_3O_4, and $FeTiO_3$. And when this was compared to gas obtained by pyrolysis directly burned by air. The results showed that the oxygen Deacon reaction was lower than in air by using 4 oxides: CuO, NiO, Fe_1O_3, and $FeTiO_3$. According to the results of this simulation and experimental design, dioxin emissions in China, Europe, the United States, and Japan were expected for solid waste disposal with such combustion processes. The thermographic analysis results in this paper showed that chemical combustion in the food chain could reduce dioxin production during solid waste disposal.

5.2 To Create a Learning Manual on Smart Cremation Management

The results of the 2nd objective in the research found that by creating a learning manual on smart cremation management, there was a detailed description of the duties of the crematorium manager (undertaker) that described the operation under the crematorium for approximately 30 minutes. Toxins were produced by combustion within the incomplete crematorium. Therefore, the cause of dioxin and furans diffusion from the chimney into the air. Such details would be contained in the training manual for using the smart crematorium and the Vimutti substance sprayer consisting of the air compressor, collection of Vimutti substances, and a set of Vimutti substances in the crematorium to promote learning. There were training and demonstrations for the cremation manager (undertaker) and students to attend all training activities. It emphasized learning and focusing on controlling the use of smart crematoriums and Vimutti substance sprayers corresponding to the research of Soonthonwaritthichod (2013) studied “A study of environmental problems in the district, three graduates: Factors affecting the development of natural resources and environment of the people of the Third District graduates”.

The results of the study found that participation in river and canal development activities; inviting family members to participate in water resources development activities on important days and attending the meeting with the village committee or groups of organizations in the community to offer feedback, suggestions, and methods for developing water resources and when measuring the maintenance of natural resources and the environment in various activities related to the development of natural resources and the environment. The factor that didn’t influence the development of natural resources and the environment was the awareness of the people’s consciousness in various activities that related topics including garbage disposal, rice straw removal, toilet construction, and aquatic animal capture. It was found that consciousness didn’t influence the development of natural resources and the environment.

In addition, Wu et al. (2019) have studied the distribution characteristics of dioxins and assessed health risks in small particles of fly ash in China. The study found that during the treatment and recycling process of fly ash from the city, it was found that fly ash dioxin, the polychlorinated dibenzo-p (PCDD/Fs), and polychlorinated dibenzofurans (dl-PCBs) in fly ash were densely concentrated in the atmosphere and diffused widely in the environment due to air pressure which happened inevitably.

Therefore, this work presented the distribution of PCDD/Fs and dl-PCBs in the coarse particles that could be breathed (Dp10-1.5 (particle diameter in μm), fine particles (Dp < 1.5) of fly ash, and the conventional fly ash from the 4 MSWI factories in China. The results showed that PCDD/Fs and dl-PCBs were concentrated in Dp10-1.5 and Dp < 1.5. The mass and TEQ concentrations were higher than in conventional fly ash. However, the distribution of PCDD/Fs congeners in Dp10-1.5 and Dp < 1.5 was similar to that of conventional fly ash. Additionally, the mass and TEQ of dl-PCBs are relatively low compared to the fluidized bed. The samples from the furnace had significantly lower concentrations of dioxins. In terms of health risks, the cancer risk from PCDD/Fs infection in Dp10-1.5 and Dp < 1.5 is 9.87 × 10 (-1) to 4.81 and 1.19–7.95 for cancer risk of PCDD/Fs. The accumulation of Hazard Quotients (HQ) in both Dp10-1.5 and Dp < 1.5 exceeded the threshold and should be considered an unacceptable risk or a serious hazard to on-site workers the above findings could provide information to support MSWI fly ash risk management during the fly ash recycling and disposal process.

The importance of operating manuals also showed that they were knowledgeable and competent in their work by studying and learning from the manual and following the instruction of the manual because funeral arrangements would change according to the situation. It took an experimental process of the smart crematorium and Vimutti substance sprayer to come up with effective methods and procedures.

5.3 To Promote the Development of Learning for Undertakers to Use the Smart Crematorium

The results of the 3rd objective in the research found that the most important people were the crematorium managers (undertakers) who managed the soulless body according to religious ceremonies. It should be encouraged, learned, and developed to promote them to develop knowledge and skills to have behavior appropriately to the duties assigned by the abbot (Schermerhorn et al., 2000). This increased the potential to be able to operate effectively the manual of the smart crematorium and Vimutti substance sprayer by studying the manual of the smart crematorium and Vimutti substance sprayer that realized the impact on the environment according to the Buddhist way of the temples and the model urban community. In addition, training to promote knowledge and develop learning on pollution management from temples, connected by rituals, faith, and beliefs as a source of dioxins, furans, and various types of pollution. It's consistent with the research of Wang, Linchi; et al. (2001) studied the subject. "Characterizing the Emissions of Polychlorinated dibenzo-p-dioxins and dibenzofurans from Crematories and their Impacts on Surrounding Environment" on the nature of polychlorinated emissions, Dibenzo-P-dioxin and dibenzofurans (PCDD/F) from crematoriums and their impact on the surrounding environment. The experiment was conducted with 2 cremation furnaces, the 1st furnace wasn't equipped with air filters and the 2nd furnace was equipped with air filters. The results showed that PCDD/F released from furnace 1 and furnace 2 were 2.36 and 0.322 ng I-TEQ Nm-3, respectively. It could be seen that the removal efficiency of PCDD/ F is 55.1%. In addition, when taking samples of the above-ground air at furnace 1, it was found that the concentration of PCDD/F was higher than that of the above-ground air in agricultural, residential, urban, and industrial areas. It has been shown that PCDD/F from crematoriums had an impact on the surrounding environment.

While Mari and Domingo (2010) have studied "Toxic Emission from Crematories" to compare the number of polybrominated dibenzo-p-dioxins, dibenzofurans (PBDFs), and mercury between crematorium and other types of crematoriums. Such substances when released into the atmosphere would affect the environment and be dangerous to human life. It was a substance that would stimulate cancer that affected the fertility and immune system of the human body. From the results of the study, it was found that cremation furnaces emitted a greater amount of PCDD/F than other types of incinerators. The amount of mercury was the same.

To promote and develop knowledge for crematorium managers (undertakers) to be able to use the smart crematorium and the Vimutti substance sprayer. This emphasized on knowledge dimension of understanding dioxins, furans, carbon monoxide gas, sulfur dioxide gas, small dust, smoke, odor, P.M. 2.5, and small dust. These toxins were cancer-causing agents. The process of surveying the orderliness of the machine, packing the Vimutti substances, launching a practical test, and turning on the automatic spray control system in the crematorium. Therefore, crematorium managers (undertakers) have been promoted and guided in the development of operational dimensions according to the manual that has been developed. The book contained details and procedures for the cremation system and the operation of the Vimutti substance sprayer manual (Aucharoen, 2019; Borwornchai, 2020; Bunyarit, 2015).

6. New Knowledge from the Research

After studying the smart crematorium and Vimutti substance sprayer, it was a technology that was developed to manage the control or reduction of dioxins, furans, carbon monoxide gas, and sulfur dioxide gas by controlling or eliminating the first 30 minutes. This was the period in which the most toxic substances were produced by the

breakdown of corpse fat and various elements packed in a coffin. Therefore, it was necessary to control and eliminate these substances by spraying the Vimutti substances into the crematorium in the first 30 minutes. There were the promotion and development of the practice of crematorium managers (undertakers) to promote environmental learning and pollution caused by cremation, study and train the use of smart crematorium and Vimutti substance sprayer according to the manual. Therefore, it would be beneficial to use duty-bearers appointed by the abbot as manager of the crematorium (undertakers).

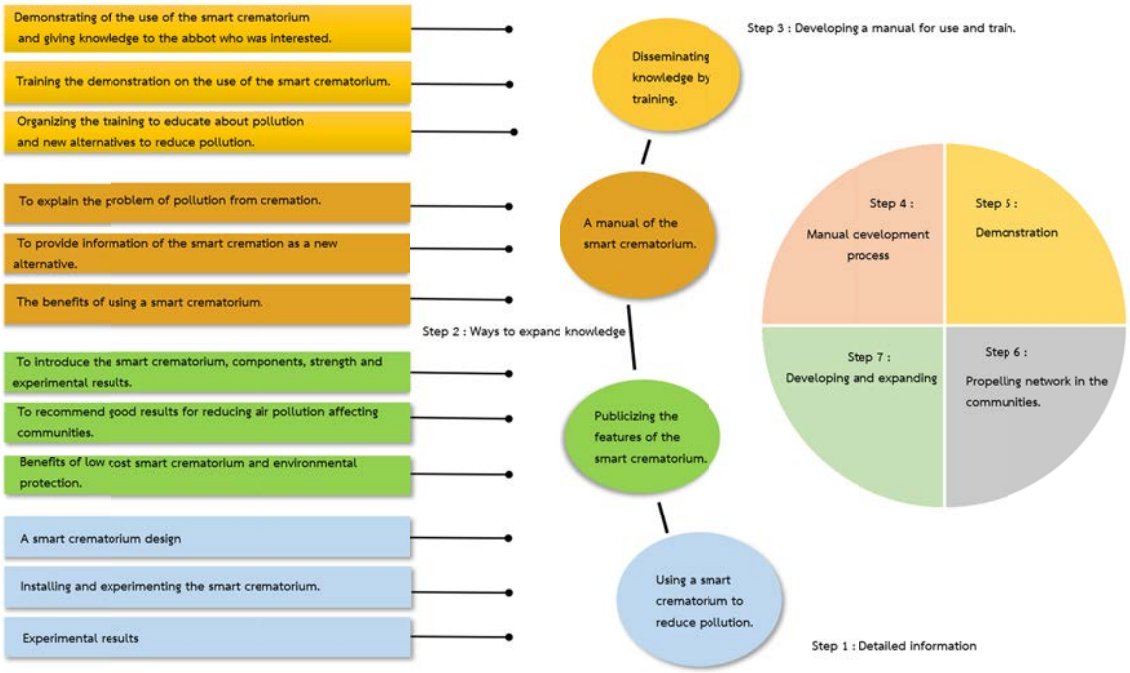

Figure 4. New knowledge from the research

7. Conclusion

Access to information on cremation ceremonies that were environmentally friendly but still maintained good Thai cultural traditions have changed behavior and created innovations. It was a mechanism to empower people in society by adjusting certain behaviors and beliefs but maintaining the correctness of the principle without destroying the old tradition, and opening a new way for people in society to use new environmentally friendly cremation technology, raising the standard of management of temples and crematorium management (undertaker). This was a key principle at the heart of stepping up to the standards of Thailand 4.0 with the smart crematorium and Vimutti substance sprayers. The technology was developed to manage the control or reduction of dioxins, furans, carbon monoxide gas, and sulfur dioxide gas.

Promotion and development of a learning model for crematorium managers (undertakers) have been promoted in knowledge development guidelines, practical skills from training, and the use of smart crematoriums and Vimutti substance sprayer. It was the innovation such as how to add the Vimutti substances into the collection of Vimutti substances, turning the air compressor onto a full tank before opening the valve. This allowed the undertakers to use the smart crematorium and the Vimutti substance sprayers by organizing training on dioxins and furans and organized training and demonstrations on how to use the smart crematorium and the Vimutti sprayer. The crematorium managers (undertakers) should be trained to use the operator according to the manual to be easy to use and work. The manual contained details about the pollution caused by cremation and emphasized the dangers of these toxins that came with innovative and environmentally friendly technology. Therefore, it was proposed as a new alternative to a pollution-free Thai society. It is an upgrade of the Buddhist way of life of the temple and the urban communities as a model for cremation.

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