

Research article

# DEVELOPMENT OF MIXED-MEDIA LEARNING ENVIRONMENTS ON GLOBAL WARMING FOR RURAL HOUSEHOLDS

Prachayakul Tulachom<sup>1</sup>, Boonlert Wongpho<sup>2</sup>, and Pairot Boajai<sup>3</sup>

<sup>1</sup>Ph.D. Candidacy Student

<sup>2,3</sup>Recturors at Department of Environment Education

Faculty of Education, Valaya Alongkorn Rajabhat University, Thailand

E-mail: [prachayakul\\_3p@hotmail.com](mailto:prachayakul_3p@hotmail.com)



OPEN ACCESS

This work is licensed under a [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by/4.0/).

---

## ABSTRACT

The purpose of this paper is to develop the mixed-media learning environment on Global Warming and analyse rural households' perceptions of their understanding, knowledge and attitudes to global warming investigated. A Questionnaire on Rural Household has to districted assess their understanding knowledge was used, and rural household' attitudes of their persistence was analyzed with a sample of 400 persons whose age were 15-60 years old and living in Wang Nam Yen and Klong Had Districts in Sa Kaeo Province, Thailand. The Krejcie and Morgan technique from 101,725 persons was selected using a random sample size with percentage, mean, standard deviation, t-test, and F-test were analyzed. It has found that the quality of the Mixed Medias on Global Warming for information education of people's satisfaction was to highest level that it confirmed with criterion; rural household's perceptions of their pre- and post- understanding knowledge to their studying on Mixed Medias were significantly different at the .05 confidence level, the pre- and post-persistence attitudes on Mixed Medias were significantly at level .05 confidence level, and their understanding related to environment issues at a high level of 78.20%. **Copyright © WJER, all rights reserved.**

**Key words:** Development, global warming, information education, mixed medias learning, rural households, Sa Kaeo province.

## INTRODUCTION:

Global warming is the observed century-scale rise in the average temperature of Earth's climate system (IPCC, 2013: 2). Since 1971, 90% of the increased energy has been stored in the oceans, mostly in the 0 to 700m region (IPCC, 2013: 6). Despite the oceans' dominant role in energy storage, the term "global warming" is also used to refer to increases in average temperature of the air and sea at Earth's surface (Riebeek, 2010). Since the early 20th century, the global air and sea surface temperature has increased about 0.8 °C (1.4 °F), with about two-thirds of the increase occurring since 1980 (The National Academies Press. 2011: 15). Each of the last three decades has been successively warmer at the Earth's surface than any preceding decade since 1850 (IPCC, 2013: 3).

Scientific understanding of the cause of global warming has been increasing. In its fourth assessment (AR4 2007) of the relevant scientific literature, the Intergovernmental Panel on Climate Change (IPCC) reported that scientists were more than 90% certain that most of global warming was being caused by increasing concentrations of greenhouse gases produced by human activities (National Research Council, 2010: 1). In 2010 that finding was recognized by the national science academies of all major industrialized nations (Kirby, 2001). Affirming these findings in 2013, the IPCC stated that the largest driver of global warming is carbon dioxide emissions from fossil fuel combustion, cement production, and land use changes such as deforestation (IPCC, 2013: 10). Its 2013 report states: Human influence has been detected in warming of the atmosphere and the ocean, in changes in the global water cycle, in reductions in snow and ice, in global mean sea level rise, and in changes in some climate extremes. This evidence for human influence has grown since AR4. It is extremely likely (95-100%) that human influence has been the dominant cause of the observed warming since the mid-20th century. - IPCC AR5 WG1 Summary for Policymakers (IPCC, 2013: 2).

Climate model projections were summarized in the 2013 Fifth Assessment Report (AR5) by the IPCC. They indicated that during the 21st century the global surface temperature is likely to rise a further 0.3 to 1.7 °C (0.5 to 3.1 °F) for their lowest emissions scenario using stringent mitigation and 2.6 to 4.8 °C (4.7 to 8.6 °F) for their highest (Stocker *et al.*, 2013). The ranges of these estimates arise from the use of models with differing sensitivity to greenhouse gas concentrations (Schneider, 2006).

Future climate change and associated impacts will vary from region to region around the globe (Parry., *et al.*, 2007). The effects of an increase in global temperature include a rise in sea levels and a change in the amount and pattern of precipitation, as well as a probable expansion of subtropical deserts (Jian, Gabriel, and Thomas, 2007). Warming is expected to be strongest in the Arctic, with the continuing retreat of glaciers, permafrost and sea ice. Other likely effects of the warming include more frequent extreme weather events including heat waves, droughts and heavy rainfall; ocean acidification and species extinctions due to shifting temperature regimes. Effects significant to humans include the threat to food security from decreasing crop yields and the loss of habitat from inundation (Battisti and Naylor, 2009).

Global warming is no longer a conspiratorial hoax, nor a phony threat created by some environmentalists with hidden agenda. In fact, this natural phenomenon is more real than what people could possibly imagine. Its existence and threats to mankind have been scientifically documented with concrete evidences, statistical data, and occurrences that should be sufficient enough to keep world citizens from ignoring the reality, while also

urging them to reflect on their actions. Though global warming and climate change are not entirely man-made, its negative repercussions have indeed become more accelerated and amplified due to overexploitation of natural resources and economic activities driven by mankind. Excessive greenhouse gases in the earth's atmosphere, species extinction, revival of wiped-out diseases, fluctuating length of seasons, coastal flooding, rapid sea level rise, unpredictable changes in meteorological conditions, and more severe and frequent storms are all clear indicators which should have reminded people that the threat from global warming is real and imminent. Over the past decade, Thailand has witnessed and suffered from a variety of natural disasters that were quite extreme in both dimension and consequences. Let alone the 2007 Asian Tsunami, the nation has also been plagued by recurring inundation caused by lengthy and heavy rain falls, intense drought, severe cold weather conditions, and declining quality and production of agricultural crops, etc. Thus, the Thai government has to seriously take these matters into account, either by implementing health and environmental policies or by cooperating with other nations and/or organizations in a mutual effort to confront the global warming. The city of Bangkok, on the other hand, also has been tackling the effects of global warming through specific approaches that would eventually become the most challenging task for both provincial and state authorities in the future (National News Bureau of Thailand, 2012).

The 2013 monsoon season (August 2013 - December 2013) is seeing large-scale flooding return to Indochina after a calmer 2012. Poverty stricken Cambodia has been hardest hit, with some 83 deaths so far. Also hit include Vietnam, Thailand, Laos, and Myanmar. Philippines have seen the annual typhoon related occurrences, which often pummel into Indochina. Flooding and/or related typhoon damage is an annual occurrence in all of Southeast Asia. However, deforestation, land subsidence, poor drainage, has exacerbated existing problems, while infrastructure development such as dams, drainage, and pumps has lessened it elsewhere. Despite a long history of devastation and little spread of news outside the region, more global attention has been paid to Southeast Asian flooding as it's become a manufacturing hub in the global supply chain and major tourist destination (Bangkok Post, 2013).

From July 2011 to January 2012, Thailand encountered the worst flooding in five decades. The floods killed over 800 people and left millions homeless or displaced. Over three quarters of Thailand's provinces were declared flood disaster zones, and the World Bank estimated that the economic loss exceeded \$45 billion. Thailand's government was unprepared for the longevity and severity of the floods, and many communities felt that the Flood Response Operation Center (FROC), which was established to coordinate emergency response and provide regular communications to the public, was inadequate (Nindang and Allen, 2012). While Thais are accustomed and well adapted to the annual flood season, the 2011 flooding crisis was the worst in five decades and caught the entire nation off guard. The floods actually began in northern Thailand in May and continued through mid-January, ultimately submerging 65 of Thailand's 77 provinces, including seven major industrial estates north of Bangkok, leaving 815 dead and 13.6 million affected. The World Bank ranked the flood emergency as the world's fourth most severe national disaster in terms of economic consequences (Winijkulchai, 2012)

One of the major problems in Thailand is drought. Drought has the most profound effect on environmental and socio-economic at local, regional and the whole country as well. Drought has lowered the water resources for drinking and irrigation as well as stressed vegetation including rice and other crops. There are also serious issues

of mental health due to prolonged dry and hot weather periods. For drought monitoring and planning, it is needed to improved knowledge of landscape temporal variations and interannual behavior at local to regional scales. Drought is one of the most serious problems in Thailand with far reaching environmental and socio-economic impacts on local as well as the whole country. It is important to improve knowledge of landscape temporal variations and inter-annual vegetation response to precipitation at local to regional scales for drought monitoring and planning. Overall, temporal profiles of rice, crops, and deciduous forest depicted dry-wet seasonal contrast strongly coupled with rainfall with a pronounced dry season from November to April and wet season from May to October. In contrast, the evergreen forest showed the lowest seasonal contrast and relationships with rainfall with green-up occurring during the dry season (Jan-Feb). Significant decreasing trends were found in the 6-year (2001-2006). However, the dominant land cover type, dry paddy rice, exhibited seasonal profiles with large spatial variations due to land use Management practices, which resulted in more complex rainfall-vegetation relationship. Therefore, it is suggested that land use practices be taken into account for drought assessment and that the use of other land cover types, i.e. dry land crops be considered (Ratana, 2012).

Heavy flooding in Eastern Thailand, especially in Sa Kaeo, Prachin Buri, Chon Buri Provinces. Despite government assurances after the 2011 disaster, flooding has shutdown two factories at an Amata estate. As of Oct 9th, 28 out of 77 Thai provinces and 39 people have been killed, but health ministry puts at 51, with more than 3 million people affected since July (Asia News, 2013). Sa Kaeo is a province of Thailand. It is located in the east of Thailand, neighboring provinces of Cambodia. Sa Kaeo became a province in 1993, when the six districts Sa Kaeo, Khlong Hat, Wang Nam Yen, Aranya Prathet, Ta Phraya and Watthana Nakhon of Prajin Buri were elevated to provincial status. It is thus one of the four youngest provinces of Thailand; in 1979 Sa Kaeo Refugee Camp was established to the northwest of Sa Kaeo town. The north of the province is covered with the forested mountains of the Sankamphaeng range and the Dangrek Mountains. To the south are foothill plains and foothills of the Cardamorn Mountains, which are mostly deforested. Sa Kaeo is subdivided into 9 districts. The districts are further subdivided into 59 subdistricts and 619 villages; the 9 districts, namely; Mueng Sakaao, Khlong Hat, Ta Phraya, Wang Nam Yen, Wattanakorn, Aranyaprathet, Khao Chakan, Khok Sung, and Wang Sombun. Weather in Sa Kaeo is heavy rain and about 28+ degrees, average per year. SA KAEO - Aranyaprathet district has been devastated by floods and water levels in the Cambodia border town look set to rise, after a fresh alert from the Natural Disaster (Wikipedia, the free encyclopedia, 2014).

Development may refer to: work aiming to increase knowledge for the practices and academic disciplines to improve various aspects of local communities (Wikipedia, the free encyclopedia, 2014). Development is the systematic use of scientific and technical knowledge meet specific objective or requirements; an extension of the theoretical or practical aspects of a concept, design, discovery or invention; the process of economic and social transformation that is based on complex cultural and environmental factors and their interactions (Business Dictionary, 2014). In this study, development is a significant event, occurrence, or change; a group of dwellings built by the same contractor, and Determination of the best techniques for applying a new device or process to production of goods or services for developing mixed medias process to investigate the rural household perceptions of their understanding knowledge and their attitudes to their Global Warming in Sa Kaeo province in Thailand.

A disaster is a serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources. In contemporary academia, disasters are seen as the consequence of inappropriately managed risk. These risks are the product of a combination of both hazards of flood/drought and vulnerability. Hazards that strike in areas with low vulnerability will never become disasters, as is the case in uninhabited regions.<sup>[1]</sup>

Developing countries suffer the greatest costs when a disaster hits – more than 95 percent of all deaths caused by hazards occur in developing countries, and losses due to natural hazards are 20 times greater in developing countries than in industrialized countries, Focus in Sa Kaeo province in Thailand, the Thai Meteorological Department has reported the rain fall data in the last five was decreased, continually, in the other hand, the temperature was higher than in each year. This reason is affecting of the people and others (see in Table 1).

Table 1: Shows antecedent rainfall in last 5 years ago in Sa Kaeo Province.

Years	Antecedent rainfall (mm.)	Average rainfall means (mm.)
2008	133.53	4.38
2009	108.34	3.55
2010	123.25	4.03
2011	159.30	5.24
2012	132.39	4.35

Source: Thai Meteorological Department (2013).

Climate change is a change in the statistical distribution of weather patterns when that change lasts for an extended period of time (i.e., decades to millions of years). Climate change may refer to a change in average weather conditions, or in the time variation of weather around longer-term average conditions (i.e., more or fewer extreme weather events). Climate change is caused by factors such as biotic processes, variations in solar radiation received by Earth. Certain human activities have also been identified as significant causes of recent climate change, often referred to as “global warming” (IPCC, 2013: pp 21). Climatologically temperatures substantially affect precipitation. For instance, during the five years ago, thermal-driven evaporation from the Sa Kaeo region onto landmasses was low, causing large areas of extreme temperature, including droughty, in contrast, the Sa Kaew's climate was wetter than today near the start of the warm, flexibility. This effect from situation is shown in Table 2.

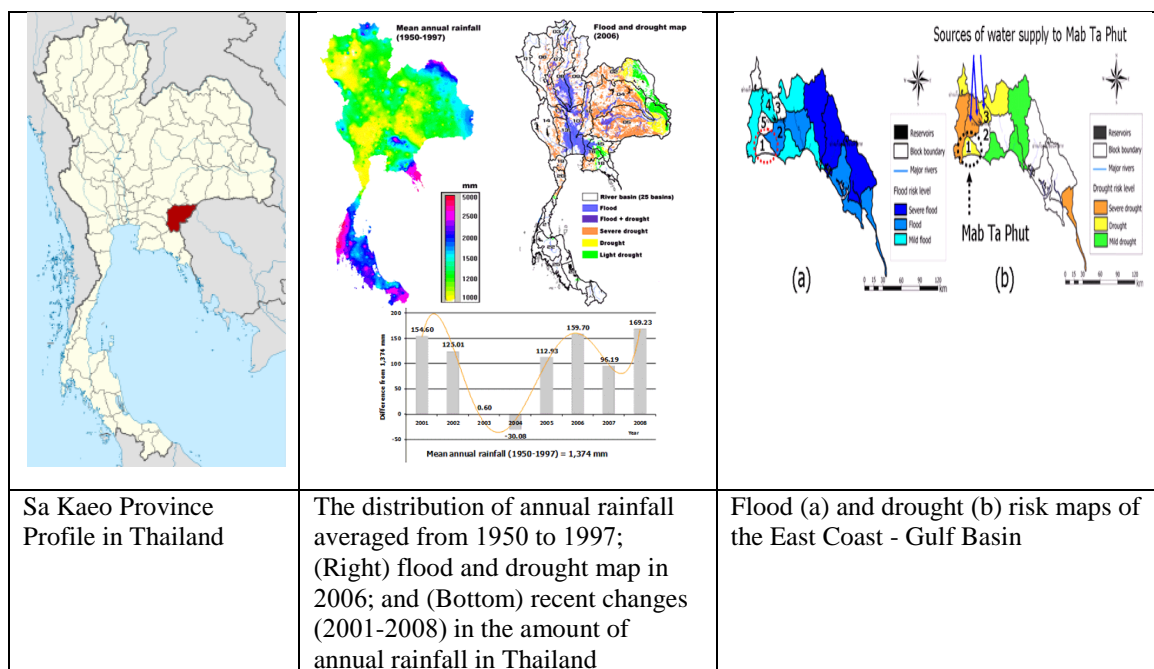
Table 2: Affecting drought natural disaster in Sa Kaeo Province region in 2011.

Sequence Number	Drought Areas			Household families' disaster	
	District	Number of Sub districts	Number of Villages	Number of households	Number of population
1	Mueng Sa Kaeo	8	129	11,967	42,817
2	Aranyaprophet	12	114	19,000	65,000
3	Ta Praya	5	64	9,703	41,435
4	Wattana Nakorn	11	115	20,785	74,300
5	Wang Nam Yen	4	48	14,313	51,729
6	Klong Hat	7	71	1,178	3,480
7	Khoachakan	4	71	3,486	12,908
8	Khoksung	4	41	8,349	25,877
9	Wangsombun	3	48	11,713	35,578
	Total	58	701	100,494	353,124

Source: The National Disaster Warning Centre (2013)

In the other hand, The National Disaster Warning Centre has warned the people in Chanthaburi, Prajinburi, Sa Kaeo, and Trat provinces of eastern Thailand to prepare for heavy rains over next few days. Disaster Warning Centre expects flash floods and mudslides from July 17-19, 2013 in the mentioned regions. People near hillsides and waterways are said to be more vulnerable to the coming natural calamities. Thai Meteorological Department has predicted scattered to fairly widespread thundershowers and isolated heavy rain from Jul 16, 2013 to Jul 22, 2013. Below are 7-day weather forecast charts for Chanthaburi, Prajinburi, Sa Kaeo, and Trad (Thai Meteorological Department, 2013).

This issue highlights the importance of risk management for water security, not only in Rayong, Chantaburi, Trat, Sa Kaeo, and Chonburi but also in the greater region. By conducting a risk assessment for the East Coast - Gulf Basin using the water balance and scenario analysis (HAIL, 2008-b), to be able to create flood and drought risk maps (Figure 1). In this case, the Mab Ta Phut area typically has a risk of drought whereas two out of three areas (areas 3, 4 and 5 in Figure 1) supplying water to Mab Ta Phut have a severe drought risk and one of them also has a risk of flooding and exploring to the eastern region. Therefore, policy makers are advised that area 4, which has both flood and drought issues, should have the highest priority for management. Thus, the potential severity of drought and flood threats in individual sub-basins can be determined and local measures suggested, based on the magnitude of the severity in eastern region, especially in Sa Kaeo province area.



Source: Chitradon, Boonya-aroonnet, and Thanapakpawin (2013).

This research has been seeking the natural disaster affects different aspects of people living. There are multiple of effects of natural disasters. It affects almost every part of their life, like social, emotional, economic, physical, environmental and many others. Natural disasters strike suddenly and leave behind lives shattered by physical injury or the loss of home and job. These conditions may severely affect the emotion of the people. Natural disasters like flood, drought, tsunami and landslide may cause huge loss of wealth and bring financial problems. Likewise, the natural disaster may lead to catastrophic effects on the environment as many toxic materials such

as paint, pesticide and gasoline can be released into the rivers due to flood and drought. Moreover, this study can describe the effects of natural disasters on different heads, like: Physical destruction, economic loss, environmental problems, emotional concerns, remembers the effects of natural disasters are also varying from immediate to long term. Some of the effects are immediate where as some other effects have persistence long term impacts. If people who have got the understanding knowledge and learning this disaster effects with the mixed-based medias learning environment and there is a unit of association to manage the knowledge and they are able to know and understand of these effects, this situation will prepare to protect their life or aster and others, immediately, this research has been seeking for them.

Normally, the mixed Medias, in visual art, refer to an artwork in the making of which more than one medium has been employed. There is an important distinction between "mixed-media" artworks and "multimedia art". Mixed media tends to refer to a work of visual art that combines various traditionally distinct visual art media. For example, a work on canvas that combines paint, ink, and collage could properly be called a "mixed media" work, but not a work of "multimedia art." The term multimedia art implies a broader scope than mixed media, combining visual art with non-visual elements (such as recorded sound, for example) or with elements of the other arts (such as literature, drama, dance, motion graphics, music, or interactivity). When creating a painted or photographed work using mixed media it is important to choose the layers carefully and allow enough drying time between the layers to ensure the final work will have structural integrity. If many different media are used it is equally important to choose a sturdy foundation upon which the different layers are imposed. A phrase sometimes used in relationship to mixed media is, "Fat over lean." In other words: "don't start with oil paints. Plan to make them the final layer." Many effects can be achieved by using mixed media. Found objects can be used in conjunction with traditional artist media to attain a wide range of self-expression.

In this study, Seeking to guide successful introduction of technology into non-school system, scholars of education have computer design principles for engaging learners interest and supporting content learning. This research study focuses on designs in which rural households to understanding knowledge, attitudes, and durability perceptions of their information educational learning system on technology media and materials to create artifacts on Global warming situation which their taught and acknowledgement in their daily life. Taking the data, data based, number, graphic design, soundtrack visual, and video tape to mixed Medias with the computer technology program. The term 'mixed-media' is intended as distinct from 'multimedia,' which has come to mean audiovisual artifacts, such as presentations, interactive CD-ROMs, or websites to develop of this program format and content of global warming topic for rural household families' study, completely in term of non educational system; information education for being built modern technology to their study whose they were able to learn on free time, which have designed mixed-media curriculum for global warming lessons in rural household families in Sa Kaeo province in Thailand. Learners are interested and understood to have extra attitudes on global warming that it has been changed the attitudes and understanding knowledge to their high adapting behaviors, enhancement exactly. In collaborative and interactive situations, learners in non classroom could gradually develop the ability to look at background events from various viewpoints. Through experiments, researchers have demonstrated that learners could think about day-to-day situations to discover, to understand, to reconstruct, and finally to create new relationships between daily events of global warming situation.

## **METHODOLOGY**

### **Research Objectives**

1. To develop the mixed-medias to support the learning environment on global warming for rural households with an information education in Sa Kaeo province in Thailand.
2. To investigate the pre- and post rural households' perceptions of their understanding knowledge on global warming effects with an information education managements.
3. To assess the pre- and post rural households' attitudes of their global warming effects with an information education managements.
4. To describe the pre- and post rural households' durability of their attitudes and understanding knowledge on global warming effects with information education managements.

### **Research Limitations**

This research has limited of the frame study with the research on environmental education principles, content of global warming situation and effects, Bloom's taxonomy, advertising Medias, learning on environmental education processes, theory communication of Berlo, typing data passing to mixed Medias, the description of Albert Arnold "Al" Gore Jr, Vice President of U.S.A. used to campaign on global warming, and the senior professional environment, which to exemplify for developing the mixed-medias to manage of leering environment in terms of the information education for rural households in Sa Kaeo province in Thailand that it has been composted with four contents, namely; the fundamental knowledge of global warming, problems of global warming effects, the affecting global warming, and the protecting and relieving effects from global warming in 12 months, planning consequently.

### **Sample Sizes**

This study was administered in a randomly selected sample of 400 rural household population with the Krejcie & Morgan sampling technique for planning the new mixed medias learning environment from 101,725 persons whose age were between 15 – 60 years old and live in Wang Nam Yen, Klong Hat, and Ta Praya districts, Sa Kaeo Province in Thailand.

### **Research Instruments**

Researcher has designed the research instruments, which was detailed in Figure 2.

1. Mixed Medias Information Technology model for supporting learners' understanding knowledge.
2. Environmental education lesson plans on global warming with the information education.
3. Assessing quality of the mixed Medias questionnaire in four scales, namely; Utility standard, Feasibility standard, Propriety standard, and Accuracy standard scales with the 5-Rating scale (Almost,..., Never).
4. The questionnaires for rural households' perception of their understanding knowledge to their attitude and durability on global warming situations and effects with the 5-Rating scale (Almost,..., Never).



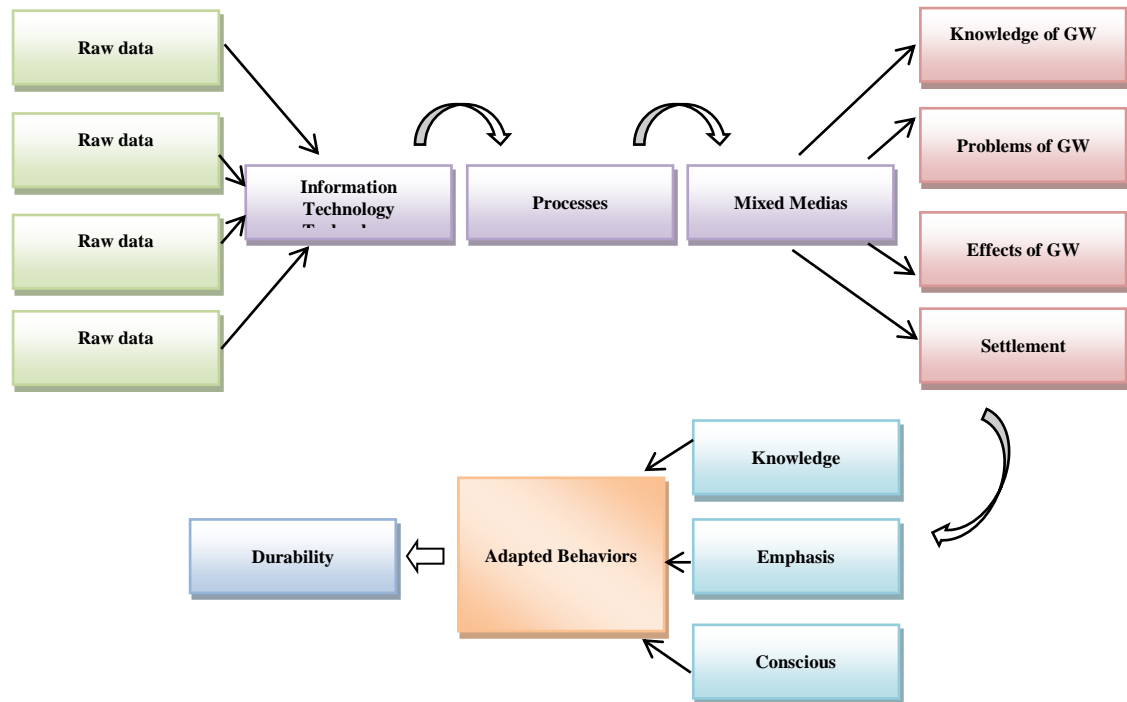


Figure 2: Shows significantly model for planning steps of research instruments.

## RESULTS

The results of this study are to investigate of development of the mixed Medias learning environment on global warming effects and problems to protect and understand of next natural disaster that it ought to cause from global warming to their region with the 4 phases of this research.

### Phase I: The Quality of Mixed Medias Learning Environment on Global Warming for Rural Household Memberships.

In terms of the quality of mixed medias learning environment on global warming for rural household memberships which it contained in the CD-ROMs on the 4 scales, namely: the content and administration of this curriculum; pictures, language, and sound; mixed medias, and overall of using this mixed medias for information educational properties. The 7 scales of this section, namely; confirmation of content followed as the research purposes, content accuracy, content satisfaction, content explanation cleanness, containing content quality, and content suitability of the sample size, which it has found that overall of the 7 scales are highest level; content satisfaction of the sample size, and content accuracy ( $\bar{X}=5.00$ , S.D.=.00), content suitability, content and administration ( $\bar{X}=4.80$ , S.D.=.44), and content explanation cleanness is the lowest means score ( $\bar{X}=4.60$ , S.D.=.44), consequently.

Focused on quality of the pictures, language, and sound were assessed on the 10 scales of language accuracy, pictures confirmation with soundstages, meaning cleanness and suitability, confirmations between pictures and contents quality, amount pictures composed of contents, suitability be composed of graphic designs, suitability be composed of picture movement, quality of soundstage, music accompany, and mixed medias attractive. It has found that overall of these 10 scales are too highest level of rural households' responses ( $\bar{X} > 4.60$ ).

Interestingly, the quality of the mixed Medias on the 4 scales of the suitability of monitor design to simply of use, the alphabet size and color to suitability for learners, suitability and cleanness of graphic pictures, and creative design on inventing pictures scales. This result has indicated that overall of the 4 scales of the quality of the mixed medias are too highest levels ( $\bar{X} > 4.60$ ).

## Phase II: Background of Rural Households' Volunteers.

Rural households' perceptions of their understanding knowledge and their attitudes to their durability of global warming effects and problems in the 4 scales of the personal individual status, the outcomes of their understanding knowledge, their attitudes, and their durability of these learning environments. However, this paper is reporting the background of the volunteers of rural household's leaders and memberships of sample size whose sex was 195 males and 205 females, the average age mean score is 36 years old, the most educational quality of sample size is secondary education (40%), and the most occupation is agriculturist (41%).

## Phase III: Pre- and Post- Assessment Tests of Rural Households' Perceptions to their Understanding Knowledge on Global Warming

Rural households' perceptions were analyzed with the pre- and post- assessments and testing of their understanding knowledge, their attitudes, and their durability on the global warming learning environment from the CD-ROMs with the information educational system. Rural households have been responded of their assessments on the 4 scales of the 40-Items Assessing Test, namely; the foundational understanding knowledge on global warming, the problems of their understanding knowledge on global warming, the effects of their understanding knowledge on global warming, and the protections and relieves on the effects of global warming scales, each scale composed with the 10-Items tests.

Table 3: Scales Means and Standard Deviations for the Rural Households' Responses Correctly of the Assessing Test to their Understanding Knowledge on Global Warming.

Testing Scales on Global Warming	Means		Standard Deviation		Mean Diff.	t-value
	Pre-test	Post-test	Pre-test	Post-test		
The foundational understanding knowledge.	43.37	82.17	0.77	0.58	38.80*	1.57*
The problems of their understanding knowledge.	43.87	78.72	0.67	0.52	34.85*	1.62*
The effects of their understanding knowledge.	47.30	75.82	0.76	0.55	28.52*	1.87*
The protections and relieves on the effects.	53.38	80.72	0.77	0.57	27.34*	1.69*
Mean score average (100%)	46.98	79.35	0.77	0.56	32.37*	1.66*

N = 400,  $\rho < 0.05$

Statistical analyses including information about each scale's mean scores, standard deviations, mean differences, and comparisons of means by t-tests are presented. The results in this study details in Table 3.

The pre- and post- assessment tests of 400 persons of their mixed Medias learning environments to their understanding knowledge on global warming were also using the assessment tests for each scale: the learning environments of information education of rural household mean scores, correctly, the standard deviations and the t-test results for statistical significance. The scale means ranged from 43.37 to 53.38 (total score is 100) on the pre-assessment test, and from 75.82 to 82.17 on the post-assessment test. Standard deviations for the pre-assessment test ranged from 0.67 to 0.77 and 0.52 to 0.58 for the post-assessment test. Rural households' responses tended to be greater than what their post-assessment tests whereas compared with the pre-assessment test. The t-values were indicated that the post- and pre-assessment tests were differentiated of statistically significant at level 0.05.

#### **Phase IV: Pre- and Post- Attitude Questionnaire to Assess Rural Households' Perceptions to their Understanding Knowledge on Global Warming**

This section presents a comparison between pre- and post- volunteers from rural households' perceptions of their attitudes in mixed Medias technology learning environments with the information educational system on global warming curriculum which it was invented by researcher. Using the 20 items of the pre- and post- attitude questionnaire to assess of the rural households' perceptions with a sample size of 400 volunteers on 4 scales, each scale was composed with the 5-item questions, namely; the foundational understanding knowledge, the problems, the effects, and the protections and relieves on the effects of global warming scales. The understanding knowledge on global warming in information educational system of volunteers with their attitudes to their learning environments is also discussed. Statistical analyses including information about each scale's mean scores, standard deviations, mean differences, and comparisons of means by t-tests are presented. The results in this study details in Table 4.

Table 4: Scales Means, Standard Deviations and t-test Value for the Rural Households' Perceptions of their Pre- and Post Attitude Questionnaire to their Understanding Knowledge on Global Warming.

Attitude Scales on Global Warming	Means		Standard Deviation		Mean Diff.	t-value
	Pre-test	Post-test	Pre-test	Post-test		
The foundational understanding knowledge.	2.69	3.58	0.65	0.60	0.89*	1.57*
The problems of their understanding knowledge.	2.90	3.99	0.69	0.50	1.09*	1.71*
The effects of their understanding knowledge.	2.86	4.40	0.85	0.59	1.54*	1.82*
The protections and relieves on the effects.	2.89	4.61	0.82	0.50	1.72*	1.97*
Mean score average (1.00-5.00)	2.83	4.14	0.75	0.55	1.31*	1.76*

N = 400,  $\rho < 0.05$

The pre- and post- attitude questionnaires of 400 volunteers who were the rural households of their mixed Medias learning environments to their attitudes of their understanding knowledge on global warming were also using the 4-attitude scales for each scale in the learning environments with information education of attitude

mean scores (minimum 1 and maximum 5), the standard deviations and the t-test results for statistical significance. The scale means ranged from 2.69 to 2.90 on the pre- attitude assessment, and from 3.58 to 4.61 on the post- attitude assessment. Standard deviations for the pre-assessment test ranged from 0.65 to 0.85 and 0.50 to 0.60 for the post- attitude assessment. Rural households' perceptions tended to be greater than what their post-assessment tests whereas compared with the pre-assessment test. The t-values were indicated that the post- and pre- attitude assessments were differentiated as statistically significant at level 0.05.

Overall of this study, in Table 1 and Table 2 reveal the mean differences between the rural households' responses to the pre- and post – assessing tests of their understanding knowledge and their attitudes to their pre- and post attitude assessments of their learning environment with their information education for using the mixed Medias which it was invented and file conversion to CD-ROMs multimedia to their foundational global warming. In most cast, the finding also indicates that rural households would prefer the post assessments and perceptions are higher scores than the pre- assessments and attitudes scores which reveal that the differences between the pre- and post- assessments of their testing and perceptions of their attitudes to the mixed Medias of their understanding knowledge with their information education on global warming were statistically significant at the 0.05 level for all of the four scales.

## **DISCUSSIONS**

The results of this study showed statistically significant differences between the 400-Volunteers learners who were rural households' testing and perceptions in Karasin province in Thailand of four scales of the pre- and post- foundational understanding knowledge to their attitudes on global warming effects, problems of their knowledge, and the protections and relieves on the effects with the mixed Medias of the global warming CDRoms multimedia were assessed. However, there are a number of widely held misconceptions about climate change, and unfortunately, these are reflected in some of the educational materials available on the mixed medias. It is therefore crucial for researcher to educate him and these learners with accurate information and be careful not to reinforce common but incorrect notions. The following primer is a good place to begin. Normally, everybody who understands on global warming is caused primarily by carbon dioxide from burning coal, oil and gas.

Certain gases that trap heat are building up in Earth's atmosphere. The primary culprit is carbon dioxide, released from burning coal, oil and natural gas in power plants, cars, factories, etc. (and to a lesser extent when forests are cleared). The second is methane, released from rice paddies, both ends of cows, rotting garbage in landfills, mining operations, and gas pipelines. Third are chlorofluorocarbons (CFCs) and similar chemicals, which are also implicated in the separate problem of ozone depletion. Nitrous oxide (from fertilizers and other chemicals) is fourth. These causes are changed to understand of this knowledge for the volunteers on new situation after they have studied with the CD-ROMs mixed Medias learning environment on global warming, successfully.

There are the promotions and campaigns which past the Medias from scientific consensus that global warming is real, is caused by human activities, and presents serious challenges. Research has tried to indicate that scientists working on this issue report that the observed global warming cannot be explained by natural variations such as changes in the sun's output or volcanic eruptions for volunteers' understanding knowledge.

Therefore, the most authoritative source of information is the UN Intergovernmental Panel on Climate Change (IPCC, 2013) which draws upon the collective wisdom of many hundreds of scientists from around the world. The IPCC projects global temperature increases of 3 to 10 degrees F in the next 100 years and says that human activity is the cause of most of the observed and projected warming (National Science Teachers Association, 2013), which these situations are contained knowledge and their attitudes of global warming effects and determinants to their daily life that these detail in Table 1 and 2.

Interestingly, this field study on environment education is an essential element of the global response to climate change. It helps people (especially, people who live in the third world countries) understand and address the impact of global warming, encourages changes in their attitudes and behaviour and helps them adapt to climate change-related trends that this study has found that through it has reported of Climate Change Education for sustainable Development programme, UNESCO aims to make climate change education a more central and visible part of the international response to climate change. The programme aims to help people understand the impact of global warming today and increase "climate literacy" among people. It does this by strengthening the capacity of its Member States to provide quality climate change education; encouraging innovative teaching approaches to integrate climate change education in school or non school systems and by raising awareness about climate change as well as enhancing non-formal education programmes through mixed media, networking and partnerships (UNESCO Office in Kathmandu, 2013) to enhance understanding knowledge for people on global warming effects and ought to study with their information education on their freedoms and needs.

## **SUGGESTIONS**

The results in this study, the development mixed medias learning environmental education on global warming curriculum for volunteers who are the rural households with their information education system by the CD-ROMs in Sa Kaeo province, their pre- and post- understanding knowledge on global warming was tested and their pre- and post attitudes' perceptions on global warming were assessed, and it has found that the indications of their understanding knowledge and their attitudes were greater from post-actual than pre-actual, significantly. The modern lifestyle age propelled the economies of the present-day developed countries forward and gave rise to unprecedented improvements in the standard of living for much of mankind. It also gave birth to environmental pollution as they ought to know it today, beginning a slow but accelerating transformation of the Earth's surface and atmosphere. Meeting the ever-increasing appetite for goods and services of the modern lifestyle continues to require extensive use of a seemingly infinite natural resource base. The challenge imposed on the mother land to provide the necessary raw materials, energy, and waste disposal processes for mankind's production and consumption has had many consequences for the health of ecosystems around the globe.

The shelter, in precipitation patterns leading to extended droughts or flooding, and more frequent extreme weather events are just some of the effects of global warming and changes to the global climate. The human toll in lost lives and livelihoods is mounting; particularly in Northeastern and the Eastern regions in Thailand and other countries will remain unaffected, thus making it clear that climate change mitigation and adaptation necessary to address one of the greatest challenges faced by the world today and people ought to learn in this situation, clothing, nourishment, mobility and other lifestyle components that make up humanity's basic needs and increasing 'Western-style' consumption impose a significant impact on the environment, particularly as the Earth's population increases. Of the many problems generated by the economic and global energy progress,

climate change is one that dominates media headlines in recent memory. The current warming trend of the effects of atmosphere that started with the global energy revolution has given scientists, politicians, and individuals people around the world cause for great concern, this research study has indicated the process for enhancing people to learn of their understanding knowledge and have a good attitude for durability and sustainable development with their information education on global warming forever.

## REFERENCES

- [1] America's Climate Choices, Washington, D.C. (2011). *The National Academies Press*. ISBN 978-0-309-14585-5. "The average temperature of the Earth's surface increased by about 1.4 °F (0.8 °C) over the past 100 years, with about 1.0 °F (0.6 °C) of this warming occurring over just the past three decades." Retrieved from [http://en.wikipedia.org/wiki/Global\\_warming](http://en.wikipedia.org/wiki/Global_warming).
- [2] Asia News. (2013). *South East Asia news*: AsiaOne. News.asiaone.com. Retrieved 2013-10-23 from [http://en.wikipedia.org/wiki/2013\\_Southeast\\_Asian\\_floods](http://en.wikipedia.org/wiki/2013_Southeast_Asian_floods).
- [3] Bangkok Post. (2013). *Death toll from floods rises to 73*. Bangkok Post. -10-19. Retrieved 2013-10-23.. Bangkok Post. 2013-10-19. Retrieved 2013-10-23. [http://en.wikipedia.org/wiki/2013\\_Southeast\\_Asian\\_floods](http://en.wikipedia.org/wiki/2013_Southeast_Asian_floods).
- [4] Battisti, D. and Naylor, N. (2009). Historical warmings of future food insecurity with unprecedented seasonal heat. *Science* 323 (5911): 240–4. Retrieved 13 April 2012.
- [5] Business Dictionary. (2014). *What is development?* Retrieved from <http://www.businessdictionary.com/definition/development.html>.
- [6] Chitradon, R., Boonya-aroonnet, S., and Thanapakpawin, P. (2013). *Risk management of water resources in Thailand in the face of climate change*. Retrieved from [http://www.haii.or.th/wiki/index.php/Risk\\_Management\\_of\\_Water\\_Resources\\_in\\_Thailand\\_in\\_the\\_Face\\_of\\_Climate\\_Change](http://www.haii.or.th/wiki/index.php/Risk_Management_of_Water_Resources_in_Thailand_in_the_Face_of_Climate_Change).
- [7] HAI (Hydro and Agro Informatics Institute), 2008-b: Study of the National Water Policy Framework, Parliament House, Thailand. Retrieved from [http://www.haii.or.th/haiiweb/index.php?option=com\\_content&task=view&id=94&Itemid=95&lang=th\\_TH#](http://www.haii.or.th/haiiweb/index.php?option=com_content&task=view&id=94&Itemid=95&lang=th_TH#).
- [8] IPCC. (2013). *Ocean warming dominates the increase in energy stored in the climate system, accounting for more than 90% of the energy accumulated between 1971 and 2010*. IPCC, Climate Change 2013: The Physical Science Basis - Summary for Policymakers, Observed Changes in the Climate System. In IPCC WG1 2013. Retrieved from [http://en.wikipedia.org/wiki/Global\\_warming](http://en.wikipedia.org/wiki/Global_warming).
- [9] Kirby, A. (2001). Science academies back Kyoto. *BBC News*. Retrieved 27 July 2011 from [http://en.wikipedia.org/wiki/Global\\_warming](http://en.wikipedia.org/wiki/Global_warming).
- [10] Lu, J., Vechhi, G. A. and Reichler, T. (2007). Expansion of the Hadley cell under global warming (PDF). *Geophysical Research Letters* 34 (6): L06805.
- [11] Meehl, G. A. and Stocker, T. F. (2007). *Chapter 10: Global climate projections. Selection 10.5: Quantifying the range of climate change in IPCC AR4 WG4 WG1 2007*. Retrieved from [http://en.wikipedia.org/wiki/Global\\_warming](http://en.wikipedia.org/wiki/Global_warming).

- [12] National News Bureau of Thailand. (2012). *Global warming in Thailand*. Retrieved from <http://nntworld.prd.go.th/newsenglish/global/index.html>.
- [13] National Science Teachers Association. (2013). *Teachers' guide to high quality educational materials on climate change and global warming*. Retrieved from <http://hdgc.epp.cmu.edu/teachersguide/teachersguide.htm>.
- [14] Nindang, S. and Allen, T. (2012). *Ahead of flood season, Thailand's communities demand greater preparedness*. Retrieved from <http://asiafoundation.org/in-asia/tag/thailand-floods/>.
- [15] Parry, M. L., and Palutikof, J. P. (2007). *Technical summary*. Box TS. 6. The main projected impacts for regions missing or empty title in IPCC AR4 WG2 2007: pp. 59 – 63. Retrieved from [http://en.wikipedia.org/wiki/Global\\_warming](http://en.wikipedia.org/wiki/Global_warming).
- [16] Rattana, P. (2012). *Recent drought in Northeast Thailand: Case study using model time series*. Retrieved from [http://gecnet.kku.ac.th/research/i\\_proceed/2550/2\\_Recent\\_Drought.pdf](http://gecnet.kku.ac.th/research/i_proceed/2550/2_Recent_Drought.pdf).
- [17] Riebeek, H. (2010). *Global warming: Feature articles*. Earth Observatory, part of the EOS Project Science Office located at NASA Goddard Space Flight Center. "Global warming is the unusually rapid increase in Earth's average surface temperature over the past century primarily due to the greenhouse gases released as people burn fossil fuels." Retrieved from [http://en.wikipedia.org/wiki/Global\\_warming](http://en.wikipedia.org/wiki/Global_warming).
- [18] Schneider, von, D, T. and Held, G, R. (2006). Climate sensitivity estimated from ensemble simulations of glacial climate. *Climate Dynamics* **27** (2–3): pp. 149.
- [19] Solomon, S., Qin, D. and Manning, M. (2007). *Technical summary*. Section TS. 5.3: Regional-scale projections in IPCC AR4 WG1 2007: pp. 49 – 58.  
[http://en.wikipedia.org/wiki/Global\\_warming](http://en.wikipedia.org/wiki/Global_warming).
- [20] Stocker, T. F., Qin, D., Plattner, G. K., Alexander, L. V. (2013). *Technical summary* in IPCC AR5 WG1 2013. National Aeronautics and Space Administration Goddard Institute for Space Studies. Retrieved from [http://en.wikipedia.org/wiki/Global\\_warming](http://en.wikipedia.org/wiki/Global_warming).
- [21] Thai Meteorological Department. (2013). *Natural disaster in Thailand 2013*. Retrieved from <http://www.disaster-report.com/2013/02/natural-disasters-in-thailand-2013.html>.
- [22] The National Disaster Warning Centre. (2013). *Natural disaster in Thailand*. Retrieved from [http://www.ldeo.columbia.edu/chrr/research/profiles/pdfs/thailand\\_profile1.pdf](http://www.ldeo.columbia.edu/chrr/research/profiles/pdfs/thailand_profile1.pdf).
- [23] UNESCO Office in Kathmandu, 2013). *Workshop for Climate Change Education stakeholders: mapping report indicates the need for improved coordination*. Retrieved from [http://www.unesco.org/new/en/kathmandu/about-this-office/singleview/news/workshop\\_for\\_climate\\_change\\_education\\_stakeholders\\_mapping\\_report\\_indicates\\_the\\_need\\_for\\_improved\\_coordination-1/#.U9DA87HFIZ9](http://www.unesco.org/new/en/kathmandu/about-this-office/singleview/news/workshop_for_climate_change_education_stakeholders_mapping_report_indicates_the_need_for_improved_coordination-1/#.U9DA87HFIZ9).
- [24] Wikipedia, the free encyclopedia. (2014). *Development*. Retrieved from <http://en.wikipedia.org/wiki/Development>.
- [25] Wikipedia, the free encyclopedia. (2014). *Sa Kaeo province*. Retrieved from [http://en.wikipedia.org/wiki/Sa\\_Kaeo\\_Province](http://en.wikipedia.org/wiki/Sa_Kaeo_Province)
- [26] Winijkulchai, A. (2012). Thailand's 2011: *Flood crisis reveals potential of technology and social media in disaster response*. <http://asiafoundation.org/in-asia/tag/thailand-floods/>.