Structures Development of Master of Public Health Program and Doctor of Philosophy Program in Public Health Innovation Research and Development in Thailand

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Abstract

Aim: To study the need about the Master of Public Health Program (MPH) and Doctor of Philosophy Program (PhD) in Public Health Innovation Research and Development (PHIRD), to analyze factors components of the institute, and to analyze components of the MPH and PhD.

Methods: 304 samples were selected by stratifying random sampling. Data were analyzed by mean, standard deviation, and priority needs index with Modified Priority Needs Indexing technique ($PNI_{Modified}$), the exploratory factor analysis (EFA), and the second-order confirmatory factor analysis (the 2nd CFA).

Results: The research showed that samples have the level of necessity related to the programs. Regarding the appropriateness of the draft of the programs, the expected level was at a high level = 4.31/5 and 4.33/5, the $PNI_{Modified}$ = 3.31/5 and 3.3/5, respectively. Models of factors were composed of consistent with empirical data and were based on Financial (1.00), Accept (1.00), and Progress (1.00). Models of structures are composed of consistent with empirical data and were based on Professional (1.00) and Potential (1.00).

Conclusion: The observed variables and latent variables of the four models had high construct validity by EFA and 2nd CFA that can be used for the development of programs.

Keywords: *need; structures of the program; master of public health; doctor of philosophy program; public health innovation research and development*

Introduction

Meaning of "innovation" is the ability to do new something to use knowledge, creativity, skills, and experience in technology or management to develop and produce new products new production process or new service which meets the needs of the market. In a part of "economic innovation" is the introduction of new concepts or uses[1] and of "Public Health Innovation" is the ability to use knowledge, creativity, skills, and experience in technology or management public health [Health Promotion, Prevention, Treatment, and Rehabilitation] to develop and manufacture new tools (Machine, Material, Tool, etc.), new services (Curriculum, Program, Activity, etc.) or new processes that solve the cause of the problem and meet the needs of customers.[1]

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The Praboromarajchanok Institute (PI), Established by the Ministry of Public Health since 1993 to be the main duty of the production and development of public health personnel.[2] Researchers, therefore, saw the need to develop the structure MPH and PhD in PHIRD (new program) to produce researchers and develop public health innovations that can research in creating a new body of knowledge for the program and use the research process to improve the public health develop a public health management system develop the capacity of public health personnel and develop the supervision system monitor and evaluate the management of public health to further improve the quality of public health of the nation.

Objectives

To study the need for the MPH and PhD, analyze factors components of the institute, and components of the MPH and PhD.

Methodology

This research survey is the first step in research and development.[1,3] The population is 4th-year students and graduates in health science in 2019, which is the case of the unknown population or infinite numbers (Infinite Population). Determination of sample size if the population size is not known to use a 95 percent confidence level by using the following formula[4], number of samples needed=384 records. The data has collected a questionnaire divided into 5 parts by checking content validity with Index of Item Objective Congruence (IOC) and selected items with a consistency index of 0.50 or more, try out the questionnaire with 30 4th-year students at a College in Phitsanulok Province of Thailand to improve the quality by the Cronbach method[5] by finding the alpha coefficient (α- coefficient), the reliability of the four types of questionnaires (Part 2-5) were 0.93, 0.83, 0.98, and 0.95, respectively by sending online questionnaires to the 4th-year students and graduates in the health sciences, 2019, as the respondents and compile the returned online questionnaires then used in the analysis of 304 data, accounting for 79.17 percent and analyzed with basic statistical, $PNI_{Modified}$[6], EFA, and the 2nd CFA.

Results

1. Results of needs analysis found that the expected level was at a high level (= 4.31/5 and 4.33/5), the $PNI_{Modified}$ of MPH = 3.31/5 and $PNI_{Modified}$ of PhD = 3.33/5.

2. The results of the analysis of the factors that influence the decision to study in the MPH and PhD in PHIRD

2.1 The EFA that were studied by analysis Kaiser-Meyer-Olkin Measure of Sampling Adequacy found a KMO or MSA equal to 0.801 and 0.881, which are greater than 0.80, very good level, according to the criteria of Kim and Mueller[7]and the results of Bartlett's Test of Sphericity[8] found that the variables were statistically significant at the level of 0.001, could be used to analyze the components.

For component extraction of each variable used in analyzing the factors, A total of 12 elements, between 0.461 - 0.795 and 0.508 - 0.807, are medium-high and have Cronbach's Alpha = 0.826 and 0.868. Orthogonal rotation using the varimax method found that all 12 variables used in the analysis can be grouped into 3 components with eigenvalues more than 1.00, which showed that each element could explain the variance of all 12 variables more than 1.00 were 59.733% and 66.682%. When considering to put each variable into one single element in which the variables have the highest factor loading found that all 3 elements can be classified into 12 elements, with each element consisting of variables 3-6 numbers, each variable that has been arranged in the composition weights elements from 0.569 to 0.862 and 0.556 to 0.834. The compositions of 3 components have been named a meaningful as detailed in Table 1.

Table-1: The structural adjustment of economic, social, and institutional factors that influence the decision to study in the MPH and PhD in PHIRD

Side/ Core Component	Sub-Component
MPH	
1) Financial	1. Scholarships (Giving Fund)
	2. Expense per term (Expense)
	3. Own income (Self Income)
2) Accept	4. Proud of the family (Proud)
	5. Need acceptance (Acceptance)
	6. Increase qualifications (Add Academic)
	7. The famous reputation of course instructors (Famous)
	8. Interesting course (Interest)
	9. The convenience of study locations (Convenience)
3) Progress	10. The income of parents (Parent Income)
	11. Career advancement (Occupation Progress)
	12. Increase career paths (Add Occupation)
PhD	
1) Financial	1. Expense per term (Expense)
	2. Scholarships (GivingF)
	3. The convenience of study locations (Con)
	4. Own income (SelfIn)
	5. The famous reputation of course instructors (Famous)
	6. Interesting course (Interest)
2) Accept	7. The income of parents (ParentIn)
	8. Proud of the family (Proud)
	9. Need acceptance (Acceptance)
3) Progress	10. Increase career paths (AddOcc)
	11. Increase qualifications (AddAcad)
	12. Career advancement (OccPro)

2.2. Results of the 2nd CFA showed that the 12 elements are considered to be a subset of the 3 main components. Overall the field of research and innovation in public health is real as detailed in Figure 1-2 as follows

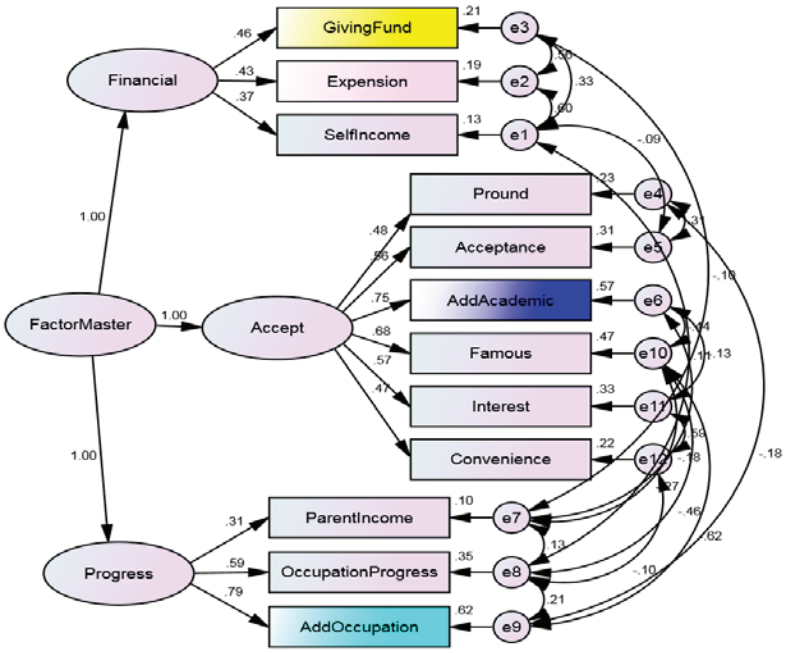

Figure-1: Diagram of the 2nd CFA of economic, social, and institutional factors that influence the decision to study in the MPH in PHIRD

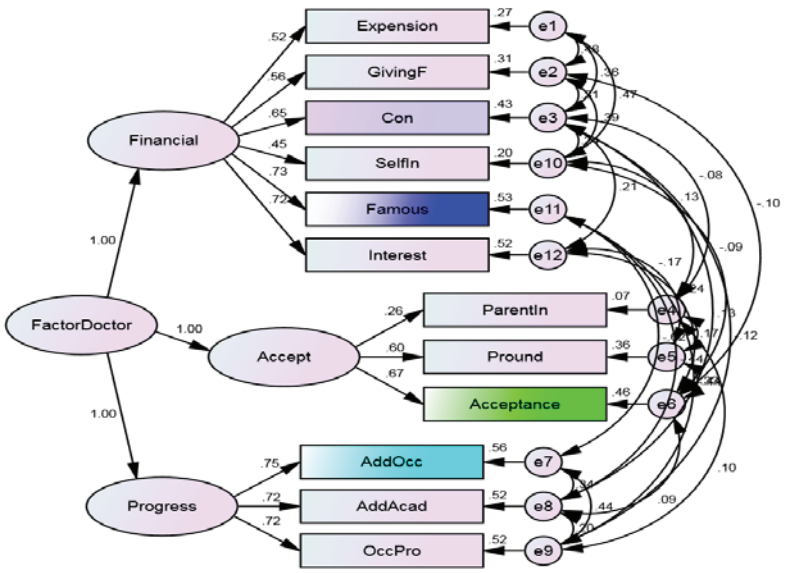

Figure-2: The 2nd CFA of the economic, social, and institutional factors that influence the decision to study in the PhD in PHIRD

3. Results of the Composition Analysis of the MPH and PhD in PHIRD

3.1. Results of the EFA found a KMO or MSA equal to 0.955 and 0.938, which are greater than 0.80, very good level, according to the criteria of Kim and Mueller[7] and the results of Bartlett's Test of Sphericity[8] found that the variables were statistically significant at the level of 0.001, could be used to analyze the components. The results of component extraction of each variable used in analyzing, A total of 20 numbers, between 0.345 - 0.712 and 0.583 - 0.838 are medium-high and have Cronbach's Alpha = 0.952 and 0.977. The result of variable arrangement into the structure, adjusting structure, and name the elements with Orthogonal Rotation found that all 20 variables used in the analysis can be grouped into 2 components with eigenvalues greater than 1.00, indicating that each element can explain the variance of all 20 variables more than 1.00. Two elements could explain the variance of the total of 20 variables were 58.697% and 75.739 %. When considering to put each variable into one element, only that variable has the highest weight (Factor Loading) found that 2 elements could be classified into 20 elements, with each element consisting of variables 3-17 characters, each variable that has been arranged in the composition weights elements from 0.514 to 0.843 and 0.623 to 0.853. The element 2 elements have been named so that they can be interpreted clearly as detailed in Table 2.

Table-2: Restructuring the Structure of the MPH and PhD in PHIRD

Side/ Core Component	Sub-Component	
MPH		
1) Professional	1.	Seminar in Public Health Management following the sufficiency economy (Seminar)
	2.	Integrated research methods in public health (Research)
	3.	Public health development theory (Theory)
	4.	Theory and design of public health innovations (Design)
	5.	Seminar on research and innovation in public health (SeminarResearch)
	6.	Public Health Thinking Strategy (Strategy)
	7.	Public health supervision strategies (Supervisor)
	8.	Information technology for the development of public health innovations (Technology)
	9.	Public health analysis and evaluation (Evaluation)
	10.	Techniques for creating public health gauges (Measurement)
	11.	Public health measurement and evaluation innovation (Innovation)
	12.	Qualitative research in public health (Qualitative)
	13.	Quantitative research in public health (Quantitative)
	14.	Knowledge management and learning organization (KM)
	15.	Development of public health innovations (DevelopmentInnovation)
	16.	Action research on innovation in public health (ActionResearch)
	17.	Seminar in Information Technology in Public Health (Information)

Cont... **Table-2: Restructuring the Structure of the MPH and PhD in PHIRD**

2) Potential	18. English for Master (Eng)
	19. Thesis (Thesis)
	20. Multivariate statistical analysis (multilevel) (Statistics)
PhD	
1) Professional	1. Advanced statistics in public health (AdvancedStat)
	2. Advanced research methods in public health (AdvancedR)
	3. Theory and design of advanced innovations in public health (AdvancedDesign)
	4. Seminar in Advanced Research and Innovation in Public Health (AdvancedSeminar)
	5. Seminar in Advanced Information Technology in Public Health (AdvancedTechSem)
	6. Advanced analysis and assessment in public health (AdvancedEval)
	7. Innovative measurement and evaluation in public health (AdvancedTechMea)
	8. Techniques for creating advanced metrics in public health (AdvancedMea)
	9. Advanced qualitative research in public health (AdvancedQualitative)
	10. Advanced quantitative research in public health (AdvancedQuantitative)
	11. Advanced integrated research in public health (AdvancedMMethods)
	12. Advanced Health Economics Analysis (AdvancedEconomic)
	13. Development of future innovations (InnovationFuture)
	14. Dissertation (Dissertation)
	15. Development of advanced innovations in public health (DevelopmentAdvInno)
	16. Action research, Advanced Innovation in Public Health (AdvancedActResearch)
	17. Advanced information technology for the development of public health innovations (AdvancedInformation)
3) Potential	18. Seminar in Public Health Management following the guidelines of the World Health Organization (AdvancedSeWHO)
	19. English for Doctorate Degree (EngDissertation)
	20. Research and development of public health innovations at the international level (RandD)

3.2. Results of the 2nd CFA showed that the 20 elements are two sub-components. Overall the field of research and innovation in public health is real as detailed in Figure 3-4 as follows.

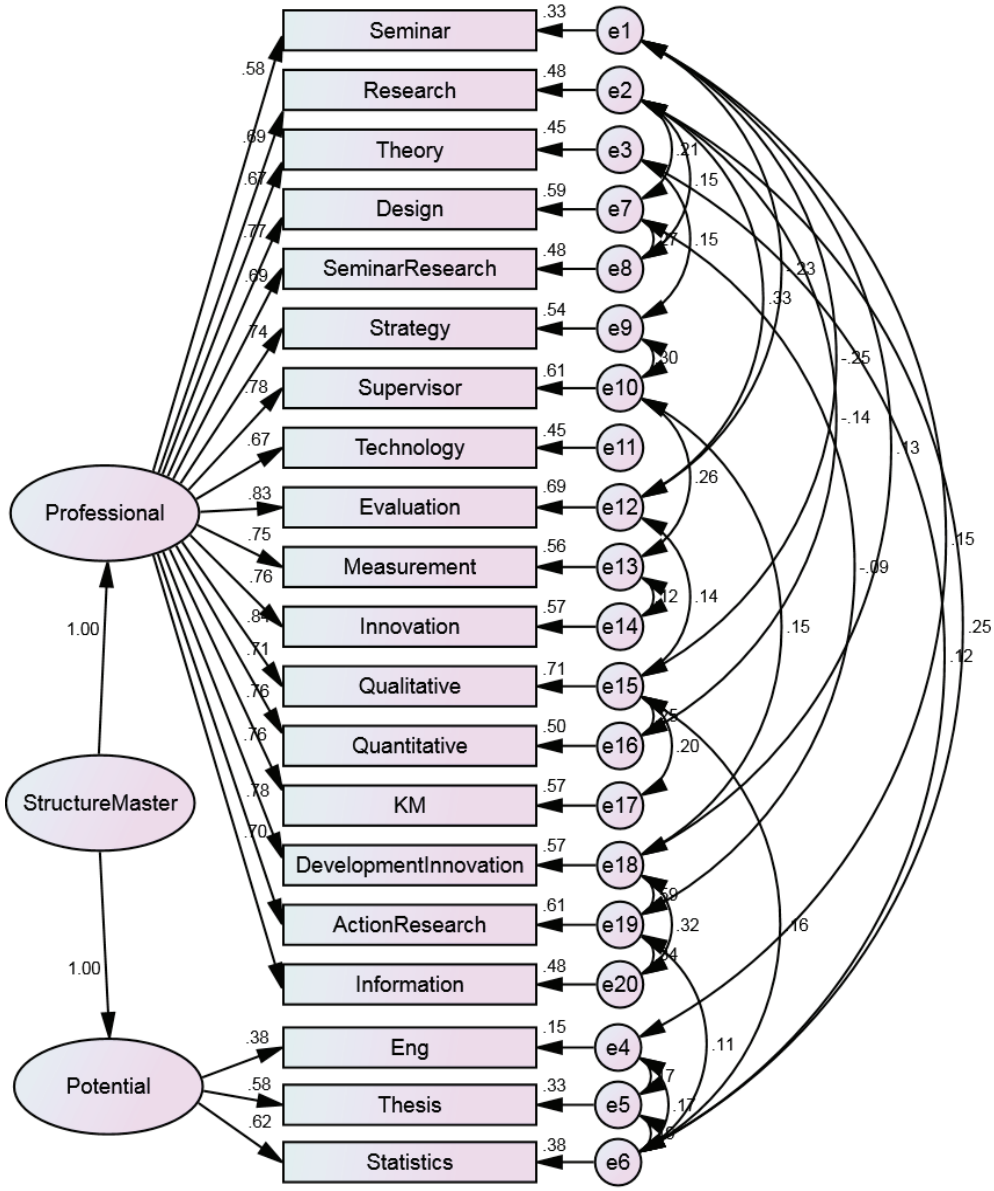

Figure-3: Diagram of the 2nd CFA of the components of the structure of the MPH in PHIRD

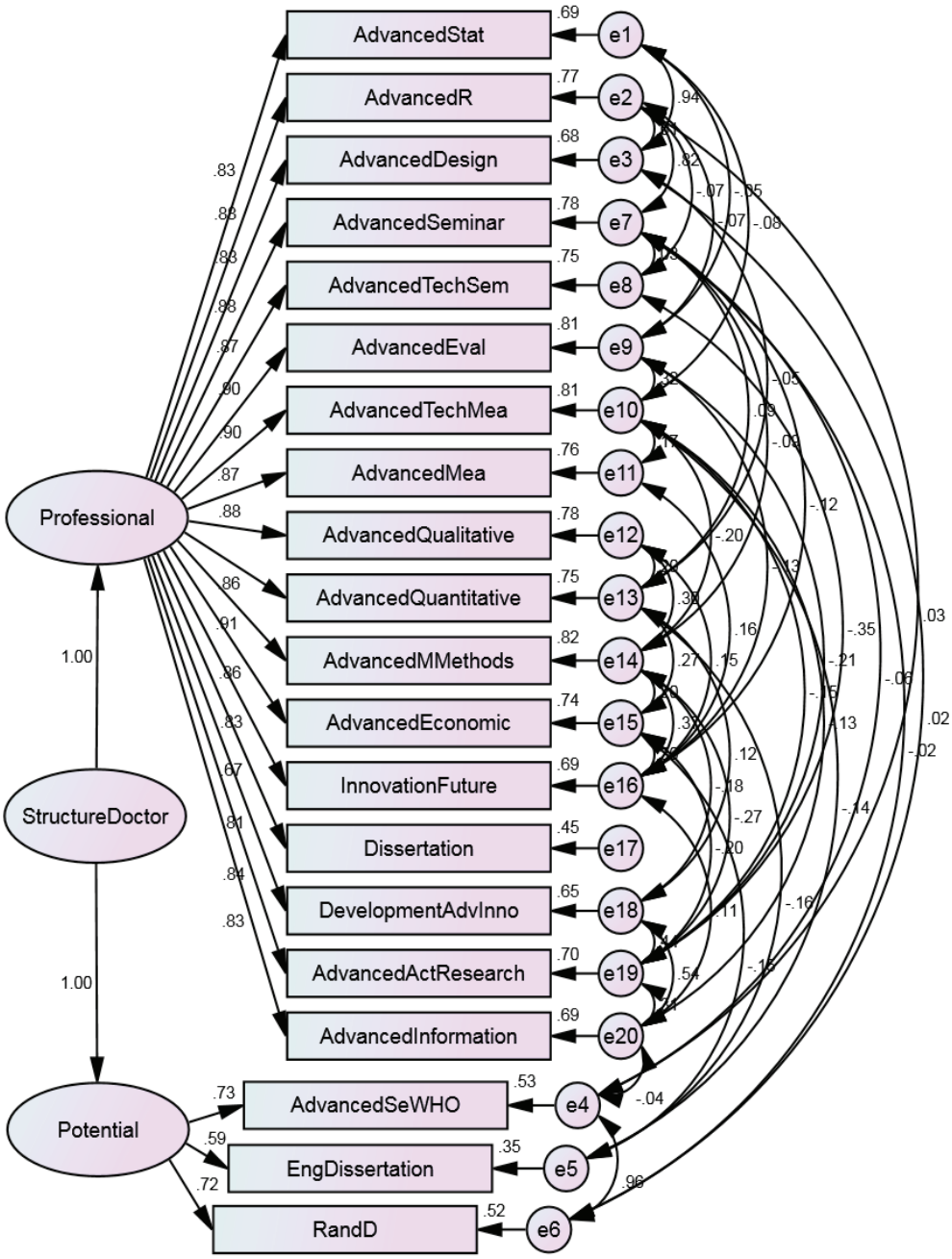

Figure-4: Diagram of the 2nd CFA of the structure of the PhD in PHIRD

Discussions

Needs of 4th-year students and graduates in health sciences regarding curriculum MPH and PhD in PHIRD. The expected level was at a high level (= 4.31/5 and 4.33/5), the PNI $_{Modified}$ of MPH = 3.31/5, and PNI $_{Modified}$ of PhD = 3.33/5.

1. 2. 3. 3.1. The analysis of the factors found that all 12 studied variables can be grouped into 3 components, with each element having a value of more than 1.00 and all the components could explain the variance of all variables 59.733 percent and 66.682%. The weight of each variable have valued from 0.569 to 0.862 and 0.556 to 0.834 showed that the variables analyzed can be used to study the factors and the decision to study further because these variables are documented and research supported by the researcher who has studied the related documents and research and therefore has important variables that are consistent and cover the large structure of the three aspects, namely

finance, acceptance side, and progress and then to check the structural accuracy again by analyzing the 2nd CFA and found that the factors consists of 3 main components and 12 elements in which the model is consistent with the empirical data were good, with a statistical measure of harmonization, passing all good criteria, have good structural validity and can be used to study the factors and found that the model has good accuracy because the variables and components used in the analysis have relevant documents and research and have been through the 2nd CFA. The structures are good which should be suitable for importing data in the design of programs.

The analysis of the structure found that the 20 studied variables can be grouped into 2 components, each element has a greater than 1.00 value, and all the components could explain 58.697% and 75.739% of the variance of all variables. The weight of each variable have valued from 0.514 to 0.843 and 0.623 to 0.853 showed that the variable analyzed can be used to study because these variables are documented and supported by the researcher and the relevant researches and documents have important variables that are consistent and cover a large structure of the two aspects are professional and potential, and then to check the structural accuracy again by analyzing the second confirmatory element. The 2nd CFA of this format showed that the structure consists of 2 main components and 20 sub-elements that the model consistent with empirical data, were satisfied with the statistical value of harmonizing through all criteria and showed that the 2nd CFA developed has good structural accuracy and can be used to study the structures because the variables and components used in the analysis have relevant documents and research and have passed the 2nd CFA and found that structural precision is in good shape which should be suitable for importing data into the design of programs and the results from this research resulting in participation and coordination among graduate students, public health officers, and the health network. In the development of the programs as input for curriculum development and course opening to produce public health innovations that can be used to solve health problems

In this study found that needed in the further studies. Therefore, the person responsible for the program and the Faculty of Public Health and Allied Health Sciences of Royal Institute should focus on curriculum design and course opening and found that the components have good structural accuracy because the model is consistent with the empirical data with good statistics, with the statistical measurements of conformity passing almost all good criteria in all 4 cases except the curriculum structure of PhD at $\chi 2$ with statistical significance p-value = 0.001[8], CMIN / DF> 2 (2.257)[9], AGFI <0.90 (0.853)[10] and RMSEA> 0.05 (0.064)[11,12]. The desired composition of the model must be $\chi 2$ with no statistically significant p-value> 0.05[8] CMIN. / DF <2[9,13] GFI values> 0.90, AGFI values> 0.90[10] NFI values> 0.90[11] CFI values> 0.90[11] RMR <0.05[14,15] and RMSEA <0.05[11,12] by the importance of components of financial, acceptance and the progress and components of professionalism and potential are equally important, 4 models of these elements appropriate in designing by experimenting and can be used more completely**.** Suggestions for further research, the expert's perspective on the curriculum structure should be studied and other issues related to developing and requesting to open a course to make the course more complete to be consistent with the context and social conditions allowing graduates to have the capacity to produce public health innovations**.**

Ethical Clearance- Taken from Sirindhorn College of Public Health Phitsanulok committee

Source of Funding- Self

Conflict of Interest- Nil

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