Causal Relationship Model of Water Conservation Behavior

Chalermsak Udonboon

Department of Environmental Education
Faculty of Environment and Resource Studies
Mahasarakham University, Mahasarakham 44150, Thailand

Nongnapas Thiengkamol

Major Advisor, Department of Environmental Education
Faculty of Environment and Resource Studies
Mahasarakham University, Mahasarakham 44150, Thailand

Chatchai Thiengkamol

Co- Advisor, Director of Research In Motion Co., Ltd.
Bangkok 10900, Thailand

Abstract: The populations were 18,463 upper secondary school students from school under Secondary Service Area Office 24 (Kalasin), Northeastern region of Thailand in academic year of 2012. The with Multi-stage random sampling technique was employed to collect the sample for 400 upper secondary school students. The research instrument was the questionnaire and it was used for data collecting. LISREL was used for model verification. The objective of this study was to develop a causal relationship model of water conservation behavior of upper secondary school student. Considering on structural model confirmatory factors of Psychological Trait (PsT), Psychological State (PsS), Environmental Knowledge (EK) and Environmental Education (EE) were able to explain the variation of endogenous factors of Inspiration of Public Consciousness (INS) to caused Water Conservation Behaviors (BEH) with 60.00 percents. As a result, the equation 1 can be written as following.

$$BEH = 0.96*INS + 0.28*EK + 0.052*PsS - 0.14*PsT - 0.11*EE \ldots\ldots\ldots(1)$$
$$R^2 = 0.60$$

Equation (1) factors that had the most effect to Water Conservation Behaviors (BEH) was Inspiration of Public Consciousness (INS) and subsequences were Environmental Knowledge (EK) and Psychological State (PsS) but Psychological Trait (PsT) and Environmental Education (EE) with negative direction, these were able to explained the variation of Water Conservation Behaviors (BEH)with 60.00 percents. Moreover, confirmatory factors of Psychological Trait (PsT), Psychological State (PsS), Environmental Knowledge (EK) and Environmental Education (EE) were able to explain the variation of confirmatory factors of Inspiration of Public Consciousness (INS with 86.00 percents. Therefore, the equation can be written as following equation 2.

$$INS = 0.79*EE + 0.25*PsT - 0.21*PsS - 0.17*EK \ldots\ldots\ldots\ldots\ldots(2)$$
$$R^2 = 0.86$$

Equation (2) factors that had the most effect to Inspiration of Public Consciousness (INS) was Environmental Education (EE) and subsequences were Psychological Trait (PsT) but Psychological State (PsS) and Environmental Knowledge (EK) with negative direction, these were able to explained the variation of Inspiration of Public Consciousness (INS) with 86.00 percents

Key Words: Causal Relationship Model/ Water Conservation /Environmental Education / Inspiration of Public Consciousness

1. Introduction

The Intergovernmental Panel on Climate Change (IPCC) observed on impacts of climate change and revealed the new obvious evidences that during five decades. The human activities were most important effect of global temperature rising over all area of the world at average of 1.4-5.8 Celsius degrees. The change of climate has been vigorous and more frequently. The obvious examples of climate change are violent drought, storming, flooding, hurricane, tornado, and earth quake. It has caused tremendously loss of million species of living things due to lost habitats and ecological imbalance including occurring acidity of sea water and changing of ocean currents, therefore, the small glacial age has occurred in

European continent and fluctuation of climate in different areas (IPCC, 2012, The Royal Society, 2005, &Sutayasue, 2010).

The risen of global temperature has affected to the ecological system obviously. Such as the rain is not raining according to periodic time and the amount of rain changes, the major change has been caused by deforestation, particularly in the tropical rain forest areas in Asia and Africa continents. Besides the global warming has loosen biodiversity of ecological system, the sea level and temperature in the sea has risen but it also impacted to ecological system of sea shore. Current sea level rise potentially impacts human populations such as those living in coastal regions and on islands and the wider natural environment such as marine ecosystems (Bindoff et al, 2007, & Fischlin, 2011).

Global average sea level rose at an average rate of around 1.8 mm per year over 1961 to 2003 and at an average rate of about 3.1 mm per year from 1993 to 2003. It is unclear whether or not the increased rate observed between 1993 and 2003 reflects an increase in the underlying long-term trend (Dahlman, 2009). However, Sea level rise is one of numerous lines of proof that strongly support the view that the climate has recently warmed (Solomon et al, 2007 & Hegerl et al, 2007). This also has caused the coral bleaching, therefore it has taken long time for recovering, and then it impacted to fishery and tourism industry. For health aspect, the climate change of temperature and humidity have caused the rapid growth of mosquito and increased the vector of malaria and dengue fever infection.

Moreover, the reports of natural disasters covering volcano eruptions, earthquakes, Tsunamis, various kinds of storms including tornadoes, thunderstorms, floods, droughts, fires, landslides and mudslides, blizzard and avalanches, and human epidemics and animal diseases have occurred more frequently. The opinions of scientists over the world are congruent that the green house gases are the essential factors of these phenomena of global warming and it is cause of these natural disasters (Kotchasenee, 2010, & Bicknell, et al., Eds. 2009).

The vast majority of the Earth's water resources are salt water, with only 2.5% being fresh water. Approximately 70% of the fresh water available on the planet is frozen in the icecaps of Antarctica and Greenland leaving the remaining 30% (equal to only 0.7% of total water resources worldwide) available for consumption. From this remaining 0.7%, roughly 87% is allocated to agricultural purposes. These statistics are particularly illustrative of the drastic problem of water scarcity facing the world. Water scarcity is defined as per capita supplies less than 1700 m3/year (IPCC 2012).

Water scarcity is expected to become an escalating problem in the future, for diverse reasons. First, the distribution of precipitation in space and time is very irregular, leading to fabulous temporal unpredictability in water resources worldwide (Oki, & Kanae., 2006). For example, the Atacama Desert in Chile, the driest place on earth, receives undetectable annual quantities of rainfall each year. On the other hand, Mawsynram, Assam, India receives over 450 inches annually. If all the freshwater on the planet were divided equally among the global population, there would be 5,000 to 6,000 Cubic meter of water available for everyone, every year (Vorosmarty, et al, 2000).

Influencing of global warming to Thailand, even though, the climate change is not extremely affected to the agricultural sectors at over all view because most of the agricultural areas are supported by irrigation system but Thailand frequently affected by the floods almost every year, particularly, this year Thai people are facing with violent flood over the country.

The Northeastern region is the driest region of the country; therefore it has a chance of water shortage in summer season for food and vegetable cultivation. The shortage of water influenced to economic and social aspects as well. Furthermore, it also impacted to water resources, especially; the river, canal, swamp, and pond would be dried in the summer season. This will affected to the breeding and growth of water plants and animals such as fish, crab, and shrimp. Therefore, the number and diversity of living things will decrease and results in decrement of biodiversity and florist in Great Mekong Region in the Northeastern region of Thailand (Thiengkamol, 2005b).

Nevertheless, if climate change is still going on, Thailand might face with flood in some part of country and drought in some area such as Northeastern region. Therefore, the natural disasters will be repeated occurring every year. It was revealed that there are various areas will face to floods, landslides and mudslides covering 12 provinces included Chiang Rai, Chiang Mai, Nakhon Sawan, Pa Yao, Pichit, Pitsanulok, Lumpoon, Sukhothai, Chanthaburi, Nakhon Nayok, Prajeenburi, and Trang. Moreover, the villages nearby Cha Phraya River, the main river of country, are also affected. For drought, it is accumulated the vigorous water increment, it was found that 34 percents of villages over the country have faced with risk of water shortage, and drought, particularly, Northeastern region is in the high risk of drought (Office of Natural Resources and Environmental Policy and Planning, 2009). The estimation of water demand of whole country is 57,302.8 million cubic meters per year. For only agricultural sector has water demand of 51,786.2 million cubic meters or 90 percents per year. It forecasted that the total water shortage over the country will be approximately 4,737 million cubic meters per year (Office of Natural Resources and Environmental Policy and Planning, 2009).

From the above, it can be concluded that every region of Thailand will face with water problems in both quantity and quality. Presently, the demand of water consumption has increased in all sectors whether agriculture, industry, and household consumption but the quantity and quality of water is decreased because of water resources were

contaminated with toxic substances that drained from community, factory and agriculture (Thiengkamol, 2009c).The great problems of degradation of water resources and water shortage as mentioned above, different findings showed that the people are lacking knowledge and understanding, awareness, positive attitude, public consciousness and responsibility for natural resources and environment conservation such as look after water resources, and lack of measurement to control people who lacked of consciousness to maintain and use fresh water effectively (Thiengkamol, 2011e, & Vichaidit, 1994).

Therefore, to develop people, especially, new generations to use water with minimization and realize the value of water resources, it needs to cultivate them with environmental education process through different channels of educational system whether with Formal Education System, Non-Formal Education System, Informal Education System, and Lifelong Education System (Thiengkamol, 2011e). Particularly, the youths who are students by providing teaching and learning process with various activities to raise their knowledge and understanding, awareness, positive attitude, public consciousness and responsibility for natural resources and environment conservation including water resources, it will lead to success mean of active learning process through brain storming of group dynamic activities. In addition, they will learn about the real situation of community and river resources to receive direct experience from direct contact by themselves. This will stimulate them to be good observers, be able to gathering data, discuss among their friends and their teachers including evaluating, decision making for problem solving. Therefore, it will assist them to aware the importance of water resource and it will a good process for attitude and behavior changing to conserve natural resources and environment conservation (Thiengkamol, 2011e, & Sariwat, 2010).

Additionally, the intention of psychologists tried to understand on human behavior, and then they had developed a large number of theories and models but they had the main focus on explanation how individual perceived and evaluated the stimulant before making decision to express his behavior. Nevertheless, study on human behavior, it can't be neglected the psychological trait. Trait theorists are primarily interested in the measurement of traits, which can be defined as habitual patterns of behavior, thought, and emotion including psychological health and physical health which are inherited trait from parents. There is much debate over how much of who we are is by nature (genetic) or nurture (environment), and both contribute significantly to our complete expression (Kassin, 2003, & Pearson, 2006). However, Interactionist theory has grown in the latter half of the twentieth century and has become one of the principal sociological perspectives in the world today. Interationism is most popular at present in Thailand for psychological study, especially, psychological trait and psychological state are play essential roles to spire for public consciousness for environmental conservation. Generally, environmental issues were ignorant as non-important issue for people until the beginning of this year 2011, Thai peoples have faced with strange of weather in summer, they faced with cold weather. This stimulated their attention s for turning their awareness to global warming seriously (Punthumnavin, 2008, Thiengkamol, 2009b, Thiengkamol, 2009c, Thiengkamol, 2011e, Thiengkamol, 2011f, Thiengkamol, 2011i, Thiengkamol,2011j, Thiengkamol,2012c, & Thiengkamol,2012d).

Therefore to determine the actual problems of water conservation behavior of upper secondary school students by studying on the causal relationship model of water conservation behavior with integration of psychological trait, psychological state, environmental knowledge, and environmental education influencing through inspiration of public consciousness to water conservation behavior, it might be a good answer for Ministry of Education and national policy maker to formulate the curriculum and projects to support for water conservation to meet real sustainable development.

2. Objective

The objective of this study was to develop a causal relationship model of water conservation behavior of secondary school student under the Office of Kalasin Educational Area Zone 24.

3. Methodology

The research design was implemented in steps by step as follows:

1) The populations were 18,463 upper secondary school students from school under Secondary Service Area Office 24 (Kalasin), Northeastern region of Thailand in academic year of 2012. 405 upper secondary school students were used as sample group. The research instrument was the questionnaire and it was used for data collection. LISREL was used for model verification. The content and structural validity were determined by Item Objective Congruent (IOC) with 5 experts in the aspects of environmental education, psychology, social science and social research methodology. The reliability was done by collecting the sample group from 30 elementary school students from Demonstration School Elementary of Rajabhat Mahasarakham University that locates nearby. The reliability was determined by Cronbach's Alpha. The

reliability of environmental education, environmental management, inspiration of public mind, and environmental behaviors, and the whole questionnaire were 0.912, 0.862, 0.878, 0.883 and 0.964 respectively.

The descriptive statistics used were frequency, percentage, mean and standard deviation. The inferential statistics used was LISREL by considering on Chi-Square value differs from zero with no statistical significant at 0.05 level or Chi-Square/df value with lesser or equal to 2, P-value with no statistical significant at 0.05 level and RMSEA (Root Mean Square Error Approximation) value with lesser than 0.05 including index level of model congruent value, GFI (Goodness of Fit Index) and index level of model congruent value, AGFI (Adjust Goodness of Fit Index) between 0.9-1.00.

4. Results

4.1 General Characteristics of Sample Group

The sample group was 405 upper secondary school students under the Office of Kalasin Educational Area Zone 24 in academic year of 2012. Most of them were female with 71.60%, studying at level 6 with 40.25% and had GPA at 3.51-4.00 with 46.42%. They lived at their home with 90.15 percents. Most of them had nuclear family with 57.28% and lived at their home with 82.22%. Their parents' statuses were living together with 70.07% and their guardian statuses were living together with 83.33%. Majority of their father, mother and guardian education levels were at the same level at lower than lower secondary school with 40.47%, 46.62%, and 55.36% respectively. Their father, mother and guardian had occupation as agriculturist with 33.83%, 32.84% and 47.02% respectively as presented in table1.

Table 1 General Characteristics of Sample Group of Upper Secondary School Students

Sex	Number	Percent
1.Male	115	28.40
2.Female	290	71.60
Total	405	100

Table 1 (Cont')

Studying in Level	Number	Percent
1. Level 4	123	30.37
2. Level 5	119	29.38
3. Level 6	163	40.25
Total	405	100
GPA	Number	Percent
1. Lower than 2.00	4	0.99
2. 2.01-2.50	18	1.44
3.2.51-3.00	52	12.84
4. 3.01-3.50	143	35.31
5. 3.51-4.00	188	46.42
Total	405	100
Family Characteristic	Number	Percent
1.Nuclear Family	232	57.28
2.Extended Family	173	42.72
Total	405	100
Present Resident	Number	Percent
1. Home	333	82.22
2. Guardian House	55	13.58
3. Rent	10	2.47
4. Dormitory	7	1.73
Total	405	100
Parents Status	Number	Percent
1. living together	300	70.07
2. Separated	36	8.89
3. Widow/Divorce	42	10.37
4. Father or Mother Passed away	27	6.67
Total	405	100

Table 1 (Cont')

Guardian Status	Number	Percent
1. living together	140	83.33
2. Separated	12	7.14
3. Widow/Divorce	16	9.53
Total	168	100
Father Education Level	Number	Percent
1.Lower than Lower Secondary School	169	40.73
2.Upper Secondary School/Vocational School	136	33.58
3.Diploma /High Vocational School	26	6.42
4.Bachelor	56	13.83
5.Master or Higher	18	4.44
Total	405	100
Mother Education Level	Number	Percent
1.Lower than Lower Secondary School	188	46.42
2.Upper Secondary School/Vocational School	122	30.12
3.Diploma /High Vocational School	29	7.16
4.Bachelor	53	13.09
5.Master or Higher	13	3.21
Total	405	100
Guardian Education Level	Number	Percent
1.Lower than Lower Secondary School	93	55.36
2.Upper Secondary School/Vocational School	34	20.24
3.Diploma /High Vocational School	7	4.17
4.Bachelor	25	14.88
5.Master or Higher	9	5.35
Total	168	100

Table 1 (Cont')

Father Occupation	Number	Percent
1. Government Officer	72	17.78
2. Retired Government Officer	3	0.74
3. State Enterprise Officer	9	2.22
4. Company Officer	12	2.96
5. Merchant / Business Owner	72	17.78
6. Employee / Hire	84	20.74
7. Agriculturist	137	33.83
8. Househusband	16	3.95
Total	405	100
Mother Occupation	Number	Percent
1. Government Officer	49	12.10
2. Retired Government Officer	5	1.23
3. State Enterprise Officer	12	2.96
4. Company Officer	15	3.70
5. Merchant / Business Owner	87	21.48
6.Employee / Hire	77	19.01
7. Agriculturist	133	32.84
8. Housewife	27	6.67
Total	405	100
Guardian Occupation	Number	Percent
1. Government Officer	26	15.48
2. Retired Government Officer	2	1.19
3. State Enterprise Officer	3	1.79
4. Company Officer	2	1.19
5. Merchant / Business Owner	30	17.85
	15	8.93

6.Employee / Hire	79	47.02
7. Agriculturist	11	6.55
8. Househusband		
Total	**168**	**100**

4.2 Confirmatory factors Analysis of Exogenous Variables

1) Confirmatory factors Analysis of Exogenous Variables of Psychological Trait (PsT) Confirmatory factors of EE had Bartlett's test of Sphericity of 169.683 statistically significant level (p< .01) and Kaiser–Mayer–Olkin Measure of Sampling Adequacy/MSA) of 0.698. This indicated that components of PsT aspect had proper relationship at good level and it can be used for analysis of confirmatory factors as shown in picture 1 and table 2.
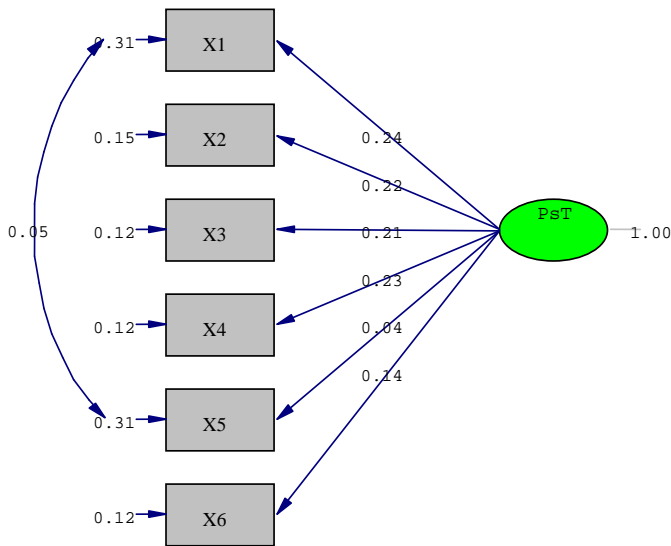

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Chi-Square=5.25, df=8, P-value=0.73084, RMSEA=0.000
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Picture 1: Model of Confirmatory factors of Psychological Trait

Table 2 Results of Analysis of Confirmatory factors of Psychological Trait

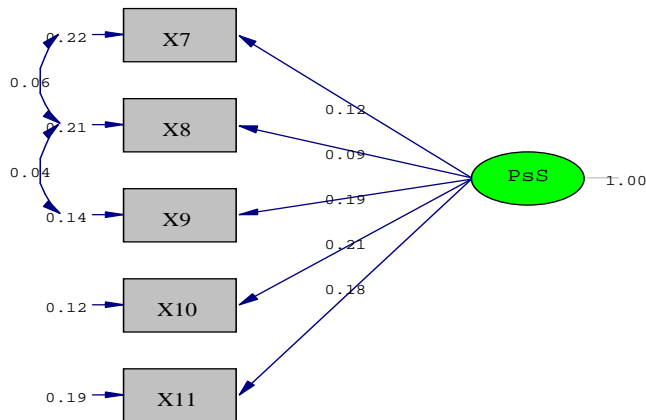| Components of Psychological Trait	Weight	SE	t	R^2
X1 Physical Health	0.24	0.039	6.15**	0.15
X2 Mental Health	0.22	0.029	7.47**	0.23
X3 Locus of Control	0.21	0.026	7.99**	0.27
X4 Mercy and Kindness	0.23	0.027	8.46**	0.31
X5 Achievement Motive	0.04	0.039	0.99	0.044
X6 Life Target	0.14	0.024	5.67**	0.13
Chi-square = 5.25 df = 8 P = 0.73084				
GFI =1.00 AGFI =0.99 RMSEA = 0.000 RMR =0.0046				

** Statistically significant level of .01

From picture 1 and table 2, results of analysis of confirmatory factors of Psychological Trait from 6 observed variables was revealed that the model was congruent to empirical data by considering from 1) Goodness of Fit Index (GFI) equaled to 1.00 and Adjust Goodness of Fit Index (AGFI) equaled to 0.99 2) Root Mean Square Error of

Approximation (RMSEA) equaled to 0.000 (RMSEA < 0.05) and 3) Chi- Square value had no statistically significant at level of .01 and degree of freedom was lesser than or equaled to .05 ($\chi^2/df \leq 5.00$).

Considering on loading weight of observed variables in model, it was revealed that observed variables had loading weight with 0.04 to 0.23 and had covariate to model of Psychological Trait with 4.40 to 31.00 percents.

2) Confirmatory factors Analysis of Exogenous Variables of Psychological State (PsS)

Confirmatory factors of EE had Bartlett's test of Sphericity of 139.267 statistically significant level (p< .01) and Kaiser–Mayer–Olkin Measure of Sampling Adequacy/MSA) of 0.614. This indicated that components of PsS aspect had proper relationship at good level and it can be used for analysis of confirmatory factors as shown in picture 2 and table 3.

Chi-Square=1.82, df=3, P-value=0.61040, RMSEA=0.000

Picture 2: Model of Confirmatory factors of Psychological State

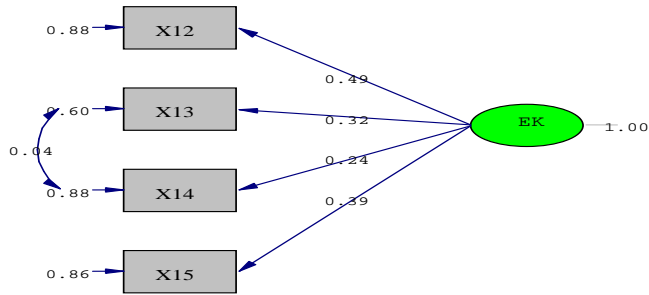**Table 3** Results of Analysis of Confirmatory factors of Psychological State

Components of Psychological State	Weight	SE	t	R^2
X7 Self -Value of Life	0.12	0.036	3.34**	0.061
X8 Family Value of Life	0.091	0.034	2.34*	0.037
X9 Attitude toward Sufficiency	0.19	0.036	5.37**	0.21
X10 Religion Belief	0.21	0.037	5.71**	0.27
X11 Physical Environment	0.18	0.036	4.82**	0.14
Chi-square = 1.82 df = 3 P = 0.61040				
GFI =1.00 AGFI =0.99 RMSEA = 0.000 RMR =0.0031				

** Statistically significant level of .01

From picture 2 and table 3, results of analysis of confirmatory factors of Psychological State from 5 observed variables was revealed that the model was congruent to empirical data by considering from 1) Goodness of Fit Index (GFI) equaled to 1.00 and Adjust Goodness of Fit Index (AGFI) equaled to 0.99 2) Root Mean Square Error of Approximation (RMSEA) equaled to 0.000 (RMSEA < 0.05) and 3) Chi- Square value had no statistically significant at level of .01 and degree of freedom was lesser than or equaled to .05 ($\chi^2/df \leq 5.00$).

Considering on loading weight of observed variables in model, it was revealed that observed variables had loading weight with 0.091 to 0.21 and had covariate to model of Psychological State with 3.70 to 27.00 percents.

3) Confirmatory factors Analysis of Exogenous Variables of Environmental Knowledge (EK) Confirmatory factors of EE had Bartlett's test of Sphericity of 145.726 statistically significant level (p< .01) and Kaiser–Mayer–Olkin Measure of Sampling Adequacy/MSA) of 0.614 This indicated that components of EK aspect had proper relationship at good level and it can be used for analysis of confirmatory factors as shown in picture 3 and table 4.

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Chi-Square=0.24, df=1, P-value=0.62135, RMSEA=0.000
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Picture 3: Model of Confirmatory factors of Environmental Knowledge

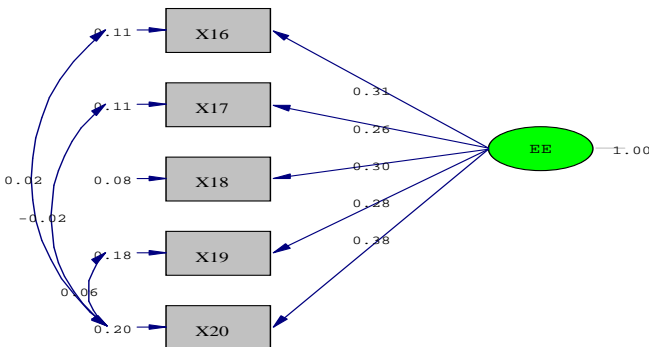**Table 4** Results of Analysis of Confirmatory factors of Environmental Knowledge

Components of Environmental Knowledge	Weight	SE	t	R^2
X12 Natural Resources	0.49	0.11	4.50**	0.21
X13 Water Resource	0.32	0.080	3.98**	0.14
X14 Appropriate Technology	0.24	0.089	3.72**	0.12
X15 Effective Water Management	0.39	0.090	4.29**	0.15
Chi-square = 0.24 df = 1 P = 0.62135				
GFI = 1.00 AGFI = 1.00 RMSEA = 0.000 RMR =0.0063				

** Statistically significant level of .01

From picture 3 and table 4, results of analysis of confirmatory factors of EK from 4 observed variables was revealed that the model was congruent to empirical data by considering from 1) Goodness of Fit Index (GFI) equaled to 1.00 and Adjust Goodness of Fit Index (AGFI) equaled to 1.00 2) Root Mean Square Error of Approximation (RMSEA) equaled to 0.000 (RMSEA < 0.05) and 3) Chi- Square value had no statistically significant at level of .01 and degree of freedom was lesser than or equaled to .05 ($x^2 / df \le 5.00$).

Considering on loading weight of observed variables in model, it was revealed that observed variables had loading weight with 0.24 to 0.49 and had covariate to model of Environmental Education with 12.00 to 21.0 percents.

4) Confirmatory factors Analysis of Exogenous Variables of Environmental Education (EE) Confirmatory factors of EE had Bartlett's test of Sphericity of 562.086 statistically significant level (p< .01) and Kaiser–Mayer–Olkin Measure of Sampling Adequacy/MSA) of 0.785. This indicated that components of EE aspect had proper relationship at good level and it can be used for analysis of confirmatory factors as shown in picture 4 and table 5.


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Chi-Square=0.97, df=2, P-value=0.61452, RMSEA=0.000
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Picture 4: Model of Confirmatory factors of Environmental Education

Table 5 Results of Analysis of Confirmatory factors of Environmental Education

| Components of Environmental Education	Weight	SE	t	R^2
X16 Environmental Awareness	0.31	0.024	12.77**	0.45
X17 Environmental Attitude	0.26	0.022	11.74**	0.39
X18 Environmental Belief	0.30	0.030	11.59**	0.51
X19 Environmental Skill	0.28	0.027	10.27**	0.29
X20 Environmental Participation	0.38	0.035	10.65**	0.42
Chi-square = 0.97 df = 2 P = 0.61452				
GFI = 1.00 AGFI = 0.99 RMSEA = 0.000 RMR =0.0018				

** Statistically significant level of .01

From picture 4 and table 5, results of analysis of confirmatory factors of EE from 5 observed variables was revealed that the model was congruent to empirical data by considering from 1) Goodness of Fit Index (GFI) equaled to 1.00 and Adjust Goodness of Fit Index (AGFI) equaled to 0.99 2) Root Mean Square Error of Approximation (RMSEA) equaled to 0.000 (RMSEA < 0.05) and 3) Chi- Square value had no statistically significant at level of .01 and degree of freedom was lesser than or equaled to .05 ($\chi^2 / df \leq 5.00$).

Considering on loading weight of observed variables in model, it was revealed that observed variables had loading weight with 0.26 to 0.38 and had covariate to model of Environmental Education with 29.00 to 51.0 percents.

4.3 Confirmatory Factors Analysis of Endogenous Variables

Results of Confirmatory Factors Analysis of Endogenous Variables of Inspiration of Public Consciousness influencing to Water Conservation Behaviors was revealed as followings.

Confirmatory Factors Analysis of Endogenous Variables of Inspiration of Public Consciousness (INS) Confirmatory Factors of Inspiration of Public Consciousness (INS) had Bartlett's test of Sphericity of 593.889 statistically significant level (p< .01) and Kaiser–Mayer–Olkin Measure of Sampling Adequacy/MSA) of 0.842. This indicated that components of Public Consciousness (INS) aspect had proper relationship at good level and it can be sed for analysis of confirmatory factors as shown in picture 5 and table 6.
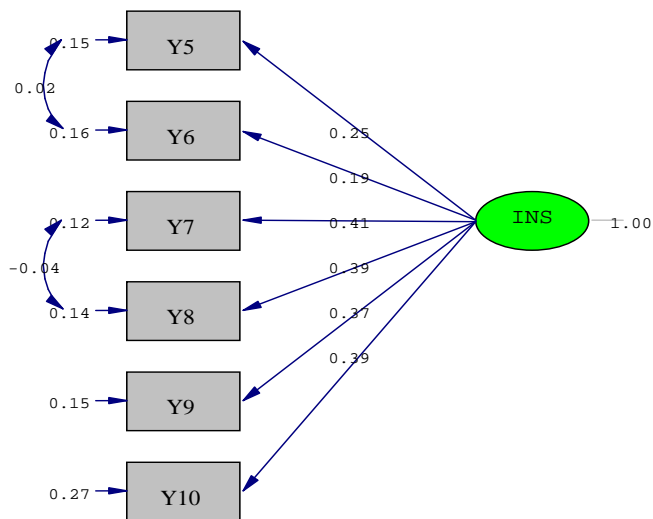
Chi-Square=4.91, df=7, P-value=0.67111, RMSEA=0.000

Picture 5: Model of Confirmatory factor of Inspiration of Public Consciousness

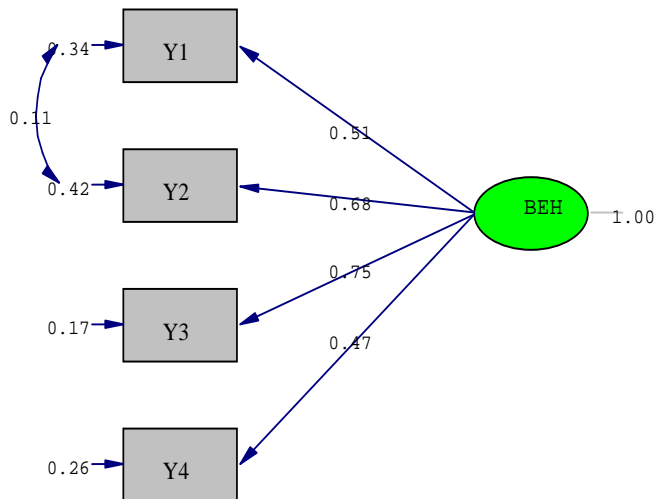**Table 6** Results of Analysis of Confirmatory factors of Inspiration of Public Consciousness

Confirmatory factors of Inspiration of Public Consciousness	Weight	SE	t	R^2
Y5 Person as Role Model	0.25	0.023	10.68**	0.29
Y6 Impressive Event	0.19	0.023	8.15**	0.18
Y7 Impressive Environment	0.41	0.027	14.94**	0.57
Y8 Book Reading	0.39	0.028	13.97**	0.52
Y9 Television Watching	0.37	0.026	14.43**	0.38
Y10 Internet Using	0.39	0.032	12.12**	0.36
Chi-square = 4.19 df = 7 P = 0.67111				
GFI = 1.00 AGFI = 0.99 RMSEA = 0.000 RMR = .0044				

** Statistically significant level of .01

From picture 5 and table 6, results of analysis of confirmatory factors of INS from 6 observed variables was revealed that the model was congruent to empirical data by considering from 1) Goodness of Fit Index (GFI) equaled to 1.00 and Adjust Goodness of Fit Index (AGFI) equaled to 0.99 2) Root Mean Square Error of Approximation (RMSEA) equaled to 0.000 (RMSEA < 0.05) and 3) Chi- Square value had no statistically significant at level of .01

and degree of freedom was lesser than or equaled to .05 and $\mathcal{X}^2 / df \leq 5.00$.

Considering on loading weight of observed variables in model, it was revealed that observed variables had loading weight with 0.19 to 0.41 and had covariate to model of Inspiration of Public Consciousness (INS) with 18.00 to 57.00 percents.

2) Confirmatory Factors Analysis of Endogenous Variables of Water Conservation Behaviors (BEH) Confirmatory Factors of Inspiration of Environmental Behaviors for Sustainable Development (BE) had Bartlett's test of Sphericity of 1409.304 statistically significant level (p< .01) and Kaiser–Mayer–Olkin Measure of Sampling Adequacy/MSA) of 0.833. This indicated that components of BE aspect had proper relationship at good level and it can be used for analysis of confirmatory factors as shown in picture 6 and table 7.

Chi-Square=1.11, df=1,P-value=0.29304, RMSEA=0.016

Picture 6: Model of Confirmatory factor of Water Conservation Behaviors

Table 7 Results of Analysis of Confirmatory factors of Water Conservation Behaviors

Confirmatory factors of Water Conservation Behaviors	Weight	SE	t	R^2
Y1 Self Water Conservation Behaviors (WCB)	0.51	0.038	13.36**	0.44
Y2 Promote for Family Member for WCB	0.68	0.045	12.70**	0.52
Y3 Promote for Community Member for WCB	0.75	0.040	18.70**	0.76
Y4 Promote for Social Member for WCB	0.47	0.033	14.09**	0.46
Chi-square = 1.11 df = 1 P = 0.29304				
GFI = 1.00 AGFI = 0.99 RMSEA = 0.016 RMR = 0.0041				

** Statistically significant level of .01

From picture 6 and table 7, results of analysis of confirmatory factors of Water Conservation Behaviors (BEH) from 4 observed variables was revealed that the model was congruent to empirical data by considering from 1) Goodness of Fit Index (GFI) equaled to 1.00 and Adjust Goodness of Fit Index (AGFI) equaled to 1.00, 2) Root Mean Square Error of Approximation (RMSEA) equaled to 0.000 (RMSEA < 0.05) and 3) Chi- Square value had no statistically

significant at level of .01 and degree of freedom was lesser than or equaled to .05 and $\chi^2 / df \leq 5.00$.

Considering on loading weight of observed variables in model, it was revealed that observed variables had loading weight with 0.47 to 0.75 and had covariate to model of Water Conservation Behaviors with 44.00 to 76.00 percents.

4.4 Results of Effect among Variables in Model in Terms of Direct and Indirect Effect

1) Confirmatory factors of Psychological Trait (PsT), Psychological State (PsS), Environmental Knowledge (EK) and Environmental Education (EE) had direct effect to Inspiration of Public Consciousness (INS) with statistically significant at level of .01 with effect of 0.25, -0.21 0.17 and 0.79. Moreover, Psychological Trait (PsT), Psychological State (PsS), Environmental Knowledge (EK) and Environmental Education (EE) had direct effect to Water Conservation Behaviors (BEH) with statistically significant at level of .01 with effect of- 0.14, 0.05, 0.28 and -0.11. In addition, confirmatory factors in aspect of Psychological Trait (PsT), Psychological State (PsS), Environmental Knowledge (EK) and Environmental Education (EE) had indirect effect to Water Conservation Behaviors (BEH) with statistically significant at level of .01 with effect of 0.24, -0.20, -0.16 and 0.76.

2) Confirmatory factors of Inspiration of Public Consciousness (INS) had direct effect to Water Conservation Behaviors (BEH) with statistically significant at level of .01 with effect of .96.

Considering on structural model confirmatory factors of Psychological Trait (PsT), Psychological State (PsS), Environmental Knowledge (EK) and Environmental Education (EE) were able to explain the variation of endogenous factors of Inspiration of Public Consciousness (INS) to caused Water Conservation Behaviors (BEH) with 60.00 percents. As a result, the equation 1 can be written as following.

$$BEH = 0.96*INS + 0.28*EK + 0.052*PsS - 0.14*PsT - 0.11*EE \ldots\ldots\ldots(1)$$
$$R^2 = 0.60$$

Equation (1) factors that had the most effect to Water Conservation Behaviors (BEH) was Inspiration of Public Consciousness (INS) and subsequences were Environmental Knowledge (EK) and Psychological State (PsS) but Psychological Trait (PsT) and Environmental Education (EE) with negative direction, these were able to explained the variation of Water Conservation Behaviors (BEH)with 60.00 percents
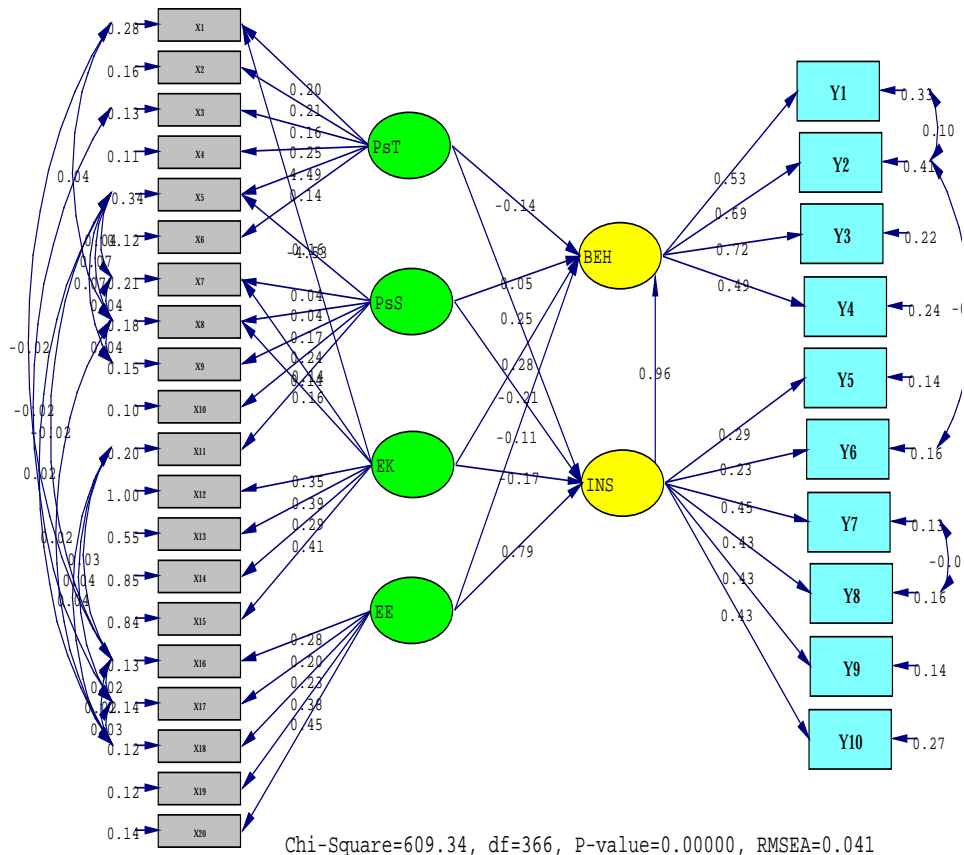
Moreover, confirmatory factors of Psychological Trait (PsT), Psychological State (PsS), Environmental Knowledge (EK) and Environmental Education (EE) were able to explain the variation of confirmatory factors of Inspiration of Public Consciousness (INS with 86.00 percents. Therefore, the equation can be written as following equation 2.

$$INS = 0.79*EE +0.25*PsT - 0.21*PsS - 0.17*EK \ldots\ldots\ldots\ldots(2)$$
$$R^2 = 0.86$$

Equation (2) factors that had the most effect to Inspiration of Public Consciousness (INS) was Environmental Education (EE) and subsequences were Psychological Trait (PsT) but Psychological State (PsS) and Environmental Knowledge

(EK) with negative direction, these were able to explained the variation of Inspiration of Public Consciousness (INS) with 86.00 percents

Chi-Square=609.34, df=366, P-value=0.00000, RMSEA=0.041

Picture 7: Model of Direct and Indirect Effect of PsT, PsS, EK and EE through INS Influencing to BEH

5. Discussion

The results revealed that Psychological Trait (PsT) had direct influencing to Inspiration of Public Consciousness (INS) and Water Conservation Behaviors (BEH) with highly statistically significant at level of .01 with effect of 0.25 and -0.14. Additionally, when considering on prediction of correlation of observed variables of Physical Health (X1), Mercy and Kindness (X4), Mental Health (X2), Locus of Control (X3), Life Target (X6) and Achievement Motive (X5) can predict the PsT rather high with 0.21, 0.23, 0.22, 0.21, and 0.04 respectively. These were congruent to different studies of Thiengkamol and her colleagues (Thiengkamol, 2011f, Thiengkamol, 2012c, Thiengkamol, 2012d, and Pimdee, et al, 2012a).

Consequently, Psychological State (PsS) had direct influencing to Inspiration of Public Consciousness (INS) and Water Conservation Behaviors (BEH) with highly statistically significant at level of .01 with effect of -0.21 and 0.05. Additionally, when considering on prediction of correlation of observed variables of Religion Belief (X10), Attitude toward Sufficiency (X9), Physical Environment (X11), Self -Value of Life (X7), and Family Value of Life (X8) can predict the PsS rather high with 0.24, 0.19, 0.18, 0.12, 0.14 and 0.091 respectively. These were congruent to different studies of Thiengkamol and her colleagues (Thiengkamol, 2011j, Thiengkamol, 2012d, Dornkornchum, and Thiengkamol, 2012, Pimdee, et al, 2012a, and Waewthaisong, et al, 2012a).

Subsequently, Environmental Knowledge (EK) had direct influencing to Inspiration of Public Consciousness (INS) and Water Conservation Behaviors (BEH) with highly statistically significant at level of .01 with effect of 0.17 and 0.28. Additionally, when considering on prediction of correlation of observed variables of Natural Resources (X12), Effective Water Management (X15), Water Resource (X13), and Appropriate Technology (X14) can predict the EK rather high with 0.49, 0.39, 0.32, and 0.24 respectively. These were congruent to different studies of Thiengkamol and her colleagues (Thiengkamol, 2005b, Thiengkamol, 2011a, Thiengkamol, 2011i, Thiengkamol, 2012a, Thiengkamol, 2012b, Thiengkamol, 2012c, Dornkornchum, et al, 2012a, Gonggool, et al, 2012b, Ngarmsang, et al, 2012b, Pimdee, et al, 2012a, Ruboon, et al, 2012a, and Waewthaisong, et al, 2012a)   Moreover, the findings indicated that Environmental Education (EE) had direct influencing to Inspiration of Public Consciousness (INS) and Water Conservation Behaviors (BEH) with highly statistically significant at level of .01 with effect of 0.79 and- 0.11. Moreover, when considering on prediction of correlation of observed variables of Environmental Participation (X20), Environmental Awareness (X16), Environmental Value (X18), Environmental Skill (X19), and Attitude (X17) can predict the EE rather high with 0.38, 0.31, 0.30, 0.28, and 0.26 respectively. These were congruent to different studies of Thiengkamol and her colleagues (Thiengkamol, 2005a, Thiengkamol, 2011a, Thiengkamol, 2011g,   Thiengkamol, 2011i, Thiengkamol, 2012a, Thiengkamol, 2012b, Thiengkamol, 2012c, Dornkornchum, et al, 2012a, Gonggool, et al, 2012b, Ngarmsang, et al, 2012b, Pimdee, et al, 2012a, Ruboon, et al, 2012a, and Waewthaisong, et al, 2012a) that the results illustrated that inspiration of public consciousness would inspire upper secondary schools student to perform better water conservation behaviors whether self water conservation behavior, promote to family member for water conservation behavior, promote to community member for water conservation behavior, and promote to social member for water conservation behavior, when they had real practice through environmental conservation with inspiration of public consciousness.

Additionally, Inspiration of Public Consciousness (INS) had direct effect to Water Conservation Behaviors (BEH) with statistically significant at level of 0.01 with effect of 0.96. Particularly, considering on prediction of correlation of observed variables of Impressive Environment (Y7), Book Reading (Y8), Internet Using (Y10), Television Watching (Y9), Person as Role Model (Y5), and Impressive Event (Y6), can predict the INS rather high with 0.41, 0.39, 0.39, 0.38, 0.25 and 0.19 respectively (Thiengkamol, 2011i, Thiengkamol, 2011j, Thiengkamol, 2012c, Thiengkamol, 2012d, , Dornkornchum, and Thiengkamol, 2012, Dornkornchum, et al, 2012a, Gonggool, et al, 2012b, Ngarmsang, et al, 2012b, Ruboon, et al, 2012a, Pimdee, et al, 2012, and Waewthaisong, et al, 2012a).

However, it might be concluded that Psychological Trait (PsT) observed from observed variables of Physical Health (X1), Mental Health   (X2), Locus of Control (X3), Mercy and Kindness (X4), Achievement Motive (X5) and Life Target (X6), Psychological State (PsS) observed from observed variables of Self -Value of Life (X7), Family Value of Life (X8), Attitude toward Sufficiency (X9), Religion Belief (X10), and Physical Environment (X11), Environmental Knowledge (EK) observed from observed variables of Natural Resources (X12), Water Resource (X13), Appropriate Technology (X14), and Effective Water Management (X15), and Environmental Education (EE) observed from observed variables of Environmental Awareness (X16), and Attitude (X17), Environmental Value (X18), Environmental Skill (X19), Environmental Participation (X20), can influence through Inspiration of Public Consciousness (INS) composing of Person as Role Model (Y5), Impressive Event (Y6), Impressive Environment (Y7), Book Reading (Y8), Television Watching (Y9), and Internet Using (Y10), to Water Conservation Behaviors (BEH) that included   Self Water Conservation Behaviors (Y1) Promote for Family Member for Water Conservation Behaviors (Y2), Promote for Community Member for Water Conservation Behaviors (Y3), and Promote for Social Member for Water Conservation Behaviors (Y4). Therefore, the model of PsT, PsS, EK and EE influencing through INS to BEH was verified the proposed model was fitted with all observed variables according to criteria of Chi-Square value differs from zero with no statistical significant at .01 level or Chi-Square/df value with lesser or equal to 2, P-value with no statistical significant at .01 level and RMSEA (Root Mean Square Error Approximation) value with lesser than 0.05 including index level of model congruent value, GFI (Goodness of Fit Index) and index level of model congruent value, AGFI (Adjust Goodness of Fit Index) between 0.90-1.00.

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