Model of Environmental Health Knowledge Affecting Environmental Health Behavior For Undergraduate Student

รูปแบบความรู้อนามัยสิ่งแวดล้อมที่มีผลต่อพฤติกรรมอนามัยสิ่งแวดล้อม สำหรับนิสิตปริญญาตรี

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Abstract

The objective of this research was to develop the causal relationship model of environmental health knowledge affecting environmental health behavior through inspiration of public mind. The populations were 17,666 undergraduate students of Rajabhat Mahasarakham University in second semester of academic year of 2013. The simple random sampling technique was employed to collect the sample for 400 undergraduate students. The questionnaire was used as tool for data collection. Structural Equation model (SEM) was used for model verification. The results revealed that when considering on structural model confirmatory factors of Environmental Health Knowledge (EHK) was able to explain the variation of endogenous factors of Inspiration of Inspiration of Public Mind (INS) to cause Environmental Health Behavior (EHB) with 66.00 percent. INS was the most effect to EHB with 0.54 and subsequence was EHK with 0.36. Moreover, confirmatory factors of EHK was able to explain the variation of confirmatory factors of Inspiration of Public Mind (INS) with 34.00 percent with effect of 0.58

Keywords: model, environmental health behavior

บทคัดย่อ

วิจัยนี้มีวัตถุประสงค์ในการวิจัยเพื่อพัฒนารูปแบบความสัมพันธ์เชิงโครงสร้างของความรู้อนามัยสิงแวดล้อมที่มีผลต่อพฤติกรรมอนามัยสิ่งแวดล้อมผ่านแรงบันดาลใจในการมีจิตสาธารณะ ประชากรเป็นนักศึกษาระดับปริญญาตรีของมหาวิทยาลัยราชภัฏมหาสารคาม จำนวน 17,666 คน ในภาคการศึกษาที่ 2 ปีการศึกษา 2556 ใช้เทคนิคการสุ่มอย่างง่าย เพื่อเก็บรวบรวมข้อมูลกลุ่มตัวอย่างนักศึกษาจำนวน 400 คนโดยใช้แบบสอบถามเป็นเครื่องมือในการเก็บรวบรวมข้อมูล และตรวจสอบความตรงของรูปแบบด้วยสมการโครงสร้างที่นำเสนอว่าสอดคล้องกับข้อมูลเชิงประจักษ์ ผลการวิจัยพบว่าตัวแบบโครงสร้างที่มีความรู้อนามัยสิ่งแวดล้อมซึ่งเป็นตัวแปรแฝงภายนอกสามารถอธิบายความแปรปรวนของพฤติกรรมอนามัยสิ่งแวดล้อมผ่านแรงบันดาลใจในการมีจิตสาธารณะได้ร้อยละ 66.00 โดยแรงบันดาลใจในการมีจิตสาธารณะส่งผลต่อพฤติกรรมอนามัยสิ่งแวดล้อมมากที่สุดเท่ากับ 0.54 รองลงมาเป็นความรู้อนามัยสิงแวดล้อมมีผลเท่ากับ 0.36 นอกจากนี้เป็นความรู้อนามัยสิงแวดล้อมสามารถอธิบายความแปรปรวนของแรงบันดาลใจในการมีจิตสาธารณะร้อยละ 34.00 ด้วยอิทธิพลเท่ากับ 0.58

คำสำคัญ: รูปแบบ, แรงบันดาลใจในการมีจิตสาธารณะ, พฤติกรรมอนามัยสิ่งแวดล้อม

Introduction

Thailand, Ministry of Public Health with the corroboration of Ministry of Environment and Natural Resources, launched The Second National Environmental Health Strategy Plan B.E.255-2559 after the first national plan to be strategies for organizing environmental health of countries with highlighting to encourage all governmental and private sectors including populace from every region of country. Moreover, Thailand has established the main activities of health promotion on 5 new tends including 1) build healthy public policy by extending to all involved sectors, 2) create supportive environment by paying attention on balance among economic, social and environment including challenging the community people to look after environment and natural resources their duties of global citizen, 3) strengthen community action with health promotion activities via community practice to accomplish better quality of life, 4) develop personal skills on health promotion by providing health information and education for peoples to be able to maintain their health and environment, and 5) reorient health services by changing from the burden of health system service to taking the responsibilities together among people, community and health personnel (Office of Environmental Health, 2012).

In particular, environmental health concludes all aspects of environmental quality of air, water, soil and noise, management of waste and hazardous waste, chemical substance and toxic substance, public and environmental health, management of environmental health in critical situation, and health impact assessment. Consideration on environmental health with the whole perspectives, it must regard to 1) providing clean water for drinking and other consumptions adequately including planning for water production and distribution, 2) controlling water pollution by preventing pollution and controlling and maintaining quality at origin sources of water like as river, canal, swamp and so on including sea water and underground water. In addition, control at the point of pollution sources covering household, agricultural, and industrial sources, 3) management of waste and hazardous waste for disease control and prevention of dispersion, 4) control arthropod and rodent animals that are the vector of diseases to human such as diarrhea, malaria, dengue, bubonic plague and leptospirosis, 5) Prevention and control soil pollution from drainage wastewater, waste and hazardous waste from industrial activities and human activities, 6) food sanitation with germs and toxic substances control because food is essential for human health meanwhile it is also able to be a medium for disease transmission, therefore the food sanitation addresses on food hygiene and safety are emphasized at starting point of caring on raw material, preparation, production, transportation and distribution including providing knowledge to consumer, 7) Air pollution control by preventing the contamination and maintaining air quality, not impact to property and human health, 8) prevent the danger from radiation that is used in diverse activities whether food preservation, medical treatment, and other activities, 9) environment health is prevention and control environment in workplace for all aspects of physical, chemical and biological features by arranging the appropriate working and studying environments continuously, 10) control the noise pollution with over standard because to loud noise can disturb the mental concentration and harm to

human health, 11) management on environmental shelter habitat and institute to be hygiene, safe and aesthetics view for living , 12) city planning properly for instances business area, industrial area, living area to provide non traffic congestion, to maintain physical and mental health, 13) environmental health arrangement involved transportation by controlling all sectors of transportation whether in terms of land, water, and air, 14) Prevention accident and emergency event to decrease the injury, mortality and handicap rates, 15) environmental health of recreation site by arranging and providing the clean, safe and without disease spreading such as swimming pool and public park, 16) sanitation implementation when disease epidemic, emergency event, disaster and migration, and 17) general measurement to prevent environment from any risk or harm to human health (Suwan, 2006; Thiengkamol, 2009c; Thiengkamol, 2011e; Office of Environmental Health, 2012; WHO, 2014).

Thiengkamol proposed and proved on inspiration of public mind for environmental conservation and health maintenance with different researches were done by herself and her colleagues that inspiration is completely dissimilar from motivation because peoples will perform their public with their desires from their inside to conduct for environmental conservation and health maintenance. Their inspiration might be arisen from the appreciation of good role model of any person, impressive event, impressive environment and a variety of media perception. They do with public mind for other without the requirement of rewards, money, nobility or admiration but they are willing to do with appreciation or impression to do so (Thiengkamol, 2009a; Thiengkamol, 2009b; Thiengkamol, 2011e; Thiengkamol, 2011f) Concurrently, the various researches were implemented by her colleagues, these have also confirmed that inspiration of public consciousness or public mind are essential for environmental conservation in divers target groups about environmental management with integration of environmental education principle (Waewthaisong, et al, 2012a; Ruboon, et al., 2012a; Pimdee, et al., 2012a; Donkonchum, et al, 2012a; Donkonchum, &Thiengkamol, 2012; Morrasri, et al, 2012b; Mongkonsin, et al, 2013b; Gonggool, et al, 2012b; Jongwutiwet, et al, 2012b; Phinnarach, et al., 2012a; Praneetham, et al., 2012; Artwanichakul, et al., 2012a; Artwanichakul, et al., 2012b; Sangsan-anan, et al, 2012a; Tumpracha, et al., 2012b; Udonboon, 2012b).

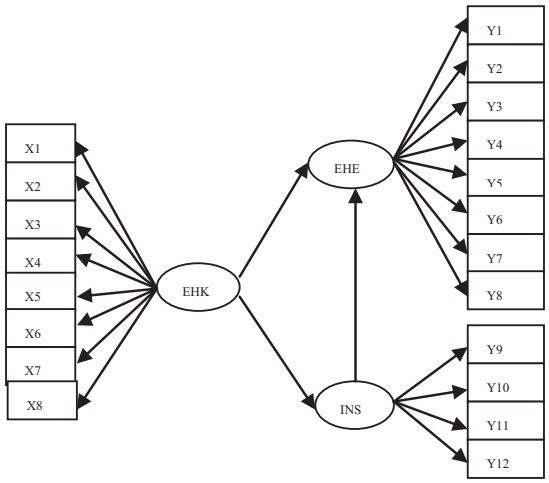
However, in this study about environmental health of educational institute like as university level, it needs the cooperation among academic sector, supportive sector and students, particularly undergraduate students are the majority of students of university. In order to reach the target of good environmental health, it must be implemented the research on undergraduate students, therefore the environmental health is conducted to understand their perception on environmental health knowledge, environmental education, inspiration of public mind for environmental health and environmental health behavior (Office of Environmental Health, 2012; WHO, 2014; Thiengkamol, 2011e; Thiengkamol, 2011f; Donkonchum et al., 2012a; Phinnarach et al., 2012a; Sangsan-anan et al., 2012a; Petchang et al, 2013a; Saisunantharom et al., 2013a).

This research was carried on the undergraduate students Rajabhat Mahasarakham University in order to understand that the variable of environmental health knowledge are affecting environmental health behavior through inspiration of public mind at what level. Moreover, understanding the prediction power of 8 observed variables of Physical Environment, Environmental Sanitation, Food Sanitation, Waste Management, Contagious Disease Prevention, Disease Vector Control, Management of Institutional Environment, and Prevention of Accident and Injury, it will be employed it to help for supporting the undergraduate student to have better environmental health behavior..

Objective

The objective of research was to develop the causal relationship model of environmental health knowledge affecting to environmental health behavior through inspiration of public mind.

Conceptual Framework



EHK refers Environmental Health Knowledge, INS refers Inspiration of Public Mind and EHB refers Environmental Health Behavior. The exogenous latent variable of EHK was measured by Physical Environment (X1), Environmental Sanitation (X2), Food Sanitation (X3), Waste Management (X4), Contagious Disease Prevention (X5), Disease Vector Control (X6), Management of Institutional Environment (X7), and Prevention of Accident and Injury (X8). The endogenous latent variable of EHB was measured by Consumption Behavior (Y1), Waste Management Behavior (Y2), Personal health Behavior (Y3), Disease Prevention and Control Behavior (Y4), Good Living Behavior (Y5), Shelter Sanitation Behavior (Y6), Energy Conservation Behavior (Y7) and Accidental Prevention Behavior (Y8) and INS was measured by Person as Role Model (Y9), Impressive Event (Y10), Impressive Environment (Y11), and Diverse Media Receptions (Y12).

Methodology

Population and Sample

The populations were 17,666 undergraduate students of Rajabhat Mahasarakham University in second semester of academic year of 2013. The simple random sampling technique was used to collect the sample of 400 undergraduate students from different faculties of Rajabhat Mahasarakham University with confident interval at 0.05.

Research Tool

The research instrument was the questionnaire with 88 items and it was used for data collection. The content and structural validity were determined by Item Objective Congruent (IOC) with 5 experts in the aspects of environmental health, environmental education, psychology, social science and social research methodology. The reliability was done by collecting the sample group from 50 undergraduate students of Roi-Et Rajabhat University which is similar characteristics to Rajabhat Mahasarakham University. The reliability was determined by Cronbach's Alpha. The reliability of environmental health knowledge, inspiration of public mind, environmental health behavior and the whole questionnaire were 0.931, 0.950, 0.974 and 0.976 respectively.

Data Collection

The questionnaire was used for data collecting from different faculties of Rajabhat Mahasarakham University during the second semester in academic year 2013. The simple random sampling technique was conducted for data collection with 400 undergraduate students.

Statistical Analysis

The descriptive statistics used were frequency, percentage, mean and standard deviation. The inferential statistics used was Structural Equation Model (SEM) and analyzed with LISREL version 8.30 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 5, RMSEA (Root Mean Square Error Approximation) value and RMR (Root Mean Square Residual) with lesser than 0.05 including index level of model congruent value, GFI (Goodness of Fit Index) and critical number, and index level of model congruent value, AGFI (Adjust Goodness of Fit Index) between 0.90-1.00.

Result

1. Results of general characteristics of undergraduate student of Rajabhat Mahasarakham University

The sample group was 400 undergraduate students of Rajabhat Mahasarakham University in first semester of academic year of 2013. Most of them studied at Faculty of Education with 98 (24.502%), studied at the second year 127 (31.75%), were female with 333 (83.25%), paid respect to Buddhism with 394 (98.50%), had home town at Maha Sarakham Province with 144 (31.00%), lived outside municipality with 253 (63.25%), their family characteristics was nuclear family with 266 (66.50%). They were the second order children with 168 (46.50%) and lived at dormitory with 218 (54.50%), traveled to university by motor-bicycle with 323 (80.75%). They had the mean grade point average 2.98 and mean of age with19.66 years and mean of expense per month with 3124.25 baht.

2. Results of confirmatory factors analysis of exogenous variables

Confirmatory factors analysis of exogenous variables of Environmental Health Knowledge (EHK)

Confirmatory factor analysis of exogenous variables of Environmental Health Knowledge (EHK) affecting to Environmental Health Behavior (EHB) was revealed as the followings.

Confirmatory factors of EHK had Bartlett's test of Sphericity of 2085.522 statistically significant level ($p < 0.01$) and Kaiser–Mayer–Olkin Measure of Sampling Adequacy/MSA) of 0.882.

3. Confirmatory factors analysis of endogenous variables

Confirmatory factors analysis of endogenous variables of Inspiration of Public Mind (INS)

Confirmatory factors analysis of endogenous variables of Inspiration of Inspiration of Public Mind (INS) influencing to Environmental Health Behavior (EHB) was revealed as the followings.

Confirmatory factors of inspiration of Inspiration of Public Mind (INS) had Bartlett's test of Sphericity of 1060.964 statistically significant level ($p < 0.01$) and Kaiser–Mayer–Olkin Measure of Sampling Adequacy/MSA) of 0.836.

Confirmatory factors analysis of endogenous variables of Environmental Health Behavior (EHB)

Confirmatory factors of Environmental Health Behavior (EHB) had Bartlett's test of Sphericity of 11598.554 statistically significant level ($p < 0.01$) and Kaiser–Mayer–Olkin Measure of Sampling Adequacy/MSA) of 0.856.

4. Results of effect among variables in model in terms of direct effect

4.1 Confirmatory factors of Environmental Health Knowledge (EHK) had direct effect to Inspiration of Public Mind (INS) and Environmental Health Behavior (EHB) with statistically significant at level of 0.01 with effect of 0.58 and 0.36. Moreover, confirmatory factors in aspect of Environmental Health Knowledge (EHK) had indirect effect to Environmental Health Behavior (EHB) with statistically significant at level of 0.01 with effect of 0.31.

4.2 Confirmatory factors of Inspiration of Public Mind (INS) had direct effect to Environmental Health Behavior (EHB) with statistically significant at level of 0.01 with effect of 0.54.

4.3 Considering on structural model confirmatory factors of Environmental Health Knowledge (EHK) was able to explain the variation of endogenous factors of Inspiration of Inspiration of Public Mind (INS) to cause Environmental Health Behavior (EHB) with 66.00 percent as the following in equation (1).

$$EHB = 0.54*INS + 0.38*EHK \ldots\ldots (1)$$

$$(R^2 = 0.66)$$

Equation (1) factors that had the most effect to Environmental Health Behavior (EHB) was Inspiration of Public Mind (INS) with effect of 0.54, and subsequence was Environmental Health Knowledge (EHK) with effect of 0.38. These were able to explain the variation of Environmental Health Behavior (EHB) with 66.00 percent.

Moreover, confirmatory factors Environmental Health Knowledge (EHK) was able to explain the variation of confirmatory factors of Inspiration of Public Mind (INS) with 34.00 percent with effect of 0.58. Therefore, the equation can be written as the following equation (2).

$$INS = 0.58*EHB \ldots\ldots\ldots (2)$$

$$(R^2 = 0.34)$$

Equation (2) factors that Environmental Health Knowledge (EHK) had the direct effect to Inspiration of Public Mind (INS) with 0.34.

4.4 Considering on Chi-Square value/df was 2.64 that was lesser than 5, therefore it was accepted that hypothetical model of research was congruent to empirical data. Moreover, it was considered on other statistical values to verify the congruence that were Goodness of Fit Index (GFI) and Adjust Goodness of Fit Index (AGFI) were 0.94 and 0.91 respectively (GFI > 0.90 and AGFI > 0.90), RMSEA <0.05 (0.047) and critical number =263.91 which was more than 200. It indicated that model was congruent to empirical data. The results of analysis of causal relationship model and analysis of path effect as presented in figure 1 and table 1.

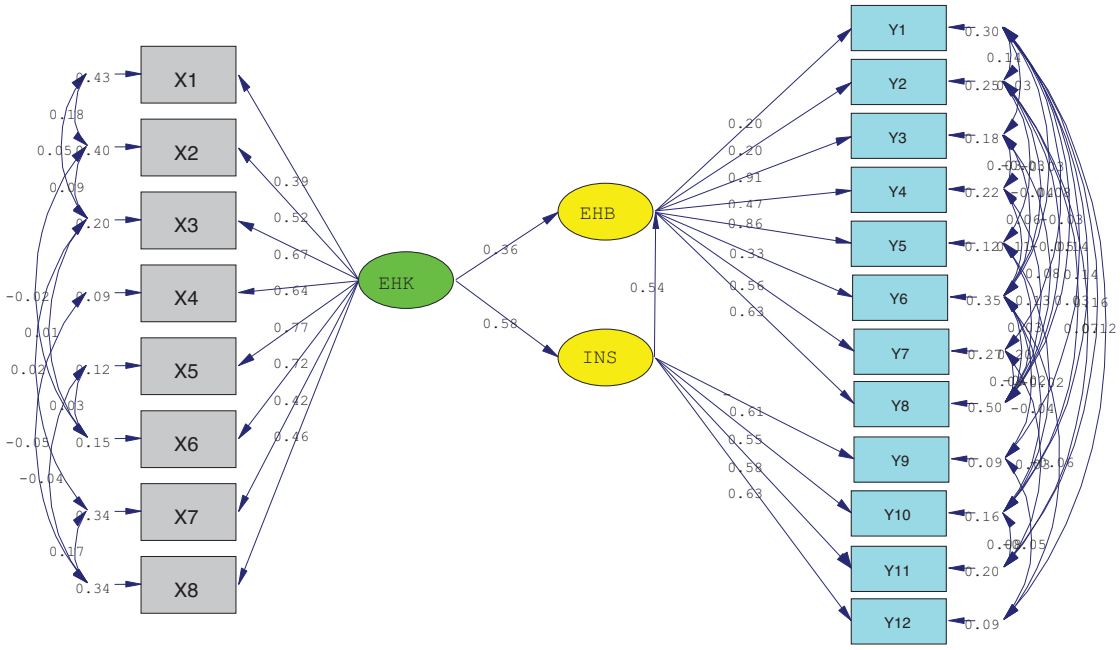


Figure 1 Causal Relationship Model of Environmental Health Behavior

Table 1

Direct and Indirect Effect of EHK Affecting EHB through INS

Causal variable	Result variables					
	INS			EHB		
	TE	IE	DE	TE	IE	DE
EHK	0.58** (0.031)	-	0.58** (0.031)	0.67** (0.033)	0.31** (0.029)	0.36** (0.030
INS	-	-	-	0.54** (0.028)	-	0.54** (0.028
χ^2 = 234.96; df = 125			CN = 263.91		χ^2 / df = 1.879	
GFI = 0.94	AGFI = 0.91		RMSEA = 0.047		RMR = 0.013	

TE: Total Effect, IE: Indirect Effect, DE: Direct Effect

Discussion

The findings indicated that Environmental Health Knowledge (EHK) had direct effect to Environmental Health Behavior (EHB) with statistically significant at level of 0.01 with effect of 0.36. Considering from observed variable of Waste Management (X4), was highest correlation to Environmental Health Knowledge (EHK) with 0.80. This might be explained that the sample groups who are undergraduate students have recognized to the importance of waste accumulation in the university, therefore they have realized to raise the environmental awareness critical to assist to waste reduction. Consequently, Contagious Disease Prevention (X5), Disease Vector Control (X6), and Food Sanitation (X3), had rather high correlation to Environmental Health Knowledge (EHK) with 0.77, 0.72 and 0.67 respectively. It is obviously seen that the undergraduate students have accepted that when the waste accumulation increasingly, the food sanitation, disease vector control, and contagious disease prevention should be paid attention. This indicated that it should challenge undergraduate students to participate in environmental projects and activities with correctly environmental health knowledge to maintain their health and to decrease environment problems in diverse facets when considering on other environmental health knowledge about university physical environment, environment sanitation, management of institutional environment and prevention of accident and injury are all important to maintain environmental health of Rajabhat Mahasarakham University.

However, Inspiration of Public Mind (INS) was revealed as very essential endogenous latent variable affected to result variable of Environmental Health Behavior (EHB) with the highest prediction power with 0.54. Additionally, observed variables of Consumption Behavior (Y1), Waste Management Behavior (Y2), Personal health Behavior (Y3), Disease Prevention and Control Behavior (Y4), Good Living Behavior (Y5), Shelter Sanitation Behavior (Y6), Energy Conservation Behavior (Y7) and Accidental

Prevention Behavior (Y8) are able to predict Environmental Health Behaviors with 0.28, 0.20, 0.91, 0.47, 0.86, 0.33, 0.56, and 0.63. It is obviously seen that the Personal health Behavior (Y3) was the highest prediction power with 0.91 and subsequences were Good Living Behavior (Y5) with 0.86, Accidental Prevention Behavior (Y8) with 0.63, Energy Conservation Behavior (Y7) with 0.57, Disease Prevention and Control Behavior (Y4) with 0.47, Shelter Sanitation Behavior (Y6) with 0.33, Consumption Behavior (Y1) with 0.28, and Waste Management Behavior (Y2) with 0.20. It can be explained that most undergraduate students performed better personal health but they had rather poor waste management behavior.

These were congruent to Thiengkamol concept (Thiengkamol, 2009a; Thiengkamol, 2009b; Thiengkamol, 2011e; Thiengkamol, 2011f, and her different studies and her colleagues (Thiengkamol, 2011f; Thiengkamol, 2011i; Thiengkamol, 2011j; Thiengkamol, 2012d; Thiengkamol, 2012g; Thiengkamol, 2012h; Donkonchum, & Thiengkamol, 2012; Pimdee, et al, 2012b; Phinnarach, et al, 2012a; Chomputawat et al., 2013b; Kotchakote et al., 2013a; Koonboonchan et al., 2013a; Petchang et al., 2013a; Prasertsri et al., 2013b; Suebsing et al., 2013a; Mongkonsin et al., 2013b; Sangsan-anan et al., 2012a; Jongwutiwet et al., 2012b) that the results illustrated that environmental education influencing through inspiration of public mind for environmental conservation to perform better environmental behaviors whether consumption behavior, energy conservation behavior, waste management behavior, traveling behavior and knowledge transferring and supporting for environmental conservation when they had real practice through environmental conservation with inspiration of environmental conservation with public mind.

Therefore, the research results should be integrated in the teaching and learning process for university students who are our future hope of environmental quality maintenance to reach actual sustainable development (Thiengkamol, 2009b; Thiengkamol, 2011e; Thiengkamol, 2011f; Thiengkamol, 2011j; Thiengkamol, 2012g; ; Donkonchum, & Thiengkamol, 2012; Donkonchum, et al, 2012a; Gonggool, et al, 2012b; Jongwutiwet, et al, 2012b; Morrasri, et al, 2012b; Phinnarach, et al, 2012a; Pimdee, et al, 2012a; Ruboon, et al, 2012a; Sangsan-anan, et al, 2012b; Tumpracha, et al, 2012b; Udonboon, et al, 2012b; Waewthaisong, et al, 2012a; Mongkonsin, et al, 2013b; Koonboonchan et al., 2013a).

However, it might be concluded whether EHK and INS latent variables are play significant roles to cause environmental health behavior of consumption behavior, waste management behavior, personal health behavior , disease prevention and control behavior, good living behavior, Shelter sanitation behavior, energy conservation behavior and accidental prevention behavior through INS. Therefore, the model of EHK affecting through INS to EBH 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 0.01 level or Chi-Square/df value with lesser or equal to 5, 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.

Recommendation

The finding indicated that the inspiration of public mind play very important role to make undergraduate students to change their environmental health behavior**,** therefore, we can create activities to encourage them to practice better environmental health behavior.

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