

## Effect of an Operational Competency Development Model of Public Health Personnel in the Virtual Service Provider Office (VSPO) in Thailand

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### Abstract

The main objective of this study was to develop the operational competency of public health personnel in the Virtual Service Provider Office (VSPO) in Thailand. The study was conducted in four stages: (1) study and review of situations, problems and guidelines for operational competency development; (2) creation and justification of the operational competency development model components by analysis and synthesis of data gathered from the first stage; (3) implementation and dissemination of results by training; and (4) evaluation by executives and practitioners.

The results of achievements after training showed that the knowledge of the practitioners who were trained at competency level 1 had improved from 75.00% to 88.35%. The knowledge of practitioners at level 2 increased from 82.50% to 87.50%. The achievement of skills by behavioral observation suggested that practitioners at level 1 had increased their skills

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from 50.30% to 75.00%, and practitioners at level 2 increased their skills from 60.50% to 79.50%. Evaluation of the productivity from group process and reports before and after the training program for 3 major elements found that SWOT analysis increased from 76.69% to 96.78%, determination strategies increased from 86.86% to 98.25%, and finally transformation strategies to action plan increased from 80.52% to 95.64%. And the public health personnel's competency after the intervention was significantly higher than before at 0.01. 4) The level of satisfaction towards the competency development management was at a high level.

It can be confidently concluded that the competency development procedure outlined here in is suitable and can be applied successfully. The format developed by this work can be applied to other virtual offices to enhance their competitiveness and to further develop their human resources.

**Keywords:** Operational Competency Development of Public health personnel / Virtual Service Provider Office

### **บทคัดย่อ**

งานวิจัยนี้มีวัตถุประสงค์เพื่อพัฒนาสมรรถนะในการปฏิบัติงานของบุคลากรสาธารณสุข ในสำนักงานเขตบริการสุขภาพเสมือนจริงของประเทศไทย การวิจัยถูกดำเนินการใน 4 ขั้นตอน คือ (1) การศึกษาและทบทวนเอกสารที่เกี่ยวข้องในสถานการณ์ ปัญหา และแนวทางต่างๆ สำหรับการพัฒนาสมรรถนะในการปฏิบัติงาน (2) การสร้างและตรวจสอบองค์ประกอบรูปแบบของการพัฒนาสมรรถนะในการปฏิบัติงาน โดยการวิเคราะห์และสังเคราะห์ข้อมูลที่ได้รวบรวมมา

จากขั้นตอนที่หนึ่ง (3) การทดลองและศึกษาผลที่ได้โดยการฝึกอบรม และ (4) การประเมินผลโดยผู้บริหารและบุคลากรสาธารณสุข

ผลสัมฤทธิ์ภายหลังจากดำเนินการฝึกอบรม พบว่า ความรู้ของบุคลากรสาธารณสุขที่ผ่านการฝึกอบรม ระดับสมรรถนะ 1 ความรู้เพิ่มขึ้น 88.35% จากเดิม 75.00% และบุคลากรสาธารณสุขระดับสมรรถนะ 2 มีความรู้เพิ่มขึ้น 87.50% จากเดิม 82.50% ผลสัมฤทธิ์ของทักษะความสามารถ พบว่าบุคลากรสาธารณสุขระดับสมรรถนะ 1 มีทักษะเพิ่มขึ้นที่ระดับ 75.00 จากเดิม 50.30 และบุคลากรสาธารณสุขระดับสมรรถนะ 2 มีทักษะเพิ่มขึ้นที่ระดับ 79.50 จากเดิม 60.50 ส่วนการประเมินผลผลิตภาพจากกระบวนการกลุ่ม และรายงานก่อนและหลังที่ได้จากการฝึกอบรม สำหรับ 3 องค์ประกอบหลัก พบว่าปริมาณร้อยละของรายงานด้านการวิเคราะห์องค์การ (SWOT Analysis) เพิ่มขึ้นจาก 76.69% เป็น 96.78% ปริมาณร้อยละของรายงานด้านการกำหนดยุทธศาสตร์ เพิ่มขึ้นจาก 86.86% เป็น 98.25% และปริมาณร้อยละของรายงานด้านการแปลงกลยุทธ์เป็นแผนปฏิบัติงาน (Action Plan) เพิ่มขึ้นจาก 80.52% เป็น 95.64% และพบว่า บุคลากรสาธารณสุขมีสมรรถนะหลังการทดลองสูงกว่าก่อนการทดลอง อย่างมีนัยสำคัญทางสถิติที่ระดับ 0.01 มีความพึงพอใจต่อการจัดการพัฒนาสมรรถนะตามรูปแบบที่พัฒนาขึ้น อยู่ในระดับมาก

จึงสามารถสรุปได้อย่างมั่นใจได้ว่าขั้นตอนการพัฒนาสมรรถนะในการปฏิบัติงานของบุคลากรสาธารณสุขนี้ มีความเหมาะสมและสามารถนำมาใช้ได้ประสบความสำเร็จ รูปแบบที่พัฒนาขึ้นสามารถนำไปใช้กับสำนักงานเสมือนจริง เพื่อเพิ่มศักยภาพในการแข่งขัน และการพัฒนาทรัพยากรมนุษย์ในอนาคต

**คำสำคัญ:** การพัฒนาสมรรถนะในการปฏิบัติงานของบุคลากรสาธารณสุข / สำนักงานเขตบริการสุขภาพเสมือนจริง

## Introduction

In 2013, efforts to reform the health system of Thailand started with the aim of optimizing the management of the health system of the country, improving the management style in the area providing health services in the 12 regions, and promoting solidarity in the management and services of the health services network. In 2014, the Second Regional Health Service, one of the country's 12 service network zones, was defined for Virtual Service Provider Office (VSPO) and was responsible for Tak Province, Phitsanulok Province, Sukhothai Province, Uttaradit Province, and Phetchabun Province. This is similar to having a virtual enterprise, but no clear model operates in a virtual organization and there is no clear format that can be considered appropriate to the context. As a virtual organization, it is a new form of organization challenged to bring the application, but not the definition that is generally accepted by the virtual organization seen 15–20 years ago, when working at home was made possible by the use of technology (Olson, 1983; Venkatesh & Vitalari, 1992). Since then, terms such as virtual office (VO), virtual classroom, and virtual corporation have appeared in the literature (e.g., Giuliano, 1982; Hiltz, 1986; Malone & Davidow, 1992).

The VSPO Management Model (VSPOMM) for service plan (SP) in the Second Regional Health Service in Thailand was composed of 7 factors from 74 selected variables, as follows: (1) providing administration and management for everyone, regardless of time and place, as of media and technologies fit in any way; (2) establishing administration by collaboration and clearing house; (3) supporting technical services both in the system and outside the system in academic administration; (4) instituting

stakeholder support system in the network of general administration; (5) freedom in budget administration, especially in the information technology development; (6) personnel administration with new management and information technology skills; (7) operating support resources management, including management cockpit, document and URL web link, and using web technology applications (Boonda et al., 2014). They put into consideration the concept of virtual reality created by a computer to establish an organization, so it may be of no physical shape, which is a characteristic that is different from traditional organizations in general. However, the definition of virtual organizations refers to the network of organizations linked by information technology in order to share operational skills and resources (Travica, 1997) through the use of telecommunications, technology, social, and community networks, which are interdependent in terms of cooperation, flexibility, trust, and self-organization (Faucheux, 1997). The scope of the organization has an unclear boundary and location, which is expected to be useful in the adoption of VSPOMM for SP and in performing effectively.

“VSPO” is a new key management mechanism created to realize the health service system development plans and also a mechanism established to bring about integration of all elements of the health system. However, this VSPO to support the work of the executive has not yet been formally deployed (in terms of operations and practitioners), and there are no training programs instituted yet, which are based on necessary factors to develop the competency of public health personnel in each province. Researchers are interested in the education aspect of the operational

competency development model of public health personnel in the VSPO in Thailand, which is a new model intended to solve the problems mentioned above.

### **Research Objective**

The main objective of this study was to develop the operational competency of public health personnel in the VSPO in Thailand, which includes the following six sub-purposes:

1. To analyze the VSPOMM factors for SP in the regional health service in Thailand by using exploratory factor analysis (EFA) and second-order confirmatory factor analysis (2<sup>nd</sup> Order CFA)

2. To define the operational competency of public health personnel in the VSPO and competency assessment of executives

3. To analyze the need and guidelines for improving competency among executives

4. To analyze the factors of the training program in order to develop the competency of regional operating officers (ROOs) in the VSPO in Thailand using the EFA and 2<sup>nd</sup> Order CFA.

5. To design an appropriate training program to develop the competency of ROOs in the VSPO in Thailand

6. To develop the operational competency of public health personnel using the program training

## Methodology

### Scope of Research

Step 1: Study and review of situations, problems and guidelines for operational competency development

1. Analyzing the VSPOMM factors for SP in the regional health service in Thailand

1) The population used in the development of the components consisted of qualified members of the health services system in the VSPO of the regional health service, and the executives and practitioners in the vice chief of the provincial health office in the 12 health service virtualization regions of Thailand.

2) Sampling site used in the study consisted of two groups: (1) group of highly qualified experts of nearby health services system in the VSPO of the regional health service in Thailand, of which 274 were selected by network sampling; (2) to develop the confirmatory factor, 664 administrators and practitioners in the field of health services and VOs were selected by multistage random sampling covering all geographical regions and including executives and workers from other parts of Thailand.

3) Tools used in research: The instrument used for data collection consisted of the questionnaire that the researchers created. Two versions of the questionnaire were distributed among qualified administrators and practitioners in the field offices of the Virtual Health Services. (1) The questionnaire for luminaries was used to collect information for the development of components. It is a survey of the experts' opinions on a list of variables (90) on the form of the VSPOMM for service plans in regional health service in Thailand. (2) The

questionnaire for the management and practitioners in the Virtual Service Provider Office of Thailand was the tool used to collect information for the development of component-oriented confirmation.

4) Data analysis: Developed by two elements: (1) Experts, who created the master of studies and research-related documents, and then used it as a framework to create a query. The survey collected the data from a sample of experts and analyzed it with EFA. (2) CFA, which introduces elements that are developed by experts in the framework of item 1 (above) to create a query, and a questionnaire to collect data from managers and practitioners in the 12 of VSPO of the regional health service in Thailand, and then analyzed with the 2<sup>nd</sup> Order CFA.

2. Defining the operational competency of public health personnel in the VSPO and competency assessment of executives

1) Population: This includes executives on various aspects, and practitioners in the Vice Chief of the Provincial Health Office in the Second Regional Health Service (Phitsanulok, Tak, Uttaradit, Sukhothai, and Phetchabun).

2) Sampling site: 15 executives were selected by purposive sampling.

3) Tools used in research: 15 executives by focus group discussion.

4) Data analysis: Content analysis was used.

3. Analyzing the need and guidelines for improving competency

1) Population: This consisted of executives on various aspects, and practitioners in the Vice Chief of the Provincial Health Office in the Second Regional Health Service (Phitsanulok, Tak, Uttaradit, Sukhothai, and Phetchabun).

- 2) Sampling site: 15 executives were selected by purposive sampling.
- 3) Tools used in research: 15 executives by focus group discussion
- 4) Data analysis: Content analysis was used.

**Step 2: Creation and justification of the operational competency development model components by analysis and synthesis of data gathered from the first stage**

1. Analyzing the factors of the training program to develop the competency of ROOs in the VSPO in Thailand.

1) The population used in the development of the components referred to qualified members of the health services system in the VSPO of the regional health service and the executives and practitioners in the vice chief of the provincial health office in the 12 health service virtualization regions of Thailand.

2) Sampling sites used in the study consisted of two groups: (1) 274 highly qualified experts of nearby health services system in the VSPO of the regional health service in Thailand, who were selected by network sampling; (2) to develop the confirmatory factor, 664 administrators and practitioners in the field of health services and VOs who were selected by multistage random sampling covering all geographical regions and including executives and workers from other parts of Thailand.

3) Tools used in research: The instrument used for data collection consisted of a questionnaire that the researchers created. Two versions of the questionnaire were distributed among qualified administrators and practitioners in the field offices of the Virtual Health Services. (1) The questionnaire for luminaries was used to collect information for the development of components.

It is a survey of the experts' opinions on a list of variables (40) on the form of the training program factors to develop the competency of ROOs in the VSPO in Thailand. (2) The questionnaire for administrators and practitioners in the VSPO of Thailand was the tool used to collect information for the development of component-oriented confirmation.

4) Data analysis: Developed by two elements: (1) Experts, who created the master of studies and research-related documents, and then used it as a framework to create a query. The survey collected the data from a sample of experts and analyzed it with EFA. (2) CFA, which introduces elements that are developed by experts in the framework of item 1 (above) to create a query, and a questionnaire to collect data from managers and practitioners in the 12 of VSPO of the regional health service in Thailand, and then analyzed with the 2<sup>nd</sup> Order CFA.

2. Designing the training program to develop the competency of ROOs in the VSPO in Thailand.

1) Population: Experts in terms of designing the training program to develop competency

2) Sampling site: 15 experts who were selected by purposive sampling

3) Tools used in research: Focus group discussion

4) Data analysis: Content analysis was used

### **Steps 3-4: Implementation and dissemination of results by training and evaluation of executives and practitioners**

#### 3. Developing the operational competency of public health personnel

1) Population: This consisted of executives on various aspects, and practitioners in the Vice Chief of the Provincial Health Office in the Second Regional Health Service (Phitsanulok, Tak, Uttaradit, Sukhothai, and Phetchabun).

2) Sampling site: This consisted of 15 executives, as well as practitioners in the Vice Chief of the Provincial Health Office (regional operating officer) in the five provinces (five for each province, for a total of 25). Groups studied in this research were selected by purposive sampling. These individuals are those who have a deep understanding about the executive office of health services or those who are used to performing tasks related to health services, including in field offices.

3) Tools used in research: By passing the training program of four modules and focus group discussion.

4) Data analysis: Data were analyzed using percentage, mean, and content analysis.

### **Results**

#### **1. Analyzing the VSPOMM factors for SP in the regional health service in Thailand using EFA and the 2<sup>nd</sup> Order CFA**

The results of EFA for testing the suitability of the variables used in this study were analyzed using Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy. The result showed that the KMO of MSA was 0.890, which exceeds

0.80, indicating that the variable series was appropriate to be analyzed at a good level on the basis of Kim and Mueller (1978). Moreover, the Bartlett's test of sphericity found that the variables correlated significantly ( $p=0.000$ ), which shows that different variables can be used to analyze the elements.

Results of the 2<sup>nd</sup> Order CFA are analyzed to confirm that the 10 elements are classified as major elements of the four aspects as detailed in Figure 1 and Table 1.

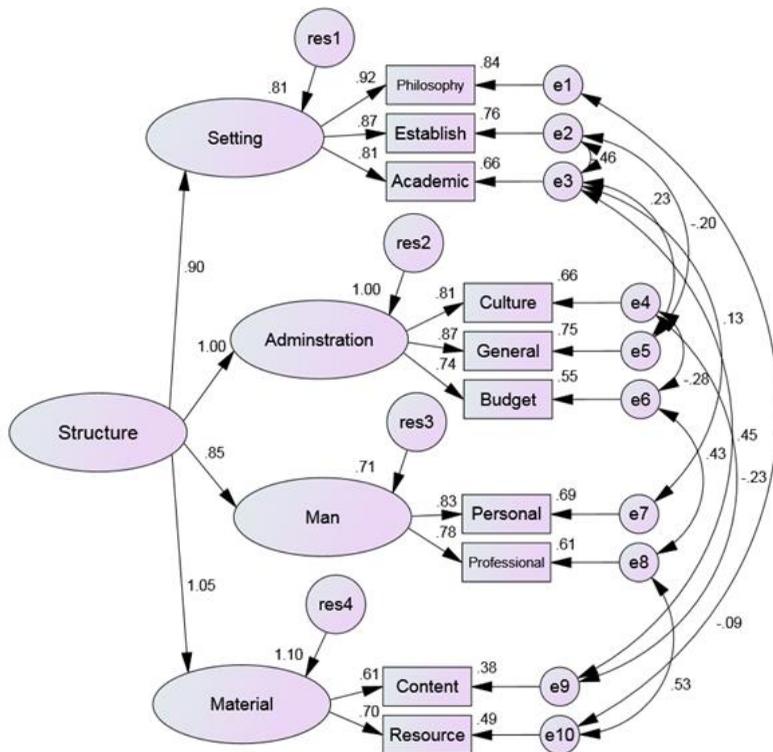


Figure 1 The second confirmatory factor model of the VSPOMM for SP factors in the regional health service in the regional health service in Thailand

**Table 1** Statistics measuring the harmony of the model with empirical data of the VSPOMM for SP factors in the regional health service in Thailand

Fit Index	Acceptable Threshold Levels	The values obtained	Consideration	Decision
Chi-square ( $\chi^2$ )	> 0.05	.076	Meet the criteria	Well
CMIN/DF	< 2.00	1.471	Meet the criteria	Well
GFI	> 0.90	.991	Meet the criteria	Well
AGFI	> 0.90	.976	Meet the criteria	Well
ECVI	<ECVI for Saturated Model (0.290)	0.166	Meet the criteria	Well
Model AIC	<Saturated AIC (110.00)	110.00	Meet the criteria	Well
NFI	> 0.90	.994	Meet the criteria	Well
CFI	> 0.90	.998	Meet the criteria	Well
RMR	< 0.05	.006	Meet the criteria	Well
RMSEA	< 0.05	.027	Meet the criteria	Well

Figure 1 and Table 1 showed that the elements model of VSPOMM factors for service plan in the regional health service in Thailand is desirable and consistent with the empirical data of the administrators and practitioners due to a statistical measure of harmony through them, showing that the variables model has good construct validity. The statistics measure the harmony through all as follows: the resulting management desirable model fits with a chi-square of 30.882, 21 degrees of freedom (DF) and is not statistically significant with a p-value of 0.076 (A good model fit would provide an insignificant result at a 0.05 threshold [Barrett, 2007]), and chi-square statistics and degree of freedom ratio (CMIN/DF) is 1.471 (Although there is no consensus regarding an acceptable ratio for this statistic,

recommendations range from as high as 5.0 [Wheaton et al., 1977] to as low as 2.0 [Tabachnick & Fidell, 2007]). The various goodness of fit indices are also acceptable : the goodness-of-fit index (GFI) is 0.991, and the adjusted goodness-of-fit index (AGFI) is 0.976 (Traditionally an omnibus cut-off point of 0.90 has been recommended for the GFI however, simulation studies have shown that when factor loadings and sample sizes are low a higher cut-off of 0.95 is more appropriate [Miles & Shevlin, 1998]), Expected Cross-Validation Index (ECVI) for Saturated Model is 0.166 (ECVI is a useful indicator of a model's overall fit. The model's ECVI is compared with the ECVI of independent model and the ECVI of saturated model, If the model has good overall fit, its ECVI value should be lower than both the ECVI values of the other 2 models [Byrne, 1998]), Saturated Akaike Information Criterion (AIC) is 110.00 (Probably the best known of these indices is the Akaike Information Criterion [AIC] or the Consistent Version of AIC [CAIC] which adjusts for sample size [Akaike, 1974]). These statistics are generally used when comparing non-nested or non-hierarchical models estimated with the same data and indicates to the researcher which of the models is the most parsimonious. Smaller values suggest a good fitting, parsimonious model however because these indices are not normed to a 0-1 scale it is difficult to suggest a cut-off other than that the model that produces the lowest value is the most superior. It is also worth noting that these statistics need a sample size of 200 to make their use reliable (Diamantopoulos & Siguaaw, 2000), the normed-fit index (NFI) is 0.994 [More recent suggestions state that the cut-off criteria should be  $NFI \geq .95$  (Hu & Bentler, 1999), the comparative fit index (CFI) is 0.998 (a value of  $CFI \geq$

0.95 is presently recognized as indicative of good fit [Hu & Bentler, 1999]), and the root mean square residual (RMR) is 0.006 (Values for the SMR range from zero to 1.0 with well fitting models obtaining values less than 0.05 [Byrne, 1998; Diamantopoulos & Siguaw, 2000]) while the root mean square error of approximation (RMSEA) is 0.027 (more recently, a cut-off value close to 0.06 [Hu & Bentler, 1999] or a stringent upper limit of 0.07 [Steiger, 2007]).

It can be seen that the VSPOM factors for service plan in the regional health service in Thailand is desirable since it includes the four aspects: (1) Material; the tools to support the work of health services consists of two elements; (2) Administration; the general management includes three elements; (3) Setting; the framework for the establishment of the Health Service Virtual Office consists of three elements; and (4) Man; the administrative staff consists of two elements. This leads to a total of ten components: (1) RESOURCE (The resources, operational support, health services); (2) CONTENT (Developing academic subject); (3) GENERAL (General administration); (4) CULTURE (Culture of the organization); (5) BUDGET (budget administration); (6) PHILOSOPHY (Organization philosophy); (7) ESTABLISH (Establishing and administrative in the health service virtualization); (8) ACADEMIC (Academic Administration); (9) PERSONNEL (Personnel administration); and (10) PROFESSIONAL (Professional staff)

## **2. Defining the operational competency of public health personnel in the VSPO and competency assessment**

An inspector of the Ministry of Public Health has determined that a mid-level public health executive must have the following eight traits: (1)

Achievement motivation. (2) Service mind. (3) Expertise. (4) Integrity. (5) Teamwork. (6) Creative and systematic thinking. (7) The consciousness of living by the principles of self-sufficiency. (8) Creating a network of goodwill

A certain level of performance is required for public health personnel in the VSPO which was even more than what was expected from civil servants and the performance of mid-level public health executives. In descending order of importance, the position requires people with the following qualifications: (1) Communication skills, (2) Knowledge broker. (3) System expert.

### **3. Analyzing the need and guidelines for improving competency**

It was the consensus opinion of executives on various aspects, and practitioners in the Vice Chief of the Provincial Health Office in the Second Regional Health Service that there were the needs for operational competency among public health personnel in the following areas (in descending order of importance): (1) communication skills; (2) knowledge broker; and (3) system expert. They also agree that there was a need for operational competency development for public health personnel in the VSPO by training.

### **4. Analyzing the training program factors to develop competency of ROOs in the VSPO in Thailand (Boonda et al., 2016)**

The results of EFA for testing the suitability of the variables used in this study were analyzed using the KMO Measure of Sampling Adequacy. The results showed that the KMO of MSA was 0.959, which exceeds 0.80, showing that the variable series was appropriate to be analyzed at a good level on the basis of Kim and Mueller (1978). Moreover, Bartlett's test of

sphericity found that the variables correlated significantly ( $p=0.000$ ), which showed that different variables can be used to analyze the elements.

Results of the 2<sup>nd</sup> Order CFA are analyzed to confirm that the 4 elements are the four aspects as detailed in Figure 2 and Table 2.

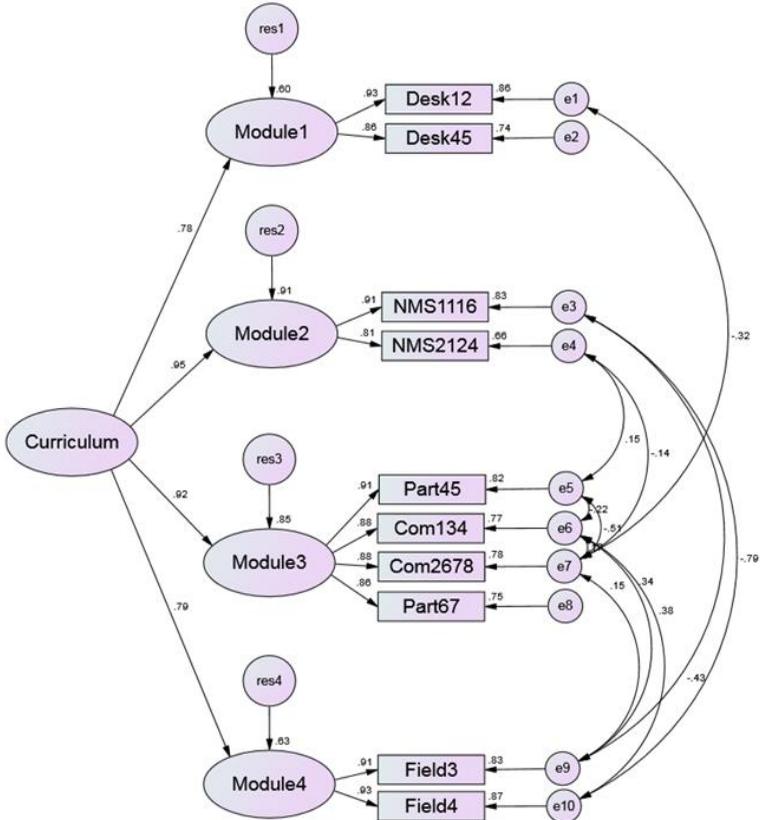


Figure 2 The 2<sup>nd</sup> Order CFA Model of the Training Program Factors to Develop Competency of ROO in the VSPO in Thailand

**Table 2** Statistics measuring the harmony of the model with empirical data of the Training Program Factors to Develop Competency of ROO in the VSPO in Thailand

Fit Index	Acceptable Threshold Levels	The values obtained	Consideration	Decision
Chi-square ( $\chi^2$ )	> 0.05	.055	Meet the criteria	Well
CMIN/DF	< 2.00	1.550	Meet the criteria	Well
GFI	> 0.90	.991	Meet the criteria	Well
AGFI	> 0.90	.975	Meet the criteria	Well
ECVI	<ECVI for Saturated Model (0.290)	0.166	Meet the criteria	Well
Model AIC	<Saturated AIC (110.00)	110.00	Meet the criteria	Well
NFI	> 0.90	.995	Meet the criteria	Well
CFI	> 0.90	.998	Meet the criteria	Well
RMR	< 0.05	.008	Meet the criteria	Well
RMSEA	< 0.05	.029	Meet the criteria	Well

Table 2 and Figure 2 showed that the elements of the training program that include four aspects are main elements and tensub-elements have good construct validity. Because the model is consistent with the empirical data, it is in good shape. The statistics measure the harmony through all as follows: the resulting management desirable model fits with a chi-square of 30.997, 20 degrees of freedom (DF) and is not statistically significant with a p-value of 0.055, and chi-square statistics and degree of freedom ratio (CMIN/DF) is 1.550 (Although there is no consensus regarding an acceptable ratio for this statistic, recommendations range from as high as 5.0 [Wheaton et al., 1977] to as low as 2.0 [Tabachnick & Fidell, 2007]). The various goodness of fit indices are also

acceptable: the goodness-of-fit index (GFI) is 0.991, and the adjusted goodness-of-fit index (AGFI) is 0.975 (Traditionally an omnibus cut-off point of 0.90 has been recommended for the GFI however, simulation studies have shown that when factor loadings and sample sizes are low a higher cut-off of 0.95 is more appropriate [Miles & Shevlin, 1998]), expected cross-validation index (ECVI) for saturated model is 0.166 (The model's ECVI is compared with the ECVI of independent model and the ECVI of saturated model, If the model has good overall fit, its ECVI value should be lower than both the ECVI values of the other 2 models [Byrne, 1998]), Saturated akaike information criterion (AIC) is 110.00 [Probably the best known of these indices is the Akaike Information Criterion (AIC) or the consistent version of AIC (CAIC) which adjusts for sample size (Akaike, 1974). These statistics are generally used when comparing non-nested or non-hierarchical models estimated with the same data and indicates to the researcher which of the models is the most parsimonious. Smaller values suggest a good fitting, parsimonious model however because these indices are not normed to a 0-1 scale it is difficult to suggest a cut-off other than that the model that produces the lowest value is the most superior. It is also worth noting that these statistics need a sample size of 200 to make their use reliable (Diamantopoulos & Siguaw, 2000), the normed-fit index (NFI) is 0.995 (More recent suggestions state that the cut-off criteria should be  $NFI \geq 0.95$  [Hu & Bentler, 1999]), the comparative fit index (CFI) is 0.998 (a value of  $CFI \geq 0.95$  is presently recognized as indicative of good fit [Hu & Bentler, 1999]), and the root mean square residual (RMR) is 0.008 (Values for the SMR range from zero to 1.0 with well fitting models obtaining values less than 0.05 [Byrne, 1998; Diamantopoulos & Siguaw, 2000]) while the root mean square error of

approximation (RMSEA) is 0.029 (more recently, a cut-off value close to 0.06 [Hu & Bentler, 1999] or a stringent upper limit of 0.07 [Steiger, 2007]). It can be seen that the Training Program Factors to Develop Competency of ROOs in the VSPO in Thailand is desirable since it includes the following four aspects:

- (1) Module 1: Health Sector Reform and Regional Health System, two elements;
- (2) Module 2: Management, Leadership and Partnership for Regional Health, two elements;
- (3) Module 3: Competency of ROO, four elements; and
- (4) Module 4: Field Study, two elements. This yielded a total of 10 components:
  - (1) DESK12 (Service Plan and Personnel Administration);
  - (2) DESK45 (Fiscal and Monetary, Internal Control and Risk Management);
  - (3) NMS1116 (New management skills, System Thinking, Analytical Thinking, Synthesis Thinking, Conflict Management part 1, Leadership);
  - (4) NMS2124 (Positive Thinking, Conflict Management part 2, Negotiation Skill Contingency Management);
  - (5) PART45 (Network Management, Team Building);
  - (6) PART67 (Project Management, Monitoring and data definition);
  - (7) COM134 (Presentation of Methods and Data for monitoring, Presentation skill, Conference management skill);
  - (8) COM2678 (Researching, learning skill, Communication skill exercise, Action plan work shop, Preparation to study in the fields work shop);
  - (9) FIELD3 (Summary to adjust Strategies, KPI and Action Plan); and
  - (10) FIELD4 (Summary to present for Administrators in the VSPO).

##### **5. Designing the training program to develop the competency of ROOs in the VSPO in Thailand**

By beginning from steps 1 and 2 in the research process includes studying the data and information, analysis and synthesis of the components of structure in the VSPOMM for SP from data and experts, and

then creation of the components of a new training program. Subsequently, this has brought both the elements of structure and training program analyzed by SEM, which is developed by two elements: (1) EFA and (2) second-order CFA. The results of the second-order CFA from the data of the administrators and practitioners in the VSPO in the regional health service in Thailand indicated that the elements of the training program that include four aspects of main elements and 10 sub-elements have good construct validity. Because the model is consistent with the empirical data, it is in good shape. Then, new training program to develop the competency of ROO in a VSPO in Thailand was created and the optimal training program to develop the competency of ROO in a VSPO in Thailand was determined. The results of the training program to develop the competency of ROO in a VSPO in Thailand are presented with four modules in the following order: (1) Module 1: Health Sector Reform and Regional Health System; (2) Module 2: Management, Leadership, and Partnership for Regional Health; (3) Module 3: Competency of ROO; and (4) Module 4: Field Study as detailed in Table 3.

**Table 3** Structure of the Training Program Factors to Develop Competency of ROO in the VSPO in Thailand

Side	Core Component
1) MODULE1	1. Service Plan and Personnel Administration
	2. Fiscal and Monetary, Internal Control and Risk Management
2) MODULE2	3. New management skills, System Thinking, Analytical Thinking, Synthesis Thinking, Conflict Management part1, Leadership
	4. Positive Thinking, Conflict Management part2, Negotiation Skill Contingency Management

Table 3 (continued)

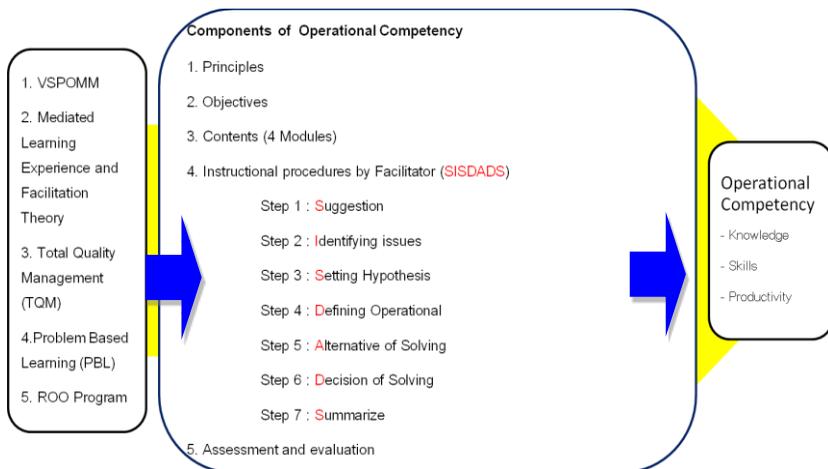
Side	Core Component
3) MODULE3	5. Network Management, Team Building
	6. Project Management, Monitoring and data definition
	7. Presentation of Methods and Data for monitoring, Presentation skill, Conference management skill
	8. Researching, learning skill, Communication skill exercise, Action plan work shop, Preparation to study in the fields work shop
4) MODULE4	9. Summary to adjust Strategies, KPI and Action Plan
	10. Summary to present for Administrators in the VSPO

And results of the data analysis and the opinions of the practitioners in the Vice Chief of the Provincial Health Office in the Second Regional Health Service, and executives in all provinces in Thailand from try out about the training in Step 3 (Implementation using the various practitioners in the Vice Chief of the Provincial Health Office in 5 provinces [25 people] who attended the training courses of the field practitioners of the province) and in Step 4 (Evaluating the 15 executives [Service Provider Board] who managed in VSPO of the Ministry of Public Health in Thailand) found that most practitioners and executives agreed on most issues of the 4 modules.

After that, this study was research and development and was conducted in four stages, as follows: (1) to study the method of operational competency development model based on problem based learning principles from related documents and literatures; (2) to develop and evaluate the quality of the operational competency development model by 5 experts and then a pilot study again was conducted for one group (15 persons); (3) implement the developed operational competency development model to compare public

health personnel's skill before and after attended the activities; (4) investigate the satisfaction of public health personnel towards the developed model. The samples in this study research were one group of public health personnel (15 persons) by purposive sampling technique from the Lampang Provincial Health Office. The instruments used for data collection was lesson plan, skill test, and satisfaction questionnaires. Descriptive statistics such as means, standard deviations were computed, and t-test dependent was used to compare pre-test and post-test means.

And the findings were as follows: (1) the developed operational competency development model consisted of 5 components; principles, objectives, contents, instructional procedures, assessment and evaluation as Figure 3. (2) The quality of the model checked by experts was good. (3) The results of the experiment showed that the operational competency development model following the stage was smooth.



**Figure 3** Components of an Operational Competency Development Model of Public Health Personnel in the Virtual Service Provider Office (VSPO) in Thailand

## 6. Developing the operational competency of public health personnel

The results of achievements for developing the operational competency of public health personnel after training with 4 modules, lesson plan, skill test, and satisfaction questionnaires showed that the knowledge of practitioners who were trained at competency level 1 had improved from 75.00% to 88.35%. The knowledge of practitioners at level 2 increased from 82.50% to 87.50%. The achievement of skills by behavioral observation suggested that practitioners at level 1 had increased their skills from 50.30% to 75.00%. Practitioners at level 2 increased their skills from 60.50% to 79.50%. Evaluation of the productivity from group process and reports before and after the training program for 3 major elements showed that SWOT analysis increased from 76.69% to 96.78%, determination strategies rose from 86.86% to 98.25%, and transformation strategies to action plan rose from 80.52% to 95.64%.

The public health personnel's competency after the intervention was significantly higher than before at 0.01. And the level of satisfaction towards the task analysis management was at a high level.

## Discussion and Conclusion

The results of developing a training program to develop the competency of ROO in a VSPO in Thailand, which practitioners and executives agreed with the points on four modules, found that the course focused on adult learning and active learning, which the participants agreed that the course is appropriate and useful, can be applied better. This is in response to VSPO, which is a new key management mechanism created to realize the health service system development plans and also a mechanism established to bring about the

integration of all elements of the health system that is composed of seven factors. These components of variables were analyzed by EFA and second-order CFA to use as a basis of the training program design by creating the components of a new training program. The elements considered are as follows: (1) health sector reforms, (2) regional health system, (3) new management, (4) leadership, (5) partnership for regional health, (6) competency of the regional officer, and (7) field learning. Then, the optimal training program was determined.

In the part of the effectiveness of the training program to develop the competency of ROO in a VSPO in Thailand, achievement evaluation of knowledge, skills, and practices by facilitators and self-assessment of the performance of public administration as well as follow-up comments in a meeting with the trainees found the following results: (1) The role and performance management of the participants before and after the training program have different average scores, which showed statistically significant difference ( $P < 0.05$ ). In terms of the facilitator role, mentor role, innovator role, broker role, producer role, director role, and coordinator role, the average scores of the monitor role were statistically insignificant difference ( $P > 0.05$ ). The role of the regulator that seems like a watchful and intrusive gaze means supervision, and snooping seems like a controlling or nosy activity but is an act to maintain the high performance of the personnel and team. Depending on who is trained, there are a variety of positions, not working directly in the VSPO and not the role full potential because it does not mandate directly. (2) The desirable competencies of ROO in the VSPO equivalent to middle-level public health administrators in eight aspects are (1) achievement orientation, (2) good

service, (3) accumulating expertise in careers but focusing on the knowledge broker, (4) virtue ethics and dignity, (5) cooperation, (6) systems thinking: creative but focusing on the system experts, (7) consciousness of living based on the sufficiency, and (8) building alliances in the management but focusing on communication technology and information. The average comparison before and after the training program in the eight performances showed statistically significant difference ( $P < 0.05$ ). This might be due to the training model, activities to promote teamwork, creating a supportive network mutual help, and teamwork. Learning portfolio is an exchange between members with similar properties. It is an important platform that complements the knowledge and exchange experiences in view of the development of responsibility for the virtual organization.

A reflection of the views from people outside the organization (outside in) helps promote sustainability expertise. In addition, the performance of ROO in the VSPO equivalent to middle-level public health executives in eight aspects is a needed feature of the Ministry of Public Health that administrators at all levels must have developed. Compliance with various executives includes basic, intermediate, and advanced levels. The issue is about the awareness of who is trained.

Suggestions of research findings: (1) The Ministry of Public Health should take this course as a basis for the development of personnel management to move to a higher level. (2) Public health executives can be further developed in various senior management roles. (3) Executives can use this information to consider selecting individuals to move higher or to evaluate the performance for development. (4) Units for the executive development courses can be adapted

to suit with the context and the culture of each organization or guideline development organizations. (5) Agencies and organizations can be used as an impurity in enhancing performance management. Suggestions of a direct connection: (1) Monitoring ROO who were trained in the VSPO. (2) Evaluation of the course in a study group and a control group using experimental research methods. (3) A study of leadership development with a new variety.

It can be confidently concluded that the competency development procedure outlined herein is suitable and can be applied successfully. The format developed by this work can be applied to other virtual offices to enhance their competitiveness and to further develop their human resources.

### **Acknowledgements**

This study was supported and supervised by Sirindhorn College of Public Health, Phisanulok, and The Second Regional Health Service of Ministry of Public Health, Thailand.

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